APPAREL AND TEXTILE SUPPLIERS' PERSPECTIVES ON THE IMPACT OF BUYERS' PURCHASING PRACTICES ON ENVIRONMENTALLY FRIENDLY OPERATIONS

by

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ABSTRACT

The purpose of this study was to understand the impacts of apparel buyers' purchasing practices on the environmentally friendly initiatives of the supplier firms. In addition to this, drivers, benefits and barriers to the suppliers' environmentally friendly initiatives were taken into consideration to understand a more holistic set of variables associated with environmentally friendly operations. All of the data in this study were collected by one-on-one semi-structured interviews of the participants. Ten participants represented the companies, originating from eight different countries: Bangladesh, China, Hong Kong SAR, India, Sri Lanka, South Korea, Spain and Taiwan participated in this study.

The study found cost saving as a benefit of the environmentally friendly initiatives. On the other hand, lack of funds was found to be a major barrier as well as consequence of negative purchasing practices. Second, suppliers showed increased concern about environmental certification and rating platforms as a driver of environmentally friendly operation. Suppliers pursued environmental certificates to show concern about the environmental friendliness of the company. Suppliers also participated in different rating platforms which are not discussed in the previous literature. Lastly, suppliers criticized buyers' lack of knowledge about sustainability and supplier base which created hindrances to the environmentally friendly operation of the supplier firm. Future research can take a qualitative approach to analyze the relationship among different factors of the purchasing practices and environmentally friendly operation of the supplier firms. As this study considers suppliers' opinions about buyers' purchasing practices, further study can be conducted from the buyers' side to analyze sustainable performance and practices of the supplier firms.

Chapter 1

INTRODUCTION

1.1 Introduction to the Problem

Manufacturing operation is one of the largest contributors to global business. The economies and lives of people are influenced by manufacturing activities in various ways. Sustainable manufacturing operation has potential to contribute both to the economy and people's lives but many times it becomes hard to ensure sustainable operation in the manufacturing process. If manufacturing operation fails to ensure environment friendliness, it will pose threat to human as well as environment. The impact of the environmental hazards caused by manufacturing operation also has a negative impact upon organizational image and acts as a barrier to successful implementation of national policy (Rao, 2002). So, it is necessary to run manufacturing operation in such a way that does not hamper natural environment at the same time contribute to the environment and lives of human. Sustainable retailers take care of the environmental friendliness of the manufacturing operation of its supplier. On the other hand, activities like sudden change of order amount, short lead time pressure supplier firms to act unethically leading to force workers in overtime duty (ILO, 2017). If buying firms choose unsustainable material for their product then suppliers have to use those unsustainable materials in their manufacturing operation creating negative impacts upon environment. Decisions taken during purchase order further impact the operational performances of the supplier firm. For example, if buyers source more woolen fabrics, then the negative environmental impacts

associated with wool processing will be more intense (Tortora & Collier, 1997). The purchasing activities, skills and strategy used by buying firms can be termed as purchasing practices (Carr, Keong Leong, & Sheu, 2000). Purchasing practices play influential role both for supplier and buying firms. This study investigates the impacts of buyer's purchasing practices upon environmentally friendly operation of the supplier firm.

1.2 Summary of Relevant Literature

1.2.1 Problems Regarding Environmental Sustainability

Manufacturing operations influence human and environment in several ways. Cultivation of raw material, material processing, and redundant chemicals at the end of processing, carbon foot print generation by the utility usage through the processing stage, all these activities impact environment in multiple ways. Manufacturing process of fiber like Nylon emits harmful gas causing air pollution to the environment (Textile World News,1991). Processing chemicals such as conditioning agents, scouring chemicals, dispersing agents all these have negative impact both on human health and environment (Tortora & Collier, 1997; Lewin & Pearce, 1998). These toxic chemicals enter human body through direct or indirect contact causing long term intoxication.

The concern about carbon dioxide generation is so pervasive that regulation like Kyoto protocol of 1997 has restricted carbon dioxide generation during manufacturing process.

1.2.2 Different Environmental Initiatives

Considering the hazards caused by manufacturing operation, initiatives were taken by several manufacturers and national organizations. To reduce water

consumption in the processing stages Novozymes introduced BioPreparationTM process where DyeCat invented special type of coloration catalyst (Roy Choudhury, 2013). Waterless technology was also introduced by DyeCoo which uses recycled carbon dioxide instead of water ,saving tons of water and chemical consumption (Porteous & Rammohan, 2013).

Manufacturers also invested for the environmentally friendly operation to improve their operational and organizational performances. Shaw industries introduced several environmentally friendly products such as “EcoSolution Q”, “EcoWorx”, “LokDots adhesives” (EcoWorx Backing, 2017). Dow chemical industries replaced chlorofluorocarbon with 100percent carbon dioxide blowing agents in polystyrene foam production which brought them significant recognition in implementation of environmentally friendly initiatives (Roy Choudhury, 2013) Retailers like Nike, Coalatree invested for the development of environmentally friendly operation. Nike went into collaboration with DyeCoo to bring water free technology in textile manufacturing (Porteous & Rammohan, 2013). All these initiatives taken by retailers and manufacturers indicate the importance of environmentally friendly operation.

1.2.3 Drivers of Environmental Initiatives

Previous research identified several driving factors of the environmental initiatives of the supplier. Study conducted by Gabzdylova, Raffensperger, and Castka (2009) found personal view, job satisfaction, product quality and firm size as the driver of environmentally friendly initiatives of the wine producers. Impact of company size was also reported by Zhang, Bi, and Liu (2009) along with some additional drivers such as imposed regulations, stakeholder demand, risk management

etc. Company's corporate image, brand value, competitive advantages and complying with the international regulating body acted as driver in some cases (Agan, Acar, & Borodin, 2013). Customer demand, competitive advantage, regulations, and legislations were also mentioned in the study conducted by Bey, Hauschild, and McAloone (2013). In the study conducted by Lee (2008) environmental consciousness of the buyers and support from the government were identified as important driving factors. Study by Hitchens, Thankappan, Trainor, Clausen, and De Marchi (2005) found drivers being varied from country to country. Where regulations in some country got importance, other countries considered market pressure and return on investment as driving factors. Four major drivers were identified by Hsu, Choon Tan, Hanim Mohamad Zailani, and Jayaraman (2013): "Regulatory measures", "Competitor pressures", "Customer pressures", and "Socio-cultural responsibility".

1.2.4 Benefits of Environmental Initiatives

First world countries are more concerned about the environmental welfare and human health. Initiatives are being taken by first world country like Germany to promote environmentally friendly initiatives and discourage unsustainable products and materials (Wong & Taylor, 2001). Companies acting against environmental standards will fail to run business with such conscious countries, on the other hand companies which implemented required environmental standards will get access to big retailers of those countries which will promote their business growth.

Environmentally friendly initiatives benefit organizations, human and environment in several ways. Improved organizational images from environmentally friendly initiatives increased company's stock price, which increased the organizational value of the business (Feldman, Soyka, & Ameer, 1997; Miles &

Russell, 1997). Such kind of initiatives increased company's return on asset which indicates organizational development in terms of financial performance (Lo,Yeung, & Cheng, 2012).

Operational performances of the manufacturing plants were also improved by implementation of environmentally friendly initiatives. Water and chemical consumption reduced due to use of environmentally friendly materials and process in the manufacturing operation (Fresner, 1998; Xu, Chen, Wang, & Yang, 2016).

1.2.5 Barriers to Environmental Initiatives

Organizations have to face several barriers while implementing environmental initiatives in the operational strategies. One of the major limitations is the availability of technical support and resources (Simonsson, 2002). Environment friendly technologies are costly, take long time to implement in the facilities and need much technical training for the employees (Shen & Tam, 2002; Chan, 2008). Another problem is the integration of new technologies in the old setup. Even investing time and money for the environmentally friendly initiative, often old machine parts do not support the new components which create difficulty in gaining complete advantage of the environmentally friendly measures (Moors, Mulder, & Vergragt, 2005).

Lack of proper communication and management effort is another barrier to the environmentally friendly initiatives. Frondel, Horbach, and Rennings (2007) concluded that "The establishment of cleaner production technologies, however, is often hampered by barriers such as additional co-ordination input and a lack of organizational support within firms" (p. 7). Additional cost associated with environmentally friendly initiatives often becomes a hurdle for the company. Initial cost of product and process development is much higher for environmentally friendly

technology which often becomes difficult to bear for the small and medium sized companies (Shrivastava, 1995).

1.2.6 Purchasing Practices

Purchasing is one of the major activities in the business operation which has significant impact upon business success and operational efficiency. While placing orders retailers look into audit report, workplace codes of conducts, operational policies which are integral parts of organizational management (Starmanns, 2017). If retailers take care of the ethical aspects of organizations, then supplier firms will be compelled to comply with the ethical standards which in turn will improve environmentally friendly performance of the organization.

Operational activities of the supplier firms were found being influenced directly or indirectly by retailers' purchasing practices. Study conducted by Clean Cloth Campaign (2008) found cheap product price and inefficient lead time being responsible for fake time sheets and pay sleep, forcing workers to lie to inspectors and many other unethical measures taken by organizations.

Organizations were found being benefitted by reduced raw material waste, reduced transportation, compliance, and regulating cost by maintaining a close relationship with their buying firms. The environmental initiatives of the retailers got so much importance that 23 percent of the surveyed companies reported that they stopped sourcing from the suppliers having issues with environmental sustainability (Zhu & Geng, 2001). All the above findings suggest that purchasing practices of the company have direct or indirect influence upon its supplier firms.

1.3 Justification

Strategic purchasing is a major driver of supply chain activities. Lawson, Cousins, Handfield, and Petersen (2009) defined strategic purchasing as "a planning process that will direct all purchasing activities toward opportunities consistent with the firm's capabilities to achieve its long-term goals" (p. 2651). They found positive relationship between strategic purchasing and the level of supplier involvement which act as an effective way to improve business performance. Strategically oriented-supplier development practices can render positive influence upon buyers as well as the manufacturers by integrating relationship marketing efforts (Sánchez-Rodríguez, 2009). In developed countries it was found that the ability to enhance raw material and product design from the beginning as well as complying with the environmental regulations for the improvement of corporate image will pressure local firms to adopt improved environmental management system (Chen, 2005). Material selection, design, and other aspects are finalized in purchasing stages which further influence the impact of production operation. Research suggests that there are significant and complex connections between the normal commercial buying practice of a company and its suppliers' ability to meet required ethical standards (Acona, 2004). Green purchasing is increasingly being used as an effective tool to mitigate the environmental impacts of the product consumption and as a way to promote the development of clean production technology (Chen, 2005). So, analyzing the impact of retailers' purchasing practices upon manufacturers' environmental performance can be a crucial measure of sustainable global supply chain.

1.4 Purpose

The purpose of this study is to understand how buyer's purchasing practices impact environmentally friendly operation of the supplier firm. The qualitative study will go deep with brands and retailers' purchase behaviors, problems created by their purchase decisions, their unusual behaviors while dealing with suppliers and related issues. Besides, suppliers will be asked about their feedbacks on retailers' purchasing practices, environmental initiatives, barriers to ethical purchasing, and related issues with environmentally sustainable operation. Those responses will be analyzed to find relationship among them which will describe the influences of retailers' purchasing practices upon environmental performance of the supplier firm.

Research questions

RQ 1: How do apparel manufacturers define environmental friendliness of the production operation? What is the vision these companies are trying to achieve?

RQ 2: What initiatives have been taken by suppliers to improve environmental friendliness of the production operation?

RQ3: What are the drivers of apparel manufacturers' pursuit of environmentally friendly production?

RQ 4: What barriers prevent apparel manufacturers' pursuit of environmentally friendly production?

RQ 5: What benefits do apparel manufacturers receive from the implementation of environmentally friendly production?

RQ 6: How do buyer customers' purchasing decisions impact environmental performance of the apparel manufacturer? Which operational parameters are influenced?

1.5 Assumption and Limitations

The business relationship between buyer and supplier significantly impacts operational performance of both parties. Unsustainable and unethical purchasing decisions taken by buying firms pressures suppliers to act against sustainable and ethical practices. For example, if buyers want conventional cotton instead of organic cotton in their product then the carbon foot print, chemical consumption, and other related factors will be higher for that product. In that case buyer's decision to source organic cotton could reduce environmental impacts associated with manufacturing of that product. Taking consideration of such factors, this study assumes that decisions taken by buyer influence the operational performances of suppliers and vice versa.

There are several limitations of the study. The interviews will be conducted online which will limit interaction with the interviewee. It may be challenging to find companies which tell detail about their interaction with buyers as due to business privacy suppliers are reluctant to talk against their buyers. In this study manufacturers will be interviewed but it will not be possible to collect responses of the buyers. So we do not know how buying firms will justify their activities in favor of or against sustainable operation of the supplier firms. The study will interview responsible persons from the supplier firm but it will not be possible to verify the accuracy of the information collected through the interview.

Chapter 2

LITERATURE REVIEW

The following section discusses previous literature related to problems regarding environmental sustainability, different environmentally friendly initiatives, buyers' purchasing practices, benefits and barriers to environmentally friendly performance.

2.1 Problems Regarding Environmental Sustainability

Natural environment is being negatively affected by production and operation of different types of business activities. Different environmental parameters are being negatively influenced due to unsustainable operation activities of these business entities. The concept of sustainable product is explained by Ottman, Stafford, and Hartman (2006), ''Although no consumer product has a zero impact on the environment, in business the terms 'green product' or 'environmental product' are used commonly to describe those that strive to protect or enhance the natural environment by conserving energy and/or resources and reducing or eliminating use of toxic agents, pollution and waste''(p. 24).

Cotton production has both environmental and social impacts. Increased use of chemical and waste generation influences the environment negatively and at the same time health issues created by pesticides and toxic chemicals have negative social impact (Myers & Stolton, 1999). Sometimes oil is extracted from residual cotton seeds to be used in the food processing, which contains toxic chemicals. Patyk and Reinhardt (1998) conducted Life Cycle Assessment of hemp fiber and the study found that the crop cultivation and harvesting stage is responsible for 17 percent climate

change and 36 percent acidification in environment. These chemicals enter the human body through food causing long term health hazards.

During wool processing a significant amount of soap and alkali is used to clean fiber impurities. Wool is also treated with conditioning chemicals to avoid shrinkage and increased wash fastness which enters into the environment both during production and usage period (Tortora & Collier, 1997). Another mostly used fiber is viscose rayon which is extracted from wood pulp. Multiple toxic chemicals are used during the process of extracting, cleaning, and converting wood pulp into fiber (Chen & Burns, 2006).

Nylon production emits nitrous oxide into the natural air, which is responsible for destruction of earth's Ozone layer (Textile World News, 1991). Dyeing polyester fiber needs high temperature and pressure along with dispersing agent assisting dye absorption into fiber (Lewin & Pearce, 1998). Some of the disperse dyes used in the polyester dyeing has been found to have allergic effect on human health (Hatch, 1984).

Navarro et al. (2001) discussed the LC 50 value and acute toxicity unit (ATU) levels of textile effluent and found very high level of toxicity. Textile effluent is saline and colored solution having high level of Biological and Chemical Oxygen Demand (BOD, COD) which is very much harmful for natural environment (Yusuff & Sonibare, 2004). Metal suspended in effluent water is so harmful that sometimes biological treatment fails to remove those impurities from water. Dhas, Shiny, Khan, Mukherjee, and Chandrasekaran (2014) tested the impact of silver and zinc oxide nanoparticle which are used as antimicrobial substance on some species of bacteria species living in sewage water. It has been found that those nanoparticles act as

growth inhibitory agent for the bacteria. Very few numbers of bacteria can adapt continuous exposure of such nanoparticle and those adapting species convert the particles into a less toxic form. Textile effluents contain residual fiber and toxic chemicals along with suspended solids, grease and heavy metals such as mercury, zinc, lead, chromium which is very much harmful for living species (Yusuff & Sonibare, 2004).

Beside textile manufacturing industries, other types of industries are responsible for the environmental hazards in various ways. Tanning is a mandatory stage of leather processing where chromium based salts and oils are used to bring water resistance and pliable properties in leather. This process has been found as the most hazardous stage of leather processing (Yeager, 2000). Perchloroethylene, trichlorofluoromethane, trichlorotrifluoroethane are used in dry cleaning of leather which are very much harmful to health (Chen & Burns, 2006).

In the past several regulations like the Montreal Protocol of 1987 put restriction on chlorofluro carbon and the Kyoto Protocol of 1997 restricted carbon dioxide generation during production process (Dangelico & Pujari, 2010). It is apparent that lack of implementation of environmental sustainability can directly or indirectly cause health hazards of living organisms.

Study conducted by Cao, Scudder, and Dickson (2017) on the South African apparel supply chain revealed several problems regarding environmental sustainability. In the case of cotton cultivation, harmful chemicals were found being sprayed by the farmers which has negative consequence upon environment. Heavy use of energy by the yarn manufacturers increased the overall operating cost of operation. Textile manufacturers were found using hazardous Sulfur dyes which is a threat to the

human and environmental ecology. Negative practices were also identified in the apparel production. Waste generated from the cutting room as well as use of packaging materials was found having negative impacts on the environment. Tons of fabric waste was found being sent to the landfill each week, which is a fact of great concern for the environmentally friendly performance of the apparel manufacturers.

Stigzelius and Mark-Herbert (2009) conducted a study on the Indian apparel manufacturers' motivation and participation in environmental management system. The study found gap in the information flow among workers as a problem in case of implementation of the environmental sustainability. Due to workers lack of knowledge it was hard to pass environmental information to the worker level which made it difficult to implement environmental initiatives.

Survey conducted by Jakhar (2015) on the Indian apparel manufacturers revealed several environmental problems. According to this study "Intensive use of energy, chemicals, and natural resources during the production process, the apparel industry is particularly vulnerable on the environmental dimension" (p. 406). The study also reported that, manufacturers' shift to cost saving approach caused 0.39 percent more carbon emission which is responsible for the environmental hazard.

2.2 Different Environmental Initiatives

Problems related to environmental sustainability have led companies to adopt solutions in different aspects. Considering the devastating consequences of human and business operation activities on natural environment, different types of environmentally friendly initiatives are being taken by different organizations to minimize the impacts. In developing countries, the manufacturers run on traditional "end-of-the-pipe" concept where they focus much on setting up system to mitigate the

negative environmental impacts of the process rather than taking measures to find out and eliminate the source of problem (Walton, Handfield, & Melnyk, 1998). For example, residual water after fabric dyeing process is treated in water treatment plant (WTP) and toxic sludge is separated from the water and dumped into some safe places in the environment. This kind of end-of-pipe approach cannot bring permanent solution to the problem rather it just transforms one type of pollutant into another type (Sarkis, 2010).

A program titled as "Clean by Design" was launched by Natural Resources Defense Council (NRDC) which aimed at Chinese textile mills to improve their environmental practices while at the same time emphasizing the financial benefits of those initiatives. Thirty-three mills in Shaoxing and Guangzhou finished the program in 2014 that required the mills to implement several initiatives such as reusing cooling water, recovering heat from hot water, exhaust gas, and heating oil, recovering condensate, improving boiler efficiency and many more which saved operation cost of the manufacturing unit. To collect and reuse cooling as well as condensate water, one company spent less than 1 RMB (16 cent) per ton of water which reduced the water usage by 4.5 percent and saved $20,000 per year (124,500 RMB) (Greer, Keane, Lin, Zhou, & Yiliqi, 2015).

The 1986 Montreal Protocols urged foam polymer manufacturers to replace CFCs with sustainable alternatives. Crain Industries initiated a "gate-bar" assembly system which allows controlled release of pressure from mixture of urethane constituents and liquid carbon dioxide. In the production of Polystyrene all- carbon dioxide -blown process was introduced by Dow which eliminated emission of pentane to a significant level (Beckman, 2003). As a recognition of using 100percent carbon

dioxide blowing agent as a substitute of chlorofluorocarbons (CFCs) in polystyrene foam production, Dow Chemical was awarded Greener Reaction Conditions Award in 1996 (Roy Choudhury, 2013).

Environmentally friendly initiatives were also taken in the development of fiber and textile material. BioPreparationTM process was introduced by Novozymes which reduced the usage of energy and water use keeping cotton fibers unharmed during the process, and as a recognition they received Presidential Green Chemistry Challenge Award in 2001 (Roy Choudhury, 2013). Polylactic acid (PLA) is a lactic acid derived polymer which is fully compostable and sustainable fiber that consumes 20-50 percent less fossil fuel compared to traditional polyester treatment process. DyeCat Limited introduced a special type of coloration catalyst which is mixed with the PLA polymer solution before being extruded into fiber, as a result the wet dyeing stage of fiber was skipped saving tons of water and utility (Roy Choudhury, 2013).

Shaw Industrial group is a renowned eco-friendly manufacturer who implemented sustainability in multiple aspects of product and process development. For signature carpet products they innovated environmentally friendly fiber called "EcoSolution Q" which is used in 90percent of their products. They also designed "EcoWorx" backing, made with PVC free, 20percent recycled contents which meets low Volatile Organic Compounds (VOCs) CRI Green Label and Green Label Plus requirements (EcoWorx Backing, 2017). To attach carpet in the floor they developed a new pressure sensitive adhesive "LokDots" which provides an alternative to wet adhesive, virtually eliminating the issue of Volatile Organic Compounds (VOCs). As recognition of development of sustainable EcoWorx Carpet tile, Shaw Industries received "Designing Greener Chemicals" Award in 2003. They also implemented

“Reclaim-to-Energy” (Re2E), a unique pre-consumer recycling measure, where power is generated by reclaimed carpet products which are not suitable for any kind of recycling purpose. In this process steam and electricity is generated from the shredded scraps and collected used carpets in “CAAF” (Carpet as Alternative Fuel) process (CXGBS, n.d.).

‘Mihila’ is the first custom built eco-friendly factory in the world located in Srilanka which operates on three basic areas - energy consumption, water consumption, and waste generation. They introduced industrial production of upcycled fashion, LED task light in the factory, and biodiversity refuge on the premises (Hirdaramani, n.d.). Because of multiple sustainable initiatives, they have gained 48percent reduction in carbon footprint, 70 percent less water consumption compared to conventional factories, and zero waste to landfills.

Along with manufacturers, environmental initiatives were also taken by some retailers. Nike introduced Manufacturing Index (MI) to implement sustainable manufacturing practices to their manufacturing firms. The index used to monitor and measure the performance in quality assurance, on-time delivery, cost, and sustainable operation. Each of these four categories contains around 25percent weight which sums up to 100. Nike has also invested in DyeCoo to develop waterless textile dyeing technology. In this new technology dye molecules were transferred using recycled carbon dioxide rather than using water, which eliminates the water at the same time to reduce chemical consumption to great extent (Porteous & Rammohan, 2013). Retail brand “Coalatree” extracted color from recycled plastic and glass bottles collected from landfill. They extracted green color from green soda bottles, brown from beer and root beer bottles, blue from blue water bottles and used x-ray films and black food

trays to extract grey and black color respectively. Products made in this way exist in Original Bottle Tee™ product line. According to their website, “Each Original Bottle Tee™ saves the equivalent of 6.5 20oz plastic bottles from the landfill and 18 quarts of water by eliminating textile dyeing” (Environmental Initiatives, n.d.).

From time to time manufacturers have chosen environmentally friendly approaches in their product and process development. It can be assumed that some sort of benefits and value addition from buyer or consumer acted as motivation to such kind of sustainable initiatives of manufacturers.

2.3 Drivers of Environmental Initiatives

Suppliers’ environmental initiatives were driven by several direct and indirect factors. Those factors acted as motivational force for the suppliers in terms of integration of sustainable initiatives in the organizational structure. A study was conducted by Gabzdylova et al. (2009) to figure out the motivation behind sustainable practices of the wine producers. Twenty-four wineries were interviewed with open-ended questions. According to their findings, “The most important drivers for sustainable practices are personal values, preferences and satisfaction with the profession (i.e., enjoyment of the work itself), followed by product quality. Size of firm also appeared to be an important factor. New Zealand wine companies are also driven by the market. Environmental value and personal satisfaction with profession acted as major driver of sustainable initiatives. Product quality was found as second most important driver on the sense that sustainable agriculture such as restricted use of fertilizer and pesticides improve soil quality which in turn produce better quality product. International rules and regulation also acted as a motivating force to take compliance initiatives of the wine producers.

A survey was conducted by Zhang et al. (2009) on the companies in Suzhou Industrial Park, located in China, to figure out drivers of environmental management initiatives. The survey contained total 138 responses, from the companies including SMEs, wholesale, retail and some other types of industries. Key drivers found were increased regulation, competitive advantage of one company over other as well as company's' responsibilities to the environmental welfare. 30.8 percent suppliers mentioned demand from customers where 24 percent mentioned the benefits from cost reduction as driving factors to the sustainable initiatives of the companies. The size of the company also acted as a crucial factor in company's sustainable initiatives. Compared to small companies like SMEs, large companies were found more actively responding to the compliance and sustainable measures. Other driving factors for sustainable initiatives were supply chain demand, support provided by government, demand from the employee and stakeholders, environmental risk management, urge from banks and companies.

Another survey was conducted by Agan et al. (2013) on several industries containing metal equipment industries, textile, apparel, and leather industries, chemical and plastic industries, food and agriculture product industries, construction materials manufacturers, wood and furniture manufacturers located in Turkey. The survey collected total 590 responses and aimed at looking into the drivers of environmentally friendly operation of the companies. Study found regulations being less significant driver for sustainable management such as waste treatment. Agan et al. (2013) found similar impact of company size as reported by Zhang et al. (2009). Agan et al. (2013) concluded that company's resources get increased with the increased size of the company which in turn enable them to invest more for the overall

environmental performance. There are some other driving factors involved in the company's environmental initiatives. According to the Agan et al. (2013), "our findings suggest that Expected Soft Benefits, such as corporate image, are the strongest driver of environmental activities. Specifically, there are four items in Expected Soft Benefits: 1) Corporate image, 2) Brand name, 3) Comparative advantage, and 4) Adjustment to the European Union (EU)" (p. 32).

Bey et al. (2013) took an international survey approach containing participants from nine different countries, among which over 50 percent were major manufacturing companies and rest were companies involved in outsourcing from sub-contractors. Research findings showed domination of several sustainability drivers such as competitive edge, legislative demands, forefront of future legislative. Bey et al. (2013) found "increased employee satisfaction" as less important drivers of sustainable initiatives of the participant companies.

A survey was conducted by Lee (2008) based on the responses from machinery, metal, electronic, chemical, and textile industries to find sustainability practices of buyers and suppliers. Buyers' environmental consciousness motivated suppliers to adopt environmentally friendly initiatives. The study also found government support as an important driving force to the suppliers' sustainable initiatives.

A multi-country survey was conducted by Hitchens et al. (2005) on textile finishing, furniture, fruit and vegetable processing industries comparing the driving factors of environmental performance of different companies located in UK, Germany, and Italy. They found influential factors varying from country to country. According to their study finding, "In Italy regulation predominated, in UK/ROI regulation and

cost were important, in Germany market pressures were much more important in bringing forth environmental initiatives" (p. 549).

A survey was conducted by Hsu et al. (2013) on ISO 14001 certified Malaysian companies to identify the motivating factors behind their sustainable initiatives. Four major influencing drivers were identified: "Regulatory measures", "Competitor pressures", "Customer pressures", and "Socio-cultural responsibility". Companies were influenced by the regulations, laws as well as pressure from the competitors.

2.4 Benefits of Environmental Initiatives

Environmentally friendly initiatives not only benefit the environment, but also bring some positive impacts to the implementing organizations. Many times, it has been found that such kind of initiatives are adopted by organizations to gain support for education, research, and outreach in order to meet environmental challenges faced by businesses and industries (Business & Environment, n.d.). Most often policy, planning, resource allocations, and performance evaluations of environmental sustainability are considered under company's environmental management system (EMS), which is indicative of company's overall environmental performance. Study of Feldman et al. (1997) showed that firms can increase their stock price around 5percent by adopting improved environmental management systems and environmental performance. Lo, Yeung, and Cheng (2012) collected responses from sixty-one ISO 14000 certified textile and apparel industries to analyze the benefit derived from that environmental management system. It has been found that ISO 14000 can increase firm's profitability through increased return-on-asset. From the implementation of ISO 14000, profit improvement started even in the implementation stage bringing further

cost efficiency. Return on asset was improved around 2.9 percent and return on sales improved up to 3.3 percent by adopting this environmental management system. A survey was conducted by Melnyk, Sroufe, and Calantone (2003) on 1510 active responses from different types of manufacturer and suppliers' environmentally friendly practices and found that environmentally friendly approaches bring cost reduction, quality improvement, reduction of production lead time and reduces waste generation in different stages of production. Similar result was found by Berry and Rondinelli (1998) who showed that implementation of environmental management system helps to reduce waste generation in design and production stage, indirectly reducing the extra cost associated with waste generation and removal.

Another significant benefit of environmental performance improvement is global market expansion. In 1995 the government of Germany imposed restriction upon production, sales, and importation of products containing harmful dyes to protect environment (Wong & Taylor, 2001). In that case, adoption of green technology and better environmental performance will create scope to export products in countries like Germany, which have environmental regulatory requirements (Moore & Ausley, 2004). Adoption of environmentally friendly approaches gives organizations access to environmentally conscious markets, most of which are located in the first world countries. Such scope of market extension brings better business development for any organization.

Environmental initiatives increase the reputation of companies, creating a more stable and organizational image which acts as a favor to company's marketing and financial performance (Miles & Russell, 1997). Adoption of green technology creates

better organizational image, which outperforms the non- environmentally friendly competitors in global supply chain (Russo & Fouts, 1997).

Environmentally responsible production of manufacturers reduces the pressure upon effluent treatment plants saving energy and effort. Fresner (1998) analyzed the importance of environmental performance improvement in production unit of Austrian textile mills and found that through cleaner and sustainable initiative water consumption was reduced to 30percent, gas consumption reduced to 15percent even reducing COD of waste water to 30percent saving around 0.5 to 1.5percent of total cost of company. From the analysis of 10 cases conducted between 1980 and 1995 it has been found that companies saved 20percent or more chemical usage by implementing toxicity reduction initiative during manufacturing (Jeong, Jang, Day & Ha, 2014). To save water and reduce chemical consumption Xu et al. (2016) dyed polyester using organic solvent liquid paraffin. Compared to dyeing polyester in conventional method this new organic solvent showed better color yield, fastness properties, and mechanical properties improving overall quality of the final product. Even the dyeing machineries were less expensive compared to dyeing polyester with super critical carbon dioxide which is a latest technology to save environment the study found that use of organic solvent in dying process can save 115 kg of chemicals and 70 m3 water per metric ton of dyed polyester thus saving utility cost and reducing overall production cost of the products (Xu et al., 2016). Such reduction in chemical and water consumption will also reduce the operation cost of water treatment plant, which might save money and bring more profit.

It was found that the mills not only improved their environmental performance but also benefited financially by taking initiatives such as fixing insulation, monitoring

water, electricity consumption, and capturing discharged heat of hot water. On average for each mill, water usage was cut by 9percent, coal usage was cut by 6.5 percent and electricity usage was reduced by 4percent. NRDC estimated that the mills have saved 3 million tons of water, 36 million kilowatt-hours of electricity, 400 tons of chemicals, and 61,000 tons of coal while at the same time saving a total of $14.7 million (Bain, 2015).

Orji and Wei (2016) compared the conventional manufacturing and green manufacturing for cost saving in different stages of manufacturing. Overall, carbon emission in product life cycle was reduced to almost one third due to use of green manufacturing. Reduction in carbon emission also reduces carbon emission tax for the company which constitutes a significant portion of life cycle cost of any product. Activity based cost of product was reduced to $179.22 in green manufacturing process compared to $ 190.65 in the conventional process (Orji & Wei, 2016).

Various types of benefits such as cost reduction, improved organizational image, and operational efficiency can be derived from the successful implementation of environmental initiative in the organizational structure. Even though manufacturers are often pressured and influenced by surrounding factors to implement such environmentally friendly approaches, doing so becomes beneficial and supportive to their overall business development.

2.5 Barriers to Environmental Initiatives

Despite having several benefits of environmental initiative of business operation, it often becomes difficult to integrate them in the business strategy. During the implementation of environmental initiatives, most of the time organizations face different types of strategic and economic barriers. This kind of initiative requires

integration of pollution prevention technology and advanced technology management which requires modern technology and features. Technical limitations have been found as one of the major barriers to environmental management system (Simonsson, 2002).

Similar results were found in the survey of Van Hemel and Cramer (2002) on SME's preference to environmental management system in product and process design which stated that sometimes senior management fails to realize the importance of implementing environmental initiatives in the operation strategy, which acts as a barrier to take initiative. Frondel et al. (2007) concluded that, "The establishment of cleaner production technologies, however, is often hampered by barriers such as additional co-ordination input and a lack of organizational support within firms" (p. 7).

Another barrier is related to cost effectiveness of process development. Initial cost of implementing environmentally friendly initiative is higher due to need of modern technology and management practices. In the apparel industry the price of environmentally friendly materials (recycled) has been found to be more expensive compared to conventional virgin materials (Larney & van Aardt, 2004). But the amount of cost saving is not always enough to repay and compensate initial implementation cost of new measures, which can discourage manufacturers in taking such green initiative. Higher price sometimes acts as a barrier to environmentally friendly product and process development. To develop environmentally friendly technology, initial product and process development cost is incurred which cannot be borne by many small and medium size companies (Shrivastava, 1995). As the direct cost saving and revenue generation from the environmental initiatives cannot always

be identified directly, often the benefits of environmental initiatives become hard to measure directly (Presley, Meade, & Sarkis, 2007).

Uncertain and unexpected consumer preferences and less willingness to pay premium for environmentally friendly products is another barrier to suppliers' environmental initiative (Nimon & Beghin, 1999). In general, retailers always try to align themselves with expectations and demand of consumers. If consumers are not interested in buying environmentally friendly products, then retailers may not be interested to source that kind of product which will indirectly affect environmental initiatives of manufacturers.

Merging new initiatives in the already existing facilities and management policy is a great challenge for any organization. There is much difficulty in merging alternative green technology to the existing infrastructure (Moors et al., 2005). It often happens that old infrastructure cannot support the latest technology. As a result, parts of infrastructure need to be replaced for new technologies, which increase the cost of implementation. Lack of proper communication and top management responsibilities act as organizational barrier of environmentally friendly initiatives (Post & Altma, 1994). "Contradictory regulation" barrier is a condition where environmental initiatives sometime contradict managements' regular responsibilities and bring them to an inactive mode (Shrivastava, 1995).

Sometimes concept on reasons and solutions of environmental problems are not clear to the management because information is not always available in a structured way (Shrivastava, 1995). This causes managers to adopt a wait and see approach and linger the implementation process. Such kind of barriers were termed as "Lack of know-how and environmental information" by Shrivastava (1995).

Shrivastava (1995) found “organizational inertia” as another major barrier which causes organizations to follow conventional and familiar route rather than bringing innovative change.

Several other barriers to the implementation of environmentally friendly initiatives are lack of government legal enforcement, increase in management and operation costs, lack of trained staff and expertise, lack of client support, lack of sub-contractor cooperation, lack of supplier cooperation, difficult coordination of environmental ,performance among multi-tier subcontractors, and lack of working staff support, time-consuming for improving environmental performance ,change of existing practice of company structure and policy, increase in documentation workload, lack of tailor-made training on environmental management, lack of technological support within organization (Shen & Tam, 2002).

Zhu, Sarkis, and Geng (2011) conducted a study on the Chinese apparel manufacturers to identify the barriers to environmentally friendly clothing production. Three most discussed barriers were: less preference to the environmentally friendly production compared to product quality and price, manufacturers’ lack of knowledge about market protentional of environmentally friendly clothing production, and inadequate strategic planning. Other reported barriers were lack of technology and human resources as well as difficulties in entering environmentally conscious market.

2.6 Purchasing Practices

Barriers to environmental initiatives can be created by several external and internal factors. The decision taken while purchasing can impact the operational strategy of suppliers which further influence their environmental performances. A survey conducted by United States Fashion Industry Association (USFIA) found that

companies consider three major factors while making their sourcing decisions: speed to market, sourcing costs, and risks related to compliance. Risk related to compliance considers the social and environmental safety issues of supplier firm and is one of the major factors in supplier selection (USFIA, 2017). Retailers use different approaches while selecting suppliers such as analyzing audit report, on spot audit, and signing codes of conduct that dig into the operational policies and practices of suppliers (Starmanns, 2017). Such kind of purchasing activities influence the performance metrics of supplier firm as better performance creates more scope of business development through orders from renowned buyer. Strong external stakeholder pressure persuades companies in the implementation of ethical sourcing initiatives especially if there are some kind of direct business benefits such as cost saving or business development (Roberts, 2003).

Carr and Smeltzer (2000) conducted a survey on manufacturing and non-manufacturing firms and found that strategic purchasing has positive relationship with purchasing personnel's technical skills which is important for firm's operational excellence. Eltayeb, Zailani, and Ramayah (2011) defined the term "green purchasing" as "environmentally-conscious purchasing initiative that tries to ensure that the purchased products or materials meets environmental objectives set by the purchasing firm, such as reducing sources of waste, promoting recycling, reuse, resource reduction, and substitution of materials" (p. 3). Such kind of green purchasing approach mainly highlight supplier's environmental performance through prioritizing environmentally responsible suppliers. Green purchasing is increasingly being used as an effective tool to mitigate the environmental impacts of consumption and to promote the development of clean production technology (Chen, 2005).

Strategic purchasing acts as a structured approach which has much potential to influence both sourcing and manufacturing activities. Lawson et al. (2009) defined strategic purchasing as "a planning process that will direct all purchasing activities toward opportunities consistent with the firm's capabilities to achieve its long-term goals" (p. 2651). They found a positive relationship between strategic purchasing and the level of supplier involvement which is an effective strategy for improving business performance. Strategically oriented-supplier development practices can render positive influence upon buyers as well as the manufacturers by integrating relationship marketing efforts (Sánchez-Rodríguez, 2009). A study conducted by Dickson and Chang (2015) found manufacturers' involvement in social responsibility practices bring more faith and long-term relationship with the buying company. The order volume of the manufacturing firm was reported to be increased through implementation of social responsibility practices. The study also found that any incentive or punishment provided by buying firms can improve manufacturers' performances on social responsibility practices. As buying firms' active initiatives were found improving the social responsibility practices of the manufacturing firm, and environmental welfare is integral part of any improved society, it can be assumed that such kind of active initiatives from buying firm will also influence environmentally friendly initiatives of the supplier firm.

Narasimhan and Das (1999) explained strategic sourcing as a way to gain manufacturing capabilities without having major investment of capital. Sourcing strategy can bring organizational efficiency by bringing extra value to product and manufacturing process. Kannan and Tan (2002) received survey responses from four hundred and eleven suppliers among which 18 percent responses were from raw

material manufacturers, 43 percent were from final product manufacturers and 14 percent were from wholesaler and retailers. The study found that supplier' effort to reduce waste is considered during the sourcing decision for many companies. Zhu and Geng (2001) conducted a survey on large and medium sized state-owned enterprises (LMSOEs) of China to analyze the impact of environmental issues during supplier selection. The LMSOEs who were able to develop close relationship with suppliers reported to get some benefits, such as reduced raw material waste, reduced cost relating to transportation, compliance, waste disposal as well as regulatory issues. That kind of close relationship increased customer retention rate and increased overall market share of the company. One of the major findings was that 23 percent LMSOEs stopped purchasing from the suppliers that have environmental issues which shows the importance of environmental practices of supplier firm upon business development. From the study on electronic manufacturers of Taiwan, Wong, Lai, Shang, Lu, and Leung (2012) concluded that companies should source from ISO 14000 certified environmentally responsible suppliers and conduct environmental performance evaluation of second-tier suppliers as well as share environmental management policies for more transparent operational criteria.

Raw material, design and other product aspects are finalized in purchasing stages which further influence the impact of production operation. Research suggests that there are profound and complex relationship between the normal commercial buying practice of a company and its suppliers' ability to meet required ethical standards (Acona, 2004).

Though buyers' good purchasing practices have potential to change supplier's manufacturing activities in positive ways as stated above, bad purchasing practices act

as a threat to ethical and environmentally friendly operation of the supplier firm. Purchasing practices of buying firms were found having profound influence upon suppliers' operational activities. In a global survey on 1,454 suppliers from 87 countries conducted by ILO, suppliers reported accepting orders below production cost just to maintain competitive advantage over other suppliers and continue getting orders from the buyers to run the business. Inefficient purchasing practices of the buyer, such as inaccurate technical specification and inefficient lead time, increase production cost hampering overall organizational performance (ILO, 2017).

Big retailers favor purchasing practices that aim to get the maximum flexibility and the lowest prices from their suppliers. Research conducted by Clean Cloth Campaign (2008) found fake time-sheets and pay slips, workers being forced to lie to inspectors, and many other such tricks which were due to the pressure created by competing demands of good working conditions and faster, cheaper product purchase orders. Here one fact is apparent that, if the purchasing decision is not taken ethically then it creates negative consequences, which either directly or indirectly impacts firm's sustainable performance. Dickson and Cahn (2017) collected responses on the order risk to reward which considered the variation of received monthly order quantity from the average and found that "With higher Order Risk to Reward, suppliers face risks in having the right amount of production capacity and may have to lay off workers, require overtime, fail to meet full social benefits, engage temporary labor, or arrange sub-contracts, all of which can place the supplier out of compliance with the buyers' code of conduct" (pera. 11). Here higher order risk to rewards means higher variation in monthly order quantity. So, it is apparent that order quantity placed by buying firm can also influence operational performance of the supplier firm. The study

also found that no incentives are provided by the buyers of half of the participating companies for compliance purpose. Without support from buying firms, suppliers will need extra investment for compliance features which makes them reluctant to implement such features. As environmental initiatives are also a part of company's compliance it can be assumed that without proper incentive by buying firms, it will be a burden for supplier firms to implement environmentally friendly initiatives.

2.7 Theoretical Framework

A theoretical model was developed based on the literature review discussed in the previous sections (see Figure 2.1). First section of the framework discusses buyers' positive purchasing practices, negative purchasing practices and drivers of suppliers' environmental initiatives. Second section considers benefits and barriers to the environmentally friendly initiatives of the supplier firms.

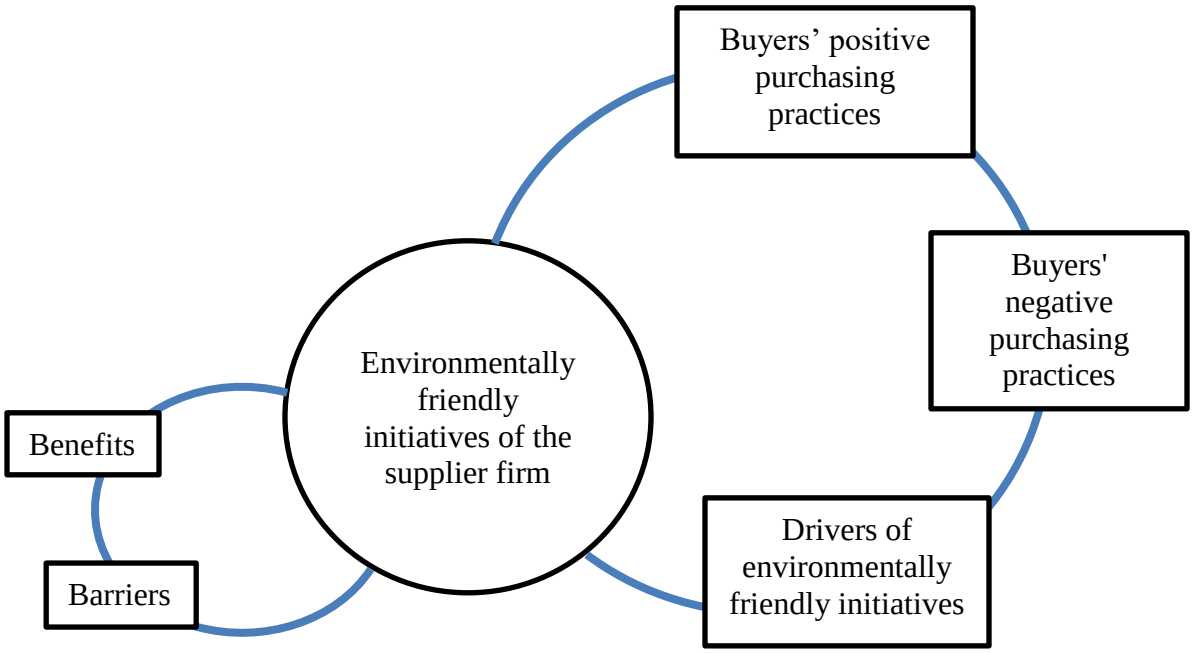

Figure 2.1 Theoretical Framework.

In case of buyers purchasing practices, the proposed model considers both positive and negative activities of the buyers. As positive purchasing practices, the literature review found buyers conducting on spot audit, looking into suppliers' audit reports, codes of conducts as well as waste management of the supplier firms before placing order (Kannan & Tan, 2002; Starmanns, 2017). The framework assumes that such positive purchasing practices of the buyers will also have impacts on the environmentally friendly initiatives of the supplier firm.

The literature suggest that bad purchasing practices created several problems to the organizations. According to the study by ILO (2017), buyers' inaccurate technical specification and inefficient lead time are responsible for the increase of suppliers' production cost. Pressure created by the demand of good working conditions, short lead time as well as cheaper product purchase orders compel suppliers to submit fake time sheets and lying to inspectors (Clean Cloth Campaign, 2008). As production, compliance, sustainability all are directly and indirectly connected with each other the framework assumes that bad purchasing practices will also impact environmentally friendly initiatives of the supplier firms.

Previous studies reported several factors acting as drivers to the sustainable initiatives such as personal view, job satisfaction, imposed regulations, stakeholder demand, risk management (Gabzdylova et al., 2009; Zhang et al., 2009; Bey et al. 2013; Hsu et al., 2013). Driver of environmentally friendly initiatives has been included in the framework to identify the motivating factors.

Several benefits were reported in the previous literature as a result of the sustainable initiatives. Sustainable performance brought cost, waste, and lead time reduction, increased stock price and firm's return on asset which positively influenced

the organizational performance (Melnyk et al., 2003; Lo, Yeung & Cheng, 2012; Feldman et al., 1997). Long term buyer supplier relationship influences supplier firm by positively affecting the process as well as organizational performance through reduced waste, cost and increased profit (Zhu & Geng, 2001). The framework looks into the benefits of the environmentally friendly initiatives of the supplier firms.

The literature found that companies faced several barriers while implementing sustainable initiatives in the organizational structure. Barriers related to technical limitations, extra time and cost, challenge of merging new technology with existing infrastructure, lack of proper management support have been reported by previous studies (Shen & Tam, 2002; Chan, 2008; Simonsson, 2002; Moors et al., 2005; Post & Altma, 1994). So, the framework discussed the barriers to the environmentally friendly operation of the supplier firms.

Environmentally friendly initiatives of the supplier firm were evaluated by the factors adopted from the framework discussed by Chardine-Baumann and Botta-Genoulaz (2014). They used five major fields to measure environmental performance such as: Environmental management, use of resources, pollution, dangerousness and natural environment. Each major field contained several sub fields. Under the first field "Environmental management" four sub-fields were discussed such as: Environmental budget, environmental certification, environmental compliance, workers implications. Due to irrelevancy with this study "workers implications" was excluded from the consideration. Under the field "Use of resources" several sub field such as Renewable energy, recycled water, inputs stemming from the recycling, recyclable outputs, recyclable wastes were considered. Third major field "Pollution" contains four sub-fields: air pollution, water pollution, land pollution. Fourth major

field “Dangerousness” contains three sub-fields such as Dangerous inputs, dangerous outputs, dangerous wastes. The last major field “Natural environment” discussed four sub fields: Eco-systemic services, respect of biodiversity, land use, development of urban and rural areas. Previous literature also discussed sustainable manufacturing, sustainable product innovation, sustainable energy consumption, reduction of water consumption initiatives of the manufacturing companies (Roy Choudhury, 2013; Porteous & Rammohan, 2013; EcoWorx Backing, 2017; Greer et al., 2015; Beckman, 2003). Due to relevancy with this study first three major fields environmental management, use of resources, and pollution were adopted with respective sub fields from the study of Chardine-Baumann and Botta-Genoulaz (2014).

Chapter 3

METHOD

3.1 Sampling, Instrument development and Data collection

There are mainly two types of research approaches: qualitative and quantitative. In qualitative study, statistical procedure or quantification is not used to derive research findings (Strauss & Corbin, 1998). On the other hand, quantitative research uses statistical approaches to derive results. The qualitative research approach is used to understand live experience of people in any social context (Ritchie, Lewis, Nicholls, & Ormston, 2013). According to Berkwits and Inui (1998), "Qualitative encounters are also necessary to understand the 'structure' of a system: how interdependent individual groups, and institutional components function (or fail to function) together" (p. 197). Our study considers the manufacturing and supply chain system to analyze impacts of purchasing practices on the environmentally friendly operation of supplier firms. As the study investigates the practical problems faced by supplier firms, created by unethical practices of buying firms, and looks for their impacts upon supplier's environmentally friendly activities, the qualitative research approach is most suitable here as the qualitative approach provides more detailed information about any context.

Data in this study were collected through one-on-one semi-structured interviews of the participants. The interview data collection method was selected because this kind of approach answers the "what", "how" and "why" of the impact of purchasing practices on the environmental and organizational performance of the supplier company. The semi-structured interview provides much flexibility and in-depth collection of data through probing the responses which provides much scope of

the root cause analysis and the impact measurement of the incidents (Alshenqeeti, 2014).

Participant suppliers were selected from the manufacturer member list of the Sustainable Apparel Coalition (SAC). Due to being member of the Sustainable Apparel Coalition (SAC), it was assumed that they keep track of issues related to environmentally friendly initiatives. Participants were from companies either textile and apparel manufacturer or contract manufacturer. One supplier which is not a SAC member was selected as a participant because of having high involvement in the sustainable initiatives. Vertically integrated textile and apparel companies were prioritized as participants due to their greater exposure to the full apparel supply chain. Primarily, invitation email was sent to 21 suppliers and finally 10 participants agreed to take part in the study, making a response rate of 47.6 percent. Among the 10 participants, 9 were textile and apparel manufacturers and one was contract manufacturer. As this study investigates the issues in the environmentally friendliness caused by the unusual decisions of buying firms, it was assumed that selected companies, having direct business with global retailers, will be able to provide more detail information on buyers' purchasing practices and its impacts upon company's operation. Open ended questions were asked which covered buyers' unusual activities during business deals, problems created by buyer's sourcing practices, company's environmental activities, barriers to company's overall sustainable performance, participant's perceptions about problems created by unethical purchasing practices, buyer's audit requirements, incentive for compliance, unexpected behavior on order placement and impacts of these unusual behaviors upon organizational performance, environmentally friendly operation and related topics. The interview questions were

developed based on the literature review done in the previous section. Selected companies were contacted via email and responsible persons were interviewed one-on-one. For this study interviews were conducted with the sustainability and compliance heads, planning and development directors, managers and executives of the sustainability team. Supplier companies were originating from different countries: China, Bangladesh, India, Sri Lanka, South Korea, Spain, Taiwan, and Hong Kong SAR.

Before interviewing the responsible persons, modified informed consent form was sent to the participants describing the IRB contents but not requiring any signature. Each interview lasted between 30 minutes and little more than 1 hour. The conversations were recorded and transcribed verbatim. The transcribed interviews were coded using NVivo software to categorize relevant findings from the conversations.

Codes were developed based on the research questions and discussed theoretical framework. Both deductive and inductive approaches were taken to code the interview transcripts. Several major codes were developed from the research questions and literature review: definition, vision, driver of environmentally friendly initiatives, benefits, barriers, positive purchasing practices, negative purchasing practices. Different major themes were identified under these codes which were stated as sub-code under them. Even though “negative purchasing practices” was a major field and major code, later it was merged into sub-field of the code “Barriers”. “Environmental Performance” was one major field and major code which contained several sub-codes. Under this field three sub-codes: “Environmental Management”, “Pollution” and “Use of Resources” were adopted from the framework discussed by

Chardine-Baumann and Botta-Genoulaz (2014). Under each of these three major codes there are some other sub-codes which were also adopted from the discussed framework. Inductive codes: “Raw material” and “Use of Advanced Technology” were developed from the conversation of the participants. The study took both inductive and deductive approaches where the assumed theoretical framework was tested and specified based on the analysis of the responses collected through the interviews.

Chapter 4

RESULTS

Following section discusses the findings from the study. Results are discussed on the major areas which were identified from the analysis of participant interview.

4.1 Definition and Vision

Environmental friendliness was defined by suppliers from a broad range of aspects. It was defined as a fact of legal compliance, pollution prevention as well as innovation and investment for more sustainable operation. One supplier defined environmental friendliness as a combination of seven key areas: sustainable raw material, limited water consumption, limited energy consumption, greenhouse gas and carbon footprint reduction, controlled emission to air, waste reduction and sustainable chemical management. According to one supplier,

> For our organization, environmentally friendliness is: inventing, investing on company requirements in order to become a sustainable, as more sustainable as possible and especially invest in the material side because we work in a textile industry and this is our product.

Suppliers took environmental initiatives with several visions. Environmental and organizational welfare worked as a vital factor in company's vision. Suppliers aimed at adapting positive changes, investing for new environmentally friendly initiatives, using environmentally friendly materials to bring net positive impact for the company. From the environmental side, welfare of the planet acted as a motivating factor for some suppliers to take environmentally friendly initiatives. Suppliers expressed desire to work for building a better world by restoring planet as well as creating economic value. According to one supplier,

We want to be a great company and we have been working in the apparel field nearly 30 years. Our boss has a big mission, we want to grow and be a company like NIKE and Adidas and some other great manufacturers. We also want to do more for the industry and for the society so this motivates us.

4.2 Environmentally Friendly Initiatives

To ensure environmentally friendly operation suppliers have taken several initiatives from different aspects. Environmental pollution is one of the major problems associated with manufacturing and distribution of product. Suppliers showed concern about advanced technology, pollution control measures, advanced resource management, sustainable environmental management system. Each of these topics is explained in more detail in the following section.

4.2.1 Use of Advanced Technology

Several advanced technologies have been adopted by suppliers to ensure sustainable operation of the company. Suppliers worked on replacing mechanical parts with sustainable alternatives, used advanced lighting system as well as integrated modern IT system in the organizational structure.

Four out of ten suppliers showed their increased concern for efficient use of energy. One of the participating suppliers replaced their clutch motors with Servo motors which are more energy efficient. Now they are gradually moving to the electronic Box motor machines which are even more efficient than Servo motor machines. Currently 80 percent of their machines runs with Servo motor where only 20 percent runs with electronic Box motors. For energy efficient lighting they are using florescent tube light T8 and T5 and for more sustainable performance they are

now moving to LED. Another sustainable initiative is compressed air boiler which is more fuel efficient and causes less pollution and less electricity consumption.

While buying new machines suppliers are considering safety, green energy and energy efficiency. Suppliers are working on energy efficient machines which is a great support for sustainable operation of the supplier firm. According to a participant supplier,

> In all the purchase progress Standard Operating Procedures (SOP) already involve the safety study and the green energy study as well. Not like before whenever we purchased a machine just used to see whether it is workable or not. But now we are adding another subject, it's energy efficiency and the safety concern.

Management of a big supply chain is always challenging task. One of the participant suppliers adopted advanced globally recognized information technology (IT) measures to supervise their hundreds of offices and manufacturing sites. The use of IT systems made the organizational activities more efficient and easily manageable. According to that supplier, "We've purchased an IT system that we have used to translate the company framework which has now been certified to 13 international standards."

4.2.2 Pollution Control

Suppliers faced several pollution related problems stemming from increased water pollution, greenhouse gas, air pollution, as well as land pollution. Initiatives have been taken in pollution control and sustainable operation of the supplier firm.

Four participants talked about water related issues of industrial operation. Water usage was found being measured and controlled by suppliers. Water recycling

takes place in the Water Treatment Plant (WTP). One of the participant suppliers had set target for not using any fresh water in the manufacturing process and recycle all the water that they use. Their largest textile manufacturing plant is zero liquid discharge which recycle hundred percent of the water from that plant. Rain water harvesting is another sustainable initiative taken by manufacturers which has reduced pressure upon natural water sources. Rain water is being collected and stored for further use. One supplier said that they use water saving toilet tank to save water and even use recycled water for toilet flush or car wash. One supplier was found collecting water after printing process with a purpose of recycling.

Suppliers started working on greenhouse gas intensity reduction, water intensity reduction, waste reduction measures. Less issues were reported around air pollution compared to other types of pollutions. During the manufacturing operation air pollution was found happening due to boiler usage such as fuel boiler usage and biomass boiler is a great alternative to the fuel boiler for better environmentally friendly performance.

Land pollution efforts were also reported by few suppliers. One supplier said that they work with government agents who take away the domestic waste so that there is not impact on the environment. Suppliers involved in only cutting and sewing have lesser impacts on the landfill compared to other types of textile manufacturing industry. Initiatives were taken to eliminate disposable plastic ranging from water bottles to coffee cups which saved landfill from further pollution. According to one supplier, “We've eliminated quite a lot of disposable plastic within our operations everything from water bottles to coffee cups.”

4.2.3 Use of Resources

Suppliers showed their increased concern while dealing with remaining fabrics, fibers, recycling activities as well as sustainable energy usage. These topics are discussed in detail in the following sections.

4.2.3.1 Material Management

Suppliers are sorting and recycling fibers and fabric scraps. Conventional Product packaging materials are being replaced by sustainable alternatives to ensure sustainable product handling.

According to one supplier fabric itself creates 80 percent of the total waste during apparel manufacturing process. Remaining cotton, wool, cashmere etc. are sorted, sent or sold to recyclers. Solid cotton waste, printed cotton, solid nylons are being recycled for further use. Main raw material waste comes from the cutting section which was discussed by many participants. Recycling activities take place for the replacement of virgin raw materials. Another supplier said that they are sending wastes to China and India for further recycling. Fabric scraps or leftover fabrics are also mixed with virgin cotton to produce output with different quality from the recycling input. Supplier reported that,

> We do not throw away cotton, we do not throw away wool, we do not throw away cashmere. Everything is actually then sorted out by color and then given to recyclers. It has a value, we sell it, sell the scraps to the recyclers, the recyclers then value it and that sometimes we use for our own.

For recycling purpose in-house separation is an important stage. Waste such as fabric scrap, paper boxes, plastic bags are separated in the in-house set up and

recycled for further use. According to one supplier, “We already have these internal in- house separation for the all the category of the recycled items already.”

One supplier reported that in their packing stage they use recycled fabrics instead of plastic. They are using boxes made with recycled materials. Suppliers sort out garments with minor differences which cannot be sent to buyers. They are sending these back to the manufacturing plant for further correction and then sell out those corrected garments at a low price to the people or colleagues in the company. Such kind of initiative is certainly a great alternative to the recycling activities of the supplier company.

4.2.3.2 Renewable Energy

In any organization energy is a major focus which has much potential to influence operation from several aspects. Suppliers have started to realize such importance and showed their increased concern about solar energy, steam capturing as well as biomass fuel to use energy in sustainable ways. Five out of ten participants showed their concern about renewable energy.

Three of the participants discussed about their initiatives in Solar energy. As initiative for sustainable energy one supplier discussed about installing solar power plants on rooftop and switching to biomass as a renewable alternative to coal which is a non-renewable source. Suppliers are increasing their investment for solar energy which shows their growing concern about renewable energy. Another source of renewable energy is steam capturing. Steam is captured and transformed into other form of energy to reuse it for other purpose. Biomass fuel is another renewable alternative of traditional coal energy. According to one supplier,

> In terms of, energy, so we have already put up a four megawatt of solar power plants on our rooftop and, we're going to put another 15 megawatts within this year or we will be close to 20 Mw of solar, on our own roof top energy generation and we're also switching from coal as a non-renewable fuel to biomass as a renewable fuel option, a very soon.

4.2.4 Environmental Management

Improved environmental management contributed to overall sustainable performance of the supplier. Decisions and interest of the upper management, active participation in the compliance and sustainability certification program, more focus on environmental budget, all these approaches brought significant changes in the environmentally friendly initiatives of the supplier company.

4.2.4.1 Management Initiatives

Suppliers are setting long term sustainability goals, supportive Standard Operating Procedure (SOP), appointing efficient top management and employees to ensure sustainable growth of the organization. Suppliers reported having management system with mid-term to long-term initiatives. One supplier said that they have set up a 5-year environmental sustainability goal for their company with a target of zero waste. According to one supplier passion for sustainability of their owner has enabled them to integrate sustainability into their value driver which is integrated as organizational strategy. Another supplier introduced 16 policies in their strategic framework which contained bio diversity, human right safety, health safety, environmental policy, water stewardship policy, security policy, stakeholder engagement and many more.

Reduction of the consumption of natural resources acted as a major motivation to the management motivation for taking sustainable initiatives. Suppliers included knowledgeable stakeholders to the decision-making process. According to one supplier,

> We've taken two other steps. One is to discuss with strategic stakeholders who understand the requirements of the sustainable world, or at least understand the mega trends and some of the issues on the horizon to allow us to document for ourselves. The issues that we think will become relevant over time include those in our strategic plan in order to make sure that plan is future proof.

Suppliers have set up their own environmental management system and separate departments have been created to look after the sustainability aspects of the organization. While hiring people, engineers and passionate people are being prioritized by management. Commitment of top management is important for successful implementation of environmental initiatives and according to one supplier, such initiatives cannot exist without commitment from the top management. Supplier reported having separate board of directors for the sustainable operation of the company. According to one supplier,

> We have set up our environment management system. We have a separate department which previously was not existing. Dedicated environmental science graduates are working in the organization in this particular department.

4.2.4.2 Environmental Compliance and Involvement in the Rating Platform

Better audit, complying with the local as well as international laws, active participation in the rating platforms have enabled suppliers to build a stronger compliance status.

Suppliers have incorporated sustainable aspects for better compliance such as audits. They are having more strong audits with well-defined policies. One supplier said that they are following standards set by United Nations Sustainable Development Goal.

Several rating platforms are getting importance to the suppliers to prove their environmental performance. Three of the participants talked about their active participation in different rating platforms. One participant supplier reported that they are working with their chemical suppliers to comply with the standards and regulation of Zero Discharge of Hazardous Chemicals (ZDHC) program. Both Higg Index and ZDHC were discussed by many suppliers. According to one supplier, "We have some of the best technical teams in these areas globally especially within the supply chain itself. So, we are able positively work in the standard setting whether it is Sustainable Apparel Coalition (SAC) or ZDHC."

Sometimes it is possible to get high scores without taking holistic approach. For example, a scoring system, that gives 10 percent of the marks for managing the chemical inventory because it is a basic starting point. But if any supplier focus on other categories except chemical management it is still possible to get a satisfactory score without doing anything in chemical management. So, rating platforms have such kind of loopholes which can be misused by any supplier.

4.2.4.3 Environmental Certification

Environmental certification has gotten much importance to the supplier to support their sustainable initiatives. Eight out of ten suppliers discussed about their adoption of several environmental certificates. Suppliers received Global Recycle Standards (GRS), Recycled Claim Standard (RCS) certification, Certificate of Environmental Clearance (CEC), Oeko-Tex certification so that they can ensure buyers about the sustainability measures of their facility. LEED (Leadership in Energy and Environmental Design) certification was one of the major interests of the suppliers to support their sustainable initiatives. LEED certification was pursued to ensure sustainable building design and facilities. One supplier said that by LEED certified building they tried to contribute to the environmental impact reduction but LEED certification is not always required by buyers as they know that getting this certificate is costly.

ISO was a highly sought certification for the suppliers to prove their environmentally friendly performance. Suppliers received ISO AA 1000, ISO SA 8000, ISO 14001 and 14064 for the environmental management system. One supplier said that they have developed their own environmental standards. Suppliers also participated in the Occupational Health and Safety Assessment Series (OHSAS) certification to support environmental safety of the organization. According to one supplier, “Factory manufactures have already applied for ISO certification and also OHSAS and all these certificates are involved in environmental safety and the and environmental policy standard.”

4.2.4.4 Environmental Budget

One aspect of managing environmental performance relates to the budget. Some suppliers said that they have invested more to their environmental budget for better environmental performance. One supplier said that they generally increase their environmental budget every year. Another supplier mentioned that they do not have separate environmental budget rather they have a combined budget for all types of company activities. Suppliers' environmental budget is mainly driven by Key Performance Indicators (KPI) and more over they are doing more than buyers ask, for example when ZDHC came in the then they budgeted certain expenditures for ZDHC compliance type of operations.

4.3 Drivers of Environmentally Friendly Initiatives

Several factors drove suppliers to integrate environmentally friendly initiatives in to the organization. Buyers' demand for suppliers' environmentally friendliness was found as one of the major factors. Several local and international regulations drove suppliers to adopt sustainable measures in the organizational structure. Due to scarcity of resources suppliers looked for sustainable alternatives. Financial factor was another motivating factor for supplier where they tried to save operation and other related costs of the organization.

4.3.1 Buyer's Demand

Demand from the buyer's side acted as one of the major drivers for the environmentally friendly initiatives of the supplier firm. Buyers' concern about sustainable material and process pursued suppliers to integrate sustainability into the manufacturing process. Compliance status of the supplier firm was another point of

interest of the buying firms which drove suppliers to get actively engaged in the sustainable operation.

Suppliers reported a surge of buyer's concern about environmentally friendly raw material in recent years. Buyers are showing interest for sustainable and recycled raw materials. Such preference from the buyers has driven suppliers to use sustainable materials such as recycled cotton, recycled polyester which reduced the net negative impact of manufacturing process. One supplier explained,

> So, for past 2 years we have seen many brands has now started adopting recycled content in their product and they're ready to accept that the quality challenges that come when we recycle, use recycled materials instead of virgin material in the product and they are demanding for such product.

In recent days manufacturing conditions and parameters have been great concern for global buyers. They are now opposing the use of hazardous chemicals in their products. Some brands prefer to recommend raw material supplier, chemical supplier, manufacturing machines to ensure sustainable supply chain. Quality representatives from the buyer's team showed their preference for Pneumatic machines, laser technology, ozone technology which are some modern sustainable alternatives for the manufacturing process. One supplier reported that their buyers provided the processing recipe to improve efficient water usage. Buyers' interest for the compliance and certification also acted as a great motivation for sustainable initiatives of the supplier.

4.3.2 Regulation, Scarcity of Resources and Financial Facts

Regulations were found as a driving force to the environmentally friendly initiatives of the supplier firms. Other than government laws, regulations set by local

and international organizations have also worked as motivating factors for sustainable operation. One supplier praised the environmental regulations of the Indian government and said that updated government regulations enabled them to maintain their license and take their required initiatives. Such kind of government support certainly created a positive environment for the environmentally friendly initiatives. Suppliers mentioned that their activities are also being motivated by many of their stakeholders. According to one supplier, "We obviously take a lot of interest in our strategic stakeholders in what they think, some universities, some governmental experts, some technical experts from consultancies. So, we have a whole range of stakeholders that influences in many different ways."

Campaign of Greenpeace is one example which was mentioned by one of the suppliers. According to this supplier, "Greenpeace has come up with campaign on environment and other things. So, what has happened that because of this awareness it has built an additional reinforcement within us that how we can minimize our environmental footprints."

Scarcity of resources motivated suppliers to look for modern approaches so that utility consumption gets reduced and operation efficiency gets improved. One supplier reported that they were short of fresh water supply while operating in India. So, to conserve resource use, modern green technology acted as a motivation for the suppliers.

Another motivation behind energy saving initiative was cost of operation. In recent years the price of utility has been increased globally which has also increased the operation cost. So, suppliers are looking for alternative source of cheap energy to reduce the cost of manufacturing. According to one supplier,

On the energy side in almost all the geographies it is now making sense financially to save energy and to implement energy saving measures because global energy prices have risen manifolds in last decades. And also, the availability of renewable energy has increased and it has become cheaper. So, the industry economy is driving towards reduction and energy consumption as well as move towards renewable energy.

4.3.3 Supplier's Inspiration

Several other factors such as vision of the company, environmentally conscious owners, motivation to grow bigger as well as overall betterment of the society inspired suppliers to take sustainable initiatives. Vision of the company drove suppliers to pursue environmentally friendly initiatives. Their vision inspired them to adopt sustainable initiatives. One supplier described sustainability as a driver which creates value for them which has become a part of their organizational strategy.

Environmentally conscious owners also acted as a great encouragement behind environmentally friendly initiatives. Five out of ten participants mentioned their owners as one of the major motivating force to company's sustainable initiatives. Plan for long term business growth and desire to grow like big global retailers were acted as motivating force for one supplier. For one supplier, their previous social welfare activities acted as further motivation for the environmentally friendly initiatives. Another supplier expressed their interest to contribute to the sustainable development of the world which acted as a motivation for them to properly follow rules and regulations.

One participant supplier mentioned the name of Hollywood movie "An Inconvenient Truth" by Al Gore, which inspired senior director board to pursue

environmentally friendly initiatives. Freedom of operation in private company compared to the public company give much flexibility to take and implement any initiative. One of the participants mentioned such kind of operational flexibility as a motivating factor in their environmentally friendly initiatives. Sometime the success of solving one problem acts as a motivation to take further attempts to solve other challenging problem. Such kind of indirect motivation was mentioned as one of the driving forces by one supplier. The interest to work for the betterment of people, businesses and planet altogether was one of the drivers mentioned by one supplier which summarize their interest for sustainable operation.

4.4 Benefits to the Organization

Suppliers gained various benefits by adopting sustainable approaches in the organizational practices. Suppliers could save a lot of cost and at the same time were able to improve their operational performance. Overall reputation of the suppliers got increased by the adoption of sustainable measures which brought more preference from several aspects. Sustainable approaches helped suppliers to cut cost and save money in several areas which was a direct benefit to the organization.

4.4.1 Cost Saving

Cost saving was one of the major benefits that suppliers gained by using efficient sources of energy, recycling and reduced utility consumption. Eight out of ten participants discussed about the cost saving as a benefit of implementation of different environmentally friendly measures. Renewable energy has become a cost-effective alternative in energy consumption. Use of solar energy was found saving suppliers' cost of electricity which contributed to the reduction of overall cost of operation. One

supplier said that, “The main benefit is the reduction of the operational cost. We have reduced impact on bottom line, reduced electricity and fuel which also reduced cost.”

Recycling activities were found beneficial for the suppliers in term of cost saving. Due to water recycling, 80 percent less water was needed in the manufacturing stage compared to the garment made with virgin material. As dyes and chemicals consumption is calculated based on the volume of water, reducing water consumptions saves a lot of dyes and chemicals, consequently saving a lot of money. According to the supplier,

> In 2012 we were consuming 120 liters of water to color 1 kg of fabric and now we are consuming between 55 to 60 liters only. Once you reduce the water consumption, automatically your dyes and chemicals consumption gets reduced, because the dyes and chemicals depend on the volume of water that you use. When you reduce the water consumption, your steam requirements come down and there also your waste water discharge that is effluent, gets reduced.

4.4.2 Reputation and Preference

Improved reputation and more preference from the buyers is one of the greatest benefits that suppliers received from the implementation of the environmentally friendly initiatives. Seven out of ten suppliers discussed about several reputation and preference related benefits as a result of their environmentally friendly initiatives. For the suppliers, sustainable initiatives brought positive recognition from the government and local authority as well as buyers which brought better business performance and business development opportunities for the supplier firm. Increased faith and

recognition from the government made it easy for the suppliers to pass projects from the government authority with less hassle.

From the business side suppliers got full recognition from the buyers. For example, one of the participating suppliers was nominated as Grade A factory by the International Labor Organization (ILO) in Cambodia for their sustainable practices, which in turn reduced their compliance audit burden. Another supplier mentioned that it has received the Textile sustainability award, Hongkong Shanghai Banking Corporation (HSBC) Climate Change award as a recognition of environmentally friendly initiatives. Such awards and recognition from external parties improved organizational image of the supplier firm.

Increased reputation brought many preferences for the suppliers from buyers as well as other parties. Suppliers could create a trustworthy image to the buyers. It made communication more easy and flexible both with existing and new buyers. According to one supplier,

> When our clients approach us, they are quite reassured that, we are very advanced in terms of sustainability. So, it gives an indirect benefit which actually like, our clients at the trust level immediately goes up and the contacts with the new clients or existing clients is always quite good and they have a lot of respect for us around this.

More preference from the buyers brought better business deals and stable business development. Several suppliers said that they were able to get more business from retailers as a result of their improved organizational image. Such kind of increased order enabled them to increase their investment as well as do more on environmental and working conditions. One supplier said that,

> If all factories can meet all the requirements then all can do better on the environment and working condition. We can get more business from the retailer . . . . and we can last the business better and we can do more on environmental and working conditions.

4.4.3 Employee Goodwill

Environmentally friendly initiatives were found directly and indirectly influencing the employees of the company. Due to such initiatives, employees started to feel a sense of safety, as well as gained advanced knowledge of sustainable operation. Sustainable initiatives made those supplier companies attractive to the employees, making them more passionate to their role. Due to good practices of the organization, employees felt inspired and motivated at their work place. A sense of interest and gratefulness were created among employees, which inspired them to take further problem-solving initiatives. Sustainable growth of the company contributed to the professional betterment of the employees.

Environmentally friendly initiatives created a sense of safe work environment and job safety to the employee perception. One supplier was confident that even if their employees left their job in the company, they would be able to use the knowledge gained in other places.

It was possible to gain advanced knowledge on different aspects of operation by active participation in the environmentally friendly initiatives. One supplier mentioned that they did not have much knowledge of pollution, recycled materials, and recycle process, but due to sustainable initiatives, they were able to gain knowledge on recycling and pollution prevention activities, and employees dealing

with these areas were able to gain more professional knowledge for career development.

Company's reputation was increased among people due to improved sustainable practices. One supplier reported that people from nearby villages were very much interested to join their company, because they had a good reputation for taking full responsibility for the living area and providing living wages. Such motivated employees are a great asset to any company, which is very much required for improved efficiency.

4.4.4 Performance of the Operation

Operational parameters comprise overall performance standards of any organization. Four out of ten suppliers discussed about improvement of different operational performance related parameters as a result of taking environmentally friendly initiatives. Sustainable approaches contributed to the improved performance of the manufacturing activities by decreased dependence upon natural resources, reduced carbon foot print, as well as better risk management.

Due to the use of recycled water, dependence upon natural sources was greatly decreased. This brought operational flexibility to the companies located in the area where fresh water is scarce, and the operation remained unhindered. According to one supplier,

> All the water related activities that we have done has essentially helped us to reduce our dependence on the availability of water. We see for past couple of years water scarcity problem in many parts of India where we operate.

Use of solar power reduced greenhouse gas emission during the processing stages which ultimately reduced the carbon footprint of the operation. Company's

effort to reduce waste drove them to limit the use of resources which in turn reduced carbon emission. One supplier mentioned that, “Once you try to conserve on your waste you try to conserve on reduce, target your carbon emission to reduce and what’s happening and at end of the day it has your business benefit also.”

For sustainable performance companies must predict unseen risk. Risk management is one of the benefits gained by involvement in the sustainable initiatives. By dealing with sustainable initiatives suppliers were able to gain more knowledge and take corrective action plans. One supplier said that many factors were unknown to them about pollution but their exposure to sustainable initiatives gave much knowledge and they were able to rectify the wrong factors. This kind of knowledge exchange improved environmental performance which is an indirect benefit to the company. According to that supplier,

> We'd have to learn a lot of things that we did not know regarding the pollution of the industry and regarding all other things, we can get there. We have learned a lot of things that we were doing wrong and we have changed for the better. So, I would say that, it has to give a lot of knowledge and experience on how to do things better.

4.5 Barriers to the Organization

Several barriers were found on the way to implementing sustainable initiatives in the organization. One of the major barriers was additional cost associated with such initiatives. In some cases, lack of supportive policy, integration to the existing infrastructure as well as lack of required technology hampered the intended progress of the sustainable approaches. Suppliers also faced several negative purchasing practices while dealing with the suppliers during day to day business operation. Lack

of interest in sustainability, buyers' internal conflicts, inadequate knowledge on sustainable measures, and lack of interest in paying additional cost for sustainable approaches are some issues which created a backward pull for sustainable initiatives for the suppliers.

4.5.1 Cost Barrier

Cost is one of the most frequently discussed barriers to the path of implementation of environmentally friendly initiatives. Five out of ten suppliers discussed about the barriers related to cost and fund. Suppliers struggled with several issues such as lack of funds to cover increased expense associated with sustainable initiatives, unequal priority of the development works, extra cost associated with the early adoption of new technology and additional compliance cost.

Some sustainability projects directly provide financial returns, but outputs cannot be gained instantly from the projects which are mainly done for the environmental welfare. Due to the implementation of the sustainable initiatives, company's primary expenses go up.

There is always extra cost associated with changes such as redirecting the piping, changing the tanks, removing toxic chemicals, water recycling, waste management, renewable energy etc., but buyers are reluctant to pay extra money for these. In some cases, management disburses inadequate funds for the sustainable initiatives of the company. According to that supplier,

> We do get funding on annual basis but not all of it as much what we need. And sometimes it's difficult to meet some of the payback calculations. So that's more we can do if the numbers work. So that's one barrier.

Companies try to balance this additional cost by increasing the product price but buyers become reluctant to source product with increased cost. Rather, they go for cheap product made by companies with minimum compliance standards. Buyers often demand better environmental performance from the supplier, but in return they are reluctant to pay anything which is an example of a bad business model. According to one supplier, "The moment you implement environment much, your costs go up and, then the customer is no longer willing to buy that product and getting it from a cheaper or to make it not even having basic compliance."

Another phenomenon in any organization is the continuous business expansion to keep pace with the demand of buyers and technology. It often becomes an extra burden to improve an old set-up. Instead company management prefers to build a new set-up. Due to this kind of evasive approach from the management, old set-ups remain unaltered, which becomes responsible for unsustainable practices in the long run. One supplier said that, "When we have a certain amount of funds to invest on building a new factory versus improving an existing factory, building a new factory gets the priority claim."

Any new technology is expensive at first and become less expensive as days go on. Therefore, early adopters of these technologies need to pay additional costs compared to late adopters. This often becomes a demotivating factor for companies, who are always trying to get competitive advantage. According to one supplier,

> If you think about how the industry works, think something like solar which was extremely expensive in the beginning it just reduces in price with scale and demand. So early adopters used it even with high pricing and when the

market improved, demand and prices came down to someone who had to make the sacrifice at early stage.

Previously, codes of conducts used to mainly deal with human subjects such as worker rights and social aspects, but now it's being part of environmental management which needs additional cost for company's compliance activities. Buyers are now looking for environmental certifications, scores from rating platforms like the Higg Index or ZDHC, which require additional cost for operation. But as buyers are reluctant to pay for those initiatives, it often becomes hard to make those plans feasible. According to one supplier

> Code of conduct was on the social side now the code of conduct is on the environmental side. So, you have to comply with it and in the complying it there is an additional cost and you have to bear it.

4.5.2 Policy, Infrastructure and Technological Barrier

Government regulations, outdated policy, lack of required machines, and quality of recycled products created barriers on the way of environmentally friendly operation of the supplier firm.

In many of the production geographies, the government regulations are so weak that they do not enforce any water treatment standards or water discharge standards, consequently creating a cost difference between production in a particular region where the government is more advanced and more compliant. One supplier complained that they are unable to know the destination of the products which they send to the recycle center. Some recycle centers are controlled by government and there is lack of stringent policy to ensure transparent information flow. Another barrier discussed by one supplier was outdated policy. In some cases, suppliers have to run

their businesses within years old regulations which often creates a negative pull for the sustainable initiatives of the organization.

Another barrier was the availability of required infrastructure. One supplier regretted that their company couldn't take enough sustainable initiatives due to lack of required infrastructure in pollution control. According to that supplier, "The reasons why we haven't done this more aggressive work on diverting from land fill simply because our country does not have the infrastructure to manage it."

Sometime technology limits sustainable initiatives of the supplier companies. With the currently available technology it is not possible to recycle 100 percent of the water and it is difficult to recycle blended fabrics. People want thinner yarns for better quality products but recycled yarns are much coarser with the existing technology. Still now it is much difficult to recycle whole garment with the currently available technology. Such kind of lack of available technology is certainly a great barrier for the smooth operation of the supplier company. According to that supplier,

> We have to recycle outside because we cannot do it by ourselves. We do not have unraveling machines for unraveling the yarn. And then you need a mechanical process to do that and we do not have it because we are not a mill. We are only cut and sew.

Currently available technology often limits the quality of the recycled material. Quality of recycled cotton cannot be same as the virgin cotton. Even product category is restricted for recycling with current technology. According to one supplier,

> We would not be able to recycle cotton with the same quality of the virgin cotton that we use for our shirt. So recycled cotton, we have to do trousers,

after that or sweaters or something else. But we cannot do shirts, for example but we would like to do shirts. So that's the technological limitation.

4.5.3 Negative Purchasing Practices

Suppliers faced several unusual practices by buyers while dealing with the product orders. Lack of harmony in the buyer's team, limited sustainability knowledge, reluctance to pay required price for products are some negative aspects of the buyers' purchasing practices which adversely affected suppliers' environmentally friendly initiatives.

4.5.3.1 Order Related Facts

Product development with unsustainable processes as well as developing large number of physical samples, short lead time, packaging and distribution activities, often have negative impacts on the sustainable operation of the supplier firm. Such kinds of problems are so prevalent that eight out of ten suppliers talked about product order related bad practices of the buyers.

Product type and feature have great impacts upon manufacturing operation. Sometime buyers add extra finishing stages which are less important but have negative impact upon environment. Heavy washing is not good for energy and water usage. Denim jackets with high and heavy wash, over dye (Carbon dyed) is not supportive to sustainable energy and water usage. When buyers order products containing such feature, it creates negative impacts upon the sustainable performance of the manufacturer. There are many product finishes and colors which cannot be produced without violating the ZDHC standards. In the denim style high range of washing, garment dyeing or over dyeing makes it difficult for the garment to pass standard pH

value. If buyers order products with those features, then suppliers will have to use unsustainable materials in their manufacturing process which, in turn will create negative impacts upon the environment.

Another bad practice of the buyer is refusing to accept product with minor deviation. If the quality of the product is not up to par, buyers refuse to accept the product. As a result, chemical, accessories, and utilities used in the manufacturing all go to the vain. Sometime buyers change product styles so frequently that it creates wastage in the manufacturing operation. If products are refused for minor deviation then suppliers need to go for rework, which costs additional chemicals as well as utility consumption. That in turn increases the emission from the process and creates production bottle neck which also hampers organizational image. According to one supplier,

> Once go on to rework then you have additional dyeing consumption, additional energy disposed consumption and then what happens it goes on to create a production back logs or something like this. Then it affects your resources also in terms you are consuming more water more energy, your emissions also going up to 25 to 50 percent and on the other hand there is a production bottle neck delay that starts and then what u may have to do is that you may go on and do some extra work or overtime something like that.

Many buyers just nominate specific fabric suppliers and then manufacturers must collect those fabrics from them. But at the end of the manufacturing stage, fabric scraps can neither be used for other purposes, nor be recycled; rather they have to be destroyed. Such kind of wastage of fabric is a great barrier to sustainable operation of the supplier firm.

To run textile processing machines a minimum water quantity is required. The minimum water quantities in the processing stage varies with the minimum order quantity. According to a supplier smaller order quantity act as barriers to the environmentally friendly operation of the supplier firm. It is always better to have greater minimum order quantity for sustainable and efficient operation. One supplier reported that due to low minimum order quantity they struggled to meet worker requirements as well as utility consumption as a result of which efficiency of manufacturing operation went down.

If suppliers fail to meet buyers' expectation then it becomes hard to get further business deals. Most of the time buyers are found dominating the supplier, and there is less opportunity for mutual negotiation. According to one supplier, "If we do not comply with requirements then definitely there is a problem, we cannot do business." Sometime there is short lead time for the supplier. If an order is delayed, the remaining order needs to be air freight which has greater impact in the case of carbon emission.

Many buyers require a multi packing layer which uses more plastic bags for packaging and that has negative impact upon the environment. One participant blamed raw material suppliers for using plastic bags in the distribution process. That supplier is dealing with a complicated style which requires different types of accessories made from different materials. As raw material suppliers are using plastic bags for distribution purposes, the number of plastic bags accumulating in the supplier base increase from three to five percent per year. According to one supplier, "The plastic bag so far we can see increased now because for example we buy more raw material. So far these raw material suppliers always use the plastic bag and the wrapping by the plastic bag."

Each single garment has a wash label and a manufacturing label. Some buyers may ask for extra tags, which is a waste of the material, since after buying the garments most of the labels are discarded. Often buyers develop a large number of samples for certain orders which also negatively impacts the sustainable performance of the company. Even after meeting the environmental standards of the buyers often a purchase order is not confirmed because there are some other issues for the cost, style, delivery, quantity etc.

4.5.3.2 Internal Conflict and Lack of Interest

Often buyers fail to implement what they are supposed to do for the sustainable operation of the supplier firm. There is lack of collaboration among different teams, lack of harmony between conceptual and implementation stage, hypocrisy and lack of transparency as well as a lack of interest to work for sustainability. These things contribute to another great barrier to suppliers' sustainable performance.

Sustainability, design, and purchase are major departments of any organization but unfortunately there is lack of harmony among them. Many times, different departments of the buyer company run without much collaboration with each other. In that case, if compliance guys come in conclusion not to buy from any supplier due to violation of the compliance standard commercial team is still able to overwrite the decision and buy from them. This lack of harmony often acts as a barrier to achieving the sustainability goals of both buyers and suppliers. One supplier reported that,

You can very rarely find a buyer where these three teams (Sustainability, design, purchase team) are working together to get the common aligned objective. Quite a lot of the time these three teams are running independently, trying to focus on their own agenda.

The way brands ask to ensure compliance in the upstream supply chain and the way compliance is monitored often do not match. When external pressure is created upon brands then they pressure suppliers which often becomes feeble as the days go on. This lack of commitment on the buyer's side is certainly a great conflict with their sustainability vision. According to one supplier,

> They are reactive, not proactive. They do not believe in sustainability or they do not hold the environment, to have an important place or they do not have passion for that. They are only reactive to external stakeholder pressure. So where the NGOs bother them about supply chain and labor conditions in the supply chain, they turn around and they say you have to work on supply chain and then you have to work on this, you have to work on that. So they lose the real sustainability mindset and vision, they just react to the external pressure.

One participant supplier blamed buyers for their hypocrisy, discrepancy and lack of transparency. Even though many buyers are apparently talking about the sustainable supply chain, during business deals they prioritize cheap price over sustainability. Buyers sometimes suggest to their suppliers using sustainable initiatives but most of the times they are not recruiting specialist people or not creating separate departments for sustainability. Buyers show less importance to sustainable product innovation, pollution as well as waste. There is less demand for recycled cotton fabrics. One supplier said that, "We have different sets of buyers some of them are interested in environmental performance and some of them are not interested in environmental performance."

Buyers often lack interest to support their suppliers and do not invest enough time to develop relevant strategies. Purchasing managers are less interested in

integrating new approaches in the present organizational structure. According to one supplier, “I tend to hear people saying the purchasing manager will not accept any kind of a change to the current structure no matter what it costs us to do these changes”. One supplier thought that buyers’ purchasing practices have less impact on the compliance activities of the supplier. There are also complains that some compliance initiatives contain loopholes and suppliers can easily take advantage of those.

4.5.3.3 Buyers’ Knowledge

Buyers’ lack of knowledge about sustainability related facts was found as another bad practice, mentioned by six out of ten participant suppliers. Buyers lack knowledge on their product manufacturing place. The quality of the standards made by the buyers are often not up to the expectation which fails to reflect suppliers’ requirements.

Many of the brands do not have much knowledge about their suppliers’ manufacturing conditions. Buyers mainly reach upper-tier suppliers but a majority of the impacts happen to the low-tier supplier. Buyers’ lack of knowledge low-tier suppliers is certainly one of the bad purchasing practices. One supplier reported that,

> The larger or the majority of the brands still continue to behave in the way they used to and for the large part of them, they do not even know where their products are getting manufactured. So what kind of impact would be is highly doubtful, most of the brands reach out only tier 1 supplier and at the tier 1 supplier there's only 5 to 10 percent of the environmental impacts that happens, but the larger part of the environmental impact happens in the tier 2 and tier 3 where all the materials are met, either raw materials or the fabrics.

Buyers often do not possess enough knowledge on sustainable operation. Sometimes they ask to do things which actually do not correspond to the priorities of the suppliers. If the priority of the suppliers and buyers differ then it creates an unexpected barrier to the path of successful implementation of those initiatives. One supplier reported that they found buyers setting targets without relevant background and sometime do not even know how to set targets. Sometime buyers lack relevant knowledge of sustainable operation and lack engineers or specialists who can drive them towards more practical initiatives. Even though they take initiatives they do not know how to implement them and do not invest enough time to develop their strategies. One supplier reported that,

> Quite a lot of the time the ways standards are made, it does not have a manufacturer perspective in the standard setting process, is to work against the manufacturer.

Due to lack of proper training and knowledge buyers' merchandising teams and designers fail to understand the impact of product design, causing suppliers to suffer from different environmental challenges during manufacturing operations. According to one supplier, "They often do not realize their responsibility in terms of environment. They do not really understand their design and how we (suppliers) are totally impacted, and how they have designed will actually impact from an environmental perspective."

Due to buyers' lack of practical knowledge on modern technology, manufacturers face unexpected challenges in their operation. Some quality representatives of the buyers' team prefer pneumatic machines because products made in those machines have better quality but such kind of machines use compressed air

which is not energy efficient. Some buyers suggest and prefer ozone washing, waterless machine, laser technology in the manufacturing stage but all these measures increase energy consumption of the supplier which goes against sustainable operation.

4.5.3.4 Cost and Fund

Buyers' reluctance to pay additional cost for suppliers' sustainable initiatives was mentioned by eight out of ten participants as a negative practice. Buyers' such inclination to not pay any additional cost makes it hard to implement environmentally friendly initiatives in the supplier base. Many large brands are not particularly aware of the cost of environmentally friendly operations of the supplier firms. Even though sometimes they pay attention to the sustainability aspects, they remain reluctant to finance suppliers for those initiatives. According to one supplier, "First of all majority of the customers, they do not pay much attention to air, water or land impacts as much and secondly, what happens is even if they pay attention they are not willing to finance."

Some passionate suppliers have to pay for sustainable initiatives themselves but many just try to avoid such extra expense. According to one supplier, "I think they have a bad influence because of their pricing system. So, the pricing, the way they price things actually probably pushed many people not to be compliant."

Another problem is that buyers are always trying to source cheaper products. Day by day instead of adjusting cost, buyers are offering less price for products. Reduced price is certainly a barrier to the environmentally friendly initiatives which often require extra cost. One supplier reported that, "If you go on to see last three years –four years on to market, price has been going down for products."

4.5.4 Other Barriers

There are other types of barriers such as lack of employee motivation, and overlooking lower level suppliers Unequal preference to the suppliers in the rating platforms created difficulties on the way to successful implementation of sustainable measures.

Lack of employee motivation is one of the barriers discussed by one supplier. Sustainable initiatives require complete dedication but the day to day schedule of the people does not allow enough time for general employees to perform sustainability related activities. One supplier said that, “Employees are focused on regular work and it is hard to motivate them that sustainable things are also important for them.”

In most of the cases tier 1 suppliers do not have influence upon tier 2 suppliers. So if any violation happens in tier 2 but buyers discover it while auditing tier 1 suppliers, in that case tier 1 is held responsible even though the problem was created by tier 2 creating a gap in the supply chain transparency. In the rating platforms suppliers are not given the same importance as buyers. Sometimes standards are made without any involvement of suppliers and as a result standard fail to reflect suppliers’ needs. Such types of bias to the supplier acts as a barrier to environmentally friendly initiatives.

4.6 Positive Purchasing Practices

Despite negative purchasing practices, there are still some positive practices by buyers which support suppliers’ environmentally friendly initiatives. Buyers preference regarding sustainable material selection and product design as well as interest in sustainable processing stages motivated suppliers to follow more sustainability driven operation. In recent days compliance and certification of the

supplier firms became an important factor in the buyers' business strategy which motivated suppliers to participate in the certification and rating platforms to ensure improved compliance of the company.

4.6.1 Sustainable Material and Design Aspects

Rise of demand for recycled material, suppliers' priority to sustainable materials as well as integration of sustainability aspects in the product design are some positive purchasing practices mentioned by participant suppliers.

Four out of ten suppliers discussed about buyers' increased concern about use of sustainable materials. Some brands have started using sustainable raw materials in their product and at the same time accepting the quality challenges with recycled materials because those recycled materials might not be of the same good quality as virgin materials. One supplier said that, "In case of total lifecycle of garment; customers (brands) are focused on BCI (Better Cotton Initiative), organic and, recycled material which reduce lifecycle impact of product."

According to a supplier, companies like Patagonia or Ecoalf's concept is to work with 100 percent sustainable material which is supportive to the environmentally friendly operation of the supplier firm. Some buyers are helping suppliers by recommending chemical and raw material suppliers and sharing research findings which act as boosts to the sustainable initiatives of the suppliers. In addition to environmental side, social aspects were also valued by some buyers as some of them showed preference for Fair trade products. According to one supplier, "They (buyers) are moving to sustainable raw material, fair trade products which helped them in social side."

Some global retailers are taking sustainable design initiatives so that when the products go to the manufacturing stage it creates less impact. For example, Nike has the approved color palettes which are based on technical feasibility to meet their zero-toxic standard. So, Nike designers cannot get certain colors because it is not possible to produce those colors without violating the ZDHC standards.

In general suppliers have to buy more than the order quantity because of the wastage during production. If suppliers get rid of their volatile decision-making process and are consistent with the order specifications then it will be a great support to the sustainable operation of the supplier. One participant supplier said that, “I think if buyers buy the similar styles throughout the year or do not change the style or do not change the fabrics too frequently, this is a good purchasing activity for our recycling activities.”

4.6.2 Sustainable Processing

Buyers and retailers have started to show their concern for the sustainable processing considering the working standards of the supplier, participation in the manufacturing process improvement, suggesting sustainable processing of the post manufacturing waste and resources, creating and encouraging participation in the rating and standard setting platforms.

Some leading brands are visiting suppliers’ facilities to oversee whether they are behaving in the right manner on the environmental side, looking into the manufacturing parameters and discouraging use of hazardous substances in the manufacturing stage. According to one supplier, “Previously customers were only focused on product. Now also focused on making product in sustainable way. If there is any hazardous chemical they inspire us to stop using such chemicals.”

Some buyers pursued suppliers to remove unsustainable stages from the processing. The washing process has been changed to use less hazardous chemicals. Buyers are providing a target of utility consumption, recipe and method of processing to make manufacturing process more sustainable. One supplier reported that, "Most customers gave target to reduce water consumption per product, they have given us recipe and methods to improve water efficiency for products."

Buyers are asking for rain water recycling, waste water discharge standards and other waste water content to ensure the safe discharge of the waste water to the environment. Brands and retailers have participated in the sustainable initiatives such as Partnership for Cleaner Textile (PaCT) to ensure sustainable energy, water and chemical management. According to one supplier,

> You need to test your water and even you know they want to see the traceability of that water, elements contained in that water for the zero discharge of hazardous chemical for example there is one project that is going on in Bangladesh and in other parts of the world. So through all these what is additional requirements are coming in that is your waste water needs to be tasted randomly by third parties.

Buyers' initiatives such as PaCT, Higg, and ZDHC Restricted Substances List (RSL) are pushing suppliers for sustainable operation. Because of these efforts from the buyers, suppliers are able to save a lot of water, electricity and other resources. One of the participant suppliers said that due to such initiatives from the buyers they are required to maintain a database of how much of water and electricity is being consumed to keep track of the inventory of the resources, which in turn enables them to generate KPIs, compare present data with previous month and gradually improve

the process parameters. All these initiatives have contributed to the sustainable growth of the supplier firms.

4.6.3 Compliance and Certification

Four out of ten suppliers discussed about buyers' increased concern for compliance and environmental certification programs. Brands and retailers now want to know suppliers' environmental compliance status, certificates and the overall environmental performance of the supplier firm. According to a supplier, buyers first look for labor compliance and secondly look at the environmental compliance status of the supplier facility. If buyers are satisfied with the overall conditions then they go to the next step to discuss the order. According to one supplier, "Before we work with this buyer, they must see what is our manufacturers management, how do we handle and how do we manage the production floor."

Brands like Nike have come forward to work together where they support the HR system of the supplier firm. In recent days buyers have shown their increased concern about environmental and compliance certificates. They want to know suppliers' effluent standards as well as engagement in the sustainability organizations, which is driving suppliers to more sustainable operation. According to one supplier,

> Buyers ask you whether you have the environmental clearing certificate, they want to check it, they want to check the generators license certificate, they want to check the boiler operator license certificate, they want to check whether you ETP (Effluent Treatment Plant) is functioning or not, even want to see your waste water parameter is it tested by third party or not. So, all these things are coming because of the buyers.

4.6.4 Other Positive Purchasing Practices

Buyers showed their increased concern for other related aspects of the purchasing practices. Some buyers have reduced use of accessories where others gave better estimation for future orders. One supplier said that previously they used large boxes for the packaging of final products but now brands are asking for small boxes which go directly to a retailer's store as a result there is no need to repack finished products before going to the retail stores. Such kinds of innovative initiatives of the buyers and retailers have contributed to the reduced environmental impact of the product distribution.

Some buyers are providing better estimation of the order quantity for the upcoming seasons which is helping suppliers to better plan their approach. Brands' interest to reduce environmental impact as well as sustainable initiatives taken in the supply chain has contributed to the sustainable growth of the supplier firm. According to one supplier, "This (environmental budgeting) is one of their (buyers') requirements when they work with manufacturers."

Chapter 5

DISCUSSION AND CONCLUSION

The purpose of this study was to figure out the impacts of buyers purchasing practices on the environmentally friendly initiatives of the supplier firms. The study considers positive and negative purchasing practices of the apparel and textile buyers and discusses the drivers, benefits and barriers of the suppliers' environmentally friendly initiatives. The study has six research questions which covered different aspects of the environmentally friendly initiatives and purchasing practices.

5.1 Discussion

The study was conducted to find answers of several research questions. The first question wanted to know definition of environmental friendliness and vision of the supplier company. Different suppliers defined environmental friendliness from different aspects such as compliance and pollution. Environmental friendliness was defined in the context of advanced sustainable technology, pollution prevention, use of resources, environmental management such as management initiatives, compliance, certification, environmental budgeting. Similar initiatives were reported in the previous study where material selection, sustainable waste and resource management were discussed to explain sustainable purchasing activities of the buyers (Eltayeb et al., 2011).

Second research question asked about suppliers' environmentally friendly initiatives. In this study suppliers talked about their initiatives in alternative environmentally friendly lighting facility of the manufacturing plant, green technologies, bio diversity, advanced information system. Sustainable lighting

measures and biodiversity has also been discussed by the global manufactures which supports the finding of this study (Hirdaramani, n.d.).

Suppliers mentioned several initiatives in water recycling, material recycling and use of environmentally friendly raw materials. Previous studies also reported similar initiatives in reduction of water consumption, sustainable recycling techniques, sustainable material, product as well as process innovation (Roy Choudhury, 2013; EcoWorx Backing, 2017; Porteous & Rammohan, 2013; Beckman, 2003). In this study several suppliers talked about motivation, initiatives and recruitment policy of the top management to create systems to further environmentally friendly initiatives, which has been less discussed in the previous literature.

Suppliers discussed their participation in the rating platforms like Oeko-Tex, Sustainable Apparel Coalition (SAC), ZDHC program. Involvement in the rating platforms was not discussed in the previous literature. To ensure sustainable operation, several environmental certificates were adopted by suppliers such as Global Recycle Standards (GRS), Recycled Claim Standard (RCS) certification, Certificate of Environmental Clearance (CEC), LEED, ISO, and OHSAS. Previous studies mentioned ISO and EMAS certification as an indicator of the environmental friendliness (Lo et al.,2012; Morrow et al., 2002; Wong et al., 2012). This study reports some additional environmental certificates which are point of interest of the supplier companies. The finding of this study regarding suppliers' interest in environmental certification opposes the finding of Cañón-de-Francia et al. (2009) who described adoption of environmental certification from a negative aspect.

Third question asked about the drivers of apparel and textile manufacturers' pursuit of environmentally friendly initiatives. Buyers' concern about sustainable

material and environmentally friendly manufacturing condition motivated suppliers' environmentally friendly initiatives. Previous studies also reported buyer's demand for sustainable operation as a major driver of environmentally friendly initiatives of suppliers (Zhang et al., 2009, Agan et al., 2013, Bey et al., 2013, Hsu et al., 2013). Suppliers mentioned rules and regulation set by government and international organizations acting as a driver of the environmentally friendly initiatives. Updated government regulation was mentioned as supportive to suppliers' sustainable initiatives. Previous studies also found regulations being responsible for the sustainable initiative of the company (Gabzdylova et al., 2009; Zhang et al., 2009; Bey et al., 2013; Hitchens et al., 2005; Hsu et al., 2013). Cost saving from the environmentally friendly initiatives was found another motivating factor for the suppliers. Similar finding was reported by Zhang et al. (2009) where cost saving was mentioned as an important driver of sustainable initiative of the companies located in the Suzhou Industrial Park. Company's motivation, owner's vision, consciousness as well as interest to work for environmental welfare also drove suppliers to environmentally friendly initiatives. These findings support Gabzdylova et al. (2009) where personal values and preference were found influencing sustainable initiatives of the company.

Fourth question asked about barriers to the successful implementation of the environmentally friendly initiatives. Buyers' reluctance to pay additional cost for suppliers' environmentally friendly initiatives was reported as a major barrier. Previous studies also support this finding by reporting additional cost associated with sustainable product and process development as a hindrance to the environmentally friendly performance (Shen & Tam, 2002; Chan, 2008; Shrivastava, 1995).

Weak government regulation and lack of transparent policy were mentioned by suppliers as barriers to the environmental friendliness. Due to lack of transparent policy suppliers were unable to know about the destination of their recycled stuffs. Previous literature also reported similar finding where lack of enforcement of government regulations was described as barrier (Shen & Tam, 2002).

Suppliers mentioned several technological barriers such as lack of available technologies, quality problems of recycled products in the existing machinery. These findings were supported by previous literature where technological barrier had been discussed in terms of lack of available technology and proper technical support (Simonsson, 2002; Shen et al., 2002; Zhu et al., 2011). Lack of trained stuffs and experts has been reported as a barrier by Shen et al. (2002). Our study report lack of employee motivation as a barrier to the sustainable initiative of the company which was not mentioned in the previous literature.

Fifth research question asked about the benefits of implementation of environmentally friendly initiatives. One of the major benefits mentioned by participating suppliers was cost saving by sustainable initiatives such as recycling, renewable energy. Cost reduction was also mentioned as direct benefits of environmental entitative by Calantone (2003). Xu et al. (2016) found that environmentally friendly initiatives saved a lot of water and chemicals which ultimately contributed to the process cost reduction. Study conducted by Lo et al. (2012) also reported cost efficiency as a benefit of environmental initiatives where they found that adoption of ISO certification brought increased return on asset for the company.

In this study suppliers reported that their reputation got increased which was reflected by the recognition from the government, local authority as well as from the buyers. It was found that environmentally friendly initiatives brought recognition from the buyers ensuring better business deals and more trustful relationship. These findings were supported by Russo et al. (1997) who found that sustainable initiatives create better organizational image. Moore et at. (2004) also reported that adoption of environmentally friendly initiatives helps companies expand their business to the developed countries having strict environmental regulations.

By recycling initiatives, suppliers were able to reduce dependence upon natural source. Use of renewable energy reduced carbon emission from the manufacturing operation. Previous studies also found significant decrease in water, gas, and carbon footprint reduction by adoption of environmentally friendly initiatives (Orji et al., 2016, Xu et al., 2016, Fresner, 1998).

The last research question asked about the impact of buyers' purchasing practices on the environmentally friendly operation of the supplier firms. Buyer's increased use of sustainable materials was identified as a good purchasing practice. Previous literature support this finding which found companies working on compostable fibers, PVC free material, products made with recycled contents (Roy Choudhury, 2013; EcoWorx Backing, 2017).

As a positive approach in purchasing practices buyers were found asking suppliers for removal of hazardous wastes, chemicals and negative impactful process stages which contributing to the sustainable process development of the supplier firms.

Similar facts were discussed by Kannan et al. (2002) who reported supplier's waste reduction approach as an important factor during the sourcing decision of the

buying firms. Previous studies also reported manufacturers' efforts in the development of sustainable process and recycling methods to reduce water and energy consumption (Roy Choudhury, 2013; EcoWorx Backing, 2017). Survey conducted by Zhu et al. (2001) also reported that companies could reduce waste by developing close relationship with the suppliers.

Suppliers discussed buyers' concern about the compliance status of the supplier firms. Similar finding was reported by the United States Fashion Industry Association (USFIA) which showed compliance as a major factor in retailers' sourcing decisions (USFIA, 2017). Starmanns (2017) also reported spot auditing, analysis of audit report and codes of conduct as supplier selection approach of the retailers. In our study suppliers discussed about their active participation in the environmental certification programs. Previous literature also reported participation in the environmental certification as an indicator of suppliers' environmentally friendly operation (Wilson, 2001; Morrow et al., 2002).

In case of negative purchasing practices suppliers criticized small order quantity by buyers, refusal to accept minor quality deviation as well as adding unnecessary finishing and accessories in the product feature. Problem regarding order quantity was discussed by Dickson and Cahn (2017) who reported that order fluctuation creates several problems to the supplier firms such as issues with production planning and ethical management of the man power.

Suppliers criticized lack of harmony among different teams of the buyers and their lack of interest to work and invest for sustainable initiatives. Such kind of purchasing practices wasn't discussed in the previous literature and can be topic for further analysis.

Another negative purchasing practice was buyers' lack of knowledge on sustainable product design and manufacturing operation. This finding supports Chan (2008) where managers were blamed for their lack of knowledge on environmental management system. In this study suppliers reported lack of employees to the buyer's team who are trained on environmental sustainability which is supported by previous studies where lack of employees trained on environmental sustainability was described as a barrier to the environmental management system (Chan, 2008; Shen et al., 2002). Another major finding was buyers' reluctance to pay additional cost for supplier's sustainable initiatives. This finding strongly supports Dickson and Cahn (2017) as they found half of the suppliers don't receive any incentive from the buyers for their compliance activities.

5.2 Discussion of the Theoretical Framework

Based on the finding from this study several revisions were made to the previously proposed theoretical framework. First, "Buyer's negative purchasing practices" has been moved under "Barriers" as negative purchasing practices were found acting as hindrance to the environmentally friendly initiatives of the supplier firms. Second, "Buyer's positive purchasing practices" was showed as overlapped with the "Driver of environmentally friendly initiatives" as some of the positive purchasing practices of the buyers drove suppliers to the environmentally friendly initiatives.

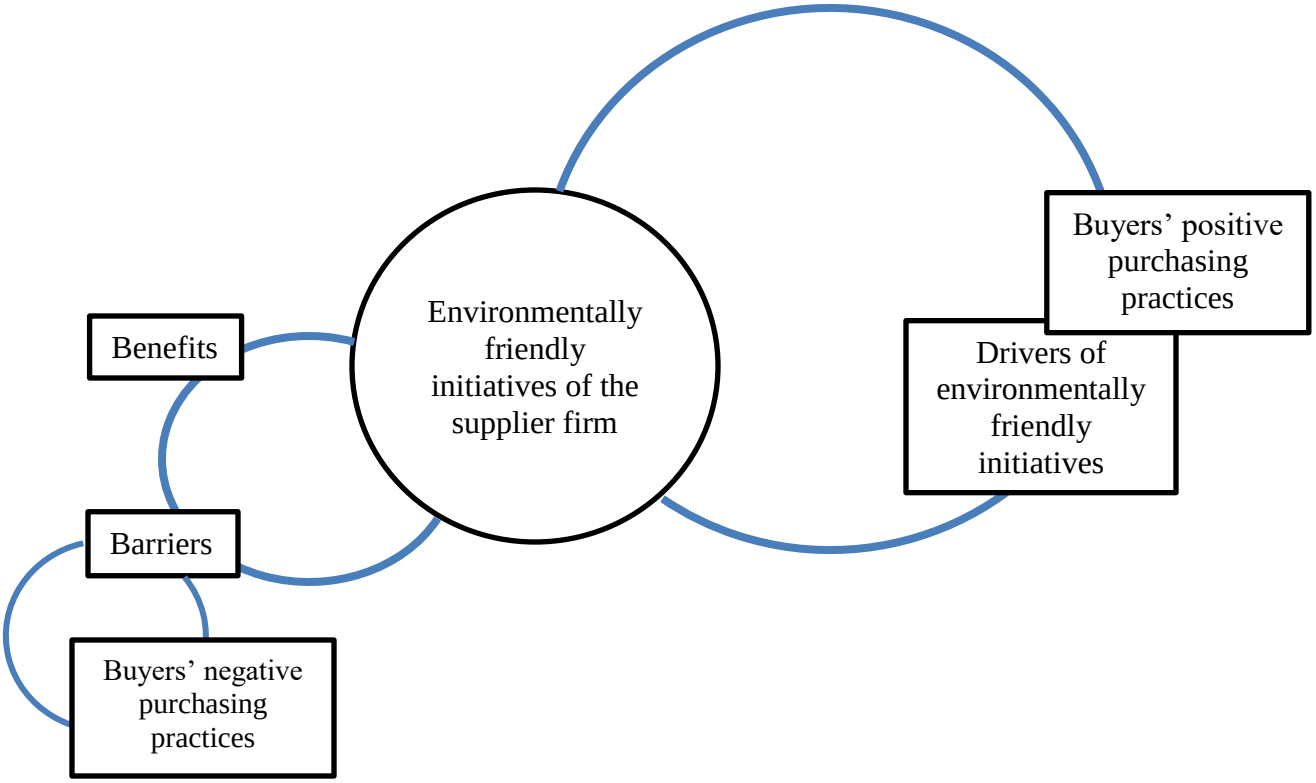

Figure 5.1 Revised Theoretical Framework.

First section of the theoretical framework discusses buyer's positive purchasing practices, negative purchasing practices and driver of environmentally friendly initiatives. Study discussed the impact of these three factors in the context of environmentally friendly initiatives of the supplier firm.

The study found positive purchasing practices influencing environmentally friendly initiatives of the supplier firms in several ways. Sustainable design initiatives of the buyers reduced environmental impacts of product manufacturing. Buyers' interest for compliance and visit to the supplier base restricted the use of hazardous chemicals as well as unsustainable manufacturing stages. Due to buyers' increased

concern about compliance suppliers sought for different environmental certificates as well as attended rating platforms. Buyers were found reducing packaging materials and use of accessories which in turn reduced the environmental impacts of product handling and distribution stages. All these findings support the influence of positive purchasing practices on the environmentally friendly initiatives of the supplier firm which was showed in the theoretical framework.

The framework discussed the impact of negative purchasing on the environmentally friendly initiatives of the supplier firm. Negative purchasing practices were found acting as barrier to the environmentally friendly initiatives. Buyers' requirements of unnecessary and additional product finish were found responsible for creating negative environmental impacts. Buyer's refusal to accept products with minor quality deviation causes extra processing stages harming environmentally friendly performance of the company. Small order quantity was found causing additional utility consumption during manufacturing stage. Requirement for extra packing and accessory were found increasing environmental impact of the handling and distribution stages. Buyers' reluctance to pay additional cost for suppliers' sustainable initiatives was found making it difficult for suppliers to implement environmentally friendly initiatives. All these negative purchasing practices act as barriers to the environmentally friendly initiatives of the supplier firms. Thus, in the framework buyers' negative purchasing practices was moved under the "Barrier".

The drivers of the environmentally friendly initiatives have been discussed in the framework. Several drivers were found directly and indirectly influencing environmentally friendly initiatives of the supplier firm. Regulations set by the government and international organizations, motivation of the owners, company

vision, business growth directly and indirectly drove suppliers to sustainable initiatives.

Some of the positive purchasing practices such buyers' interest for sustainable raw material and chemical usage, concern for compliance and sustainable manufacturing process as well as machineries directly drove suppliers to the environmentally friendly initiatives. So, it can be said that in some cases positive purchasing practices acted as driver of the environmentally friendly initiatives of the supplier firms and that's why positive purchasing practices and drivers were showed overlapped in the revised framework.

The second section of the framework considered benefits and barriers to the environmentally friendly initiatives of the supplier firms. Some of the direct benefits were cost saving by reduced consumption of chemicals, utilities such as water, electricity. In case of indirect benefits suppliers talked about reputation and preference from buyers as well as employees' increased sense of motivation and safety.

In case of barriers to the environmentally friendly initiatives, suppliers reported several issues such as lack of funds, policy, infrastructure as well as technological barriers. Negative purchasing practices also worked as a barrier which is showed in the revised framework.

5.3 Conclusion

This study identified several benefits, barriers, and purchasing practices which are mainly discussed in the context of environmentally friendly initiatives. First, factors related to cost and funds were described in the case of benefits, barriers, and negative purchasing practices. Cost saving acted as a benefit as suppliers could save money by taking environmentally friendly initiatives. On the other hand, lack of funds

was reported as a major barrier for the suppliers. Buyers' reluctance to pay additional cost for suppliers' environmentally friendly initiatives was reported as a negative purchasing practice.

Second, suppliers showed increased concern about environmental certification and rating platforms. Several environmental certificates were pursued by suppliers to show concern about the environmental friendliness of the company. Suppliers also participated in different rating platforms which is a relatively new approach of environmentally friendly initiatives.

Third, suppliers criticized buyers' lack of knowledge regarding supplier base, sustainable product design, sustainable operation as well as manufacturing condition. Buyers' lack of knowledge acted as a hindrance to the environmentally friendly operation of the supplier firm.

5.4 Limitations and Future Research

This study took a qualitative approach which can be mentioned as a limitation. Due to being qualitative in nature it was not possible to statistically measure the relationship between different influencing factors. Future research can take a quantitative approach and analyze direct and indirect relationships among different factors of the framework. Qualitative data can be collected through the survey to analyze the performance and efficiency of purchasing practices and company's environmentally friendly operation.

Several suppliers talked about their involvement in the rating platforms which is comparatively a new approach to the environmentally friendly initiative. Even though participation in the rating platforms was found to be an important aspect of the suppliers' environmentally friendly initiatives, this study didn't go deep into that.

Further study can be conducted on suppliers' motivation, benefits and barriers in case of participation in different rating platforms.

Buyer's internal conflict was reported by suppliers as a barrier but it was not analyzed in detail. Further study can be conducted on the type, reason and impact of buyer's internal conflicts in the context of environmentally friendly performance of the supply chain. In the case of barriers to the environmentally friendly initiatives, suppliers talked about lack of employee motivation. Further research can be conducted to identify the drivers of employee motivation and its influence upon sustainable and ethical organizational performance. In this study suppliers reported several negative purchasing practices of the buyers, related to product orders such as short lead time, development of large number of samples, unsustainable requirements in product features etc. More in-depth study can be conducted on each of these bad practices to analyze the impact of buyer's purchasing practices on the sustainable operation of the supplier firms.

This study mainly focused on the environmentally friendly initiatives of the SAC members. Further study can be conducted on the non-SAC members to identify their environmental performance. Future research also has a scope of comparing the environmentally friendly performance of the SAC members and non-SAC members. Participants in this study were mainly vertically integrated textile and apparel manufacturing companies. Future study can be conducted solely on the apparel manufacturers who are mainly involved in CMT (Cut Make and Trim) activities. Further studies can also compare benefits, barriers and environmentally friendly performance of the vertically integrated companies and CMT companies. Last of all, this study considers suppliers' opinions about buyers' purchasing practices but we

don’t know how buyers think about suppliers’ ethical and environmentally friendly performance. Further study can be conducted from the buyers’ side to analyze performance and sustainable practices of the supplier firms.

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Appendix A

EMAIL TRANSCRIPT

Dear XXXX,

I am Ahmed Sabab, a graduate student in the University of Delaware. I am conducting a research study titled "Influence of buyer's purchasing practices on environmentally friendly operation of the supplier firm" supervised by Professor Marsha Dickson. The study seeks to understand brands and retailers' purchase behaviors and how those impact upon environmentally friendly operation of the supplier company. We would like to carry out an one-on-one interview with you, which will be conducted via Skype or any other online platform that is preferred by interviewee. As your company is actively engaged with sustainability, we hope that you will be able to give us valuable information on the buyer's purchasing activities and influence of those practices on the performance of your organization. The online interview will take approximately 30 minutes to 1 hr. We assure you that all the data will be anonymous and your identity kept confidential. Your name and the name of your company will never be disclosed. Data collected through this interview will only be used for research purpose. Please let me know whether you are interested to take part in our study. I am looking forward to hearing from you.

Thanks,

Ahmed Sabab

Graduate Student

University of Delaware.

Appendix B

INTERVIEW SCHEDULE

Hi, thanks for giving your valuable time to let me interview you. The interview questions will ask you about your feedbacks on retailers' purchasing practices, environmental initiatives of the company, barriers to ethical purchasing, and related issues with environmentally sustainable operation. It is assured that all the information will be kept confidential and name and identity of you and your company will never be disclosed. Interview will take around 30 minutes to 1 hour. For further analysis of the response, the conversation will be recorded.

1. How do you define environmental friendliness of your organization? What is your company's vision regarding environmental friendly production?
2. What are the initiatives that you have taken to achieve environmentally friendly production operation of the company? (Probe - technology, organizational change, policy change, others).
3. What factors have motivated your company to pursue environmentally friendly production operation?
4. What kinds of barriers have prevented the successful implementation of environmentally friendly initiatives?
5. How has implementation of environmentally friendly initiatives benefited your company? Give some examples of the benefits that you gained by implementing environmentally friendly production.
6. How do buyers' purchasing decisions impact your efforts in environmentally friendly production? (Probe positive impacts and negative impacts).

- What are positive and/or negative impacts of buyers' purchasing decisions on your company's energy and water usage?
- What are the impacts of your buyer's purchasing practices upon company's recycling activities? If usage was increased or decreased in which machines or processing stages
- How have your company's air, water and land pollution increased or decreased due to buyer's purchasing activities?
- How have buyer's purchasing practices impacted inputs, out puts and waste management of the company?

7. Which activities of the buyers act as barriers to the environmentally friendly operation of your company? Please share an example about last time which purchasing practices of the buyer influenced your company's environmentally friendly production. What are other examples of challenges or opportunities created by those purchasing decisions?
    - How has environmental budgeting of your company been influenced by buyers' purchasing decisions? (Probe positive and/or negative)?
    - How has your company's environmental compliance and environmental certification been influenced by buyer's purchasing practices? Which aspects of the compliance and environmental certification were changed or modified as a result of buyer's purchasing decisions? (Probe positive and/or negative).

8. What else should we know about how buyers' practices influence your environmentally friend production?

Appendix C

CODING GUIDE

Major Code	Sub-code	Sub-Code
Definition of Environmental friendliness		
Driver of Environmental performance	Customer demand	
	Financial facts	
	Regulations	
	Scarcity of the resources	
	Motivation and vision	
	Others	
Company's vision		
Positive purchasing practices	Compliance and certification	
	Sustainable material and design aspects	
	Sustainable processing	
	Other	
Negative purchasing practices	Customer knowledge	
	Internal conflict	
	Order related facts	
	Price and cost	
	Other	
Benefits to the organization	Cost saving	
	Employee goodwill	
	Operational performance	
	Preference	
	Reputation	
	Other	
Barriers created to the organization	Cost barrier	
	Lack of Knowledge	
	Order related barrier	
	Policy and infrastructure	
	Technological barrier	
	Other	
Environmental performance		
	Environmental management	Employees
		Environmental certification

		Environmental budget
		Environmental compliance
		Involvement in the rating platform
		Management initiatives
	Pollution	
	Raw material	
	Use of advanced technology	
	Use of resources	

Field	Definition
Definition of Environmental friendliness	How suppliers define environmental friendliness of the organization.
Driver of Environmental performance	What causes /motivates suppliers to pursue environmental performance. Demand form the buyers' side, financial facts, government and national as well as international rules and regulations, scarcity of utility and resources such as water, electricity, gas, motivation and vision of the management etc were taken into consideration.
Company's vision	Company's future plan or aim regarding environmentally friendly operation.
Positive purchasing practices	Buyers' purchasing practices in support of suppliers' overall operation. Buyers' compliance requirements, sustainable product design aspects, interest to sustainable manufacturing of the products etc were taken into consideration.
Negative purchasing practices	Buyers' purchasing practices which go against supplier's proper organizational practices. Buyers' knowledge about sustainability and ethical aspects, harmony and conflict in buyer's team, buyers' practices while dealing with product orders, paying

	adequate cost for the product etc were taken into consideration.
Benefits to the organization	Direct and/or indirect benefits brought to the supplier firm. Supplier's financial benefits, benefits of the employees, sustainable performance of the operation, response from the buyer in terms of reputation and preferences etc were taken into consideration.
Barriers created to the organization	Different types of direct and/or indirect problems/barriers created to the supplier's operation. Suppliers' financial barriers, knowledge related barriers, product order related barriers, technical limitations, policy barriers etc were taken into consideration.
Pollution	Air pollution, Water pollution, Land pollution caused by the operation of supplier firm.
Raw material	Type or raw material, material mix, preference for material type.
Use of advanced technology	Types of machine, machine selection criteria, sustainable aspects of the machines.
Use of resources	Renewable energy, water recycling, inputs stemmed from recycling, recyclable outputs, recyclable wastes.
Employees	Employee selection, employee training, satisfaction, motivation.
Environmental certification	Certificate/approval gained from the government, local, national or international organizations as a recognition of better environmental performance.
Environmental budget	Target money allocated for the environmental or sustainable initiatives of the company.
Environmental compliance	Initiatives such as internal or external audit, compliance policy or corrective

	action plans taken for company's environmental compliance.
Involvement in the rating platform	Participation in rating platform such as ZDHC, SAC HIGG Index etc.
Management initiatives	Management commitment, motivation, vision, key focus etc.

Appendix D

INFORMATION FOR MODIFIED INFORMED CONSENT TO PARTICIPATE IN RESEARCH

Title of Project: INFLUENCE OF BUYER'S PURCHASING PRACTICES ON ENVIRONMENTALLY FRIENDLY OPERATION OF THE SUPPLIER FIRM.

Principal Investigator:

Name: Ahmed Sabab Sharek.

Department/Center: Department of Fashion and Apparel Studies, University of Delaware.

Contact Phone Number: +1 3024339968

Email Address: ahmedsab@udel.edu .

You are being invited to participate in a research study. This document tells you about the study including its purpose, what you will be asked to do if you decide to take part, and the risks and benefits of being in the study. If you have any questions you may ask those before you decide whether or not you agree to participate.

WHAT IS THE PURPOSE OF THIS STUDY?

The purpose of this study is to understand how buyer's purchasing practices impact environmentally friendly operation of the supplier firm. The qualitative study will go deep with brands and retailers' purchase behaviors, problems created by their purchase decisions, their unusual behaviors while dealing with suppliers and impact of those purchasing behaviors on the organization. This study is done as part of master's thesis.

You will be one of approximately 10-12 participants in this study. You are being asked to participate because being a member of Sustainable Apparel Coalition (SAC) or your company is known to be engaged in environmental sustainability initiatives. In addition, due to your job responsibilities, it is expected that you will be able to provide more information on buyer's purchasing practices and impacts of buyer's purchasing activities on your company.

WHAT WILL YOU BE ASKED TO DO?

As part of this study you will be asked to participate in one on one interview via online. The interview will take approximately 30 minutes to 1 hour. During the interview, you will be asked some questions on your experience and observation of buyers' good and bad purchasing activities and the impact of those purchasing practices on the overall performance of the organization. With your permission, I will tape record the interview for further analysis.

WHAT ARE THE POSSIBLE RISKS AND DISCOMFORTS?

There is no risk associated with this study.

WHAT ARE THE POTENTIAL BENEFITS?

You will not benefit directly from taking part in this research. However, the knowledge gained from this study may contribute to our understanding of the purchasing activities of the buyers and its impact upon organizational performance. This information may be used to improve buyer-supplier relationships in the future.

HOW WILL CONFIDENTIALITY BE MAINTAINED? WHO MAY KNOW THAT YOU PARTICIPATED IN THIS RESEARCH?

No signature, initials or proof of agreement is required for participation. Digital recordings of the conversations will be kept as password protected file and transcribed copies of the interview will be kept in a secured locked cabinet located in campus to maintain confidentiality of the data. In the transcript "Subject number" will be used for each participant to keep confidentiality of the name.

The confidentiality of your records will be protected to the extent permitted by law. Your research records may be viewed by the University of Delaware Institutional Review Board, which is a committee formally designated to approve, monitor, and review biomedical and behavioral research involving humans. Records relating to this research will be kept for at least three years after the research study has been completed.
The research team will make every effort to keep all research records that identify you confidential. The findings of this research may be presented or published. If this happens, no information will be shared that gives your name or other details."

WILL THERE BE ANY COSTS TO YOU FOR PARTICIPATING IN THIS RESEARCH?

There are no costs associated with participating in the study.

WILL YOU RECEIVE ANY COMPENSATION FOR PARTICIPATION?

There is no compensation for participating in this study.

DO YOU HAVE TO TAKE PART IN THIS STUDY?

Taking part in this research study is entirely voluntary. You do not have to participate in this research if you don't feel comfortable. If you choose to take part, you have the right to stop at any time. If you decide not to participate or if you decide to stop taking part in the research at a later date, there will be no penalty or loss of benefits to which you are otherwise entitled. Your decision to stop participation, or not to participate, will not influence current or future relationships with the University of Delaware.

WHO SHOULD YOU CALL IF YOU HAVE QUESTIONS OR CONCERNS?

If you have any questions about this study, please contact the Principal Investigator, Marsha Dickson, at 302-831-4475 or dickson@udel.edu .

If you have any questions or concerns about your rights as a research participant, you may contact the University of Delaware Institutional Review Board at hsrb-research@udel.edu or (302) 831-2137.

Appendix E

HUMAN SUBJECTS PROTOCOL

University of Delaware

Protocol Title: INFLUENCE OF BUYER'S PURCHASING PRACTICES ON ENVIRONMENTALLY FRIENDLY OPERATION OF THE SUPPLIER FIRM

Principal Investigator
Name: Ahmed Sabab Sharek
Department/Center: Department of Fashion and Apparel Studies
Contact Phone Number: +1 3024339968
Email Address: ahmedsab@udel.edu
Advisor (if student PI):
Name: Marsha Dickson
Contact Phone Number: +1 302-831-4475
Email Address: dickson@udel.edu

Other Investigators:
- N/A

Investigator Assurance:

By submitting this protocol, I acknowledge that this project will be conducted in strict accordance with the procedures described. I will not make any modifications to this protocol without prior approval by the IRB. Should any unanticipated problems involving risk to subjects occur during this project, including breaches of guaranteed confidentiality or departures from any procedures specified in approved study documents, I will report such events to the Chair, Institutional Review Board immediately.

1.Is this project externally funded?
- No

2. Research Site(s)

☑ University of Delaware

☐ Other (please list external study sites)

- Is UD the study lead?
  - YES

3. **Project Staff**

Please list all personnel, including students, who will be working with human subjects on this protocol (insert additional rows as needed):

NAME	**ROLE**	**HS TRAINING COMPLETE?**
Ahmed Sabab Sharek	Principal Investigator	Yes
Marsha Dickson	Advisor	Yes

4. **Special Populations**
Does this project involve any of the following

Research on Children?
- NO

Research with Prisoners?
- NO

Research with Pregnant Women?
- NO

Research with any other vulnerable population (e.g. cognitively impaired, economically disadvantaged, etc.)? please describe
- NO

5. **RESEARCH ABSTRACT** Please provide a brief description in LAY language (understandable to an 8th grade student) of the aims of this project.

The purpose of this study is to understand how buyer's purchasing practices impact environmentally friendly operation of the supplier firm. The study will go deep with brands and retailers' purchase behaviors, problems created by buyer's purchasing decisions, their unusual behaviors while dealing with suppliers and related issues. Suppliers will be asked about their feedbacks on retailers' purchasing practices, environmental initiatives of the company, barriers to ethical purchasing, and related issues with environmentally sustainable operation. The study will look for the answers of the following questions:

RQ 1: How do apparel manufacturers define environmental friendliness of the production operation? What is the vision these companies are trying to achieve?
RQ 2: What initiatives have been taken by suppliers to improve environmental friendliness of the production operation?
RQ3: What are the drivers of apparel manufacturers' pursuit of environmentally friendly production?

RQ 4: What barriers prevent apparel manufacturers' pursuit of environmentally friendly production?
RQ 5: What benefits do apparel manufacturers receive from the implementation of environmentally friendly production?
RQ 6: How do buyer customers' purchasing decisions impact environmental performance of the apparel manufacturer? Which operational parameters are influenced?

6. **PROCEDURES** Describe all procedures involving human subjects for this protocol. Include copies of all surveys and research measures.

All the data in this study will be collected through one-on-one semi-structured interview of the participants. Participant suppliers will be selected from the member list of Sustainable Apparel Coalition (SAC) and/or from personal contacts of the advisor. SAC members will be selected because it is generally assumed that those companies keep track of sustainable performance of the company. Other suppliers known to be involved with environmentally friendly production may also be contacted to obtain a reasonable sample. Selected companies will be contacted and responsible persons will be interviewed one-on-one. For this study we need to interview president, managing director, sustainability managers, sales managers, chief operating officers or representatives of any of these persons who are involved with production or business operation. Open ended questions will be asked for detail qualitative data collection. The interview will take place via Skype or any other online platform that is convenient for the interviewee.
Before interviewing the responsible persons, modified informed consent content will be sent to the participants describing the IRB contents but not requiring any signature. With the permission of the participant, the conversation will be recorded for further analysis. All the conversations will be transcribed verbatim and coded to bring relevant finding about the impact of purchasing practices upon organizational and environmental performances of the companies. The study will take a deductive approach where the assumed theoretical framework will be tested and specified based on the analysis of the responses collected through the interview.

Interview questions:

9. How do you define environmental friendliness of your organization? What is your company's vision regarding environmental friendly production.

10. What are initiatives have you taken to achieve environmentally friendly production operation of the company? (Probe-technology, organizational change, policy change, others).

11. What factors have motivated your company to pursue environmentally friendly production operation?

12. What kinds of barriers have prevented the successful implementation of environmentally friendly initiatives?

13. How has implementation of environmentally friendly initiatives benefited your company? Give some examples of the benefits that you gained by implementing environmentally friendly production.

14. How do buyer customers' purchasing decisions impact your efforts in environmentally friendly production? (Probe positive impacts and negative impacts).

15. Which activities of the buyer act as barriers to the environmentally friendly operation of your company? Please share an example about last time which purchasing practices of the buyer influenced your company's environmentally friendly production. What are other examples of challenges or opportunities created by those purchasing decisions?

16. How has environmental budgeting of your company been influenced by buyers' purchasing decisions? (Probe positive and/or negative)?

17. How has your company's environmental compliance and environmental certification been influenced by buyer's purchasing practices? Which aspects of the compliance and environmental certification were changed or modified as a result of buyer's purchasing decisions? (Probe positive and/or negative)

18. What are positive and/or negative impacts of buyers' purchasing decisions upon your company's energy and water usage?

19. What are the impacts of your buyer's purchasing practices upon company's recycling activities? If usage was increased or decreased in which machines or processing stages

20. How have your company's air, water and land pollution increased or decreased due to buyer's purchasing activities?

21. How have buyer purchasing practices impacted inputs, out puts and waste management of the company?

22. What else should we know about how buyers' practices influence your environmentally friend production?

7. **STUDY POPULATION AND RECRUITMENT**

Describe who and how many subjects will be invited to participate. Include age, gender and other pertinent information.

Approximately 10 to 12 individuals representing apparel manufacturing companies will be selected for the interview. Selected SAC members will be contacted and responsible persons will be interviewed one-on-one. For this study we need to interview either president, managing director, sustainability managers, sales managers, chief operating officers or representatives of any of these persons who are involved with production or

business operation. There is no restriction upon gender and age of the participant but he/she should be associated with relevant business operations of the company.
.

Attach all recruitment fliers, letters, or other recruitment materials to be used. If verbal recruitment will be used, please attach a script.

Script for Email recruitment:

Dear XXXX,
I am Ahmed Sabab, a graduate student in the University of Delaware. I am conducting a research study titled “Influence of buyer’s purchasing practices on environmentally friendly operation of the supplier firm” supervised by Professor Marsha Dickson. The study seeks to understand brands and retailers’ purchase behaviors and how those impact upon environmentally friendly operation of the supplier company. We would like to carry out a one-on-one interview with you, which will be conducted via Skype or any other online platform that is preferred by interviewee. As your company is actively engaged with sustainability, we hope that you will be able to give us valuable information on the buyer’s purchasing activities and influence of those practices on the performance of your organization. The online interview will take approximately 30 minutes to 1 hr. We assure you that all the data will be anonymous and your identity kept confidential. Your name and the name of your company will never be disclosed. Data collected through this interview will only be used for research purpose. Please let me know whether you are interested to take part in our study. I am looking forward to hearing from you.

Describe what exclusionary criteria, if any will be applied.

- If the participant is not either president, managing director, sustainability managers, sales managers, chief operating officers or representatives of any of these persons of the company, then he/she will be excluded from the study.

Describe what (if any) conditions will result in PI termination of subject participation.

- None

8. **RISKS AND BENEFITS**
List all potential physical, psychological, social, financial or legal risks to subjects (risks listed here should be included on the consent form).

- None

In your opinion, are risks listed above minimal* or more than minimal? If more than minimal, please justify why risks are reasonable in relation to anticipated direct or future benefits.

- N/A

*(*Minimal risk means the probability and magnitude of harm or discomfort anticipated in the research are not greater than those ordinarily encountered in daily life or during the performance of routine physical or*

psychological examinations or tests)

What steps will be taken to minimize risks?

- N/A

Describe any potential direct benefits to participants.

- Nothing

Describe any potential future benefits to this class of participants, others, or society.

- Study will contribute to the potential changes in the relationships between manufacturers and their customers. Improve the business relationship between manufacturer and its customer will contribute to better environmental performance for both parties?

If there is a Data Monitoring Committee (DMC) in place for this project, please describe when and how often it meets.

- N/A

9. **COMPENSATION**
Will participants be compensated for participation?

- NO

If so, please include details.

- N/A

10. **DATA**

Will subjects be anonymous to the researcher?

- NO

If subjects are identifiable, will their identities be kept confidential? (If yes, please specify how)

- Yes. No signature, initials or proof will be taken from the participants. Digital recordings of the conversations and transcribed copies of the interview will be kept in a secured locked cabinet located in campus. In the transcript “Subject number” will be used for each participant to keep confidentiality of the name.

How will data be stored and kept secure (specify data storage plans for both paper and electronic files. For guidance see

http://www.udel.edu/research/preparing/datastorage.html)

- Interview recordings will be stored as password protected digital file. Paper copies of the transcribed interview conversation will be stored in locked file cabinet located in campus.

How long will data be stored?

- Data will be stored at least 3 years following the completion of the study.

Will data be destroyed?

- NO

Will the data be shared with anyone outside of the research team?

- NO

How will data be analyzed and reported?

- Recorded interview conversation will be transcribed verbatim and will be analyzed to get result of the study. In the transcript “Subject number” will be used for each participant to keep confidentiality of the name.

11. **CONFIDENTIALITY**

Will participants be audiotaped, photographed or videotaped during this study?

- Yes, conversation will be audiotaped during the study.

How will subject identity be protected?

- No signature, initials or proof will be taken from the participants. In the transcript “Subject number” will be used for each participant to keep confidentiality of the name. Digital recordings of the conversations will be kept as a password protected file and transcribed copies of the interview will be kept in a secured locked cabinet located in campus to protect the participant name being disclosed to the public.

Is there a Certificate of Confidentiality in place for this project?

- NO

12. **CONFLICT OF INTEREST**
(For information on disclosure reporting see:
http://www.udel.edu/research/preparing/conflict.html)

Do you have a current conflict of interest disclosure form on file through UD Web forms?

- NO

Does this project involve a potential conflict of interest*?

- NO

* As defined in the University of Delaware's Policies and Procedures ,a potential conflict of interest (COI) occurs when there is a divergence between an individual's private interests and his or her professional obligations, such that an independent observer might reasonably question whether the individual's professional judgment, commitment, actions, or decisions could be influenced by considerations of personal gain, financial or otherwise.

13. **CONSENT and ASSENT**

Modified Informed Consent forms will be used and are attached for review.

14. **Other IRB Approval**
Has this protocol been submitted to any other IRBs?

- NO

15. **Supporting Documentation**
Please list all additional documents uploaded to IRBNet in support of this application.

- Information for Modified Informed Consent.
- Interview Schedule.