

ABSTRACT

REITZEL, JORDAN ASHLEY. Essential Frameworks of the Sustainable Textile Products Market. (Under the direction of Dr. Lori Rothenberg and Dr. Marguerite Moore).

The application of sustainability within the textile industry plays a vital role in global improvement towards the consumption of materials, resources and energy (Hon, 2003). Companies are finding that implementing strategies and initiatives to become sustainable is complex and multifaceted. A large part of the problem is that the term “sustainability” has yet to be universally defined. This makes it difficult for companies to bridge this gap in order to assess how their textile businesses can make claims of being “sustainable.” This research utilizes information and procedures companies provided to identify what sustainability means to apparel firms across all levels of the supply chain (raw fiber, manufacturing, retail). In addition, it explores the degree of integration of sustainable practices in all levels of the supply chain.

Respondents indicated that they felt as though the most important aspects to characterize sustainability include: maintaining their company’s profitability, preserving resources and taking care of their employees as well as their surrounding community. Though exact key words were not attached to the definition, the perception of this definition remains practical. Based on the Principal Component Analysis, the most notable practices being implemented with the highest overall means on the implementation scale included [in ascending order of rank]: social efforts (employee healthcare, benefits and working conditions), energy efforts (conservation and effective lighting) and output minimization (packaging reduction, packaging disposal, wastewater treatment and air emissions). By

observing the factor means, the practices deemed as the biggest “strengths” were [in ascending order of rank]: employee care (providing healthcare, benefits and monitoring working conditions), compliance (with local and national regulations), output minimization (wastewater treatment, air emissions and using efficient lighting) and recycling (of unused products, materials within facilities, packaging reduction and proper packaging disposal). Among the factors that emerged, the most notable weaknesses consisted of [in descending order of rank]: research (on customer demand for sustainable products and practices), metrics (use of an internally generated metric and use of an externally generated metric for tracking sustainable efforts), third party certifications (products and processes) and business connections (compliance with international regulations and using green marketing to your business customers).

Based on the results of company interviews and surveys, recommendations are provided for apparel firms seeking entry into the environmentally sustainable textile products market. This research provides an example framework for the apparel (and possibly additional) firms in the textile industry that they could adapt and use to increase their awareness of what it means to be a stakeholder in the sustainable textile product markets and immediately begin to implement these techniques within their own organizations. This results of the study offer new insight into the sustainability performance of the textile industry, as well as discovering which factors are the most significant and where barriers to implementation exist. The end result will provide Institute of Textile Technology (ITT) member companies with valuable market data on sustainability.

Essential Frameworks of the Sustainable
Textile Products Market

by
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BIOGRAPHY

Jordan Reitzel was born and raised in Conover, North Carolina in May of 1987. She is the daughter of Darrell and Sharon Reitzel, and one older sister, Brittini. In May of 2005, she graduated from as Salutatorian from Bunker Hill High School in Claremont, North Carolina. Upon graduation, she moved to Raleigh, North Carolina to continue her education at North Carolina State University's College of Textiles. While at NC State, Jordan was inducted into the Scholar's Program and Phi Psi Textile Fraternity. She held a Sales and Management internship with Buckle in Durham, North Carolina for two years while obtaining her undergraduate degree. In May of 2009, Jordan graduated with a Bachelor of Science in Textile and Apparel Management with a concentration in Brand Management and Marketing and a specialty in Medical Textiles. The following summer, Jordan was accepted into the Institute of Textile Technology's Fellowship program. In the summer of 2010, Jordan interned with the Center for Economically Sustainable Textile and Apparel Businesses. She plans to complete the requirements to graduate in May 2011 with a Master's of Science in Textiles.

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CHAPTER I

INTRODUCTION

With the ever-changing apparel market, few issues have remained at the top of suppliers', manufacturers' and retailers' list of concerns like sustainability. "Avoidance is sweet temptation," but sustainability is one of the largest social awakenings for ample reasons (Rees and Wackernagel, 1996). The ideal outcome is to eventually stop using our planet's resources faster than we can replenish them and further harming the environment for future generations. The application of sustainability within the textile industry plays a vital role in global improvement towards the consumption of materials, resources and energy (Hon, 2003). Not only is sustainability considered a good business practice, but it is becoming a requirement for adhering to government mandated procedures. In addition to the palpable environmental benefits that practicing sustainability provides, it has come to the attention of many companies that using sustainability as a management tool and marketing tactic can bring in many additional benefits, if carried out properly.

There are many underlying concerns regarding being sustainable, but the largest part of the problem for the industry lies in the fact that the term "sustainability" has yet to be universally defined, making it difficult for companies to assess how their textile businesses can make claims of being "sustainable", "environmentally friendly" or "green." Sustainable development, as defined by the World Commission on Environment and Development is "development that meets the needs of the present without compromising the ability of future

generations to meet their own needs” (1987). Sustainability involves economic and social aspects as well as traditional environmental aspects. Sustainability is meant to not only serve the earth, but to encourage companies to work through their supply chain and their own businesses to improve practices and save money, in addition to resources, in the long run. There are factors that can be altered in every step of the supply chain. Though sustainability typically involves an initial investment and research, the advantages are prominent.

At a time when textile companies have to adapt at rapid pace to continue thriving in a global economy, The Institute of Textile Technology in conjunction with the North Carolina State University College of Textiles created a program to facilitate companies in their sustainability efforts. The Council for Economically Sustainable Textile and Apparel Businesses (CESTAB) was launched in 2010 to provide a business in addition to the Institute’s Consortium. CESTAB’s mission is to work with the industry, public, government and academia in educating about current validated sustainability efforts throughout the global textile supply chain, as well as ongoing research and resources to better implement sustainability practices in the industry through its member companies. The Council can also provide resources to textile supply chain participants to reduce redundant activities to offer a more uniform approach regarding sustainability issues and concerns (CESTAB, 2010).

Purpose of Research

The purpose of this research was to utilize resources, information and procedures that companies provide to identify what sustainability means to apparel firms across all levels of the supply chain (fiber, textile, apparel, and retail). In addition, the research attempts to identify currently implemented sustainable practices and document the degree of integration across all levels of the supply chain. Recommendations were provided for firms seeking entry or advancement into the sustainable textile products market. The research outcomes serve to help textiles firms increase their awareness of what it means to be a stakeholder in the sustainable textile products market and immediately begin to implement these techniques as they see fit within their own companies. The research utilized interviews and a survey to collect data on the sustainability practices of companies. The industry interviews focused on organizations which that are recognized as leaders in engaging in sustainability methods. The industry survey research was performed on a large sample of companies who were willing to partake in the study in order to gauge the industry's standpoint as a whole, as well as help those participating organizations assess their company's current sustainability position.

Significance of Study

This study offers new insight into the sustainability performance of the textile industry as a whole, as well as individual companies' efforts. When a company is flourishing partly due to its notable sustainable development programs, it can become a useful model for other businesses and organizations aiming for similar goals. The task of generating or

executing a major shift in any managerial focus is a difficult process. This framework will be informative to the industry as well as beneficial for those starting the process of becoming sustainable in any sector of the industry. Additionally, the encouragement of transparency practices will allow the industry to work together to achieve an overall standard as opposed to remaining solely proprietary. The Presidio Graduate School developed a Sustainability Management Dictionary that defines transparency as a self regulated means of revealing the company's beliefs regarding social standards and "real time results of a business entity's performance through accessible publication of the entity's practices and behavior" (2011). The idea behind the concept is that transparency makes organizations accountable for the actions of their company, employees and affiliates.

Conceptual Definitions

Eco-friendly: an item that does not stimulate unnecessary harm on the environment (Sampson, 2009).

Ecological Footprint: "a resource management tool that measures how much land and water area a human population requires to produce the resources it consumes and to absorb its wastes under prevailing technology" (p.9, Wirtenberger, et. al, 2009). [To put it into perspective – the world's current footprint is 23% bigger than our current renewal ability.]

Economically Sustainable: as an entity strives for environmental and social sustainable development, the acts are financially feasible and beneficial.

Environmentally Sustainable: refers to fiber, fabric or apparel creating the smallest negative ecological impact possible throughout manufacturing, consumption, continuance and final disposal (Chen and Burns, 2006).

Ethical Consumerism: when product purchasers make consumption decisions based on the communicated sustainability features, and not necessarily the products' physical attributes (Hartlieb and Jones, 2009).

Social Sustainable: the concept revolving around maintaining a positive quality of life for individual people and the community as a whole.

Sustainable Development: “development which meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987).

Sustainability Gap: refers to the disparity between the globe's current over-consumption and biological production (Rees and Wackernagel, 1996).

Textile Ecology: the specific impact the textile industry as whole makes on the environment (or can be modified for the ecology of a specific garment).

Triple Bottom Line: measuring a company's success based on social and environmental factors in addition to the traditional economic value; has been modified to measure sustainability in particular (Elkington, 1999).

CHAPTER II

LITERATURE REVIEW

As every day passes, an increasing number of irreplaceable resources are taken from this planet. As referenced in 1972, the Club of Rome, which had been established four years earlier, took its small group of international professionals and published a report regarding the increasing concern about the growing populations' resource consumption. "The Limits to Growth" was developed in conjunction with Massachusetts Institute of Technology scientists to iterate scenarios that were probabilistic for the 21st century based on exponential social and economic growth. Their work produced one of the ground breaking published documents regarding a long-term need for sustainability plans in businesses and implanted a deliberate awareness in decision makers and leaders around the world (The Club of Rome, 2009).

As the issue remained a global issue, it wasn't until the 1987 World Commission on Environment and Development (now renamed Brundtland Commission) that the term 'sustainable development' was given a common definition. It focused on the concept that sustainability was based on human needs more than environmental concerns. The investigation as to whether or not man-made capital could act as an adequate alternative to natural resources was introduced. Five years later, at the United Nations Conference in Rio de Janeiro, the idea of sustainability involving three counterparts was presented. It consisted of social, economic and environmental concerns (WCED, 1987).

Soon after, consumers became aware of the inevitable reality and a major lifestyle change ensued in the 21st century. In 2001, two authors wrote about how people were going to change the world by everyone doing their small part. They lived the ‘Lifestyles of Health and Sustainability’ (LOHAS). The LOHAS lifestyle was formulated from individual consumers who were concerned about the planet’s state of being and wanted it to change, whether it involved sustainability, their health, social justice or other forms of personal enhancement (Chen and Burns, 2006). These LOHAS consumers also transferred these attitudes and concepts into their occupations and organizations, beginning the cultural shift that, as Allen Gant, CEO of Glen Raven, Inc. stated, has caused “sustainability [to] become one of the most pressing issues facing not only the textile industry, but every aspect of our existence” (CESTAB, 2010).

Perceptions

In the time since these foundations were laid, sustainability remains a complex notion to benchmark or define, but it has been adapted as an economic principle for businesses to use. Most importantly, there is no “definitive set of guidelines that a company can utilize to benchmark themselves in regards to their sustainable initiatives” (Woodson, 2010). The notion of sustainability in itself is always shifting to take on another concept. There is an extensive gap between what individuals think should be accomplished in regards to the issue and what organizations can actually readily implement. It is understandable in the sense that most companies have to start and gradually change their practices because most major

changes require a monetary adjustment as well as training, testing, changing procedures, etc. Often, a company believes it is doing its share to take part in the sustainability movement while their outcome has a much smaller impact in the eyes of its stakeholders. According to The Enterprise Sustainability Action Team, only one out of every ten business professionals thought their company was executing a fairly decent sustainability strategy, but one out of four believed their plan was above average compared to similar organizations (Wiretneberget et.al, 2009). Companies are settings goals, which is a positive notion, but often not advancing the correct actions quickly enough (Batterham, 2006). Companies occasionally assume their sustainability plan is a satisfactory one though it does not always agree with the qualities the company stated as essential, proving that this is one subject that always has room for progress regardless of numerous attempts at improvement. It needs to be viewed as a journey, more than a destination. The main take away from the Enterprise Sustainability Action Team's research was that overall, the organizations that reported a defined sustainability action plan (regardless of which issues and qualities they involved) were more inclined to exhibit economic growth. It was also noted that though "correlation is not causation," it does suggest the obvious; there are serious advantages to pursuing sustainable development when these key issues and qualities can be pinpointed (Wiretneberget et.al, 2009).

Evolving Concept of Sustainability

The amount of textile business that has transferred to overseas facilities is prominent. The 2005 lift of all quotas on textiles and apparel solidified this transformation. It was and still is an inevitable change that companies strive to adapt to as the need for textile products increases every year and the U.S. trade deficit continues to rise with it. There is no contesting the fact that there will always be a need for textiles. The question now lies in where and how that textile product is produced. For most companies, the less expensive labor has far exceeded the downfalls of outsourcing, though the environmental aspect often catches the most devastation in the end. Sustainability awareness has become vastly heightened with this major industry shift. Due to it not occurring on our home soil, it was made less noticeable for a short period of time. That time period has ended and textile businesses especially, are under the microscope.

One of the key reasons companies have begun this transition to become more sustainable is not because of the benefit it provides our environment, but the measurable gain companies can achieve from initiative programs. In fact, when ranked, the risk of climate changes only ranked 24th in importance out of 25 sustainability issues (Wiretneberget et.al, 2009). Though it was the foundation of what started the movement almost forty years ago, it is not the single major driver today and this fact is acceptable to all involved as long as the actions are legitimately taken. This is because without the economic sustainability, no other actions can progress.

Defining sustainability requires an integrated approach. Though a basic explanation can be identified, it changes with every industry, business and company. Fundamental aspects will also vary within each organization, but remain similar overall. The following twelve practices were regarded as those used most often when regarding sustainability practices. Each respondent in a survey of over 100 companies in various industries conducted by the American Management Association ranked their companies' involvement in each issue on a 5-point scale, where 1 = not at all and 5 = to a very great extent.

Table 1: American Management Association Survey regarding the top 12 most commonly used sustainability-related practices.

| To what extent does your company have practices in place to do the following? | Mean Responses from AMA (2007) |
|--|---------------------------------------|
| Ensure the health and safety of employees | 4.02 |
| Ensure accountability for ethics at all levels | 3.95 |
| Engage collaboratively with community and nongovernmental groups | 3.47 |
| Support employees in balancing work and life activities | 3.35 |
| Encourage employee volunteerism | 3.29 |
| Involve employees in decisions that affect them | 3.28 |
| Provide employee training and development related to sustainability | 3.26 |
| Reduce waste materials | 3.14 |
| Highlight our commitment to sustainability in our brand | 3.12 |
| Improve energy efficiency | 3.06 |
| Work with suppliers to strengthen sustainability practices | 2.95 |
| Get groups across organization that are working on sustainability-related initiatives to work more closely together | 2.85 |

Source: Wirttenberg, J., Russell, W. G., Lipsky, D., & Enterprise Sustainability Action Team. (2009). The sustainable enterprise fieldbook : When it all comes together. New York; Sheffield UK: Amacom; Greenleaf Pub.

The figures from Table 1 support the idea that some of the more prominent issues are those harder to implement due to a gap between how companies view sustainability and how employees and management act upon those views (Wiretneberget et.al, 2009).

It is not feasible to create one single system to accurately include all levels of sustainability due to its highly subjective and varying nature. However, grouping particular areas of sustainability can be helpful. Dr. Robin Batterham, former Chief Scientist of Australia and current President of Australian Academy of Technological Sciences and Engineering, constructed five levels he thought to be the most important in the hierarchy of sustainability when a company is trying to create a foundation for becoming sustainable. Each level covers a major category that should be recognized (Batterham, 2006).

1. Instill the idea that all of sustainability begins to approach a way to better the environment on a global level. Any harm done by one company affects the entire world, therefore any effort done to improve it will also affect the entire world.
2. All sustainability matters within one industry influence one another, making some developments pre-competitive. It is for the better of the industry as a whole.
3. This level incorporates the individual enterprise. Only individual companies can control their own actions and modify those actions if the need be. It should be the organization's goal to educate and make changes to work towards advancing sustainable growth.

4. After sustainability as an entire concept is grasped, more detailed projects can be started that embrace sustainability in one way or another. All monumental changes happen one step at a time. As a process, job, machine or material becomes outdated; a newer and more sustainable option can easily be put into place.
5. Individual actions are at top of the hierarchy. At the time, they seem to have the smallest impact, but on a large scale, have a significant effect. Individual pertains to each person, employee, work group, consumer, etc. This behavior needs to be encouraged in order to influence its continuance.

This hierarchy is simple, but important. Each level is just as vital as the next. One gap that is consistently found in the industry is companies thinking they should only focus on one particular level or one more than others; the focus should remain on the overall goal and the company will reap the expected and bonus benefits (Batterham, 2006).

Central Plan for Sustainable Strategy

In order for sustainability implementation to be effective, management should support and drive the initiatives all the way through the production process. This needs to be a sincere and notable effort by all employees, executives, suppliers, users, etc. Goals that are articulated to all parties involved allow sustainability to become part of their brand identity (University of Delaware Sustainable Apparel Initiative, 2009). There should be company values intertwined with the new sustainable values, but sustainability should remain the focal

point of importance for all business strategies (Wiretneberget et.al, 2009). Without sustainability, the company is not well established for the future. The major challenge is to create a strategy that does not always look at each task individually, but to begin a holistic view of the strategy (Zink, 2008). If the central strategy is internally communicated, the company and employees will model sustainable development; external communication allows for positive business and customer relationships (University of Delaware Sustainable Apparel Initiative, 2009). A model sustainable enterprise is one that “adopts a long-term collaborative, holistic or systems-oriented mindset” (Wiretneberget et.al, 2009). This ideal enterprise would most likely follow the triple-bottom-line (TBL) strategy.



Figure 1: Triple-bottom-line Sustainability Strategy

Source: Elkington, J. (1999). Cannibals with Forks: Triple Bottom Line of 21st century Business. Oxford, United Kingdom: Capstone Publishing Limited.

The triple-bottom-line was coined by John Elkington and elaborated upon in his 1999 book regarding how becoming sustainable is a win-win situation for every party involved. It referred to the idea that companies can no longer base success on economic values only. It encouraged those involved in organizations to not be “shareholders” just trying to increase capital, but to be “stakeholders” that use their position in the company to project their principles and this was widely accepted when referring to becoming sustainable (Elkington, 1999). Once this mindset is solidified, individual tasks are more easily and successfully executed, as they have all components of the business in mind.

Metrics

Metrics or scorecards are a way to itemize the sustainability practices into various categories under environmental, social and economic categories in order to comprehensively assess where the company stands in comparison to previous measurements or other organizations (Batterham, 2005). They monitor development and are not meant to be seen as a complete sustainability plan. They are simply an efficient means of measuring progress toward sustainable development (Kumar Singh, et. al, 2009). These evaluation procedures have been increasingly becoming a larger part of centrally focused sustainability action plans. They give attestation that practices are being carried out and are advantageous to stakeholders, suppliers and customers. They also act as a valid means of cost and benefit exploration when delving into new initiatives. The current state of metrics includes internal (created for use within one company) and external (produced by an outside source for

multiple users) ones. Often, companies are overwhelmed with information and depending upon the size of the organization, do not have the means to construct their own, but are unsure of the reliability and comprehensiveness of an outside sourced metric. There is no one cumulative metric or scorecard that ranks above the rest. However, recognizing the potential for an indicator that tracks and can circulate companies' development will aid in the completion of a well-organized centrally planned sustainability plan (Chambers, & Lewis, 2001).

Green Marketing

If a company is expending efforts and capital towards the sustainability movement, it is expected that various benefits are produced, including marketing advantages. Research has shown that this type of marketing is progressively more accepted and does not materialize as just a trend. Companies are satisfied with their progress and hope to convey that sense of purpose to customers – in addition, to making them purchase their product over a competitor's. Marketing departments across all industries are seeing this as an opportunity and that “green marketing” has a perceived value. When surveyed, 33% of respondents stated that it was proving to be more effective than their typical marketing efforts, while only 7% claimed it was less effective. (The remainder showed no distinction.) (Environmental Leader, 2009).

The thought that customers (whether it be other businesses or consumers) may not be willing to seek out environmentally sustainable textile products or companies is a viable

concern; and that many practices would prove to be too costly for them to see a major difference in business (Intel, 2009). Even in a low global economy, businesses are seeking sustainable suppliers and supply chains, all in their efforts to maintain the smallest ecological footprint or simply to maintain management and/or government mandated standards. In regards to actual product consumers, NPD Group's Chief Industry Analyst, Marshal Cohen, stated that a mere six percent of consumers were concerned with eco-friendly products (not including food and automobile purchases) in 2006, compared to a rising 21 percent just a few years later, showing that an increasing number of individuals are involving themselves in this cultural trend (Sopelsa, 2008). "Ecologically responsible consumption requires the consumer to have certain practical skills and knowledge," much of which they learn straight off of packaging (Moisander, 2007). The motivation is complex and end users need straight forward information to make informed decisions. Sustainable qualities of a product or process only 'exist' if their presence is publicized to the end user (Hartlieb &, Jones, 2009). In a well established centrally planned sustainability strategy, successful green marketing efforts communicate only accurate and accommodating facts so ethical businesses and consumers can make informed decisions.

Current Environmental Efforts

The environmental portion of the triple-bottom-line is the most recognized factor of sustainability, but also the newest forefront and most widespread. It is only within the last several decades that researchers have examined the environmental aspects of the world's rate of development. Once the facts were clear about the earth's depleting resources, the government intervened. They gradually started pressuring businesses to make changes, up until present day, when changes are compulsory and punishable. Basic recycling, waste minimization, and pollution reduction are secondhand nature to businesses now. It is the major tasks of finding substitutes or replacements for toxic substances and non-renewable resources that are becoming vital to maintain our current way of life (Wimmer, Züst, & Lee, 2004). It is apparent by the quantity of companies working on environmental sustainability initiatives that this is an imperative goal and has caused companies to set standards that they require of all affiliates and branches of their own organization, in addition to the government requirements.

Third Party Certifications

Third party certifications are documentation given by verified external organizations that state a given company has passed a set list of standards in order to maintain an environmentally friendly process or product production. Supporting documentation is necessary in most cases to fully certify a product or process (Woodson, 2010). They are typically done as a voluntary act to ensure validity and government compliance, though they currently surpass most government standards (Wimmer, Züst, & Lee, 2004). Currently, most third party certifications are for the benefit of the supply chain more so than the consumer. The two most notable third party certification organizations are Oeko Tex[®] and Bluesign[®]. Each has different qualification levels that allow it to best fit the particular product or process being qualified. Certifications effectively support sustainability plans and aid in conveying the efforts to the supply chain for improving business morality and public knowledge for green marketing and companies' sustainability mission statement.

Current Environmental Product Design

Applying sustainable technologies to particular areas of the textile supply chain can lead to considerable improvements in the way we consume resources, energy and materials (Hon, 2003). A chief example is the way in which research has proven this is the current state of products being developed. Recycling has always been a staple for certain products, but more recently, the entire production has been taken into account. Cradle to cradle design is McDonough and Braungart's sustainable version of the textile process originally labeled

cradle to grave model, which does not particularly consider what happens to textile products after their usability has run out (University of Delaware Sustainable Apparel Initiative, 2009). In the past, there has been little research done towards the “design for disassembly” that would make the product easily broken down for various reasons such as maintenance or reuse (Gam et. al, 2009). These products typically turn into a large amount of waste that could be downsized drastically if the entire life cycle of the product is designed properly. In order for this to occur, the product life cycle has to be taken into consideration, and assessed as to how it would ecologically affect the environment throughout its life cycle. This can be seen with the Life Cycle Assessment Model, developed by sustainability consultant, M.A. Shaw (2003) that targets the main environmental questions to be asked across all sections of the supply chain.

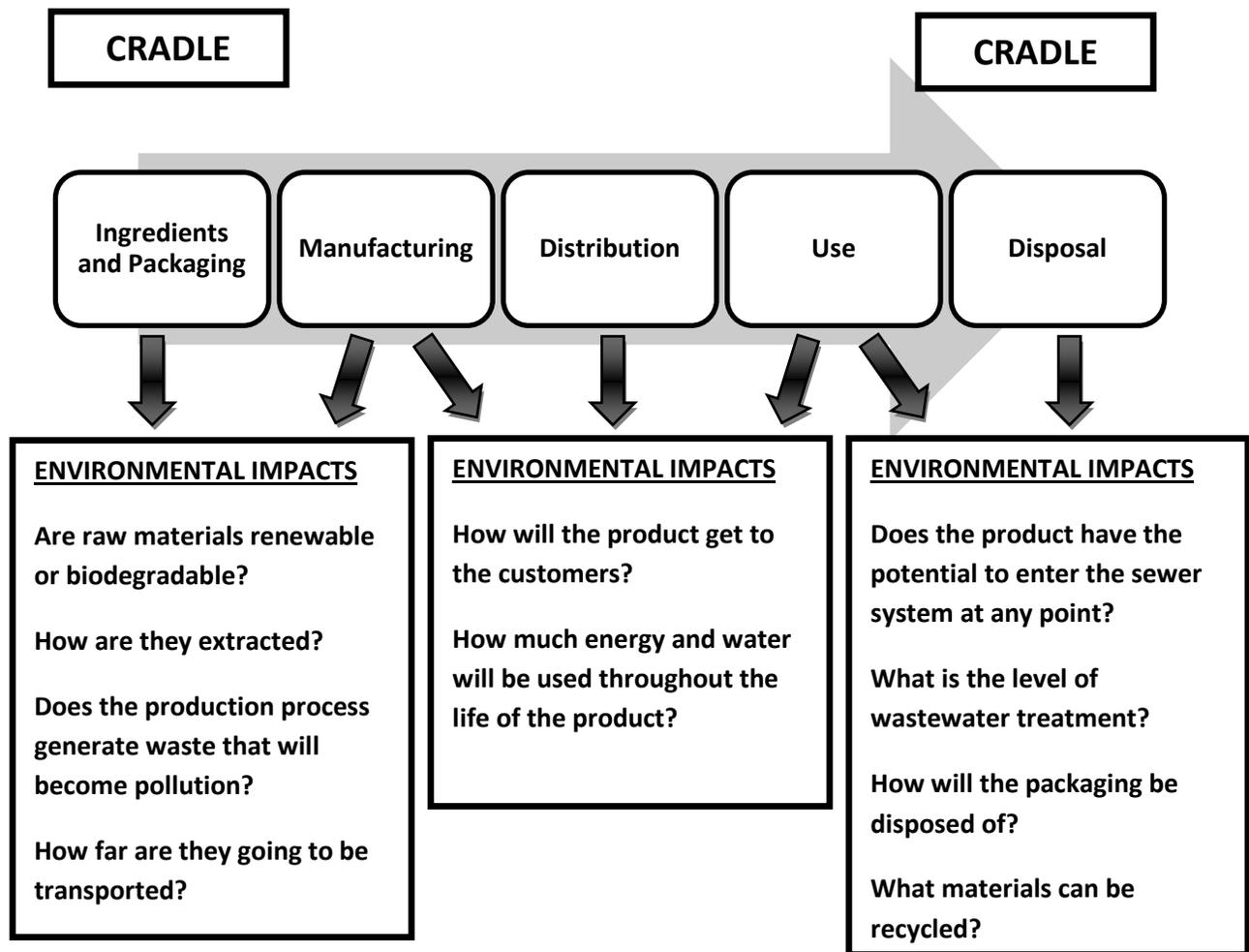


Figure 2: Life Cycle Assessment

Source: Shaw, M. A. (2003). Sustainability Principles for Product Design. In B. Hon (Ed.), Design and Manufacture for Sustainable Development (pp. 69-80). Suffolk, United Kingdom: Professional Engineering Publishing.

Other factors such as style, energy use, potential emissions, packaging and length of life are all taken into account in order to make the most sustainable product possible. The end product will provide “nourishment for something new” whether it is through recycling or

containing materials that can easily biodegrade and cause no additional harm to the surrounding earth. Nike[®], DesignTex[®] and Shaw Industries[®] have used this model successfully in their product lines. When feasible, closed loop manufacturing processes should be utilized in order to come as close to zero waste as possible (Shaw, 2003). Gam *et al.* suggests that the main idea is for the product and development departments to have access to a materials selection list that will properly categorize future hazardous materials and those that would be a “greener” option (2009). This chemical assessment protocol would enable designers to think of sustainability in the beginning phases so no money has to be spent afterward to adjust the products to make them more environmentally friendly. The products can be evaluated prior to production so time and capital is not wasted (Gam et. al, 2009).

Although changing the ecological aspect of the product is often the main focus, the social and economic facets of the product have to be optimized with just as much planning and detail; though they often improve based upon the environmental progress. Employee safety increases with less hazardous chemicals, as does the quality of life for the inhabitants in the city of the facility and consumers of the textile products. Since the cradle to cradle design strategy fosters the idea for products to “cycle safely at the end of [its] life,” the amount of resources utilized will decrease substantially. The economic segment is advanced due to the amount of diminished funds put towards waste disposal, pollution cleanup and product recalls. As previously mentioned, the product would have an improved design making repairs quicker and less costly. Thinking down the road is what makes the cradle to cradle design profitable. A short-term increase in research in development will lead to a

serious competitive advantage in the future, in addition to the environmental facet (Gam et. al, 2009).

Current Societal Efforts

The social segment of sustainability has been occurring since before sustainability became the initiative supporting it. It includes, but is not limited to: community engagement, philanthropy, poverty alleviation, governmental affairs, employee safety, constantly improving benefits and healthcare, workplace diversity and general human rights (Wirtenberg, Russell, & Lipsky, 2009). Societal efforts are vital to the development of sustainability because if the people who are creating our products aren't handled properly, it is difficult to stress the importance of them making adjustments to better their products and practices for the rest of the world. The World Commission on Environment and Development's Brundtland Report called for equal opportunity to occur more throughout the workplace, whether it was on the executive board or in a manufacturing facility (1987). Though work standards are set by each country, it is custom for American companies to abide by American laws even when dealing with facilities in foreign countries. This issue has caused a great deal of discussion over the past few decades as major companies were scrutinized for their inability to abide by these laws.

Social issues are significant to company image and often, these instances have meant serious consequences for the business. Lack of internal investigation and poor sustainability management allowed these occurrences to transpire. Organizations have been formed to specifically monitor social issues all over the world such as the Occupational Safety and

Health Administration (OSHA), the International Labour Organization (ILO), and the Worldwide Responsible Accredited Production (WRAP). Companies striving to remain as socially sustainable as feasible must continually know their restrictions and limitations, in addition to persistently trying to better the situation for their community and employees to maintain that holistic approach to sustainability.

CHAPTER III

METHODOLOGY

The primary purpose of this research is to utilize resources, information and procedures companies will provide to reach the research goals that are provided in Figure 3. For this type of exploratory research, a method called the “bottom-up” approach was used, meaning the initial input is received from companies and the remainder of the research is built upon that basis (Kumar Singh, et. al, 2009). Drawing on the knowledge of the key stakeholders will allow for a greater external validity. Each objective has to be fulfilled in order to substantiate the following objective.



Figure 3: Research Objectives

In order for the final research to act as an example framework, the exploratory research was collected in two phases. Phase I consisted of qualitative interviews. Phase II used qualitative data from Phase I to formulate a quantitative survey for distribution within the textile industry. Jointly, these two instruments provided a basis for recommendations that companies could immediately begin to implement as they see fit within their own organizations.

Development of Phase I: Qualitative Research

In order to obtain an idea of common themes surrounding the sustainability forefront, exploratory industry interviews were organized. These were chosen according to a version of the Delphi method. The Delphi method includes a preliminary panel of participants who assist in developing the next portion of research that is then analyzed. Participants typically remain anonymous or are solely associated with an identifier, so the study remains free of personal bias and facilitates free expression. Their true identities, as also done in this study, are unknown throughout the entire process.

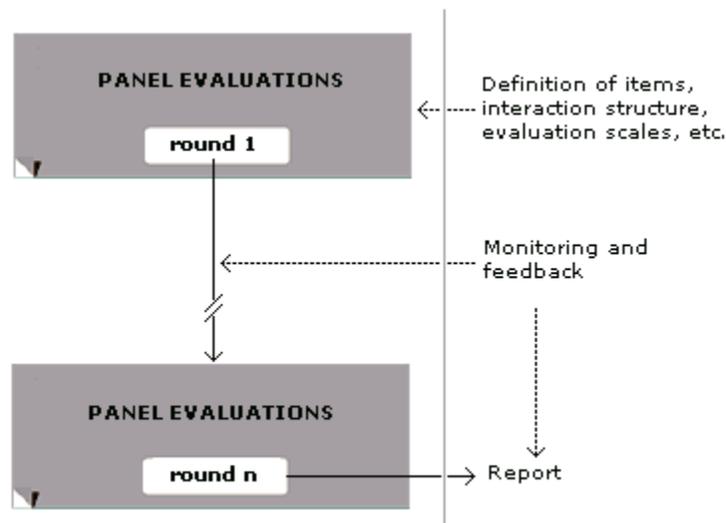


Figure 4: Delphi Method

Source: Rowe and Wright (2001): *Expert Opinions in Forecasting. Role of the Delphi Technique*. In: Armstrong (Ed.): *Principles of Forecasting: A Handbook of Researchers and Practitioners*, Boston: Kluwer Academic Publishers.

The industry interviews focused on organizations which are seen to be successful with their current participation in sustainability initiatives and practices. A protocol was developed (Appendix A) based on North Carolina State University's Institutional Review Board (IRB) that states the step-by-step procedure for the research collection process. This document was submitted to North Carolina State University's governing IRB with all necessary documents attached. Due to the nature of the research, the IRB reviewed the protocol and issued an exemption status for the study (Appendix B).

A contact list was formulated over the course of approximately one year through the Institute of Textile Technology members, conference attendees and colleague associates of potential participants. From this list, four companies were chosen based on experience and availability.

One company was chosen for each textile sector:

- Fiber
- Textile
- Apparel
- Retail

Each company agreed to participate via telephone contact or company visits. The remaining contacts were used for the next phase of the research. The majority of the first round interviews were conducted via telephone and one on-site interview. Each company signed a consent form to participate in the study (Appendix C). Each interviewee was also given background information about the nature of the study attached to the consent form. A series

of open-ended questions were developed as a guideline for the informal interviews (Appendix D). Contingency lists were added to a select number of questions in the event that an interview lacked the necessary depth. Throughout each interview, all questions were asked in addition to some related topics that were brought up during the interviews. Since each company came from a different sector, some issues were found to be more relevant than others, along with topics that had not been foreseen during the interview preparation. Each interview was audio recorded for accurate playback. Brief notes were also taken throughout the meeting. The interviews ranged from roughly thirty to ninety minutes. A transcript of the dialogue from the interviewees who signed consent waivers can be found in Appendix E.

Development of Phase II: Quantitative Research

After Phase I was performed, an addendum was added to the IRB application to continue with the research. The addendum and approval can be found in Appendix F and Appendix G, respectively. An instrument was constructed to survey a wider range of textile companies to determine their level of integration in sustainability practices based on a four point scale (ranging from not important to very important) with a “do not recall” option. In addition, the survey questioned respondent views of how these practices were going based on a separate (strengths and weaknesses) four point scale. Open-ended questions regarding company mission statements and sustainability positions were also integrated. In addition, the survey included basic demographic questions including the participant’s industry sector, company name, position within the company and years of experience in the company/industry. Results such as company name and title were omitted from results to

maintain anonymity. Surveys were distributed via email (Appendix H). In addition to the email requesting participation, a link to the online survey was included for easy access. A full copy of the survey can be found in Appendix I. A total of 75 companies and two sustainability organizations were contacted for participation. Though the majority of businesses were based in North Carolina, location was not a requirement. Many of the companies also have an international presence.

The data collection spanned an eight week time frame. The survey was designed to collect readily available knowledge from each respondent, therefore the survey took only about five to ten minutes to complete. Participation was voluntary and participants were allowed to exit the survey at any time.

Data Analysis

Data analysis was carried out in three stages:

1. The interviews performed in Phase I were transcribed with the assistance of hand-written notes and an audio recording device. The dialogue was analyzed for reappearing themes and concerns. From this, Phase II was developed.
2. The surveys from Phase II were dispensed and collected electronically. They were statistically evaluated using the Principal Components Analysis (PCA) method. This allowed for data reduction to a smaller number of fundamental latent measurements. Rotated factor matrices using the Varimax with Kaiser Normalization method were used. Initial Eigenvalues greater than one and visual depictions such as screeplots

acted as guiding points for selecting underlying factors. With each factor, a reliability test was run based on the number of variables it contained to evaluate internal consistency.

3. Descriptive statistics for each of the extracted factors were compiled for potential relationship comparisons. Recommendations were made from these findings.

CHAPTER IV

RESULTS

The Principal Components Analysis (PCA) method was used to explore the dimensionality for each of the measures. Rotated factor matrices using the Varimax with Kaiser Normalization method were used to reduce the data to the most significant factors. Eigenvalues greater than one and visual depictions such as screeplots acted as the criteria for evaluating the dimensionality of the data and assigning factors. With each factor, a reliability test was run based on the number of variables it contained to ensure validity. For factors containing more than three elements, Cronbach's coefficient alpha tests were run. The factors with coefficient alphas greater than 0.70 were considered reliable (Cronbach, 1949). For the factors comprised of only two elements, bivariate correlations were conducted using the Pearson Correlation method.

Sample Characteristics

The survey sample had 32 total respondents, seven of which were removed due to invalid survey responses and three who declined participation. Two respondents could not answer because they were not an actual for-profit business, but offered to forward the survey to their affiliates. The final analysis included 22 companies. Approximately 77 companies and organizations across the textile industry were contacted for assistance with the survey. The response rate can be seen in Equation 1.

Equation 1: Survey Response Rate

$$\text{Response Rate} = \frac{\text{Number of Responses}}{\text{Number of Eligible Respondents}}$$

The majority of survey respondents (Table 2) were from the textile sector making up over just half of sample population at 54.5%. The apparel and fiber industry followed with 22.7% and 18.2% respectively. The apparel industry only made up 4.5% of the industry, but still has adequate representation due to the fact that several apparel companies could also categorize themselves in the retail sector as well.

Table 2: Company Sector Frequencies

| Company Sector | | | | |
|----------------|-----------|---------|---------------|--------------------|
| | Frequency | Percent | Valid Percent | Cumulative Percent |
| Fiber | 4 | 18.2 | 18.2 | 18.2 |
| Textile | 12 | 54.5 | 54.5 | 72.7 |
| Apparel | 5 | 22.7 | 22.7 | 95.5 |
| Retail | 1 | 4.5 | 4.5 | 100.0 |
| Total | 22 | 100.0 | 100.0 | |

The mean level of years each respondent had been at their current company was 13.22 and the mean level of years each respondent had been working in the textile industry was 21.56 years (Table 3). Some respondents had been in the industry up to a maximum of forty years. This attests to the experience level of the participants.

Table 3: Experience of Respondents

| | N | Minimum | Maximum | Mean | Std. Deviation |
|--------------------------------------|----------|----------------|----------------|-------------|-----------------------|
| Years at Current Company | 18 | 2.00 | 30.00 | 13.22 | 8.00 |
| Years in the Textile Industry | 18 | 2.00 | 40.00 | 21.56 | 9.70 |
| Valid N (listwise) | 18 | | | | |

Specific Sustainable Efforts

The respondents gave definite answers to select questions regarding particular sustainability focused items such as whether or not their company had a publicly known sustainability mission statement: 63.6% answered “yes” and 36.4% responded “no” (Table 4). Out of 14 completed “yes” answers, only 12 were able to automatically articulate their company’s mission statement was. Four respondents noted that their company’s mission statement was still being developed.

Table 4: Mission Statement Frequencies

| Mission Statements | | | | |
|---------------------------|-----------|---------|---------------|--------------------|
| | Frequency | Percent | Valid Percent | Cumulative Percent |
| Yes | 14 | 63.6 | 63.6 | 63.6 |
| No | 8 | 36.4 | 36.4 | 100.0 |
| Total | 22 | 100.0 | 100.0 | |

Next, the respondents gave information as to whether or not their company had created positions specifically for the purpose of sustainability. Out of the 18 companies who answered, over half had jobs solely for the purpose of sustainability (Table 5).

Table 5: Companies with Sustainability-Centered Positions Frequencies

| Sustainability Positions | | | | |
|---------------------------------|-----------|---------|---------------|--------------------|
| | Frequency | Percent | Valid Percent | Cumulative Percent |
| No | 8 | 36.4 | 44.4 | 44.4 |
| Yes | 10 | 45.5 | 55.6 | 100.0 |
| Total | 18 | 81.8 | 100.0 | |
| Missing | 4 | 18.2 | | |
| Total | 22 | 100.0 | | |

A free response question inquiring about the title of the sustainability positions that had been created generated the following examples:

- Manager of Sustainability
- Corporate Director of Sustainability
- Safety, Health & Environment Officer
- Associate Director, Environmental Research
- Officer of Social and Environmental Sustainability
- Textile Quality Supervisor
- Head of Environmental Grants and Materials

Defining Sustainability

When asked which elements were important when their company defined sustainability, five options were available: “not important,” “somewhat important,” “important,” “very important,” and “do not recall.” Variables were based on a four point scale with the “do not recall” option that was set as a missing value. Among the six items in Table 6, the company’s profitability and resource preservation were highly regarded with mean responses of 3.50 and 3.41, respectively. This figure signifies that these items are fairly important to most companies when attempting to dictate an explanation for sustainability. Meanwhile, long term commitment versus short term commitment was the least critical factor on the list with a mean of 3.00.

Table 6: Definition of Sustainability Elements (Q3)

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|----------|----------------|----------------|-------------|-----------------------|
| Company's profitability | 22 | 2.00 | 4.00 | 3.50 | 0.67 |
| Resource preservation | 22 | 1.00 | 4.00 | 3.41 | 0.80 |
| Taking care of employees and the community | 22 | 1.00 | 4.00 | 3.32 | 0.78 |
| Improving the environment | 22 | 1.00 | 4.00 | 3.28 | 0.77 |
| Future generations' needs | 22 | 1.00 | 4.00 | 3.18 | 0.91 |
| Long term commitment vs. short term commitment | 21 | 1.00 | 4.00 | 3.00 | 0.89 |
| Valid N (listwise) | 21 | | | | |

Sustainable Actions Assessment

The next five questions inquired about the degree the company was currently engaging in the listed activities. There were five answer choices offered: “not at all,” “to a slight degree,” “somewhat engaged,” “to a very large degree,” and “I do not know.” The answering system was based on a four point scale with the “I do not know” option being set as a missing value in the analysis. In the management practices section, compliance was ranked the action companies were most engaged in with local, national and international environmental regulations having means of 3.95, 3.86 and 3.65, respectively (Table 7). This

is an anticipated response due to the fact that these are the only mandated activities on the list. Third party certification of products was regarded as the activity companies were currently the least engaged in, due to a mean answer of 2.80 which falls slight below the “somewhat engaged” category.

Table 7: Current Degree of Integration of Management Practices (Q4)

| | N | Minimum | Maximum | Mean | Std. Deviation |
|--|----------|----------------|----------------|-------------|-----------------------|
| Compliance with local environmental regulations | 21 | 3.00 | 4.00 | 3.95 | 0.22 |
| Compliance with national environmental regulations | 21 | 3.00 | 4.00 | 3.86 | 0.36 |
| Compliance with international environmental regulations | 20 | 2.00 | 4.00 | 3.65 | 0.59 |
| Corporate Social Responsibility implementation | 19 | 1.00 | 4.00 | 3.32 | 0.95 |
| Using green marketing to your business customer | 20 | 1.00 | 4.00 | 3.30 | 0.86 |
| Transparency of your processes to your supply chain | 21 | 2.00 | 4.00 | 3.29 | 0.64 |
| Corporate Social Responsibility planning | 19 | 1.00 | 4.00 | 3.21 | 0.98 |
| Third Party certification of your processes | 21 | 1.00 | 4.00 | 3.05 | 0.97 |
| Formal sustainability planning | 21 | 1.00 | 4.00 | 3.05 | 0.97 |
| Using green marketing to your final customer | 20 | 1.00 | 4.00 | 3.00 | 0.92 |
| Transparency of your processes to your consumers | 20 | 1.00 | 4.0 | 2.90 | 0.85 |
| Transparency regarding your processes to the public | 20 | 1.00 | 4.0 | 2.85 | 0.93 |
| Third Party certification of your products | 20 | 1.00 | 4.0 | 2.80 | 1.01 |
| Valid N (listwise) | 19 | | | | |

When asked about the current degree of integration in various operations as seen in Table 8, companies indicated that research on the customer demand for sustainable textile products ranked fairly high with an average rating of 3.00, indicating that companies were somewhat engaged with this activity. The use of internally generated metrics for tracking sustainable efforts also had a mean score of 3.00, which positioned it higher than the use of externally generated metrics (mean: 2.50) that would allow for them to benchmark their efforts with other companies in the industry.

Table 8: Current Degree of Integration of Operation Practices (Q5)

| | N | Minimum | Maximum | Mean | Std. Deviation |
|--|----------|----------------|----------------|-------------|-----------------------|
| Research on customer demand for sustainable textile products | 21 | 1.00 | 4.00 | 3.00 | 1.00 |
| Use of internally generated metric for tracking sustainable efforts | 21 | 1.00 | 4.00 | 3.00 | 1.05 |
| Research on customer demand for sustainable practices | 20 | 1.00 | 4.00 | 2.75 | 0.91 |
| Use of externally generated metric for tracking sustainable efforts | 20 | 1.00 | 4.00 | 2.50 | 1.15 |
| Valid N (listwise) | 20 | | | | |

Product development involving sustainability initiatives was the succeeding topic surveyed. All means for the degree of integration in these activities ranked fairly low compared to the previous questions (Table 9). Life cycle assessment was regarded as the most important with a mean of 2.60, whereas very few companies participated in or offered take back programs for their used products. It had an average rating of 1.90.

Table 9: Current Degree of Integration of Product Development (Q6)

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|----------|----------------|----------------|-------------|-----------------------|
| Life cycle assessment | 20 | 1.00 | 4.00 | 2.60 | 0.99 |
| Engineering for potential reuse of future products | 21 | 1.00 | 4.00 | 2.19 | 0.91 |
| Take back programs for used products | 21 | 1.00 | 4.00 | 1.90 | 1.04 |
| Valid N (listwise) | 20 | | | | |

When asked about waste minimization practices, several items had an elevated mean score. The conservation of electric energy was seen as the most highly implemented practice with a mean of 3.76. Every company that answered the question (N=21) performed this act at least “to a slight degree.” Wasterwater treatment and use of efficient lighting were also highly practiced with averages means of 3.55. As with energy conservation, every company that answered the question (N=20) performed these actions at least “to a slight degree.”

Table 10: Current Degree of Integration of Waste Minimization Practices (Q7)

| | N | Minimum | Maximum | Mean | Std. Deviation |
|--|----------|----------------|----------------|-------------|-----------------------|
| Conservation of electric energy | 21 | 2.00 | 4.00 | 3.76 | 0.70 |
| Wastewater treatment | 20 | 2.00 | 4.00 | 3.55 | 0.76 |
| Use of efficient lighting | 20 | 2.00 | 4.00 | 3.55 | 0.76 |
| Packaging reduction | 21 | 1.00 | 4.00 | 3.43 | 0.93 |
| Packaging disposal | 20 | 1.00 | 4.00 | 3.40 | 0.94 |
| Recycling materials within facilities (eg. boxes) | 21 | 3.00 | 4.00 | 3.39 | 0.36 |
| Air emissions | 20 | 1.00 | 4.00 | 3.35 | 0.88 |
| Use of recycled materials in products | 21 | 1.00 | 4.00 | 2.95 | 0.80 |
| Recycling of unused products | 21 | 1.00 | 4.00 | 2.90 | 1.09 |
| Use of solar energy | 21 | 1.00 | 4.00 | 1.81 | 1.03 |
| Valid N (listwise) | 19 | | | | |

Respondents indicated that providing their employees with proper and adequate benefits was the most implemented practice in their social sustainability efforts (Table 11). Though all items in this category ranked highly, it had the highest average with a score of 3.9, denoting that almost all companies were integrating it “to a very large degree.” Respondents also designated that providing skill enhancement was the least implemented action taken on behalf of internal social practices.

Table 11: Current Degree of Integration of Internal Social Practices (Q8)

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|----------|----------------|----------------|-------------|-----------------------|
| Providing employees with benefits | 21 | 2.00 | 4.00 | 3.90 | 0.44 |
| Monitoring working conditions | 21 | 3.00 | 4.00 | 3.86 | 0.36 |
| Providing employees with healthcare | 21 | 1.00 | 4.00 | 3.76 | 0.77 |
| Providing employees with skill enhancement | 21 | 2.00 | 4.00 | 3.57 | 0.60 |
| Valid N (listwise) | 21 | | | | |

Company Strengths and Weaknesses

Next, survey participants answered five questions about the same practices in identical order, but with the answer choices pertaining as to whether or not it was a strength or weakness of the company's sustainability implementation. Though they may find it an important aspect, it does not necessarily correlate that the item is one of the company's areas of strength. The answer choices for this set of questions were: "strength," "weakness," "neither a strength nor a weakness," and "still being developed." These answers were also arranged into a four point scale for scoring. As seen in Table 12, the biggest strengths companies currently had were compliance with all three levels of government: national, local and international, with means of 2.81, 2.81 and 2.52 respectively. Companies' answers corresponded slightly below considering it a strength. No particular practice earned a high enough score to be considered a strength for the majority of companies. Respondents regarded transparency to the public about their processes as the biggest weakness in the management section. It had a mean rating of 1.90.

Table 12: Strengths and Weaknesses of Management Practices (Q9)

| | N | Minimum | Maximum | Mean | Std. Deviation |
|--|----------|----------------|----------------|-------------|-----------------------|
| Compliance with national environmental regulations | 21 | 1.00 | 3.00 | 2.81 | 0.51 |
| Compliance with local environmental regulations | 21 | 1.00 | 3.00 | 2.81 | 0.51 |
| Compliance with international environmental regulations | 21 | 1.00 | 3.00 | 2.52 | 0.60 |
| Corporate Social Responsibility implementation | 21 | 2.00 | 3.00 | 2.48 | 0.51 |
| Corporate Social Responsibility planning | 20 | 1.00 | 3.00 | 2.45 | 0.61 |
| Third Party certification of your processes | 19 | 1.00 | 3.00 | 2.37 | 0.68 |
| Transparency of processes to your supply chain | 21 | 1.00 | 3.00 | 2.33 | 0.66 |
| Using green marketing to your business customer | 17 | 1.00 | 3.00 | 2.24 | 0.66 |
| Using green marketing to your final customer | 17 | 1.00 | 3.00 | 2.18 | 0.64 |
| Third Party certification of your products | 20 | 1.00 | 3.00 | 2.10 | 0.72 |
| Transparency of your processes to your consumers | 20 | 1.00 | 3.00 | 2.00 | 0.73 |
| Formal sustainability planning | 16 | 1.00 | 3.00 | 2.00 | 0.73 |
| Transparency regarding processes to the public | 21 | 1.00 | 3.00 | 1.90 | 0.62 |
| Valid N (listwise) | 12 | | | | |

When asked about operational strengths and weaknesses, the use of an internally generated metric for tracking sustainable efforts ranked the highest, though it ranked just above “neither a strength nor a weakness” with a mean of 2.11 (Table 13). The use of an externally generated metric for tracking purposes was the most prominent weakness. The mean result of 1.59 signifies that companies struggle with using externally produced metrics. This could be due to the lack of clarity relating to them or the excessive amount that have surfaced in the industry over the last few years.

Table 13: Strengths and Weaknesses of Sustainability Operations (Q10)

| | N | Minimum | Maximum | Mean | Std. Deviation |
|--|----------|----------------|----------------|-------------|-----------------------|
| Use of internally generated metric for tracking sustainable efforts | 18 | 1.00 | 3.00 | 2.11 | 0.90 |
| Research on customer demand for sustainable practices | 19 | 1.00 | 3.00 | 1.95 | 0.91 |
| Research on customer demand for sustainable textile products | 19 | 1.00 | 3.00 | 1.74 | 0.81 |
| Use of externally generated metric for tracking sustainable efforts | 17 | 1.00 | 3.00 | 1.59 | 0.71 |
| Valid N (listwise) | 16 | | | | |

The next question on the survey inquired about companies' opinions of their efforts on incorporating sustainability into their products. Results can be seen in Table 14. In correlation with the importance query, the life cycle assessment ranked at the top of the list with a mean of 1.93, though again, it still did not have an overall average for companies to consider it a weakness. It also had the fewest answers, with only 15 of 22 respondents answering the question. Not ranking far below was the lowest ranked item, engineering for potential reuse with a mean of 1.83.

Table 14: Strengths and Weaknesses of Incorporating Sustainable Products (Q11)

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|----------|----------------|----------------|-------------|-----------------------|
| Life cycle assessment | 15 | 1.00 | 3.00 | 1.93 | 0.70 |
| Take back programs for used products | 17 | 1.00 | 3.00 | 1.88 | 0.60 |
| Engineering for potential reuse of future products | 18 | 1.00 | 3.00 | 1.83 | 0.79 |
| Valid N (listwise) | 13 | | | | |

Among the ten items included under the waste minimization category, recycling materials within the company's facilities and conservation of energy were seen as the biggest company strengths with mean scores of 2.80 and 2.57, respectively (Table 15). These are often very easy to implement, so this response was foreseen. The most notable weakness in the waste

minimization grouping was the use of solar energy (mean: 1.74). The initial expenditure necessary for solar energy could very well be a leading factor for this response. Surprisingly, also at the bottom of the list was using recycled materials in products which had a mean of 2.15.

Table 15: Strengths and Weaknesses of Waste Minimization Practices (Q12)

| | N | Minimum | Maximum | Mean | Std. Deviation |
|--|----------|----------------|----------------|-------------|-----------------------|
| Recycling materials within facilities (eg. boxes) | 20 | 2.00 | 3.00 | 2.80 | 0.41 |
| Conservation of electric energy | 21 | 1.00 | 3.00 | 2.57 | 0.60 |
| Use of efficient lighting | 20 | 1.00 | 3.00 | 2.50 | 0.69 |
| Wastewater treatment | 21 | 1.00 | 3.00 | 2.48 | 0.68 |
| Air emissions | 20 | 1.00 | 3.00 | 2.45 | 0.60 |
| Packaging disposal | 20 | 1.00 | 3.00 | 2.45 | 0.60 |
| Packaging reduction | 19 | 1.00 | 3.00 | 2.26 | 0.73 |
| Recycling of unused products | 17 | 1.00 | 3.00 | 2.18 | 0.73 |
| Use of recycled materials in products | 20 | 1.00 | 3.00 | 2.15 | 0.59 |
| Use of solar energy | 19 | 1.00 | 3.00 | 1.74 | 0.65 |
| Valid N (listwise) | 16 | | | | |

The final question inquired about the level internal social efforts and initiatives were currently taking on within companies. The outcome, as Table 16 depicts, was that maintaining sufficient employee benefits had the highest mean of 2.90. Providing healthcare fell just below that figure, at 2.86. Skill enhancement (as with the implementation scale) came in last of the four areas, with a mean of 2.55.

Table 16: Strengths and Weaknesses of Internal Social Efforts and Initiatives (Q13)

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|----------|----------------|----------------|-------------|-----------------------|
| Providing employees with benefits | 21 | 2.00 | 3.00 | 2.90 | 0.30 |
| Providing employees with healthcare | 21 | 2.00 | 3.00 | 2.86 | 0.36 |
| Monitoring working conditions | 21 | 1.00 | 3.00 | 2.57 | 0.60 |
| Providing employees with skill enhancement | 20 | 1.00 | 3.00 | 2.55 | 0.60 |
| Valid N (listwise) | 20 | | | | |

Principal Components Analysis, Factor Analysis and Reliability

The Principal Components Analysis (PCA) method was used to explore the magnitude of dimensionality for each of the two main sections: sustainable actions and strengths and weaknesses. Rotated factor matrices using the Varimax with Kaiser Normalization method were used to reduce the data to the most associated factors.

Eigenvalues greater than one were considered notable factors. A total of 18 factors emerged from the factor analysis. Two questions were disaggregated and had no underlying dimensionality.

PCA determined two dimensions were found in question three (determining important sustainability definition attributes) which accounted for 78.70% of the cumulative variance (Table 17). Factors were evaluated for cross loadings. Long term versus short term commitments (3F) was found to be excessively cross loading, therefore it was dropped out of further analysis (Table 18). The final factor solution yielded: Preservation and Improvement (3A, 3B, 3C), and Company Views (3D, 3E). Cronbach's coefficient alpha (Table 19) was used to determine scale reliability for factor one containing greater than two items ($\alpha = 0.884$). Pearson's bivariate correlation ($\rho 0.499, p < 0.05$) was conducted on the factor with two items to confirm internal consistency for the study (Table 20). Significant correlation was reported for both.

Table 17: Total Variance Explained (Q3)

| Component | Initial Eigenvalues | | | Rotation Sums of Squared Loadings | | |
|-----------|---------------------|---------------|--------------|-----------------------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 3.691 | 61.521 | 61.521 | 2.701 | 45.010 | 45.010 |
| 2 | 1.030 | 17.170 | 78.692 | 2.021 | 33.682 | 78.692 |

Table 18: Rotated Component Matrix (Q3)

| | Component | |
|-----------------------------|-----------|------|
| | 1 | 2 |
| Future generations' needs | .933 | .086 |
| Resource preservation | .867 | .287 |
| Improve the environment | .820 | .349 |
| Company profitability | .075 | .867 |
| Employee and community care | .316 | .803 |
| Long term vs. short term | .548 | .642 |

Table 19: Reliability Statistics (Q3)

| Cronbach's Alpha | N of Items |
|------------------|------------|
| .884 | 3 |

Table 20: Correlation (Q3)

| | | Company's profitability | Employee and community care |
|-----------------------------|---------------------|-------------------------|-----------------------------|
| Company's profitability | Pearson Correlation | 1 | .499* |
| | Sig. (2-tailed) | | .018 |
| | N | 22 | 22 |
| Employee and community care | Pearson Correlation | .499* | 1 |
| | Sig. (2-tailed) | .018 | |
| | N | 22 | 22 |

*. Correlation is significant at the 0.05 level (2-tailed).

PCA determined four dimensions were found in question four (regarding the implementation of sustainable management activities) which accounted for 81.79% of the cumulative variance (Table 21). Factors were evaluated for cross loadings. Four items were eliminated from the original scale due to excessive cross loading: local compliance (4D), formal sustainability planning (4A), national compliance (4E), international compliance (4F) and transparency of processes to the supply chain (4J) (Table 22). The final factor solution yielded: Green Marketing (4G, 4H), Third Party Certifications (4L, 4M), Transparency (4I, 4K) and Corporate Social Responsibility [CSR] (4B, 4C). Pearson’s bivariate correlation was conducted on the four factors to confirm internal consistency for the study (Table 23). Significant correlation was reported in all cases (ρ 0.862, $p < 0.01$), (ρ 0.947, $p < 0.01$), (ρ 0.699, $p < 0.01$), (ρ 0.840, $p < 0.01$).

Table 21: Total Variance Explained (Q4)

| Component | Initial Eigenvalues | | | Rotation Sums of Squared Loadings | | |
|-----------|---------------------|---------------|--------------|-----------------------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 3.657 | 28.129 | 28.129 | 2.991 | 23.006 | 23.006 |
| 2 | 2.679 | 20.606 | 48.735 | 2.690 | 20.695 | 43.701 |
| 3 | 2.319 | 17.835 | 66.570 | 2.535 | 19.500 | 63.201 |
| 4 | 1.978 | 15.219 | 81.790 | 2.416 | 18.588 | 81.790 |

Table 22: Rotated Component Matrix (Q4)

| | Component | | | |
|--|-----------|-------|-------|-------|
| | 1 | 2 | 3 | 4 |
| Green marketing to businesses | .964 | .107 | -.030 | .052 |
| Green marketing to consumers | .864 | .147 | .168 | .059 |
| Local compliance | .736 | -.240 | .399 | -.024 |
| National compliance | .587 | -.463 | .194 | .406 |
| CSR planning | -.006 | .959 | .028 | .163 |
| CSR implementation | -.013 | .956 | .086 | .073 |
| Formal sustainability planning | .591 | .662 | -.102 | -.231 |
| Third party certification of processes | .025 | -.108 | .886 | .052 |
| Third party certification of products | .173 | -.047 | .830 | .029 |
| International compliance | .156 | .281 | .817 | .025 |
| Transparency to the public | .040 | .057 | .106 | .913 |
| Transparency to your customers | -.076 | .123 | .243 | .896 |
| Transparency to your supply chain | .132 | -.038 | -.279 | .721 |

Table 23: Correlations (Q4)

| | | Green marketing to businesses | Green marketing to consumers |
|--|---------------------|--|---------------------------------------|
| Green marketing to businesses | Pearson Correlation | 1 | .862** |
| | Sig. (2-tailed) | | .000 |
| | N | 20 | 20 |
| Green marketing to consumers | Pearson Correlation | .862** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 20 | 20 |
| | | CSR planning | CSR implementation |
| CSR planning | Pearson Correlation | 1 | .947** |
| | Sig. (2-tailed) | | .000 |
| | N | 19 | 19 |
| CSR implementation | Pearson Correlation | .947** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 19 | 19 |
| | | Third party certification of processes | Third party certification of products |
| Third party certification of processes | Pearson Correlation | 1 | .699** |
| | Sig. (2-tailed) | | .001 |
| | N | 21 | 20 |
| Third party certification of products | Pearson Correlation | .699** | 1 |
| | Sig. (2-tailed) | .001 | |
| | N | 20 | 20 |
| | | Transparency to the public | Transparency to customers |
| Transparency to the public | Pearson Correlation | 1 | .840** |
| | Sig. (2-tailed) | | .000 |
| | N | 20 | 20 |
| Transparency to your customers | Pearson Correlation | .840** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 20 | 20 |

** . Correlation is significant at the 0.01 level (2-tailed).

PCA determined two dimensions were found in question five (regarding the implementation of sustainable operational activities) which accounted for 85.31% of the cumulative variance (Table 24). Factors were evaluated for cross loadings. No items were found to be excessively cross loading; therefore all dimensions were kept for further analysis (Table 25). The final factor solution yielded: Research (5A, 5B), and Metrics (5D, 5E). Pearson's bivariate correlation was conducted on the items within the two factors to confirm internal consistency for the study. Due to a negative correlation, the factor concerning metrics was dropped from the final factor solution (Table 26) and the factor concerning research was significantly correlated (ρ 0.912, $p < 0.00$) (Table 27).

Table 24: Total Variance Explained (Q5)

| Component | Initial Eigenvalues | | | Rotation Sums of Squared Loadings | | |
|-----------|---------------------|---------------|--------------|-----------------------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 2.008 | 50.202 | 50.202 | 1.991 | 49.768 | 49.768 |
| 2 | 1.404 | 35.109 | 85.311 | 1.422 | 35.543 | 85.311 |

Table 25: Rotated Component Matrix (Q5)

| | Component | |
|---|-----------|-------|
| | 1 | 2 |
| Research on customer demand for sustainable practices | .971 | .088 |
| Research on customer demand for sustainable products | .970 | -.037 |
| Use of internally generated metric for tracking | -.194 | .857 |
| Use of externally generated metric for tracking | .264 | .824 |

Table 26: Correlations (Q5)

| | | Internally generated metric | Externally generated metric |
|-----------------------------|---------------------|-----------------------------|-----------------------------|
| Internally generated metric | Pearson Correlation | 1 | .415 |
| | Sig. (2-tailed) | | .069 |
| | N | 21 | 20 |
| Externally generated metric | Pearson Correlation | .415 | 1 |
| | Sig. (2-tailed) | .069 | |
| | N | 20 | 20 |

**. Correlation is significant at the 0.01 level (2-tailed).

Table 27: Correlations (Q5)

| | | Research on customer demand for sustainable practices | Research on customer demand for sustainable products |
|---|---------------------|---|--|
| Research on customer demand for sustainable practices | Pearson Correlation | 1 | .912** |
| | Sig. (2-tailed) | | .000 |
| | N | 21 | 20 |
| Research on customer demand for sustainable products | Pearson Correlation | .912** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 20 | 20 |

** . Correlation is significant at the 0.01 level (2-tailed).

PCA determined only one dimension was found in question six (regarding the implementation of sustainable product enhancement) which accounted for 45.85% of the cumulative variance (Table 28). This figure is not significant enough to substantiate creating an underlying factor for the final solution. These factors were considered disaggregated.

Table 28: Total Variance Explained (Q6)

| Component | Initial Eigenvalues | | |
|-----------|---------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % |
| 1 | 1.376 | 45.852 | 45.852 |

PCA determined three dimensions were found in question seven (regarding the implementation of waste minimization practices) which accounted for 73.99% of the cumulative variance (Table 29). Factors were evaluated for cross loadings. Four items were eliminated from the original scale due to excessive cross loading: recycling of unused products (7A), recycling materials within facilities (7B), using recycled materials in products (7C) and use of solar energy (7H) (Table 30). The final factor solution yielded: Output Minimization (7D, 7E, 7F, 7G) and Energy Conservation (7I, 7J). Cronbach's coefficient alpha was used to determine scale reliability for factor one containing greater than two items ($\alpha = 0.896$). Pearson's bivariate correlation was used for evaluation of the second factor ($\rho = 0.948, p < 0.01$). There was significant correlation in both cases (Tables 31, 32).

Table 29: Total Variance Explained (Q7)

| Component | Initial Eigenvalues | | | Rotation Sums of Squared Loadings | | |
|-----------|---------------------|---------------|--------------|-----------------------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 4.629 | 46.293 | 46.293 | 3.418 | 34.185 | 34.185 |
| 2 | 1.488 | 14.881 | 61.174 | 2.330 | 23.305 | 57.489 |
| 3 | 1.281 | 12.813 | 73.988 | 1.650 | 16.498 | 73.988 |

Table 30: Rotated Component Matrix (Q7)

| | Component | | |
|---------------------------------------|-----------|------|-------|
| | 1 | 2 | 3 |
| Packaging reduction | .891 | .267 | .017 |
| Packaging disposal | .858 | .284 | .190 |
| Air emission | .827 | .155 | -.093 |
| Wastewater treatment | .728 | .163 | .365 |
| Using recycled materials in products | .701 | .093 | .392 |
| Use of efficient lighting | .141 | .923 | .014 |
| Conservation of electric energy | .263 | .917 | .044 |
| Recycling unused products | .206 | .636 | .235 |
| Recycling materials within facilities | .009 | .142 | .850 |
| Use of solar energy | .227 | .042 | .734 |

Table 31: Reliability Statistics (Q7)

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|------------------|---|------------|
| .896 | .896 | 4 |

Table 32: Correlations (Q7)

| | | Lighting | Conservation |
|---------------------------------|---------------------|----------|--------------|
| Use of efficient lighting | Pearson Correlation | 1 | .948** |
| | Sig. (2-tailed) | | .000 |
| | N | 20 | 20 |
| Conservation of electric energy | Pearson Correlation | .948** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 20 | 21 |

** . Correlation is significant at the 0.01 level (2-tailed).

PCA determined one dimension was found in question eight (regarding the implementation of social efforts and initiatives) which accounted for 61.16% of the cumulative variance (Table 33). For exploratory purposes, the factor concerning skill enhancement (8C) did not appear to be loading with the other variables. It was removed for further reliability testing. Cronbach's coefficient alpha was used to determine scale reliability for the factor containing the remaining three items ($\alpha = 0.767$). There was significant correlation. The final factor solution yielded: social efforts (8A, 8B, 8D) (Table 34).

Table 33: Total Variance Explained (Q8)

| Component | Initial Eigenvalues | | |
|-----------|---------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % |
| 1 | 2.446 | 61.160 | 61.160 |
| 2 | .818 | 20.451 | 81.612 |
| 3 | .520 | 13.010 | 94.622 |
| 4 | .215 | 5.378 | 100.000 |

Table 34: Reliability Statistics (Q8)

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|------------------|--|------------|
| .767 | .829 | 3 |

PCA determined four dimensions were found in question nine (regarding the strengths and weaknesses of sustainable management activities) which accounted for 86.17% of the cumulative variance (Table 35). Factors were evaluated for cross loadings. Three items were eliminated from the original scale due to excessive cross loading: transparency of processes to customers (9I), transparency of processes to supply chain (9J), and transparency of processes to the public (9K) (Table 36). When reliability tests were ran, CSR Strategy Strength & Weakness [S&W] (9A, 9B, 9C, 9H) had a negative Cronbach's coefficient alpha ($\alpha = -0.239$) determining that the factor did not have enough scale reliability to be considered

in the final factor solution (Table 37). The items were regarded as disaggregated. The final factor solution yielded: Compliance S&W (9D, 9E), Third Party Certifications S&W (9L, 9M) and Business Connections S&W (9F, 9G). Pearson's bivariate correlation was used for evaluation of consistency for the remaining factors (ρ 1.000, $p < 0.01$, ρ 0.649, $p < 0.01$, ρ - 0.319, $p < 0.01$, respectively). There was significant correlation in all cases (Table 38).

Table 35: Total Variance Explained (Q9)

| Component | Initial Eigenvalues | | | Rotation Sums of Squared Loadings | | |
|-----------|---------------------|---------------|--------------|-----------------------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 4.608 | 35.450 | 35.450 | 3.322 | 25.556 | 25.556 |
| 2 | 2.960 | 22.766 | 58.215 | 2.971 | 22.855 | 48.411 |
| 3 | 2.617 | 20.132 | 78.347 | 2.914 | 22.413 | 70.824 |
| 4 | 1.017 | 7.822 | 86.169 | 1.995 | 15.345 | 86.169 |

Table 36: Rotated Component Matrix (Q9)

| | Component | | | |
|---|-----------|-------|-------|-------|
| | 1 | 2 | 3 | 4 |
| CSR implementation S&W | .959 | .117 | -.016 | .061 |
| CSR planning S&W | .867 | -.429 | -.051 | .169 |
| Green marketing to final customer S&W | -.693 | -.325 | -.390 | .221 |
| Formal sustainability planning S&W | .641 | .297 | -.134 | -.320 |
| National compliance S&W | .090 | .964 | .063 | -.197 |
| Local compliance S&W | .090 | .964 | .063 | -.197 |
| Third party certifications of processes S&W | -.043 | .080 | .885 | -.067 |
| Third party certifications of products S&W | .373 | .251 | .775 | -.273 |
| Transparency of processes to customers S&W | -.339 | -.372 | .755 | .285 |
| Transparency of processes to supply chain S&W | .478 | .229 | .594 | .504 |
| Transparency of processes to the public S&W | -.475 | -.488 | .528 | .335 |
| Green marketing to business customers S&W | -.149 | -.268 | .079 | .919 |
| International compliance S&W | -.099 | .391 | .375 | -.602 |

Table 37: Reliability Statistics (Q9)

| Cronbach's Alpha | N of Items |
|------------------|------------|
| -.239 | 4 |

Table 38: Correlations (Q9)

| | | Local compliance | National compliance |
|---|---------------------|---|--|
| Local compliance | Pearson Correlation | 1 | 1.000** |
| | Sig. (2-tailed) | | .000 |
| | N | 21 | 21 |
| National compliance | Pearson Correlation | 1.000** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 21 | 21 |
| | | | |
| | | Third party certifications of processes | Third party certifications of products |
| Third party certifications of processes | Pearson Correlation | 1 | .649** |
| | Sig. (2-tailed) | | .003 |
| | N | 19 | 19 |
| Third party certifications of products | Pearson Correlation | .649** | 1 |
| | Sig. (2-tailed) | .003 | |
| | N | 19 | 20 |
| | | | |
| | | International compliance | Green marketing to business customers |
| International compliance | Pearson Correlation | 1 | -.319 |
| | Sig. (2-tailed) | | .212 |
| | N | 21 | 17 |
| Green marketing to business customers | Pearson Correlation | -.319 | 1 |
| | Sig. (2-tailed) | .212 | |
| | N | 17 | 17 |

** . Correlation is significant at the 001 level. (2-tailed).

PCA determined two dimensions were found in question ten (regarding the strengths and weaknesses of operational activities) which accounted for 82.89% of the cumulative variance (Table 39). Factors were evaluated for cross loadings. No items were found to be excessively cross loading; therefore all dimensions were kept for further analysis (Table 40). The final factor solution yielded: Research S&W (10A, 10B), and Metrics (10C, 10D). Pearson's bivariate correlation was conducted on the two factors to confirm internal consistency for the study (Table 41). Significant correlation was reported in both instances (ρ 0.726, $p < 0.01$ and ρ 0.585, $p < 0.01$, respectively).

Table 39: Total Variances Explained (Q10)

| Component | Initial Eigenvalues | | | Rotation Sums of Squared Loadings | | |
|-----------|---------------------|---------------|--------------|-----------------------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 1.932 | 48.289 | 48.289 | 1.779 | 44.477 | 44.477 |
| 2 | 1.384 | 34.596 | 82.885 | 1.536 | 38.408 | 82.885 |

Table 40: Rotated Component Matrix (Q10)

| | Component | |
|--|-----------|------|
| | 1 | 2 |
| Use of an externally generated metric S&W | .941 | .051 |
| Use of an internally generated metric S&W | .904 | .077 |
| Research on demand for sustainable practices S&W | -.102 | .902 |
| Research on demand for sustainable products S&W | .260 | .845 |

Table 41: Correlations (Q10)

| | | Use of an internally generated metric | Use of an externally generated metric |
|--|---------------------|--|---|
| Use of an internally generated metric | Pearson Correlation | 1 | .726** |
| | Sig. (2-tailed) | | .001 |
| | N | 18 | 16 |
| Use of an externally generated metric | Pearson Correlation | .726** | 1 |
| | Sig. (2-tailed) | .001 | |
| | N | 16 | 17 |
| | | | |
| | | Research on demand for sustainable practices | Research on demand for sustainable products |
| Research on demand for sustainable practices | Pearson Correlation | 1 | .585** |
| | Sig. (2-tailed) | | .008 |
| | N | 19 | 19 |
| Research on demand for sustainable products | Pearson Correlation | .585** | 1 |
| | Sig. (2-tailed) | .008 | |
| | N | 19 | 19 |

** . Correlation is significant at the 001 level. (2-tailed).

PCA determined only one dimension was found in question eleven (regarding the strengths and weaknesses product enhancement) which accounted for 53.99% of the cumulative variance (Table 42). This figure is not significant enough to substantiate creating an underlying factor for the final solution. These factors were considered disaggregated.

Table 42: Total Variance Explained (Q11)

| Component | Initial Eigenvalues | | |
|-----------|---------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % |
| 1 | 1.620 | 53.988 | 53.988 |

PCA determined three dimensions were found in question twelve (regarding the strengths and weaknesses of waste minimization practices) which accounted for 74.38% of the cumulative variance (Table 43). Factors were evaluated for cross loadings. Two items were eliminated from the original scale due to excessive cross loading: use of solar energy (12H) and conservation of electric energy (12I). The third factor (12C) was also eliminated from the final factor solution due to it being trivial (Table 44). The final factor solution yielded: Output Minimization S&W (12F, 12G, 12J) and Recycling S&W (12A, 12B, 12D, 12E). Cronbach's coefficient alpha was used to determine scale reliability for the factors ($\alpha = 0.842$ and $\alpha = 0.806$, respectively). There was significant correlation in both cases (Tables 45, 46).

Table 43: Total Variance Explained (Q12)

| Component | Initial Eigenvalues | | | Rotation Sums of Squared Loadings | | |
|-----------|---------------------|---------------|--------------|-----------------------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 4.601 | 46.010 | 46.010 | 3.397 | 33.972 | 33.972 |
| 2 | 1.741 | 17.413 | 63.423 | 2.853 | 28.531 | 62.503 |
| 3 | 1.095 | 10.952 | 74.375 | 1.187 | 11.873 | 74.375 |

Table 44: Rotated Component Matrix (Q12)

| | Component | | |
|--|-----------|-------|-------|
| | 1 | 2 | 3 |
| Air emissions S&W | .942 | .157 | -.045 |
| Wastewater treatment S&W | .843 | .146 | .003 |
| Use of efficient lighting S&W | .816 | .350 | .112 |
| Conservation of electric energy S&W | .789 | .503 | .064 |
| Use of solar energy S&W | .622 | -.140 | .494 |
| Packaging disposal S&W | .090 | .874 | .268 |
| Packaging reduction S&W | .191 | .780 | -.160 |
| Recycling unused products S&W | .108 | .729 | .139 |
| Recycling within facilities S&W | .261 | .693 | -.001 |
| Using recycled materials in products S&W | .017 | .169 | .899 |

Table 45: Reliability Statistics (Q12)

| Cronbach's Alpha | N of Items |
|------------------|------------|
| .842 | 3 |

Table 46: Reliability Statistics (Q12)

| | |
|------------------|------------|
| Cronbach's Alpha | N of Items |
| .806 | 4 |

PCA determined two dimensions were found in question thirteen (regarding the strengths and weaknesses of social efforts and initiatives) which accounted for 85.63% of the cumulative variance (Table 47). Factors were evaluated for cross loadings. One item was eliminated from the original scale due to excessive cross loading: monitoring working conditions (13D). The second factor (13C) was also eliminated from the final factor solution due to it being trivial (Table 48). The final factor solution yielded: employee care S&W (13A, 13B). Pearson's bivariate correlation was used for internal consistency evaluation ($\rho = 0.795, p < 0.01$) (Table 49).

Table 47: Total Variance Explained (Q13)

| Component | Initial Eigenvalues | | | Rotation Sums of Squared Loadings | | |
|-----------|---------------------|---------------|--------------|-----------------------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 2.205 | 55.118 | 55.118 | 2.070 | 51.762 | 51.762 |
| 2 | 1.220 | 30.509 | 85.627 | 1.355 | 33.866 | 85.627 |
| 3 | .517 | 12.930 | 98.558 | | | |
| 4 | .058 | 1.442 | 100.000 | | | |

Table 48: Rotated Component Matrix (Q13)

| | Component | |
|--|-----------|-------|
| | 1 | 2 |
| Providing employees with healthcare S&W | .976 | .069 |
| Providing employees with benefits S&W | .886 | -.007 |
| Providing employees with skill enhancement S&W | -.123 | .932 |
| Monitoring work conditions S&W | .563 | .694 |

Table 49: Correlations (Q13)

| | | Providing employees with healthcare | Providing employees with benefits |
|-------------------------------------|---------------------|-------------------------------------|-----------------------------------|
| Providing employees with healthcare | Pearson Correlation | 1 | .795** |
| | Sig. (2-tailed) | | .000 |
| | N | 21 | 21 |
| Providing employees with benefits | Pearson Correlation | .795** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 21 | 21 |

** . Correlation is significant at the 0.01 level (2-tailed).

The Principal Component Analysis yielded 18 underlying factors from the survey distributed. The number of items within each factor ranges from two to four components which can be seen in Table 50. The factors are in order of descending means.

Table 50: Final Factor Descriptive Statistics Sorted by Means

| Factor | Items | Mean | Std. Deviation |
|---------------------------------|--------------------|-------------|-----------------------|
| Social efforts | 8A, 8B, 8D | 3.84 | 0.46 |
| Energy | 7I, 7J | 3.63 | 0.69 |
| Company views | 3D, 3E | 3.41 | 0.63 |
| Output minimization | 7D, 7E, 7F, 7G | 3.41 | 0.78 |
| Preservation and improvement | 3A, 3B, 3C | 3.29 | 0.74 |
| Corporate Social Responsibility | 4B, 4C | 3.26 | 0.95 |
| Green marketing | 4G, 4H | 3.15 | 0.86 |
| Third party certifications | 4L, 4M | 2.90 | 0.91 |
| Transparency | 4I, 4K | 2.88 | 0.86 |
| Employee care S&W | 13A, 13B, 13D | 2.88 | 0.31 |
| Research | 5A, 5B | 2.85 | 0.93 |
| Compliance S&W | 9D, 9E | 2.81 | 0.51 |
| Output minimization S&W | 12F, 12G, 12J | 2.47 | 0.58 |
| Recycling S&W | 12A, 12B, 12D, 12E | 2.44 | 0.52 |
| Business connections S&W | 9F, 9G | 2.38 | 0.38 |
| Third party certifications S&W | 9L, 9M | 2.21 | 0.63 |
| Metric S&W | 10C, 10D | 1.84 | 0.77 |
| Research S&W | 10A, 10B | 1.81 | 0.75 |

CHAPTER V

CONCLUSIONS, IMPLICATIONS, LIMITATIONS AND RECOMMENDATIONS

Conclusions and Implications

The purpose of this research was to utilize the resources, information and procedures companies provided to (1) identify what sustainability means to apparel firms across all levels of the supply chain (fiber, textile, apparel, and retail). In addition, the purpose was to (2) identify the currently implemented sustainable practices and (3) document the degree of integration across all levels of the supply chain and (4) To provide recommendations for firms seeking entry or advancement into the sustainable textile products market. The study results can act as an example framework within the textile industry that other firms could adapt and use to increase their awareness of what it means to be a stakeholder in the sustainable textile products market and immediately begin to implement these techniques as they see fit within their own companies.

The industry interviews conducted focused on those organizations which are seen to be affluent with engaging in sustainability methods. Their feedback represented one of each type of FTAR company and was constructed in an open format that led to beneficial information. These interviews assisted in pinpointing particular areas of interest to the textile industry and in the formation of the industry survey.

The industry survey research was performed on a large sample of companies who were willing to partake in order to gauge the industry's standpoint as a whole as well as

helping those participating organizations assess their company's current sustainability situation. All sectors of FTAR were represented in this study, with a 29.87% response rate. The textile sector was most heavily represented (54.5%) followed by the apparel sector (22.7%), the fiber sector (18.2%) and the retail sector (4.5%). Therefore the sustainability views and practices of textile and apparel companies are more heavily represented in the study's results. Of the respondents, the experience and expertise were substantial enough to ensure adequate knowledge for participating in the study. The surveys helped in answering specific research objectives of this study. Through these data collection processes, research methodologies were identified. From the scaled numerical survey data, a Principal Component Analysis was performed to expose recurring commonalities among the questions. Implications are suggested based upon the findings of the study.

RO1: Identify what sustainability means to apparel firms across all levels of the supply chain (fiber, textile, apparel, and retail).

Through data collection from the interviews with industry personnel and the questionnaire, a basic notion of a sustainability definition and concepts was developed. Observing the means of the data collected from question three of the survey (Table 6) and utilizing the factor means from the Principal Component Analysis (Table 50), contributing factors to a potential definition were identified. Respondents indicated that they felt as though the most important aspects to characterize sustainability include: maintaining their company's profitability, preserving resources and taking care of their employees as well as their surrounding community. Though exact key words were not attached to the definition,

the perception of this definition remains practical. How the particular company views sustainability is highly based upon the individual company, as expressed by one of the emerging factors (Table 50), which included all company outlook components (the company's profitability and how they care for employees as well as the community).

Several questions were asked to evaluate specific firm efforts to institute sustainability practices. Respondents were asked whether their company had a sustainability mission statement and whether or not they could recall this statement. A large percentage indicated that they had a sustainability mission statement (63.6%) and many of these respondents (54.5%) were able to directly recall this mission statement. In addition, companies were asked to indicate whether they have a designated position for sustainability efforts. Only 45% of companies signified that they have permanent human resources allocated to sustainability.

Based upon the general definition of sustainability, companies in the sample indicated a generic social responsibility perception of the concept rather than as a direction for business planning and competitive advantage. Though many companies are able to recite a sustainability mission statement, considerably fewer are putting actual resources in place to carry out sustainability efforts within their organization.

RO2: Identify the current practices being implemented across the FTAR supply chain.

Based on the Principal Component Analysis, the most notable practices being implemented with the highest overall means (Table 50) placing them just below the 'to a very large degree' on the implementation scale included [in ascending order of rank]:

- Social efforts (employee healthcare, benefits and working conditions)
- Energy efforts (conservation and effective lighting)
- Output minimization (packaging reduction, packaging disposal, wastewater treatment and air emissions)

Those ranked above the ‘somewhat engaged’ rating, though not as considerably as the first few factors included [in descending order of rank]:

- Corporate Social Responsibility (planning and implementation)
- Green marketing (to business customers and consumers)

Among the disaggregated items (Table 8), the use of an internally generated metric for tracking efforts was considerably ranked implicating that companies are ‘somewhat engaged’ in it, though it could not be efficiently categorized. This could be due to confusion about the creation and use of metric systems. These categories of items are often perceived as the earliest steps toward sustainability and seldom necessitate major shifts and changes in business plans. They are a good indication that most companies, regardless of where they are situated with their remaining sustainability initiatives, have executed these actions with success. This is not to say several companies have not gone much further with their efforts. Each factor concerning performing sustainable actions that emerged exhibited a current implementation score just above ‘to a slight degree’ (Table 50). These incorporated research (to business customers and consumers), transparency (publicly and directly to the consumer) and third party certifications (for processes and products).

General levels of implementation in three areas are indicated. More work needs to be put into the remaining areas, beyond what is required by law. They are potential competitive advantages that could put a company into the forefront of the sustainability movement. These items include green marketing, research into the supply chain and consumers wants, and metric development. These areas could be strategically grown to create a truly sustainable company that is seen as resourceful and a leader in the industry, via actions and profits.

RO3: Document the degree of integration of sustainable practices within the FTAR supply chain.

Though companies are implementing particular practices does not immediately incorporate it into a strong point of the company's sustainable strategy. Survey respondents were asked about whether or not the same practices they were potentially implementing could be considered a "strength," "weakness," "neither," or if it was "still being developed." This allowed for a four point scale ("strength" = 3, "still being developed" = 2, "weakness" = 1, "neither" = missing value) to gauge whether or not companies associated these practices with something they are succeeding in or struggle with. Surprisingly, the average numbers produced from the survey implicated that companies saw no final factor as an absolute strength. The companies feel as though they have to continually improve on their current efforts. By observing factor means (Table 50), the practices deemed as the biggest "strengths" were [in ascending order of rank]:

- Employee care (providing healthcare, benefits and monitoring working conditions)
- Compliance (with local and national regulations)

- Output minimization (wastewater treatment, air emissions and using efficient lighting)
- Recycling (of unused products, materials within facilities, packaging reduction and proper packaging disposal).

Among the factors that emerged, the most notable weaknesses consisted of [in descending order of rank]:

- Research (on customer demand for sustainable products and practices)
- Metrics (use of an internally generated metric and use of an externally generated metric for tracking sustainable efforts)
- Third party certifications (products and processes)
- Business connections (compliance with international regulations and using green marketing to your business customers).

Disaggregated items that were seen as potential weaknesses included (Table 14):

- Product assessment (life cycle assessment, take back programs and engineering).

RO4: Provide recommendations for FTAR companies seeking to integrate sustainable practices.

The data on the practices companies listed as their most integrated practices, along with their ratings of strengths and weaknesses, were used to devise the recommendations. It is not meant to form an exact plan with one subsequent direction to follow after another. It is meant as a roadmap for mere guidance, as the area is still in the beginning stages of development. Supplementary recommendations are described in detail in the next section.

Limitations

The limitations to this study are present due to the exploratory nature of the research. Ideas and concepts frequently mentioned are a combination of several sources and not a universal explanation. There is also a key informant bias which comes from one individual reflecting the views of an entire company. A company respondent will give perceptual answers which is important to remember because the study is focused on how companies view their own efforts. However, the framework that exhibited success for one business may not necessarily work for another as a result of differences in materials, suppliers, retailers, etc.

Methodological and administrative limitations consist of including surveying companies that choose to respond and share their practices. Though there will be a mix of small and large companies across all textile sectors, this may not provide an external validity that gives an exact portrayal as to where a portion of leading textile businesses stand on the issue. It may accurately describe the current industry situation, but that does not denote confirmation.

Future Recommendations

Exploratory research such as this is the first step in progressing towards a more sustainable future. It was stated several times throughout interviews and discussions that sustainability is a journey, not a destination. Becoming sustainable does not happen in one week, one month or one year. It takes time to develop a lifestyle and business that supports sustainability. That idea is a constructive suggestion to keep in mind as companies begin this journey. The lack of understanding is prominent, but becoming less debilitating as various sectors of the textile industry attempt transparency and working simultaneously.

The definition of sustainability will more than likely never be defined more than the one stated by the World Commission on Environment and Development. It was defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (1987). Companies need to disconnect their mindset from the actual definition and focus more on the actions it represents. The research highlighted the key facets companies believed the sustainability definition should include, and the WCED definition can encompass all of those. It’s about the company determining what is the most important to their way of life, as employees, members of the community and as a business.

For companies just beginning their sustainability planning, the research emphasized what current companies across the supply chain are already implementing. If attempting to benchmark a company’s efforts, these would be comparable efforts to mimic. Some of the higher ranking factors could be considered “low hanging fruit” – the actions that are the

simplest to implement, while having substantial benefits (Woodson, 2010). However, that is where companies need to start their efforts. There is minimal gain in establishing a sustainability action plan with the most in-depth practices. The strengths that were revealed are where the benchmark should be set for similar industries and companies. These practices are not only ongoing, but they are moving in a positive direction.

The final factor outcome also produced some of the company weaknesses. These proved to be some of the most underutilized practices. For instance, compliance with national and local regulations was being highly implemented and considered a strength, whereas international regulation was a weakness and fell below both means under the management implementation practices section. The amount of government regulation should substantiate the need for the increase in the awareness of international activities. Companies are ranking it lower, when in all actuality; the larger portion of their business is carried out overseas.

Research and metrics were regarded as the biggest weaknesses, due to their underutilized benefits. Completing simple research on what business customers and consumers want in regards to sustainable products and/or processes could vastly increase the knowledge of where the next practices should be centered. If a project requires a large monetary investment, yet will not produce a notable benefit for everyone involved (as opposed to another sustainable venture), then the company is not acting economically sustainable. Research can further assist when producing green marketing tactics. These marketing concepts were regarded highly in implementation, but were not seen as a strength. Investigations into the effects of green marketing could easily transform green marketing into

a major company asset. Research can also include exploring means of using metrics to track (or benchmark) a companies' efforts, regardless of whether or not it is internally or externally produced. The depth can depend on the business, but it is definitely an area an increasing number of companies are already looking into. It is the only way to ensure there is advancement towards becoming increasingly sustainable as time progresses.

Third party certifications were seen as in the beginning stages of implementations, and still a weakness of most sustainability strategies. Third party certifications are not ideal for every business. Conducting research on the need and/or want for this type of verification process could create a great sense of trust, even if it is not a continual effort. This could be especially important to new or less known businesses.

A common thread all practices share is the need for transparency. Though it is unnecessary to expose proprietary information, companies need to realize a large part of the sustainability effort is for the greater good of everyone and not simply a trend in the industry. By allowing consumers and other businesses to have a limited, but adequate view of how the company is operating in regards to sustainability, it will increase knowledge, trust and incentive. It will also be easier to see where resources can be properly allocated. Completely internal structures often overlook major issues. All actions require sufficient time and some monetary investments, but it is a worthwhile endeavor if done wisely. Sustainable development is a necessity and companies facilitate in how successful or arduous a task it becomes, depending on their level of resistance. Companies must be willing to recognize the need and embrace the changing world of textiles.

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Appendix A: IRB Submission Form

**North Carolina State University
Institutional Review Board for the Use of Human Subjects in Research
SUBMISSION FOR NEW STUDIES**

GENERAL INFORMATION

| |
|--|
| 1. Date Submitted: <u>6-22-2010</u> |
| 1a. Revised Date: _____ |
| 2. Title of Project: <u>Essential Frameworks of the Sustainable Textile Products Market</u> |
| 3. Principal Investigator: <u>Jordan Reitzel</u> |
| 4. Department: <u>Institute of Textile Technology</u> |
| 5. Campus Box Number: <u>2418 College of Textiles</u> |
| 6. Email: <u>jareitze@ncsu.edu</u> |
| 7. Phone Number: <u>(828) 291-6745</u> |
| 8. Fax Number: <u>(919) 882-9410</u> |
| 9. Faculty Sponsor Name and Email Address if Student Submission: <u>Dr. Lori Rothenberg</u> |
| 10. Source of Funding? (required information): <u>Institute of Textile Technology</u> |
| 11. Is this research receiving federal funding?: <u>No</u> |
| 12. If Externally funded, include sponsor name and university account number: <u>Institute of Textile Technology</u> <u>Account #: 5-51618</u> |
| 13. RANK: <input type="checkbox"/> Faculty <input checked="" type="checkbox"/> Student: <input type="checkbox"/> Undergraduate; <input checked="" type="checkbox"/> Masters; or <input type="checkbox"/> PhD <input type="checkbox"/> Other (specify): _____ |

As the principal investigator, my signature testifies that I have read and understood the University Policy and Procedures for the Use of Human Subjects in Research. I assure the Committee that all procedures performed under this project will be conducted exactly as outlined in the Proposal Narrative and that any modification to this protocol will be submitted to the Committee in the form of an amendment for its approval prior to implementation.

Principal Investigator:

Jordan Reitzel _____ * 6-4-2010
 (typed/printed name) (signature) (date)

*As the faculty sponsor, my signature testifies that I have reviewed this application thoroughly and will oversee the research in its entirety. I hereby acknowledge my role as the **principal investigator of record**.*

Faculty Sponsor:

Dr. Lori Rothenberg _____ * 6-4-2010
 (typed/printed name) (signature) (date)

***Electronic submissions to the IRB are considered signed via an electronic signature. For student submissions this means that the faculty sponsor has reviewed the proposal prior to it being submitted and is copied on the submission.**

Please complete this application and email as an attachment to: debra_paxton@ncsu.edu or send by mail to: Institutional Review Board, Box 7514, NCSU Campus (Administrative Services III). **Please include consent forms and other study documents with your application and submit as one document.**

For SPARCS office use only

Reviewer Decision (Expedited or Exempt Review)

Exempt Approved Approved pending modifications Table

Expedited Review Category: 1 2 3 4 5 6 7 8a 8b 8c 9

Reviewer Name

Signature

Date

**North Carolina State University
Institutional Review Board for the Use of Human Subjects in Research
GUIDELINES FOR A PROPOSAL NARRATIVE**

In your narrative, address each of the topics outlined below. Every application for IRB review must contain a proposal narrative, and failure to follow these directions will result in delays in reviewing/processing the protocol.

A. INTRODUCTION

1. Briefly describe in lay language the purpose of the proposed research and why it is important.

This research is for the Council for Environmentally Sustainable Textile Apparel and Businesses which is a consortium for member companies needing assistance with sustainability initiatives in various areas of the textile supply chain. This research will aim to satisfy the need for identification of sustainability across the textile supply chain (fiber, textile, apparel and retail) as well as what practices are currently the most prominent and their level of integration. From the research done, there will be recommendations provided for firms wanting to enter or further themselves in sustainability practices.

2. If student research, indicate whether for a course, thesis, dissertation, or independent research.

Master's Thesis

B. SUBJECT POPULATION

1. How many subjects will be involved in the research?

There will be between eight and ten subjects total in the interview process, depending on the level of availability of all companies contacted.

2. Describe how subjects will be recruited. Please provide the IRB with any recruitment materials that will be used.

Subjects are going to be recruited based on personal knowledge of the student and committee. Each company representative will be chosen for their recognized efforts in sustainability practices throughout their company.

3. List specific eligibility requirements for subjects (or describe screening procedures), including those criteria that would exclude otherwise acceptable subjects.

The only requirement is that each participant works with some form of sustainability within their company. No other factors are taken into consideration.

4. Explain any sampling procedure that might exclude specific populations.

Only textile company employees will be interviewed.

5. Disclose any relationship between researcher and subjects - such as, teacher/student; employer/employee.

There will be no relationship between the researcher and subjects.

6. Check any vulnerable populations included in study:
- minors (under age 18) - if so, have you included a line on the consent form for the parent/guardian signature
 - fetuses
 - pregnant women
 - persons with mental, psychiatric or emotional disabilities
 - persons with physical disabilities
 - economically or educationally disadvantaged
 - prisoners
 - elderly
 - students from a class taught by principal investigator
 - other vulnerable population.

7. If any of the above are used, state the necessity for doing so. Please indicate the approximate age range of the minors to be involved.

n/a

C. PROCEDURES TO BE FOLLOWED

1. In lay language, describe completely all procedures to be followed during the course of the experimentation. Provide sufficient detail so that the Committee is able to assess potential risks to human subjects. In order for the IRB to completely understand the experience of the subjects in your project, please provide a detailed outline of everything subjects will experience as a result of participating in your project. Please be specific and include information on all aspects of the research, through subject recruitment and ending when the subject's role in the project is complete. All descriptions should include the informed consent process, interactions between the subjects and the researcher, and any tasks, tests, etc. that involve subjects. If the project involves more than one group of subjects (e.g. teachers and students, employees and supervisors), please make sure to provide descriptions for each subject group.

A face-to-face or telephone interview will be scheduled. Upon the beginning of the meeting, the informed consent will be given and signed. All questions will be asked by the principal investigator and the interview process could take anywhere from 60-90 minutes. There are eight to ten people total in this interview process. Their responsibility to the research will be finished after their one interview. The interviews are for the purposes of collecting information about companies who are doing well in the sustainability movement. Those interviews will then be used to create a questionnaire to be distributed to numerous textile companies in the four different sectors (fiber, textile, apparel and retail). Once formed, the questionnaire will be submitted to the IRB separately for approval. It will allow companies to share their position in this sustainability movement and vaguely benchmark themselves to that of the anonymous companies interviewed. All data collected will then be used to develop a framework in my thesis for how any company could carry out certain practices to become more sustainable,

depending on their sector. The entire study should be completed in the Spring of 2011. The research is being conducted at North Carolina State University's College of Textiles.

2. How much time will be required of each subject?

Approximately 60-90 minutes depending on the depth of the interviews

D. POTENTIAL RISKS

1. State the potential risks (physical, psychological, financial, social, legal or other) connected with the proposed procedures and explain the steps taken to minimize these risks.

There are no risks involved. All notes will be destroyed after the thesis has been completed.

2. Will there be a request for information that subjects might consider to be personal or sensitive (e.g. private behavior, economic status, sexual issues, religious beliefs, or other matters that if made public might impair their self-esteem or reputation or could reasonably place the subjects at risk of criminal or civil liability)?

There will be no personal or sensitive information requested.

- a. If yes, please describe and explain the steps taken to minimize these risks.

n/a

- b. Could any of the study procedures produce stress or anxiety, or be considered offensive, threatening, or degrading? If yes, please describe why they are important and what arrangements have been made for handling an emotional reaction from the subject.

No emotional reactions are expected due to the nature of the interviews being business oriented.

3. How will data be recorded and stored?

The in-person interviews will be documented with an electronic recorder, and the telephone interviews will be recorded through the telephone provider then typed out by a transcriptionist.

- a. How will identifiers be used in study notes and other materials?

They will be identified as Company 1A, 2A, 1B, 2B, etc. and remain completely anonymous.

- b. How will reports will be written, in aggregate terms, or will individual responses be described?

The interviews are for the informational and collective purposes of composing a framework for how companies can carry out certain practices to become sustainable. The main purpose is to create a follow-up questionnaire to base where other companies stand in comparison to those interviewed.

4. If audio or videotaping is done how will the tapes be stored and how/when will the tapes be destroyed at the conclusion of the study.

The recordings will be electronically recorded so no tapes are necessary. They will be deleted when the thesis has been completed.

5. Is there any deception of the human subjects involved in this study? If yes, please describe why it is necessary and describe the debriefing procedures that have been arranged.

There will not be any deception of human subjects involved in this study.

E. POTENTIAL BENEFITS

This does not include any form of compensation for participation.

1. What, if any, direct benefit is to be gained by the subject? If no direct benefit is expected, but indirect benefit may be expected (knowledge may be gained that could help others), please explain.

There will be no direct benefit for participants, but an indirect benefit the subjects will be offered is access to the thesis which will have knowledge about the sustainable movement for their business' use.

F. COMPENSATION

Please keep in mind that the logistics of providing compensation to your subjects (e.g., if your business office requires names of subjects who received compensation) may compromise anonymity or complicate confidentiality protections. If, while arranging for subject compensation, you must make changes to the anonymity or confidentiality provisions for your research, you must contact the IRB office prior to implementing those changes.

1. Describe compensation

None

2. Explain compensation provisions if the subject withdraws prior to completion of the study.

None

3. If class credit will be given, list the amount and alternative ways to earn the same amount of credit.

n/a

G COLLABORATORS

1. If you anticipate that additional investigators (other than those named on **Cover Page**) may be involved in this research, list them here indicating their institution, department and phone number.

Dr. Marguerite Moore
Dr. W. Gilbert O’Neal
Dr. Nancy Cassill

2. Will anyone besides the PI or the research team have access to the data (including completed surveys) from the moment they are collected until they are destroyed.

Transcriptionist

H. CONFLICT OF INTEREST

1. Do you have a significant financial interest or other conflict of interest in the sponsor of this project?

No.

2. Does your current conflicts of interest management plan include this relationship and is it being properly followed? n/a.

I. ADDITIONAL INFORMATION

- If a questionnaire, survey or interview instrument is to be used, attach a copy to this proposal.
- Attach a copy of the informed consent form to this proposal.
- Please provide any additional materials that may aid the IRB in making its decision.

J. HUMAN SUBJECT ETHICS TRAINING

*Please consider taking the [Collaborative Institutional Training Initiative](#) (CITI), a free, comprehensive ethics training program for researchers conducting research with human subjects. Just click on the underlined link.

Appendix B: IRB Exemption Form

NC STATE UNIVERSITY

Sponsored Programs and
Regulatory Compliance
Campus Box 7514
2701 Sullivan Drive
Raleigh, NC 27695-7514
919.515.2444

From: Debra Paxton, IRB Administrator
North Carolina State University
Institutional Review Board

Date: June 17, 2010

Project Title: Essential Frameworks of the Sustainable Textile Products Market

IRB#: 1521-10-6

Dear Jordan Reitzel:

The research proposal named above has received administrative review and has been approved as exempt from the policy as outlined in the Code of Federal Regulations (Exemption: 46.101. b.2). Provided that the only participation of the subjects is as described in the proposal narrative, this project is exempt from further review.

NOTE:

1. This committee complies with requirements found in Title 45 part 46 of The Code of Federal Regulations. For NCSU projects, the Assurance Number is: FWA00003429.
2. Any changes to the research must be submitted and approved by the IRB prior to implementation.
3. If any unanticipated problems occur, they must be reported to the IRB office within 5 business days.

Please provide your faculty advisor with a copy of this letter. Thank you.

Sincerely,

Debra Paxton,
NCSU IRB

Appendix C: IRB Consent Forms Signed



Institute of Textile Technology

A Tradition in Excellence Since 1944

**North Carolina State University
INFORMED CONSENT FORM FOR RESEARCH**

Title of Study: Essential Frameworks of the Sustainable Textile Products Market

Principal Investigator: Jordan Reitzel

Faculty Sponsor (if applicable): Dr. Lori Rothenberg

What are some general things you should know about research studies?

You are being asked to take part in a research study. Your participation in this study is voluntary. You have the right to be a part of this study, to choose not to participate or to stop participating at any time without penalty. The purpose of research studies is to gain a better understanding of a certain topic or issue. You are not guaranteed any personal benefits from being in a study. Research studies also may pose risks to those that participate. In this consent form you will find specific details about the research in which you are being asked to participate. If you do not understand something in this form it is your right to ask the researcher for clarification or more information. A copy of this consent form will be provided to you. If at any time you have questions about your participation, do not hesitate to contact the researcher(s) named above.

What is the purpose of this study?

This research is for the Council for Environmentally Sustainable Textile Apparel and Businesses which is a consortium for member companies needing assistance with sustainability initiatives in various areas of the textile supply chain. This research will aim to satisfy the need for identification of sustainability across the textile supply chain (fiber, textile, apparel and retail) as well as what practices are currently the most prominent and their level of integration. From the research done, there will be recommendations provided for firms wanting to enter or further themselves in sustainability practices. You will be able to access the final product.

What will happen if you take part in the study?

If you agree to participate in this study, you will be asked to answer questions in an interview that will take anywhere from 60-90 minutes. There are eight to ten people total in this interview process. The interviews are for the purposes of collecting information about companies who are doing well in the sustainability movement. The interviews will be audio recorded and the recordings will be destroyed at the end of the research. The answers to the questions will be used to create a questionnaire to be distributed to numerous textile companies in the four different sectors (fiber, textile, apparel and retail) who will gauge their position in this sustainability movement to that of the anonymous companies interviewed. All data collected will then be used to develop a framework for how companies could carry out certain practices to become more sustainable. The entire study should be completed around the beginning of 2011 and available for viewing by May 2011. The research is being conducted at North Carolina State University's College of Textiles.

Risks

There are no foreseeable risks for participating in this study.



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Benefits

The anticipated benefit from this research is the awareness and knowledge that will be available. The information gained will be used to provide assistance to the industry as a whole, and individual companies.

Confidentiality

The information in the study records will be kept confidential to the full extent allowed by law. Data will be stored securely in the private office of The Institute of Textile Technology. No direct reference will be made in oral or written reports which could link you to the study. You will NOT be asked to write your name on any study materials so that no one can match your identity to the answers that you provide. All audio data will be destroyed at the end of the research.

Compensation

You will not receive anything for participating.

What if you have questions about this study?

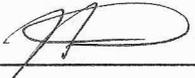
If you have questions at any time about the study or the procedures, you may contact the researcher, Jordan Reitzel, at jareitze@ncsu.edu, or (828) 291-6745.

What if you have questions about your rights as a research participant?

If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact Deb Paxton, Regulatory Compliance Administrator, Box 7514, NCSU Campus (919) 515-4514.

Consent To Participate

"I have read and understand the above information. I have received a copy of this form. I agree to participate in this study with the understanding that I may choose not to participate or to stop participating at any time without penalty or loss of benefits to which I am otherwise entitled."

Subject's signature  TOM SINGARTH Date 7-20-10

Investigator's signature  J. Reitzel Date 7/19/10

North Carolina State University
INFORMED CONSENT FORM for RESEARCH

Title of Study: Essential Frameworks of the Sustainable Textile Products Market

Principal Investigator: Jordan Reitzel

Faculty Sponsor (if applicable): Dr. Lori Rothenberg

What are some general things you should know about research studies?

You are being asked to take part in a research study. Your participation in this study is voluntary. You have the right to be a part of this study, to choose not to participate or to stop participating at any time without penalty. The purpose of research studies is to gain a better understanding of a certain topic or issue. You are not guaranteed any personal benefits from being in a study. Research studies also may pose risks to those that participate. In this consent form you will find specific details about the research in which you are being asked to participate. If you do not understand something in this form it is your right to ask the researcher for clarification or more information. A copy of this consent form will be provided to you. If at any time you have questions about your participation, do not hesitate to contact the researcher(s) named above.

What is the purpose of this study?

This research is for the Council for Environmentally Sustainable Textile Apparel and Businesses which is a consortium for member companies needing assistance with sustainability initiatives in various areas of the textile supply chain. This research will aim to satisfy the need for identification of sustainability across the textile supply chain (fiber, textile, apparel and retail) as well as what practices are currently the most prominent and their level of integration. From the research done, there will be recommendations provided for firms wanting to enter or further themselves in sustainability practices. You will be able to access the final product.

What will happen if you take part in the study?

If you agree to participate in this study, you will be asked to answer questions in an interview that will take anywhere from 60-90 minutes. There are eight to ten people total in this interview process. The interviews are for the purposes of collecting information about companies who are doing well in the sustainability movement. The interviews will be audio recorded and the recordings will be destroyed at the end of the research. The answers to the questions will be used to create a questionnaire to be distributed to numerous textile companies in the four different sectors (fiber, textile, apparel and retail) who will gauge their position in this sustainability movement to that of the anonymous companies interviewed. All data collected will then be used to develop a framework for how companies could carry out certain practices to become more sustainable. The entire study should be completed around the beginning of 2011 and available for viewing by May 2011. The research is being conducted at North Carolina State University's College of Textiles.

Risks

There are no foreseeable risks for participating in this study.

Benefits

The anticipated benefit from this research is the awareness and knowledge that will be available. The information gained will be used to provide assistance to the industry as a whole, and individual companies.

Confidentiality

The information in the study records will be kept confidential to the full extent allowed by law. Data will be stored securely in the private office of The Institute of Textile Technology. No direct reference will be made in oral or written reports which could link you to the study. You will NOT be asked to write your name on any study materials so that no one can match your identity to the answers that you provide. All audio data will be destroyed at the end of the research.

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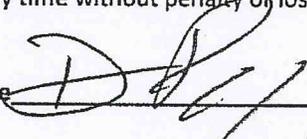
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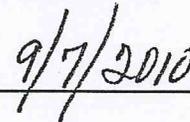
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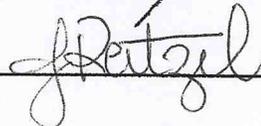
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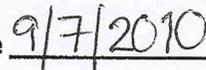
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Subject's signature



Date

3/17/2011

Investigator's signature _____

Date _____

Appendix D: Interview Outline

Interview Questions

- How does your company “define” sustainability? Are you satisfied with this definition? Why or why not? [Objective 1]
- Does your company have a sustainability or CSR (corporate social responsibility) mission statement? If so, what? [Objective 1]
- What areas does your company currently incorporate into its sustainability practices? (Contingency list below.) [Objective 2/3]
 - Compliance with local environmental regulations
 - Compliance with international standards such as those circulated by Businesses for Social Responsibility (BSR)
 - Any particularly targeted at textile companies
 - Life cycle impact of products produced
 - Waste minimization
 - Zero solid waste
 - Recycling
 - Packaging disposal considerations
 - Requirements for wastewater treatment/air emissions
 - Energy conservation/management
 - Employee care and skill enhancement (training)
 - Company markets itself as green
 - Transparency (an acceptable degree of disclosure to which agreements, dealings, practices, and transactions are open to all for verification)
 - 3rd party certification (if so, who and why?)
 - Quantitative metric used (or would one be useful?)
 - Consumer research
- Which practices do you think are the most beneficial to your company? What is this based on? [Objective 4]
 - Direct revenues
 - Bottom line
 - Competitive edge
 - Corporate policy
 - Customer satisfaction
 - Other
- What has not proven to be beneficial? [Objective 4]
- What companies do you feel are leaders in sustainable practices in the FTAR industry? What about other industries? Why? [Objective 2/3]
- Do you feel that (most, many, some, etc.) of your competitors are moving forward with sustainability and why? What do you think the consequences of not participating will be? [Objective 2/3]

- Are there currently any sustainability requirements you have put in place for companies that are part of your supply chain? Were they imposed due to corporate image, corporate policy, government regulations, 3rd party organizations, other? [Objective 2/3]
- Have you been required to institute sustainability practices by your customers? Do you feel that these practices are reasonable or redundant? [Objective 2/3]
- Do you have plans for future sustainability practices or implementations in your firm? [Objective 4]
- Where do you see opportunities for integrating sustainability practices and what are the biggest impediments facing the industry? [Objective 4]
- Triple Bottom Line Diagram will be available for the following questions. [Objective 4]
 - Where would you say your company is located on this diagram?
 - Where would you say your supply chain is located on this diagram?
 - Where would you say the industry is located on this diagram?
 - Where are the weaknesses of your company located?
- Would you be willing to implement sustainable practices that increase costs of doing business?

Appendix E: Interview Questions

- How does your company “define” sustainability? Are you satisfied with this definition? Why or why not?
We give the most common description which is meeting our needs while making sure future generations can meet their needs as well. Our mission statement is actually to build a sustainable company while simultaneous looking at people, planet and profit – it’s really about that triple bottom line. People, planet, profit is about economic prosperity. Everybody has got that one, but it’s also environmental stewardship and social justice. Once you get past that short phrase, it goes into all kinds of things. It doesn’t tell you what you’re going to do; it just says that you’re going to look at a broader approach. So, yes, I am happy with that. There is another one out there I like. It’s from the company, Seventh Generation. That name came from a Native Iroquois Federation that mandated the chief. They based all their decisions based on the next seven generations. Rather than the next seven, I like to think of myself in the middle of those seven generations. So that would be my father’s, father’s father and my children’s, children’s children. I want to honor those before me and those that come after me. That’s another way of looking at sustainability. Now Bill McDonald said we need to move past sustainability. It’s the same as asking someone about their marriage. What if they answered ‘Oh, it’s sustainable.’ Rather than sustainable, status quo, we need to make more progress. This is when I heard him speaking about his book, *Cradle to Cradle*. We need to not just drive cars that aren’t harmful, but cars that also drive around and clean up the air as they go. I want to go beyond sustainability. I haven’t heard anyone say that, but I have heard people say they’re beyond organic.

- Does your company have a sustainability or CSR (corporate social responsibility) mission statement? If so, what?
That would be our basic corporate mission statement. Some people come to us from the social side or on the environmental side, but we stand for all of it – it’s the whole social awakening. It all works together fairly well.

- What areas does your company currently incorporate into its sustainability practices? (Contingency list below.)
 - Compliance with local environmental regulations – *covered above*
 - Compliance with international standards such as those circulated by Businesses for Social Responsibility (BSR)
 - Any particularly targeted at textile companies
We aren’t exporting anything, but we do watch Europe because they’re a little bit ahead of us on dyeing and we pay attention to what’s happening.
 - Life cycle impact of products produced
We don’t close the full loop on that [as far as telling consumers how to recycle their shirts after their wear life is over]. Fortunately, our shirts are cotton, which is fully biodegradable.

- Waste minimization
 - Zero solid waste
 - Recycling
 - Packaging disposal considerations

First of all, it's just manufacturing efficiency. Specific things are reusing boxes – for instance, we don't receive a shipment of shirts, take them out and put them in another box with different labeling. We just reuse the box. We are reusing out paperwork – a lot of that goes to technology and digital formats. A lot of it is just good management of a business where you don't waste a lot of things. The low-hanging fruit is anything that has a quick payback. Everybody wants that economic prosperity, but the trip bottom line is asking how that compares to other measures. This is that three-legged stool we're trying to balance – people, planet, and profit. We lean sometimes on one leg.

- Requirements for wastewater treatment/air emissions

- Energy conservation/management

For renewal energy, we have a biodiesel pumping station. We run our company cars which are biodiesel vehicles. We have a wind turbine. We have two solar rays. We have one smaller one outside, then the larger one on our roof that is not as visible. We are an NC Green Power Sponsor. We purchase blocks of energy. In addition, we are a provider for it. We sell power from the solar ray on top of our building within the grid. We have worked with the Extension Department with graduate students on energy conservation with our boiler, dye house, air compressors. We are converting over to more flat screens for our computers, cutting off the power supply for more things. We are replacing our T12 fluorescent tubes with T8's. The whole office has LED's. We've converted our outdoor lights for security and general lighting from 175 watts to a 13 watt fluorescent lamp. We do the usual energy management as well, like turning lights off. The hallways are not kept well lit. We still have a lot of work to do on things like that. We have two sun tunnels, which is natural lighting, in the bathroom and hallway. I'm repairing this hallway one because it had a leak in it. It's one of my things to do this week, but it's late on Friday! That's just a quick review of it.

I've heard a lot about the benefits of LED lighting recently. It seems that has a great payback.

We were buying some expensive bulbs that still had a quick payback. Anytime you go from incandescent to fluorescent, it's a comparable step to LED.

- Employee care and skill enhancement (training)

I'm not sure of the nature of the question. We're so small; it's not a major issue. I do think it is important though. My partner and I are passionate about it. We study about it. We read about it. We speak about it. Then how well does that translate to every employee? We make a great effort to convey things to them, but they are living in the middle of it. They're seeing it. We have about 18 employees right now.

- Company markets itself as green [since this company in particular didn't originally start where it is now in the sustainability aspect]

That journey called sustainability, everyone comes to it differently. We started it in 1977. I really point back to 1990 when my partner noted it was the 20th anniversary of Earth Day and said ‘You know, we’re just not doing anything.’ We’d gone to sleep and all this had been forgotten after the oil embargo in the 70’s. So we started by getting rid of Styrofoam cups, recycling paper, and not only using it, but buying products with recycled content. I really point to his efforts to get us on that track. We start doing the more natural things – landscaping, energy conservation and it’s harder than you would think to find 100% post consumer non-chlorine bleached paper. It wasn’t making a lot of headway in the market. We had to learn what that meant. Then one day it just hits you. It’s the cars we drive and then you go, and it’s the houses we live in. Then we think, it’s the product we produce every single day. So it’s a journey that goes from getting rid of Styrofoam cups to looking at the product we produce every single day. It has been a journey to look at the sustainability issues of the fiber that’s in our shirts, the printing inks and dyes in our shirts, and the labor issues regarding how it’s farmed all the way to manufacturing. So it’s a step-by-step journey and I think everyone does that. You know some people may come to it because they’re allergic to toxins and they have to clean up their home or they have ‘sick-building syndrome’ or they feed their new baby organic baby food and think they should be eating organic too. One disadvantage we have as a small company, when we meet and hear other big companies talk about it, is how they do a good job of setting up metrics and goals. We don’t do that. We just go out and do it. If you tell me something you’ve seen, we’re probably going to do it. Maybe not immediately because we can’t do everything, but we are adopting every good practice that we can think of. We just think it’s the right thing to do. We try not to over analyze it or try to get an 18 month payback, but just because it’s the right thing to do. As a result of that, we’ve been greening our business. I think the compelling story is that we weren’t originally a green business. We didn’t start out that way, but how do you take a building built in 1928 – a metal butler building- and start greening it? I have a house that was built in 1948. How do you make that green? We’re not living off the grid. It’s more compelling for people who live in regular homes; drive regular cars see how they can make choices and then start that step-by-step journey. This is where the triple bottom line helps a lot. We are environmentalists at heart so everything that has an environmental benefit, we want to quickly adopt. But then you have to ask yourself, how is this on the economic prosperity side and the social justice side? The triple bottom line helps you get out of that profit only thinking and into a broader measure, but it also keeps that measure in check. We’re not perfect. We don’t always do the right thing, but we’re using that as a more value-driven aspect of our company.

- Transparency in regards to other companies who say they’re doing things, but not advertising them (an acceptable degree of disclosure to which agreements, dealings, practices, and transactions are open to all for verification)

I think of transparency a little bit differently. It’s not just telling about the things you’re doing with sustainability. Transparency is telling people what you’re doing period. I think people will make the correct choice. The reality is that we don’t know. In other words, that chicken that you buy at the store because of the price

they have on special this week or whatever, if you knew how that chicken was raised, you might say that's not what you thought you were buying. We're talking about a chicken that's packed so tight in a cage, their beaks are cut off so they don't peck each other to death and lights are left on them 24 hours a day. You see that and say that's not what you thought you were buying. I thought I was eating a chicken. This is not one that I feel good about how it was raised and what I'm eating. Well that's true about our fuel too. Notice we're sitting here in air conditioning. It is provided to us by coal and lithium. The building has two solar rays and a wind turbine, but the reality is our electricity in NC, the vast majority is imported out of this state. Well over a billion dollars leaves this state just to provide basic energy. We definitely want air conditioning too, especially on days like today. We still want our power, but we need to treat that power differently. That's what transparency is. Transparency lets you know that even though we are doing all these good things, there are negative consequences by what we are still doing. When I drive my Prius, I'm still using petroleum that comes out of the Middle East or part of the problem in the Gulf with the oil spill. I can't say 'Oh, aren't I great?' I'm the same problem so what happens is that we have got to recognize the trust cost of things. That is transparency. If people can see what is going on, they make better choices. ...Transparency is letting you know what is going on. The people that fight transparency are the large companies who do not want you to know. Wal-mart is an easy target because they're so large. They do good and bad, but they get beat up a lot. We do our share of it because some of the practices they do, we do not support. I've seen them both help communities and destroy communities. Its due in part to this thing call free enterprise and capitalism, but sometimes it runs amuck. I hope they are true to their core belief, because the best sustainability policies have a true economic benefit. Where you utilize energy, you save money. We have to be careful that everything that is done isn't just economical. It's like saying you'll be an ethical student ONLY if it gets you the grades you want. If it does, I'm going to play with it. That's what we're saying with this payback. Payback is really the wrong question. We all do still have a price. I still drive a vehicle. I am trying to minimize that impact. No one is walking the perfect sustainable path. That's one reason I like the definition "however I meet my needs, but make sure the future generation can meet theirs." It's just saying, don't take more than you should.

- 3rd party certification (if so, who and why?)
We did Oeko-Tex last year, but we did not renew. We wanted to verify that our process was in fact what we said it was. It's fairly expensive for a small company so we have not renewed it. The textile and apparel business has been decimated, so textile and apparel businesses started cleaning up in the 70's, but they don't make them here anymore. They're coming in from India or China or somewhere else, so it's very possible for some of the things we got rid of to slip back in. The dyes that we use, or chemicals that we use in our dyeing or printing process – what are they really? We did that to prove what we were using was right and correct. We wanted guys to trust us so we got some third party verification. The reality is that I can show you an organic cotton shirt and you'll say it's so soft, but that may not be why it's soft. Periwinkle Farms were certified for their first eight years. Being a new company, they felt like that was real important. After a while, they decided they had

such a close following from their customers, they were aware of what they were doing and they didn't need the certification anymore. They moved past organic. If people don't know who you are, that organic stamp of approval verifies it to the new customer. Once you've been in business a while, you have that customer base and they know who you are, what you have and you don't need that certification anymore. Certification is still very important to a small company like us for a few things: certified organic cotton for one. Whether it's Oeko-Tex or B-corp, it shows what we have and it does add to the cost, but we don't have to pay that premium. People may think we're making more money, but that's not really sound thinking. What we want to do is be sure that those large players, those big-box retailers that buy 100 million pounds of organic cotton aren't claiming to make double that in t-shirts. They would get a slap a wrist for that or a black eye, but we would also get that black eye and we didn't do it. It will hurt the industry so you want to distance yourself from the bad players. It's the greenwashing. It's relabeling shirts' country of origin. We see all kinds of potential for bad players to slip in, so that's the bottom line. We use certifications to distance ourselves from that black eye. The solution goes back to transparency. Tell everyone what you're doing. Keep in mind we don't give any of our patented processes away, but people tour our facilities, video our plants all the time. We want to tell everyone about us, because it's not just about us. It's about other printers and other apparel people. We think that a lot of the environmental and social problems in the world were caused by businesses. They may say the consumer demanded it, but the bad news is businesses have been the bad players. The good news is that other businesses can do something about it. We think we can take a stand and try to be a different kind of business.

- If a Quantitative metric were used, would it be more helpful?
I don't think we need one consistent one. I just think we need a measure, but it's complicated to measure. Let's look at our energy reduction. Almost every company in the US has had an energy reduction because business stinks right now. So, all of a sudden, we can advertise they've cut back so many tons of energy over the past year. We're saying it, but then no one will when business is back to the normal workload. So, what you're trying to do is have metrics and keep up with those. A lot of people think it's too much information. It's overwhelming, but if you're generally trying to be a better company or a better world citizen, then the metrics are very helpful as opposed to just saying 'Oh we're trying.' You can show me. The problem we have right now is that we've had an increase in water so we can turn non-edible landscape into edible landscape. We have an organic garden for our employees. We have to water them, so it's a trade-off. We should have a measure to show that our water went up, but then we can say why. You have to know all the pieces. Metrics are helpful measures whether you share them or not so that's why I say a common one is not important. There are a few though that should be shared: transportation miles, energy use, zero waste, carbon neutrality. It takes a lot of education to fully understand this. Since you're talking about all of sustainability, this isn't do-gooder stuff. This is solid business strategy. It makes no sense to exploit your resources whether it's people or timber or cotton or soil or air. That is not a good business strategy. This isn't bleeding heart, liberal, tree-hugging stuff. It just makes sense. What we can do legally is often still wrong. You know, we didn't go down this path

of being a sustainable business in order to market it, but you know, it is GREAT marketing. We aren't ignorant of that. We are aware that people seeing that solar panel out there has an impact. They'll see it sometimes and think our t-shirts are going to be much more expensive so until we post on our website that there is an economic benefit, they don't know we're doing ok. My nephew gave me the term "zero to hero." When people hear how much our solar panel is, they ask why we'd do that. Then we have to explain how much electricity we're saving and the view changes. They'll think maybe we're on to something. We put in a biodiesel pump that cost more than regular gas; people looked at us like we had two heads. Then what happened – Hurricane Katrina struck the gulf and bags were covering gas pumps all over the country. We had the good sense to put in water reservoirs and use ground water to flush the toilets. Everyone asked why we did that when we had a surplus of water. What happened a few years later? There was a huge drought in North Carolina. There's a disconnect between what is happening and what we are doing to change it. A lot of it is connecting the dots. We have to listen to our own information.

- Consumer research

We haven't done market research like that per say, but we participate in other resources. For example, I went to a green conference in San Francisco a few years ago and a very large firm came up and talked about the demographics of that green customer. It was really interesting. So, by participating in this, we got a wealth of information on who our likely consumer would be. Actually, our research is backwards. Instead of us deciding what our customers want, they tell us what they want. A customer is the first one who asked if our apparel met Oeko-Tex standards. We had to ask 'What's that?' Our customers are educated and they are driving it. Everything we do here had to come from somewhere. We didn't just up and know how to do all this or we would've done it originally. One of the other benefits is that companies may be doing sustainable things they haven't identified as sustainable. We've changed some of our processes because of other reasons – efficiency, economics, whatever it may be. Sometimes there is a sustainable story that goes along with it though. For instance, my wife and I are very involved with our church and we try to get them to change to sustainable stuff all the time. They're a little slow to do it, but recently they changed from roll carpeting to carpet squares then put LED lights in the gymnasium. Being sustainable wasn't their motive, but it was still sustainable. Especially in churches, every dollar saved is important. When you manage the financial part, I see that as being a good steward and when you're taking care of creation, you're being a good steward as well. But tell that story. I like to advocate it, because they aren't as likely to use something/someone because it's cheaper. Of all places that could use a triple bottom line, wouldn't it be a faith community? All faiths have something they teach about creation. There could be a similar model for businesses that makes sense. What business doesn't change their lighting that has an 18 month payback?

- Which practices do you think are the most beneficial to your company? What is this based on?
Our big change is that we went from a large contract printer (Nike, Gap, and Polo) to just printing t-shirts. When all the other business left the country, we picked up those pieces and

made it our business. We did it because we had to. I point to a couple epiphanies and I credit them to my partner, Eric. You don't realize it when it happens. You have to look back on it. I point to the 20th anniversary of Earth Day. That's kind of my pick because Eric said, "As a company, why don't we be good corporate citizens." I agreed with him. Of course we did. We didn't want to be a bad player. You want to create good relationships with your vendor and your customers. You have to take care of your customers and vendors. Some people don't, then wonder why they lost their business. They didn't take care of their infrastructure. The other epiphany was the first time we paid out money without thinking of the economic payback. You have to have a reason to take money from one area of a business to another. I think through Sam Moore – one of our mentors – that we learned we needed to have a plan for people, planet and profit. Any issue that came up, we tended to advocate one dimensionally. We'd have Eric sitting here as the environmentalist, our HR guy taking care of our people and me the handy man so I'd have a role. Each thing we brought up tried to go one way when really it could go all three. That's how we take care of people, planet and profit. Everyone is now obligated, no matter their purpose, to address the other two sectors. I can't just say profit profit profit. I had to show they would also profit in economic stewardship and social justice. They would do this by better wages or something. By now, it becomes an obligation to look after the other two. To me, that was the light bulb going off. It makes you balance what you're doing. That triple bottom line was important.

- Direct revenues
 - **Bottom line**
 - Competitive edge
 - **Corporate policy**
 - Customer satisfaction
 - Other
- What has not proven to be beneficial?

Nothing is popping into my head. I try not to spend a lot of time on that. I do enjoy talking about our missteps, not because I enjoy them, but because it shows that this has not been as easy ride. There was not a single tree out here when we built this building. It was all grass. Eric decides we're going to put cardboard down so we can put trees in there. Our neighbors immediately start telling us to mow the yard. By our third year, our Sycamores were tall and we put in seating so there was natural shading. What happened was that it was the wrong tree species put in the wrong direction. You don't worry about stuff like that. We even had to take some trees down because they were too close to the building. You can't read enough books to do it all right the first time. You just do it. So now, we can put the chickens there. The chickens are part of the t-shirt story or else why would a t-shirt company have livestock? The other thing is that we think we are losing farm land. We pay to build on the most fertile land we own. That's what people do – they put houses and roads near the fertile land. We like to talk about farmland preservation as a way of life, but this building was built on a farm. We didn't build the industrial complex, but that's what happened. This was Glenn Miller's farm. We moved in where there was one tree. That's just what happened, so that was also a misstep. We also put in the solar ray before we efficiently managed our energy use, but you just got to keep plugging along.

Later mentioned: All rain gutters were put on the opposite side of the building they want to use the water on. We hold all storm water we collect and use it elsewhere.

- What companies do you feel are leaders in sustainable practices in the FTAR industry? What about other industries? Why?
I don't pay as much attention because what we do it pretty out there. I value the Life Cycle Assessment, but don't really understand all of it. We're all flawed as individuals and as companies. I don't know of a company I look at and say, that's what I want to do. Our resources come from a lot of different places. It's difficult for me to know if companies are being honest when they play the sustainability card. How much is the real deal and how much is marketing? Organic Valley is maybe one. I know it sounds like a pad answer, but our customers are connected to it because they believe what we believe. Colleges are making great progress too – State, UNC, Duke, Elon, Wake Forest and even Alamance Community College teaches courses on renewable energy here. I had someone tell me they wanted to most sustainable t-shirt I had. I told her not to buy one because she probably had a drawer full at home, but if she was going to buy one, she should consider ours.
- Do you feel that (most, many, some, etc.) of your competitors are moving forward with sustainability and why? What do you think the consequences of not participating will be?
It's becoming a very competitive climate. It's becoming like the old ISO certification. Before we started down this path, I use to say it a little differently. I'd say this to employees: we're going to try to do everything absolutely right and here's why. We're going to mess up and make mistakes, but if you see us trying to be moral, ethical, fair and true then when you see that mistake, you'll know it was just that – a mistake. If they see us as sleazy players, not being fair and reasonable, then when we make honest mistakes, they'll think we tricked them. Being fair and honest just buys you consideration. Part of it is the trust and part is the golden rule. In other words, how do you play the game when you hold all the cards? We started out with words like ecology, sustainable, green and now it's gone to words like local and community. It all relates back to the community. Are you building what you tear down? If you think of ethical and moral, whether it be your faith or not, the best way to understand that is to ask if it builds communities or tears it down. That's another way of understanding sustainability.
- Did you start working with your supply chain because they do business like you do?
When we developed our process REHANCE, we sold it to Champion, Nike, and GAP. When you do this process, its printing then garment dying and it costs more. They wanted low prices and we needed a market. Turns out, there was a market for people who wanted a low environmental impact. We moved to organic cotton based on cost. It is bought on commodity exchange. It's sourced globally. Some was from the US, but most was from Pakistan and it was sewn in North Carolina. Across the street from us is a cotton field. He was trucking it down and shipping it out of the Port of Norfolk. That didn't make much sense, so we should just buy our cotton from him. He doesn't sell organic cotton. They don't grow organic cotton in NC. So we used our neighbor. It's not organic, but he uses some pretty good practices and it cuts down on other things. In the scheme of the textile industry, we're microscopic, but we're trying to build a different model. So we found this willing farmer who doesn't spray as much insecticide (4 times per year as opposed to 8-40). We work with Ronnie who knows what we do, so we're converting him. We are buying from

him so he will maybe convert to organic cotton. Same with retail stores. You have to buy from them if you want them to sell sustainable apparel. We all influence by example.

- Have you been required to institute sustainability practices by your customers? Do you feel that these practices are reasonable or redundant?

It has been a duel process. Our customers have encouraged and advanced us. What we have to do is educate ourselves. What happens is that we pay attention to what big companies are doing too. When you see them buy sugar from a company in Florida that is carbon neutral, we want to know why. We pay attention when someone says their product is ‘all-natural’ because we know it’s not. Cow manure is ‘all-natural’ and a lot of natural substances are toxic. You can play word games. It’s confusing. There are also a lot of conflicted things too. We will find an opportunity and seek it out and exploit it – whether it be labor, electricity, a cow. We have to break that mentality. I like to think of the Sabbath. On the seventh day, God rested, land rested, animals rested. It’s a sustainability story! Don’t take it and crank it up to go faster, it is just a cow. We have the mentality from the Industrial Revolution that we can crank it up and it will be ok. What were we thinking? We weren’t. We have to break that mindset.

- Where do you see opportunities for integrating sustainability practices and what are the biggest impediments facing the industry?

Our business kind of started to sag after NAFTA and the rest of the world was doing great. The market was getting larger and dot com’s were taking off. We had less value until the IT and Tech centers also got outsourced. Part of that global competition made us stronger, but part of it did not. There are very fundamental things in our society that are vulnerable – our food supply, our energy supply. We have to be careful with what we’re doing there.

- Triple Bottom Line Diagram will be available for the following questions.

- Where would you say your company is located on this diagram?

I would say we are in the middle of that. We may be dropping in the economic department after certain environmental investments.

- Where would you say your supply chain is located on this diagram? **n/a**

- Where would you say the industry is located on this diagram?

The industry would probably be a lot closer to the economic/social side. Some companies are diving in, but we have a long way to go.

- Where are the weaknesses of your company located? **n/a**

I have actually seen triple bottom also include market share. We may have to suffer on one of the bottom lines in order to increase market share. We may have to flood the market with 2 for 1’s in order to gain market share. There are many ways to measure the triple bottom line. To me, it says let’s just find a way to broaden the way we measure ourselves. There are many more than three, but three is a nice round number. This is a good measure across many disciplines and not just dollars.

- Would you be willing to implement sustainable practices that increase costs of doing business?
Absolutely yes. I could see how some people would stumble with that question because they are answering to other people. What would happen is that there would be a difference in opinion between my partner and I. We do things differently. There are things he would

implement right now, that I wouldn't want to do right now because I think it would send the wrong message on those other two bottom legs [lines]. We'll get there eventually. When a vendor comes in and wants to sell me something, I tell them what they can do to sell me their products. Like any other business, if you sell me the same product with a better service and better price, I'm going to buy it from you. If you sell me a product that is better or you give more technical advice, I will consider that. I will also consider anything that is green. Some companies think that no one is willing to pay that slightly higher cost for green products. That's a fallacy. We think everybody doesn't want low price (for instance, you don't ALWAYS shop at Wal-mart), you sometimes want to buy on value. Now some people want the highest price item and that's just as weird. If you two products are identical though, you're going to buy the cheaper one. Now let's take clothing, there are so many factors – color, size, shopping experience. A lot of it has to be decided financially. There are a lot of studies based on how people think of money based on income. Really, if you study this, it's pretty enlightening.

Interviewer: Jordan Reitzel
FTAR Sector: Retail
Date: August 31, 2010

- How does your company “define” sustainability? Are you satisfied with this definition? Why or why not?

We define sustainability as something that we can’t achieve. It is a journey and not a destination. For example, no matter how much we do to be a greener company, if we are importing or exporting it, we fall out of the realm of being sustainable. So, I guess you would say it is a blue sky goal, but it is very difficult to achieve. I find it to be the most realistic definition that I have come across. Most companies don’t understand the magnitude of what being sustainable means. So, like Nike did 5% organic cotton in their products. They couldn’t do all of it, but it was a step in the right direction. That’s the way I see it.

- Does your company have a sustainability or CSR (corporate social responsibility) mission statement? If so, what?

Yes we do. It is available on the website.

- What areas does your company currently incorporate into its sustainability practices? (Contingency list below.)

It currently touches everything including waste materials coming back to us.

- Compliance with local environmental regulations
- Compliance with international standards such as those circulated by Businesses for Social Responsibility (BSR) or others
I don’t have the scope to answer that.
- Life cycle impact of products produced
We have multiple take back programs.
- Waste minimization
 - Zero solid waste
 - Recycling
We recycle a tremendous amount of packaging. It is actually a positive straight through.
 - Packaging disposal considerations
- Requirements for wastewater treatment/air emissions
We have a social responsibility group that looks at everything from how our product is manufactured, to who manufactures it, to all of the regulations and things – making sure that they are adhered to. We are fortunate that we have

had that for a long, long time. We have not been hit by any problems with manufacturers. We know it will eventually happen.

- Energy conservation/management

Our stores are the bigger venues [than our offices]. Multiple locations of solar panels are being put in. We are changing all of our lighting to a new form of lighting that will save considerable energy. Our newer P-Fresh stores are maximizing the energy savings wherever it is feasible. We are also remodeling 300-400 stores this year.

Did I hear you mentioned there are solar panels actually on some stores?

They are on site. I cannot say whether or not they are all on top. I am not in that store's group, but they are mainly in Arizona, California and Hawaii [where there is more consistent sunlight].

- Employee care and skill enhancement (training)

At the corporate level, we have a sizable group involved in sustainability.

- Transparency (an acceptable degree of disclosure to which agreements, dealings, practices, and transactions are open to all for verification)

It depends on the product flow. I can't say that as a blanket statement because I am considering our dot com store as part of it and it is not nearly as mature as the store system. We have much less control there. I've been on a project the last six months to gain more control over what the dot com team is doing.

- 3rd party certification (if so, who and why?)

Yes we do. It depends on the product and claim. We use multiple certifications.

- Quantitative metric used (or would one be useful?)

At higher levels, I think we have some metrics. However, my scope is limited to soft lines and I've been on a couple committees that are across the pyramids. So, it is very hard for me to say a definitive no to anything, but there are metrics in place in the various areas.

- Consumer research

N/a

- Which practices do you think are the most beneficial to your company?

I think the biggest wins are the recycling and energy conservation. A good example is that we've almost completely eliminated all PVC in packaging. So, have we totally eliminated it? No, but we have downsized it a tremendous amount.

What is this based on?

- Direct revenues
- Bottom line
- Competitive edge
- **Corporate policy**
- Customer satisfaction
- Other – **It was the right thing to do.**

- What has not proven to be beneficial?

Do you mean financially or environmentally?

Either way that you're company determines it.

It is a personal comment, not a company comment, but I have been very disappointed in the organic cotton lines. We are the 10th largest user of organic cotton in the world. At the same token, I have been disappointed that have not changed it to include GM [genetically modified] cotton as being organic. Again, that's not our rule. That's a regulation. The reason I have such strong feelings is because I know the pressure we are causing on our suppliers in India, Turkey and Pakistan a shortage of cotton fiber and food. You can grow about half as much organic cotton as you can GM cotton in an organic way. It tears me up. That's a pet peeve, not an official company position.

- **What companies do you feel are leaders in sustainable practices in the FTAR industry? What about other industries? Why?**

Well, clearly Patagonia and Nike. They're the leaders. As far as the biggest impact, it would probably be Wal-Mart. It's not that I even think their program is that good, but it brought a lot of attention to the need. It gave some validity to what we were already doing. It made it much easier when we went to our vendors and said this is what we want. We let someone else educate them. It was very helpful. We had been trying and working for years. It'd take months to get a vendor up and going for organic products or a particular process. And when they were forced by another retailer, all at once, a large portion of our requirements were went out and learned. I clearly think Nike and Patagonia blazed the trail. They were out there first. There were also a lot of niche markets like Under the Canopy and Seed. These retailers literally went out and sourced their product. I think it is a trend. I don't think it is going to be a huge trend, but definitely a trend.

- **Do you feel that (most, many, some, etc.) of your competitors are moving forward with sustainability and why?**

From my conversations with the people at Patagonia and Nike – I think Patagonia started out ahead, but Nike might be in front of them now. Marks and Spencer are repositioning themselves. Honestly, that may be a very interesting transition to see how they do that. Wal-Mart has hit some walls so I think they are trying to rethink how they're going to manage. We have been very quiet, but we've been slow and steady so we haven't hit any walls yet. We started out looking at organic, but ended up looking at sustainability.

Do you think those companies are looking at the full scope now?

I think they skipped over the crawling stage because we crawled before we could walk. Once we were on our feet, a funny thing happened. We had a few people move from here to other places and they started spreading the word that we were actually saving money by being more sustainable. So, when there is a financial motivation, news travels fast.

What do you think the consequences of not participating will be?

She doesn't care that much. When I say she, I mean the guest. She doesn't care. It is still about price and fashion. Target, as company, has taken a position that we do care and that we are doing things, but the actual guest doesn't care. I did use the word average in that sentence.

- Are there currently any sustainability requirements you have put in place for companies that are part of your supply chain?

We very much interact with our supply chain. Any claims that might be construed as an environmental or sustainable claim is reviewed by a committee here [at headquarters] before it can be put on a shelf. We are very, very tough on that.

Were they imposed due to corporate image, corporate policy, government regulations, 3rd part organizations, other?

Corporate policy – One of our key considerations is to always to distribute the truth to our guest. So that committee is the conscience of the company. I actually have the pleasure of sitting on that committee. I make the joke that it is the meanest committee I’ve ever sat on because we will argue over one word. Everything is reviewed. Claims are required to have substantiation. Now the one thing that I will add is that even for a well-known national brand, we will ‘recommend’ these changes in wordings, but we cannot force it. For instance, we couldn’t make Coca-Cola change what they want to say.

Have you found any instances where that resulted in you not using the product/brand?

We have had instances where we wouldn’t print a national brand’s claim in a circular.

- Have you been required to institute sustainability practices by your customers? Do you feel that these practices are reasonable or redundant?

I would not say so. Typically, if there is something they are doing, it is to the advantage of the product, not the disadvantage. We have paid increased costs to get certifications and things of that nature, but I don’t consider that the same.

- Do you have plans for future sustainability practices or implementations in your firm?

Yes.

Are they internally based or will the consumer know about it?

We do not expect to make it clearly visible to our guests other than claims we could substantiate. We don’t feel that it is compelling to tell them. For example, as a guest, you wouldn’t know the Southpoint location’s wastewater off the roof if very carefully controlled. Any property that we own, all the runoff water is carefully managed. We are installing low-flow water in the bathrooms. These are things the guest will never notice and we will never talk about. It’s simply good business. All of our new P-Fresh stores are getting special lighting. Anywhere we can improve, we are.

- Where do you see opportunities for integrating sustainability practices?

I liken it to a very, very large boat. Two years ago, we changed our colors to accommodate our new lighting and all of our stores still don’t have the new lighting in them. So when you’re talking about changing lighting in 1800 stores, it takes a little bit of time. All of our new stores that we are building are not LEEDS certified, but they do exceed LEEDS standards. LEEDS wanted to put constraints on us, so we decided it was not worth it. All of our new stores are being built very, very energy efficient.

How many stores do you open a year?

It depends on the year. This year, we will probably open 40 or 50, but we are in the middle of a huge remodeling project. Normally, in the past years before the economic situation, we were opening almost a 100 stores per year.

What are the biggest impediments facing the industry?

Jordan, I don't know that I think there are any big issues out there. Maybe the biggest thing is that as China tightens their reigns environmentally, companies are moving to Indonesia and Bangladesh, and it is much harder to control a supply chain in motion than one that is standing still. For example, one of our India supply chains really is with it and sent us a full environmental package of what they've done in the past two years. Quite honestly, they were more environmentally friendly in their textile manufacturing facility than any facility I've ever seen in the U.S. I don't think there's any supply chain impediments, so much as the supply chain isn't moving. Once the supply chain starts to move, it's much harder to control.

- **Triple Bottom Line Diagram will be available for the following questions.**
 - **Where would you say your company is located on this diagram?**
 - **Where would you say your supply chain is located on this diagram?**
 - **Where would you say the industry is located on this diagram?**
 - **Where are the weaknesses of your company located?**

Asking if we use the Triple Bottom Line is a loaded question. We have a very developed social program. We have many team members in the field (actual target employees). We have many, how do I say this, we put a lot of pressure on suppliers to be environmentally friendly as well. Do we have that in one place? Absolutely not. The left hand never knows what the right hand is doing. That's where it comes to social compliance. We are one of the only companies that require our suppliers to let us walk in to inspect. If they don't let us in the door, we no longer do business with them. If the inspector shows up, they don't have time to do anything. They get the Plant Manager and they walk out into the factory immediately. I'll bet no other retailer has that policy. That's real surprise inspection. That's why you haven't seen us get caught for child labor or anything like that. Our vendors fear us. They know it may be 3:00 on a Friday afternoon.

- **Would you be willing to implement sustainable practices that increase costs of doing business?**

In some places, we've made changes that are profitable and in other cases, we make changes that are just the right thing to do. And then there's the situation where sometimes it is just blind luck. We converted our fill in some of our bedding to recycled polyester 2-3 years ago when it was a break-even proposition. Then the price of polyester went through the roof and the price of recycling was making us money. It was just blind luck. We had no plans of making money with that program, but it ended up making money for us. That never hurts.

I apologize for Kate not being able to get up with you. She should have managed this interview. There are a large number of people involved with sustainability here and we think we've kind of taken a different approach than say, our competitor. We have not

given a job to anyone regarding sustainability. We basically farmed it out all over the company, which means everyone is involved. It's kind of neat that 5-10% of my job is working on that type of thing. There are people all over the company doing that, so it's a big team effort. It's not a group trying to forcing it on everyone else. That is the one big difference with us. We do have 4-5 just working with sustainability then all the rest are on committees and stuff like that. We help them get things done. It's a very successful approach.

Interviewer: Jordan Reitzel
FTAR Sector: Textile/Apparel
Date: September 7, 2010

- How does your company “define” sustainability? Are you satisfied with this definition? Why or why not?
Well, basically we define sustainability as ongoing efforts to do our part for the environment. We do this by trying to reduce our carbon footprint, promoting recycling, and by engineering our products to have the smallest impact on the environment. For our company, this is pretty acceptable and this does not include everything we even do. There are many, many things involved in that it is an ongoing effort and it’s not like it’ll be over in six months. I plan on doing it as long as I’m here. It’s that type of thing.

- Does your company have a sustainability or CSR (corporate social responsibility) mission statement? If so, what?
We have an environment and sustainability statement published on our website.
[From website: "Gerber Childrenswear is doing our part in trying to make the world a better place for our children through our products, packaging and business practices."]

- What areas does your company currently incorporate into its sustainability practices? (Contingency list below.)
 - Compliance with local environmental regulations
We certainly, as far as we know, in total accord with all local regulations. What do you mean by local?
It can mean county, state or country standards – according to where you do business the most.
Well there certainly are physical rules that we have to follow and we certainly attempt to follow all of those in the area that we are. As far as national rules, we are following the California Assembly Bill – Proposition 8 and 65 which are new California rules that we are aware of and respond to. We are looking at the Consumer Product Safety Improvement Act (CPSIA), Model Impact Initiative dealing with Coalition of North Eastern Governors (CONEG) regarding packaging rules that they have that we obviously comply with. Then for labeling rules and laws, there are also a whole series of government organizations we want to be, and have to be aware of. We certainly are always in compliance with those regulations.

 - Compliance with international standards such as those circulated by Businesses for Social Responsibility (BSR)
We basically have our own set of rules that apply to our overseas suppliers and we specify to them that we expect them to comply with. They should first comply with any local rules then any national rules or regulations. They obviously,

because they're importing into the U.S., must comply with our as well – things I just went over with you. From the beginning, when we work with an outside supplier, we go in and evaluate the plant and evaluate a whole series of things: ethical standards, legal requirements, health and safety, wage and benefits, working hours, child labor/prison forced labor, discrimination, disciplinary practices. These are all things we go in and look at before we will go in and do business with anybody.

- Waste minimization
 - Zero solid waste

We push our suppliers to be very environmentally aware. We really push them in the areas of water, waste and chemical usage. We specify in our products that we want many of these to be Oeko-Tex certified. Are you familiar with Oeko-Tex?

Yes, of course.

Good. Well where we can, we specify we want Oeko-Tex certified. A number of the plants we deal with, as far as their operations go, are Oeko-Tex certified. We encourage, note I said “encourage” them, to use this. They have followed suit in numerous cases where they are dying or finishing with Oeko-Tex certified chemicals – the whole nine yards. We are very pleased to continue working with these people and to continue pushing them in that direction.
 - Packaging disposal considerations

Going back to what I stated before, engineering our products is a way to reduce the impact on the environment. So to answer your question, yes. We have reduced some of our products. Where they were made of plastic, we switched to paper. We ask our suppliers to use recycled paper. We do as much as we can to have little impact on the environment.

- Employee care and skill enhancement (training)

Basically, from our point of view, I am handling the sustainability part of the business. Part of my job is that I am purchasing manager and being in charge of all our environmental and sustainability efforts. I am not trained in that. I didn't go to college for the environmental studies. Well when I went to college, there were no courses on the environment, but obviously you can train yourself fairly quickly. There are great amounts of information out on the web. You learn the protocol and go from one to another and you quickly learn what's going on with the environmental situation. You quickly come up with figuring out what is the best approach for your company to take. There is a lot of information available and I know a lot of it is fairly common sense. A lot of it, we were already doing before we ran into the research on environment and sustainable information websites.

- Company markets itself as green

We certainly present it. I wouldn't say it is one of our main marketing tactics, but it is something we do. We put it on our website. We certainly share the information about what we do with our customers because this is our part of what's going on in the world from our point of view. We are basically saying we are looking at what's going on and we are trying to do our part as best as we can to improve the situation and encourage others.

- Transparency (an acceptable degree of disclosure to which agreements, dealings, practices, and transactions are open to all for verification)

Well again we publish what we do on our website. We are part of The Carbon Disclosure Project and we have published what we do for that project. In fact, just recently I answered 99 questions, or at least that much, for that project. And obviously when we deal with our customers, one on one, we certainly tell them what we're doing. As far as transparency, we certainly do back up to prove what we're doing.

- 3rd party certification (if so, who and why?)

We use a number of other [Oeko-Tex] third party certifiers as far as products are concerned. We sell to Wal-Mart so we are tested through Wal-Mart's laboratories and there are other testing laboratories that we use or are used by our suppliers. So if we have third party testing on all of our products or components, we're covered and there are no issues with our products.

- Quantitative metric used (or would one be useful?)

We are in the process of developing a carbon footprint reduction plan. I am working on that right now. We are evaluating several different things to see where we can reduce our carbon footprint, how much we think we will reduce it, and set a goal for a certain amount of carbon reduction.

- Consumer research

Basically, we do but I don't know how much of it has specifically been towards the environment and sustainability. It may have been a little bit. I wouldn't think that there had been a lot. Basically, as a company, we know what we want to do and we are looking at ways to accomplish that. In the normal environment, our customers would like us to do certain things. Again, it comes back to us doing our part for the environment. There are certain things we can do and there are certain things we can't do, but, you know, we are reviewing what we can do and making a concentrated effort to move on.

- Which practices do you think are the most beneficial to your company? What is this based on?

Again, our recycling and using recycled products is certainly a very good way we have responded to what would help the environment. By using recycled products, you are doing A LOT for the environment in a number of different ways. So, that is probably not the fanciest thing going on out there, but it is certainly one of the best because you

are using products that use less energy and it reduces your carbon footprint. There are a number of benefits from recycling that I think are high on the list of things that we do and any company should do. Technology improvements I think are the way of the future – what technology can help us do to reach the amount of water we consumer, what we've put in landfills, that type of thing. Yet again, using that and engineering our products to reduce their impact on the environment – that whole design idea.

- What has not proven to be beneficial?
Right now we are looking at improved lighting and I think that is going to be very beneficial in that this is something we are looking at. Also, we are looking into solar energy. At this point, this has become much more of a question than I expected it to. I expect it to be more than what I've heard about it. From further research, the impact of what it does to the environment is less than what I originally believed.
- What companies do you feel are leaders in sustainable practices in the FTAR industry? What about other industries? Why?
I wouldn't say we've modeled a plan after anybody. In fact, I'd say we definitely haven't. We are looking it at and saying what can we do in an environmentally and sustainable way. If you go out and look at other companies in textiles, certainly the footwear companies: ADIDAS, Reebok –may be the same company now. Wal-mart as far as retailers go, as far as what they're doing in the same areas as us.
- Do you feel that (most, many, some, etc.) of your competitors are moving forward with sustainability and why?
**That's a hard question to answer. I know what we have going on here, and I have no idea what others have going on. I sort of get the feeling in looking at what is going on in the world that a lot of people are making an effort. I've begun to think that a lot of people are limited in those efforts and will sort of, as time goes by, come more on board. What do you think the consequences of not participating will be?
Let me put it in a positive way. I think it benefits everyone to improve sustainability and work to reduce our carbon footprint. I think it would be a benefit to anyone to do that and anyone who isn't doing that, I think is not doing their share and it is not beneficial to their company.**
- Are there currently any sustainability requirements you have put in place for companies that are part of your supply chain?
Well, again, we basically go in physically and look at the records of the company regarding ethical standards towards employees. That's one set of things we review from the start. We make them aware of the compliance and performance standards we have to have in our products. The CPSIA sustainability standards, different testing, the FTC [Federal Trade Commission], the California rules for packaging – all these requirements are laid out to our suppliers. Before we give them the first order we go in and confirm that they can meet these requirements and we revisit that to be sure they can keep this up.

- Have you been required to institute sustainability practices by your customers?
That's interesting. Not necessarily – I'm trying to think of anything. You know, we look at all the legal standards. Those legal standards are changing so we change with them, but other than our own set of standards we have to be sure we deal with their ethical operations and business operations – how they treat their people. I can't give you any specific things that have been put in place recently. Basically, all these things have been in place for years.
- Where do you see opportunities for integrating sustainability practices?
Well certainly it's easier for us, and for most people within your own company to implement things. You have more control and it's quicker and it can be done more simply. Within the supply chain, it is becoming easier to implement things. People we deal with who are Oeko-Tex certified who have dyeing and finishing plants certified in Asia, so the people we deal with are very technically aware with what's going on in the world. We look for manufacturing of children's clothing and they are surprisingly up to date on a lot of this I would say. They are very up to date on technology and very aware of the opportunity. They are very willing to be up with the most modern standards.
 What are the biggest impediments facing the industry?
The biggest one I can think of is the ongoing financial crisis. Sustainability efforts take money. The world's situation is certainly that they have gone through financial crisis. It's not clear whether we are out of that or not. At this point, it's clear that we are not out of it and that is out there as a possibility of having a very negative effect. All of this costs money, even with end users, people in difficult financial times are going to be less likely to buy something that is fully certified throughout the system to be environmentally friendly because that adds to the price. It gets to the point where certain people can't afford it. So that is the thing that I could see being the biggest issue for anybody.
- Triple Bottom Line Diagram will be available for the following questions.
 - Where would you say your company is located on this diagram?
 - Where would you say your supply chain is located on this diagram?
 - Where would you say the industry is located on this diagram?
 - Where are the weaknesses of your company located?
No response to the diagram.
- Would you be willing to implement sustainable practices that increase costs of doing business?
We have certainly already done that so the answer is yes. Again, there is a limit to what you can do, but certainly we have already done that and are continuing to do that. That is an overwhelming yes.
- Do you have any further questions?
I'd like to know this - What is your view on solar power?

I, like you, think it is a very novel idea, but it doesn't quite get the perceived output people originally thought from the research I have seen on it. It has to be substantial in size in order to produce notable power. It's still a respectable effort, but the turnaround time for payoff is not quite what people expect.

I have looked into it and basically, there is some viability because of the number of government rebates that are involved with it. When I look at it without government rebates, it's like a 50 year payback. The question becomes, in my mind and I've just started researching, is that the government is giving back rather huge amounts of money to do this and adds to the financial burden we have. It gets added to the National debt which also seems to go on and on and on. I was wondering if you had heard any feedback that says if it is a viable thing to do. Is it going in the right direction?

I think the reason the government does this is because one the panel is in place, it is fairly permanent so to them, it is not as big of a concern as to when the payback it since it will be there for a long time to come. That seems to be the motivating factor. I'll be happy to research and send you additional information if I find it.

Appendix F: IRB Submission Form Addendum

**North Carolina State University
Institutional Review Board for the Use of Human Subjects in Research
SUBMISSION FOR NEW STUDIES**

GENERAL INFORMATION

| |
|--|
| 1. Date Submitted: <u>6-22-2010</u> |
| 1a. Revised Date: <u>10-18-2010</u> |
| 2. Title of Project: <u>Essential Frameworks of the Sustainable Textile Products Market</u> |
| 3. Principal Investigator: <u>Jordan Reitzel</u> |
| 4. Department: <u>Institute of Textile Technology</u> |
| 5. Campus Box Number: <u>2418 College of Textiles</u> |
| 6. Email: <u>jareitze@ncsu.edu</u> |
| 7. Phone Number: <u>(828) 291-6745</u> |
| 8. Fax Number: <u>(919) 882-9410</u> |
| 9. Faculty Sponsor Name and Email Address if Student Submission: <u>Dr. Lori Rothenberg</u> |
| 10. Source of Funding? (required information): <u>Institute of Textile Technology</u> |
| 11. Is this research receiving federal funding?: <u>No</u> |
| 12. If Externally funded, include sponsor name and university account number: <u>Institute of Textile Technology</u> <u>Account #: 5-51618</u> |
| 13. RANK: <input type="checkbox"/> Faculty <input checked="" type="checkbox"/> Student: <input type="checkbox"/> Undergraduate; <input checked="" type="checkbox"/> Masters; or <input type="checkbox"/> PhD <input type="checkbox"/> Other (specify): _____ |

As the principal investigator, my signature testifies that I have read and understood the University Policy and Procedures for the Use of Human Subjects in Research. I assure the Committee that all procedures performed under this project will be conducted exactly as outlined in the Proposal Narrative and that any modification to this protocol will be submitted to the Committee in the form of an amendment for its approval prior to implementation.

Principal Investigator:

Jordan Reitzel _____ * 6-4-2010
 (typed/printed name) (signature) (date)

*As the faculty sponsor, my signature testifies that I have reviewed this application thoroughly and will oversee the research in its entirety. I hereby acknowledge my role as the **principal investigator of record**.*

Faculty Sponsor:

Dr. Lori Rothenberg _____ * 6-4-2010
 (typed/printed name) (signature) (date)

***Electronic submissions to the IRB are considered signed via an electronic signature. For student submissions this means that the faculty sponsor has reviewed the proposal prior to it being submitted and is copied on the submission.**

Please complete this application and email as an attachment to: debra_paxton@ncsu.edu or send by mail to: Institutional Review Board, Box 7514, NCSU Campus (Administrative Services III). **Please include consent forms and other study documents with your application and submit as one document.**

For SPARCS office use only

Reviewer Decision (Expedited or Exempt Review)

Exempt Approved Approved pending modifications Table

Expedited Review Category: 1 2 3 4 5 6 7 8a 8b 8c 9

Reviewer Name

Signature

Date

**North Carolina State University
Institutional Review Board for the Use of Human Subjects in Research
GUIDELINES FOR A PROPOSAL NARRATIVE**

In your narrative, address each of the topics outlined below. Every application for IRB review must contain a proposal narrative, and failure to follow these directions will result in delays in reviewing/processing the protocol.

A. INTRODUCTION

1. Briefly describe in lay language the purpose of the proposed research and why it is important.

This research is for the Council for Environmentally Sustainable Textile Apparel and Businesses which is a consortium for member companies needing assistance with sustainability initiatives in various areas of the textile supply chain. This research will aim to satisfy the need for identification of sustainability across the textile supply chain (fiber, textile, apparel and retail) as well as what practices are currently the most prominent and their level of integration. From the research done, there will be recommendations provided for firms wanting to enter or further themselves in sustainability practices.

2. If student research, indicate whether for a course, thesis, dissertation, or independent research.

Master's Thesis

B. SUBJECT POPULATION

1. How many subjects will be involved in the research?

There will be between eight and ten subjects total in the interview process, depending on the level of availability of all companies contacted. The questionnaire will be sent out to 100-150 companies across the supply chain.

2. Describe how subjects will be recruited. Please provide the IRB with any recruitment materials that will be used.

Subjects are going to be recruited based on personal knowledge of the student and committee. Each company representative will be chosen for their recognized efforts in sustainability practices throughout their company. The same goes for the questionnaire that will be distributed. Contacts are kept in a secure database. The database will be deleted when the research is complete.

3. List specific eligibility requirements for subjects (or describe screening procedures), including those criteria that would exclude otherwise acceptable subjects.

The only requirement is that each participant works with some form of textiles and sustainability within their company. No other factors are taken into consideration.

4. Explain any sampling procedure that might exclude specific populations.

Only textile company employees will be interviewed.

5. Disclose any relationship between researcher and subjects - such as, teacher/student; employer/employee.

There will be no relationship between the researcher and subjects.

6. Check any vulnerable populations included in study:

- minors (under age 18) - if so, have you included a line on the consent form for the parent/guardian signature
- fetuses
- pregnant women
- persons with mental, psychiatric or emotional disabilities
- persons with physical disabilities
- economically or educationally disadvantaged
- prisoners
- elderly
- students from a class taught by principal investigator
- other vulnerable population.

7. If any of the above are used, state the necessity for doing so. Please indicate the approximate age range of the minors to be involved.

n/a

C. PROCEDURES TO BE FOLLOWED

1. In lay language, describe completely all procedures to be followed during the course of the experimentation. Provide sufficient detail so that the Committee is able to assess potential risks to human subjects. In order for the IRB to completely understand the experience of the subjects in your project, please provide a detailed outline of everything subjects will experience as a result of participating in your project. Please be specific and include information on all aspects of the research, through subject recruitment and ending when the subject's role in the project is complete. All descriptions should include the informed consent process, interactions between the subjects and the researcher, and any tasks, tests, etc. that involve subjects. If the project involves more than one group of subjects (e.g. teachers and students, employees and supervisors), please make sure to provide descriptions for each subject group.

A face-to-face or telephone interview will be scheduled. Upon the beginning of the meeting, the informed consent will be given and signed. All questions will be asked by the principal investigator and the interview process could take anywhere from 60-90 minutes. There are eight to ten people total in this interview process. Their responsibility to the research will be finished after their one interview. The interviews are for the purposes of collecting information about companies who are doing well in the sustainability movement. Those interviews will then be used to create a questionnaire to be distributed to numerous textile companies in the four different sectors (fiber, textile, apparel and retail). Once formed, the questionnaire will be submitted to the IRB separately for approval. It will allow companies to share their position in this sustainability movement and vaguely benchmark themselves to that of the anonymous companies interviewed. All data collected will then be used to develop a framework in my thesis for how any company could carry out certain practices to become more sustainable, depending on their sector. The entire study should be completed in the Spring of 2011. The research is being conducted at North Carolina State University's College of Textiles.

2. How much time will be required of each subject?

Approximately 60-90 minutes depending on the depth of the interviews
Questionnaire will take approximately 10-15 minutes to complete.

D. POTENTIAL RISKS

1. State the potential risks (physical, psychological, financial, social, legal or other) connected with the proposed procedures and explain the steps taken to minimize these risks.

There are no risks involved. All notes will be destroyed after the thesis has been completed.

2. Will there be a request for information that subjects might consider to be personal or sensitive (e.g. private behavior, economic status, sexual issues, religious beliefs, or other matters that if made public might impair their self-esteem or reputation or could reasonably place the subjects at risk of criminal or civil liability)?

There will be no personal or sensitive information requested.

- a. If yes, please describe and explain the steps taken to minimize these risks.

n/a

- b. Could any of the study procedures produce stress or anxiety, or be considered offensive, threatening, or degrading? If yes, please describe why they are important and what arrangements have been made for handling an emotional reaction from the subject.

No emotional reactions are expected due to the nature of the interviews being business oriented.

3. How will data be recorded and stored?

The in-person interviews will be documented with an electronic recorder, and typed out by myself. The questionnaire will be distributed online via Survey Monkey where the results will be kept confidential on that website. Once pulled from the website, the responses will be analyzed as seen fit.

a. How will identifiers be used in study notes and other materials?

They will be identified as Company 1A, 2A, 1B, 2B, etc. and remain completely anonymous.

b. How will reports will be written, in aggregate terms, or will individual responses be described?

The interviews are for the informational and collective purposes of composing a framework for how companies can carry out certain practices to become sustainable. The main purpose was to create the follow-up questionnaire to base where other companies stand in comparison to those interviewed.

4. If audio or videotaping is done how will the tapes be stored and how/when will the tapes be destroyed at the conclusion of the study.

The recordings will be electronically recorded so no tapes are necessary. They will be deleted when the thesis has been completed. The questionnaire will be removed from the website once the research has been complete. Only the committee will have access to the results.

5. Is there any deception of the human subjects involved in this study? If yes, please describe why it is necessary and describe the debriefing procedures that have been arranged.

There will not be any deception of human subjects involved in this study.

E. POTENTIAL BENEFITS

This does not include any form of compensation for participation.

1. What, if any, direct benefit is to be gained by the subject? If no direct benefit is expected, but indirect benefit may be expected (knowledge may be gained that could help others), please explain.

There will be no direct benefit for participants, but an indirect benefit the subjects will be offered is access to the thesis which will have knowledge about the sustainable movement for their business' use.

F. COMPENSATION

Please keep in mind that the logistics of providing compensation to your subjects (e.g., if your business office requires names of subjects who received compensation) may compromise anonymity or complicate confidentiality protections. If, while arranging for subject compensation, you must make

changes to the anonymity or confidentiality provisions for your research, you must contact the IRB office prior to implementing those changes.

1. Describe compensation

None

2. Explain compensation provisions if the subject withdraws prior to completion of the study.

None

3. If class credit will be given, list the amount and alternative ways to earn the same amount of credit.

n/a

G COLLABORATORS

1. If you anticipate that additional investigators (other than those named on **Cover Page**) may be involved in this research, list them here indicating their institution, department and phone number.

Dr. Marguerite Moore
Dr. W. Gilbert O'Neal
Dr. Nancy Cassill

2. Will anyone besides the PI or the research team have access to the data (including completed surveys) from the moment they are collected until they are destroyed.

n/a

H. CONFLICT OF INTEREST

1. Do you have a financial interest or other conflict of interest in the sponsor of this project? No.
2. Does your current conflicts of interest management plan include this relationship and is it being properly followed? n/a.

I. ADDITIONAL INFORMATION

- If a questionnaire, survey or interview instrument is to be used, attach a copy to this proposal.
- Attach a copy of the informed consent form to this proposal.
- Please provide any additional materials that may aid the IRB in making its decision.

J. HUMAN SUBJECT ETHICS TRAINING

*Please consider taking the [Collaborative Institutional Training Initiative](#) (CITI), a free, comprehensive ethics training program for researchers conducting research with human subjects. Just click on the underlined link.

Appendix G: IRB Addendum Approval

NC STATE UNIVERSITY

From: Deb Paxton, IRB Administrator
North Carolina State University Institutional Review Board

Date: January 11, 2011

Project Title: Essential Frameworks of the Sustainable Textile Products Market

IRB#: 1789-10-12

Dear Ms. Reitzel,
The project listed above has been reviewed by the NC State Institutional Review Board for the Use of Human Subjects in Research, and is approved for one year. **This protocol will expire on December 13, 2011, and will need continuing review before that date.**

NOTE:

1. You must use the attached consent forms which have the approval and expiration dates of your study.
2. This board complies with requirements found in Title 45 part 46 of The Code of Federal Regulations. For NCSU the Assurance Number is: FWA00003429.
3. Any changes to the protocol and supporting documents must be submitted and approved by the IRB prior to implementation.
4. If any unanticipated problems occur, they must be reported to the IRB office within 5 business days by completing and submitting the unanticipated problem form on the IRB website.
5. Your approval for this study lasts for one year from the review date. If your study extends beyond that time, including data analysis, you must obtain continuing review from the IRB.

Sincerely,



Deb Paxton
NCSU, IRB

Appendix H: Email Requesting Industry Participation

1. Email for a personal contact

Hi _____,

I hope you are doing well since we last made contact. As we had discussed, I am continuing my research on how various sectors of the textile industry are developing their sustainability programs. I am now at the point of my research to explore where sectors of the textile industry in their sustainable development and practices. I have attached a very brief survey that should take only a few minutes to complete. Your participation is greatly appreciated and necessary to further research in this important area. The thesis will be available for you and your company's benefit in the future. Feel free to email or call with any further questions you may have. Thank you again for your time and agreeing to participate.

Jordan Reitzel
M.S., North Carolina State University
Institute of Textile Technology Fellow, Class of 2011
(828) 291-XXXX

2. Email for a connected contact

Hi _____,

I was forwarded your contact information by a colleague at North Carolina State University saying you may be a good person to approach regarding your company's sustainability initiatives and progress. I am doing graduate level research in conjunction with The Institute of Textile Technology about how various sectors of the textile industry are developing their sustainability programs. I have attached a very brief survey that should take only a few minutes to complete. Your participation is greatly appreciated and necessary to further research in this important area. If you need more information, I'll be happy to provide it. The thesis will be available for you and your company's benefit in the future. Thank you for your time.

Jordan Reitzel
M.S., North Carolina State University
Institute of Textile Technology Fellow, Class of 2011
(828) 291-XXXX

Appendix I: Survey

Essential Frameworks of the Sustainable Textile Industry

1. Consent Form

The Institute of Textile Technology and the College of Textiles at NC State University are conducting research to help expand the knowledge of sustainability initiatives within the textile industry. This research will aim to satisfy the need for identification of sustainability across the textile supply chain (fiber, textile, apparel and retail) as well as what practices are currently the most prominent and their level of integration. From the research done, there will be recommendations provided for firms wanting to enter or further themselves in sustainability practices.

In order for this to be possible, we need your input and experience on basic sustainability actions and implementations within your company. When the research is complete, each company will be able access the information to aid their company in furthering their efforts if they wish to do so.

Your cooperation is greatly appreciated. If you have any questions concerning this study, please contact me at jareitze@ncsu.edu. You may also contact any of my thesis committee members listed below.

If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact Deb Paxton, Regulatory Compliance Administrator, Box 7514, NCSU Campus(919.515.4514).

Jordan Reitzel
NCSU Graduate Student/ITT Fellow
jareitze@ncsu.edu

Lori Rothenberg, PhD.
Extension Associate Professor, NCSU
lori_rothenberg@ncsu.edu

Marguerite Moore, PhD.
Associate Professor, NCSU
marguerite_moore@ncsu.edu

W. Gilbert O'Neal, P.E.
President, ITT
wgoneal@itt.edu

Your participation in this study is voluntary. You have the right to be a part of this study, to choose not to participate or to stop participating at any time. The information in the study records will be kept confidential. Data will be stored securely on a password protected server accessible only by the principal investigators. Though you will be asked to provide your company name and your position at the company, when the research is complete, this information will be deleted and replaced with a code number that does not identify you or your company. Company names are for investigator identification only and will not be identified in the published research. There is no monetary compensation awarded for participation in this study. There are no foreseeable risks associated with completing this study.

1. Have you read the full informed consent statement and agree to participate in this research?

- Yes, I give my consent.
- No, I do not give my consent.

Essential Frameworks of the Sustainable Textile Industry

2. Basic Information

1. What sector of the supply chain are you in?

Fiber

Textile

Apparel

Retail

2. What is the name of your company?

3. What is your current position/title?

Essential Frameworks of the Sustainable Textile Industry

3. Defining Sustainability

1. Does your company have a sustainability mission statement?

Yes

No

If so, do you know what it is?

2. When your company defines sustainability, how important are the following elements?

| | Not Important | Somewhat Important | Important | Very Important | Do Not Recall |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Future generations' needs | <input type="radio"/> |
| Resource preservation | <input type="radio"/> |
| Improving the environment | <input type="radio"/> |
| Company's profitability | <input type="radio"/> |
| Taking care of employees and the community | <input type="radio"/> |
| Long term commitment vs. short term commitment | <input type="radio"/> |

Other (please specify)

Essential Frameworks of the Sustainable Textile Industry

4. Sustainable Actions

Management Practices

1. To what degree does your company CURRENTLY engage in the following activities?

| | Not at all | To a slight degree | Somewhat engaged | To a very large degree | I do not know |
|--|-----------------------|-----------------------|-----------------------|------------------------|-----------------------|
| Formal sustainability planning | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Corporate Social Responsibility planning | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Corporate Social Responsibility implementation | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Compliance with local environmental regulations (eg. regional) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Compliance with national environmental regulations (eg. federal) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Compliance with international environmental regulations (eg. other countries' regulations) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Using green marketing to your business customer | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Using green marketing to your final customer | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Transparency of your processes to consumers | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Transparency of your processes to supply chain | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Transparency regarding process to the public | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Third Party Certifications of your processes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Third Party Certifications of your products | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Essential Frameworks of the Sustainable Textile Industry

5. Sustainable Actions

Operations

1. To what degree does your company CURRENTLY engage in the following activities?

| | Not at all | To a slight degree | Somewhat engaged | To a very large degree | I do not know |
|---|-----------------------|-----------------------|-----------------------|------------------------|-----------------------|
| Research on customer demand for sustainable textile products | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Research on customer demand for sustainable practices | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Use of internally generated metric for tracking sustainable efforts | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Use of externally generated metric for tracking sustainable efforts | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Essential Frameworks of the Sustainable Textile Industry

6. Sustainable Actions

Products

1. To what degree does your company CURRENTLY engage in the following activities?

| | Not at all | To a slight degree | Somewhat engaged | To a very large degree | I do not know |
|--|-----------------------|-----------------------|-----------------------|------------------------|-----------------------|
| Life cycle assessment | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Take back programs for used products | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Engineering for potential reuse of future products | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Essential Frameworks of the Sustainable Textile Industry

7. Sustainable Actions

Waste Minimization Practices

1. To what degree does your company CURRENTLY engage in the following activities?

| | Not at all | To a slight degree | Somewhat engaged | To a very large degree | I do not know |
|---|-----------------------|-----------------------|-----------------------|------------------------|-----------------------|
| Recycling of unused products | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Recycling materials within facilities (eg. boxes) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Using recycled materials in products | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Packaging reduction | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Packaging disposal | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Wastewater treatment | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Air emissions | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Use of solar energy | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Conservation of electric energy | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Use of efficient lighting | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Essential Frameworks of the Sustainable Textile Industry

8. Sustainable Actions

Social Efforts and Initiatives

1. To what degree does your company CURRENTLY engage in the following activities?

| | Not at all | To a slight degree | Somewhat engaged | To a very large degree | I do not know |
|--|-----------------------|-----------------------|-----------------------|------------------------|-----------------------|
| Providing employees with healthcare | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Providing employees with benefits | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Providing employees with skill enhancement | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Monitoring working conditions | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Essential Frameworks of the Sustainable Textile Industry

9. Company Strengths and Weaknesses

Management Practices

1. Which of the following do you consider your company's strengths and weaknesses?

| | Strength | Weakness | Neither a strength nor a weakness | Still being developed |
|--|-----------------------|-----------------------|-----------------------------------|-----------------------|
| Formal sustainability planning | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Corporate Social Responsibility planning | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Corporate Social Responsibility implementation | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Compliance with local environmental regulations (eg. regional) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Compliance with national environmental regulations (eg. federal) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Compliance with international environmental regulations (eg. other countries' regulations) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Using green marketing to your business customer | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Using green marketing to your final customer | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Transparency of your processes to consumers | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Transparency of your processes to supply chain | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Transparency regarding process to the public | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Third Party Certifications of your processes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Third Party Certifications of your products | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Essential Frameworks of the Sustainable Textile Industry

10. Company Strengths and Weaknesses

Operations

1. Which of the following do you consider your company's strengths and weaknesses?

| | Strength | Weakness | Neither a strength nor a weakness | Still being developed |
|---|-----------------------|-----------------------|-----------------------------------|-----------------------|
| Research on customer demand for sustainable textile products | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Research on customer demand for sustainable practices | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Use of internally generated metric for tracking sustainable efforts | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Use of externally generated metric for tracking sustainable efforts | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Essential Frameworks of the Sustainable Textile Industry

11. Waste Minimization and Practices

Products

1. Which of the following do you consider your company's strengths and weaknesses?

| | Strength | Weakness | Neither a strength nor a weakness | Still being developed |
|--|-----------------------|-----------------------|-----------------------------------|-----------------------|
| Life cycle assessment | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Take back programs for used products | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Engineering for potential reuse of future products | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Essential Frameworks of the Sustainable Textile Industry

12. Company Strengths and Weaknesses

Waste Minimization Practices

1. Which of the following do you consider your company's strengths and weaknesses?

| | Strength | Weakness | Neither a strength nor a weakness | Still being developed |
|---|-----------------------|-----------------------|-----------------------------------|-----------------------|
| Recycling of unused products | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Recycling materials within facilities (eg. boxes) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Using recycled materials in products | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Packaging reduction | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Packaging disposal | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Wastewater treatment | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Air emissions | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Use of solar energy | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Conservation of electric energy | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Use of efficient lighting | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Essential Frameworks of the Sustainable Textile Industry

13. Company Strengths and Weaknesses

Social Efforts and Initiatives

1. Which of the following do you consider your company's strengths and weaknesses?

| | Strength | Weakness | Neither a strength nor a weakness | Still being developed |
|--|-----------------------|-----------------------|-----------------------------------|-----------------------|
| Providing employees with healthcare | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Providing employees with benefits | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Providing employees with skill enhancement | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Monitoring working conditions | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Essential Frameworks of the Sustainable Textile Industry

14. Basic Information

1. How many years have you been at your current company?

2. How many years of experience do you have in the textile industry?

3. Does your company have positions devoted purely to sustainability efforts?

No

Yes

If yes, please briefly list position(s).