Abstract

A Survey of Retailer's Satisfaction

by

Zahra Nakhostin Maher

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Thesis Advisor: Dr. Kanchan Das

Major Department: Technology Systems

The purpose of this exploratory study is to examine the overall satisfaction of retailers' from manufacturers in a supply-chain system, based on selected "Lean" related factors, such as quality, delivery, cost, and pricing. Lean supply chain involves a variety of principles and techniques, all of which have the ultimate goal of eliminating waste and non-value added activities, at all levels in the supply chain in order to satisfy the customer.

To stay competitive, manufacturers have to identify pros and cons in all aspects of their relationships with retailers who are their customers in a supply chain context. Retailers are also in direct contact with consumers who are the most important part of the supply chain system, and hence having an effective interaction with retailers is crucial for manufacturers to have for the success of the whole system.

In this study a survey specifically targeted to the apparel retail industry to find retailers' expectations and performance of manufacturers was conducted. The idea is to help supply chain professionals gain a better understanding of how Lean principles can be applied to their operations.

Analysis of results conducted using the T-test and regression analyses indicate that retailers are generally dissatisfied with their manufacturers in terms of the identified four factors of quality, delivery, cost, and relationships.

A Survey of Retailer's Satisfaction

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By

Zahra Nakhostin Maher

Dr. Kanchan Das, Thesis Advisor

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APPROVED BY DIRECTOR OF DISSERTATION/THESIS:

COMMITTEE MEMBER: Dr. Kanchan Das

COMMITTEE MEMBER: Dr. Merwan Mehta

COMMITTEE MEMBER: Dr. Leslie Pagliari

CHAIR OF THE DEPARTMENT: Dr. Mohammed Tijjani

DEAN OF THE GRADUATE SCHOOL: Dr. Paul J. Gemperline

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CHAPTER 1. INTRODUCTION

The strategic significance of supply chain is well understood by retailers and manufacturers who recognize that the correct supply chain strategy presents a source of competitive advantage. Lean production justifies the importance of supply chain to competitive advantage and believes that improvement efforts must not be limited to a company, but must be extended to its suppliers and distributors (Nicholas, 2011). Extending the lean principle to the whole supply chain, makes the supply chain work as an integrated system, which links upstream and downstream flow of products, information, and services to reduce waste in all aspects in the system. Organizations within a lean supply chain are able to leverage their own lean journey more easily while delivering better customer value by responding more efficiently, quickly, and predictably to customer needs.

In a lean supply chain system every company in the chain recognizes that processes create value in products and services, while isolated functions are not value-added. The manufacturing processes are affected by processes of suppliers, the suppliers' suppliers, and down to the suppliers at the lowest tier of the chain. Lean supply chain is highly customer-focused and the needs of the customer are defined beyond quality, quantity, delivery, and cost in a lean supply chain. It includes market, processes, culture, and customer needs. In a supply chain, the customer is not the only one who is in direct business with the manufacturer. The customers' customer, their customers and the final customer are all in business with the manufacturer. Every manufacturer can affect the supply chain and contribute value to the final product at the top of the chain and if the final customer is not satisfied, it impacts all parts in the chain. Also in a customer driven supply chain, the policies should be coordinated efficiently to achieve a high customer service level at low cost.

Retailers are customers for manufacturers in direct contact with consumers and are aware of their changing demands. During the past few decades, due to changes in consumer spending habits, retailers have become an important part of the supply chain. The retail industry is impacted by changes in household disposable income, and hence a successful retailer should be able to quickly adjust inventory levels to match demand, to reduce inventory costs. Other studies have shown that during times of decrease in the consumer-spending index, some retailers were not successful in adjusting their inventory level (Nicholas, 2011).

Customer demand prediction, inventory control, cost analysis, quality improvement, and a successful collaborative relationship with manufacturers are some of the challenges encountered by retailers. This study is performed to facilitate supply chain professionals in gaining a better understanding of how lean can be applied to their operations. This study consists of literature review and a survey conducted at apparel retail stores to gauge retailers' satisfaction over services and transactions from manufacturers.

This study is focused on the apparel retail industry. This industry has become overstored, especially in department and specialty channels, due to the large number of retailers and changes in consumer buying habits (Johnson, 2005).

This study researches how lean supply chain can increase retailers' satisfaction in their relationship with manufacturers based on four major factors: quality, delivery, cost, and manufacturer-retailor relationship. These measures of satisfaction are identified using a survey with a set of statements using a Likert scale. Retailers are asked to evaluate each statement in terms of their perception and expectation of performance of the organization being

measured. Descriptive statistics, regression analysis and other statistical tests were performed to discuss the hypotheses mentioned later in this study.

Statement of the Problem

Despite the evidence of how important the role of retailers is in a supply chain and how destructive a disengagement in retailor-manufacturer relationship can be, studies on lean supply chain with focus on retailers' satisfaction relevant to quality and services provided by their manufacturers supplying product are limited. We estimate this may be due to lean supply chain being a relatively new concept. To address this problem more research focusing specifically on the satisfaction level of retailers towards manufacturers supplying products in a supply chain system is necessary. Also, empirical data is required for professionals in order to better understand retailers' satisfaction and use their findings to develop managerial interventions and alternative strategies that can improve supply chain procedures and increase the retailers' satisfaction towards the manufacturers.

Significance of the Study

This study will provide insight and information for practitioners, researchers, and supply chain management about retailers' satisfaction in supply chains, what they expect, and how they rate their manufacturers based on delivery, cost, quality, and communications. The results of this study and the survey feedback will also help managers and administrators define strategies for improvement.

Practitioners in the supply chain will benefit by understanding the status of their relationship with manufacturers, and become aware of weaknesses and strengths of manufacturers. By understanding these they can improve their processes, have the manufacturers

meet requirements defined by the retailers, and convert weaknesses into strengths. Finally, it is desired that other researchers can use this information to conduct similar studies that will contribute to the knowledge base of the retailers' satisfaction in the lean supply chain. Further research can also be conducted by others to determine what other factors are important for retailers and manufacturers for creating a lean supply chain while maintaining the methodology for the study similar to this one.

Research Objectives

Specific research objectives for this study are as follows:

RO1: Identify the degree of relationship between retailers and their manufacturers supplying their products

RO2: Identify the degree of importance of manufacturer characteristics related to the lean supply chain system from the retailers' point of view

RO3: Identify the level of retailers' satisfaction based on attributes of quality, delivery, cost, and manufacturer-retailer relationship

RO4: Identify lean principles that can improve retailers' satisfaction within their supply chain

Research Questions

The questions in this study are designed based on important factors of lean supply chain. These are quality, delivery, cost, and manufacturer-retailer relationship. These questions are developed toward achieving the research objective as shown in Table 1-1.

Research Hypotheses

This study tested the following hypotheses:

1. Retailers are satisfied with manufacturers' performance regarding quality of products, and change in quality of products has no effect on overall retailers' satisfaction

2. Retailers are satisfied with manufacturers' performance regarding delivery of products, and change in on-time delivery of products has no effect on overall retailers' satisfaction

3. Retailers are satisfied with manufacturers' performance regarding cost of products, and change in cost of products has no effect on overall retailers' satisfaction

4. Retailers are satisfied with manufacturers' performance regarding maintenance of good relationships with them, and the betterment of the relationship has no effect on overall retailers' satisfaction.

Variables

Dependent variables in this study are the retailers' survey response scores on twelve retailers' satisfaction items. Independent variables are factors of quality, delivery, cost, and retailer-manufacturer relationship.

Assumptions and Limitations

In this study it is assumed that all participants would answer survey questions honestly. Most of the participants are store managers and hence it is assumed that they have enough knowledge to answer the questions on their own without much reference. The survey was designed to take only a few minutes to complete and hence it was expected to have a good amount of participants for this study. Still a major limitation of the study turned out to be number

of participants. Although the questionnaire was given to more than 60 retailers, only 21 responses were received. Most of the stores did not participate because of store policies and limitations they had, to answer survey questions. To come up with the problem of having a small sample size, t-test is picked *to test the hypotheses.*

Potential Benefits of this Research

This research found that there is scope for the manufacturing sector to more fully embrace the strategic implications of adopting an overall lean approach to create more responsive and agile supply chains to gain a competitive advantage in the marketplace. Manufacturers supplying products to retailers should satisfy the retailers more with their lean practices so that the higher level of retailers' satisfaction will gain more cooperation for the manufacturers, resulting for them into a competitive advantage in the overall supply chain. Also the desire of this study is to provide insight and information for practitioners, researchers, and management about retailer's expectations in terms of levels of satisfaction in a supply chain from manufacturers based on delivery, cost, quality, and communications.

Table 1.1. Research Objectives and Related Survey Questions

	Research objectives	Survey questions	
RO1	Identify the degree of relationship between retailers and their manufacturers supplying their products	As a retailer how do you rate manufacturer, customer, supplier, distributer based on their influence on your business?	
RO2	Identify the degree of importance of manufacturer performance attributes related to the lean supply chain system from the retailors point of view	For the products that you receive from manufacturer/producer, how do you rate the importance of quality, cost, delivery, and relationship with manufacturer?	
RO3	Identify the level of retailers' satisfaction based on attributes of quality, delivery, cost, and manufacturer-retailer relationship	As a retailor how do you rate the following attributes based on their importance from your business point of view? • High quality product • Reliable product • Responsive customer service • Consideration of final customer needs in designing the products • Pricing • Having stable price for each order every time • Trying to reduce transaction costs • Delivery costs • Exchanging information with you about design changes, long term plans, production schedules, and problem • Joint problem solving • Joint training planning • Joint cost and quality improvement planning	• On time delivery • Quick accommodation capability in change in quantity or quality of products • Flexibility in order quantity and delivery time • Shipment tracking and expediting through online and other communication
RO4	Identify lean principles that can improve retailers' satisfaction within their supply chain	How do you rate the manufacturer/ producer on following attributes? • High quality product • Reliable product • Responsive customer service • Consideration of final customer needs in designing the products • Pricing • Having stable price for each order every time • Trying to reduce transaction costs • Delivery costs • Exchanging information with you about design changes, long term plans, production schedules, and problem • Joint cost and quality improvement planning	• On time delivery • Quick accommodation capability in change in quantity or quality of products • Flexibility in order quantity and delivery time • Shipment tracking and expediting through online and other communication • Joint problem solving • Joint training planning

CHAPTER 2. LITERATURE REVIEW

This literature review provides a background on the history of lean manufacturing, lean supply chain and its application in retailer-manufacturer relationships. Also, definitions for related concepts such as, retail industry, satisfaction, and lean tools are reviewed.

History of Lean Manufacturing

Before the industrial revolution, most products were produced by craftsmen who were highly skilled, and made customized items in their homes or shops for specific customers. Craft production has always been expensive and has had a small amount of consumers. Henry Ford's assembly line revolutionized manufacturing by making his 1908 Model T available in mass quantities for the public.

After World War II, the general manufacturing approach was to produce as much as possible without considering waste (Piciacchia & Bergsten, 2002). In contrast with craft production, mass production did not require skilled workers to do the job. They used a single purpose machine to do the same job hundreds of times to produce a single product in large quantities.

Due to rising global competition and customer demand, manufacturers no longer wished to have inflexible plants and excess inventory on hand. The Toyota Motor Company began an approach in manufacturing called the "Toyota Production System" or "Just in Time" manufacturing in the late 1940's. Taichii Ohno, the Toyota executive, developed many of the lean principles used today at the Toyota Motor Company (Womack & Jones, 2003) and other lean organizations. The lean producer combines the advantages of both production methods and uses multi-skilled workers who use flexible multi-purpose machinery to produce a variety of products at variable volumes (Womack & Jones, 2003). Ohno identified the seven types of waste

or "muda" in Japanese. The seven wastes are transportation, inventory, motion, waiting, over-processing, over-production, and defects.

In order to stay competitive, companies are now trying to adopt manufacturing principles in which lead times and cycle times are shortened, quality levels are improved and excess inventory and other process wastes are decreased. These are the core principles of lean manufacturing, which are being pursued by many US industries to become more competitive by better satisfying their customers to succeed in today's global economy.

Lean Manufacturing

Lean manufacturing is a set of management practices based on the Toyota Production System that has been applied in manufacturing as well as service industries. Lean manufacturing is about eliminating waste or "non-value-adding" activities in order to strictly focus on value adding activities for which only customers would like to pay. Lean manufacturing strives to produce products on time, better, faster, and cheaper than competitors with using as few resources as possible while eliminating waste.

Some salient lean manufacturing tools are:

• Single Minute Exchange of Die (SMED)

• Total Productive Maintenance (TPM)

• 5S: Workplace organization and visual factory

• Kanban Work Signaling System

• 2-Bin materials replenishment system

• Error and mistake-proofing

• Level-loading (Heijunka), for producing mixed quantities and styles of products

- Inventory reduction

- Kaizen events (also known as "Kaizen Blitzes" or "Improvement Events")

- Continuous improvement and "Lean culture change"

Lean operations eliminate waste, reduce variability, reduce inventory and consequently reduce cost. It is based on six principles which include waste elimination, pull production, zero defects, streamlining of processes, quality at source and continuous improvement (Joy & Vinodh, 2012). These principles can be practiced only through the involvement of management and manufacturing practitioners. Thus, in a lean manufacturing system, manufacturing management leanness, manufacturing strategy leanness, and technology and workforce leanness play a vital role.

Supply Chain

The supply chain is the multi-tiered system of people, organizations, technologies, activities, information, and resources involved in moving products or services from the suppliers to the final customers (Russell & Taylor, 2007). Typically, a supply chain includes customers, retailers, distributors, manufacturers, and suppliers. This concept is shown in Figure 2.1 and as it is illustrated in this figure, information and goods flow up and down in the supply chain. This information and flow might be within different parts of the organization such as, planning, finance, engineering, sales, distributing, order procurement, and marketing. This means a supply chain includes various functional areas in the organization and it is not limited to a specific part.
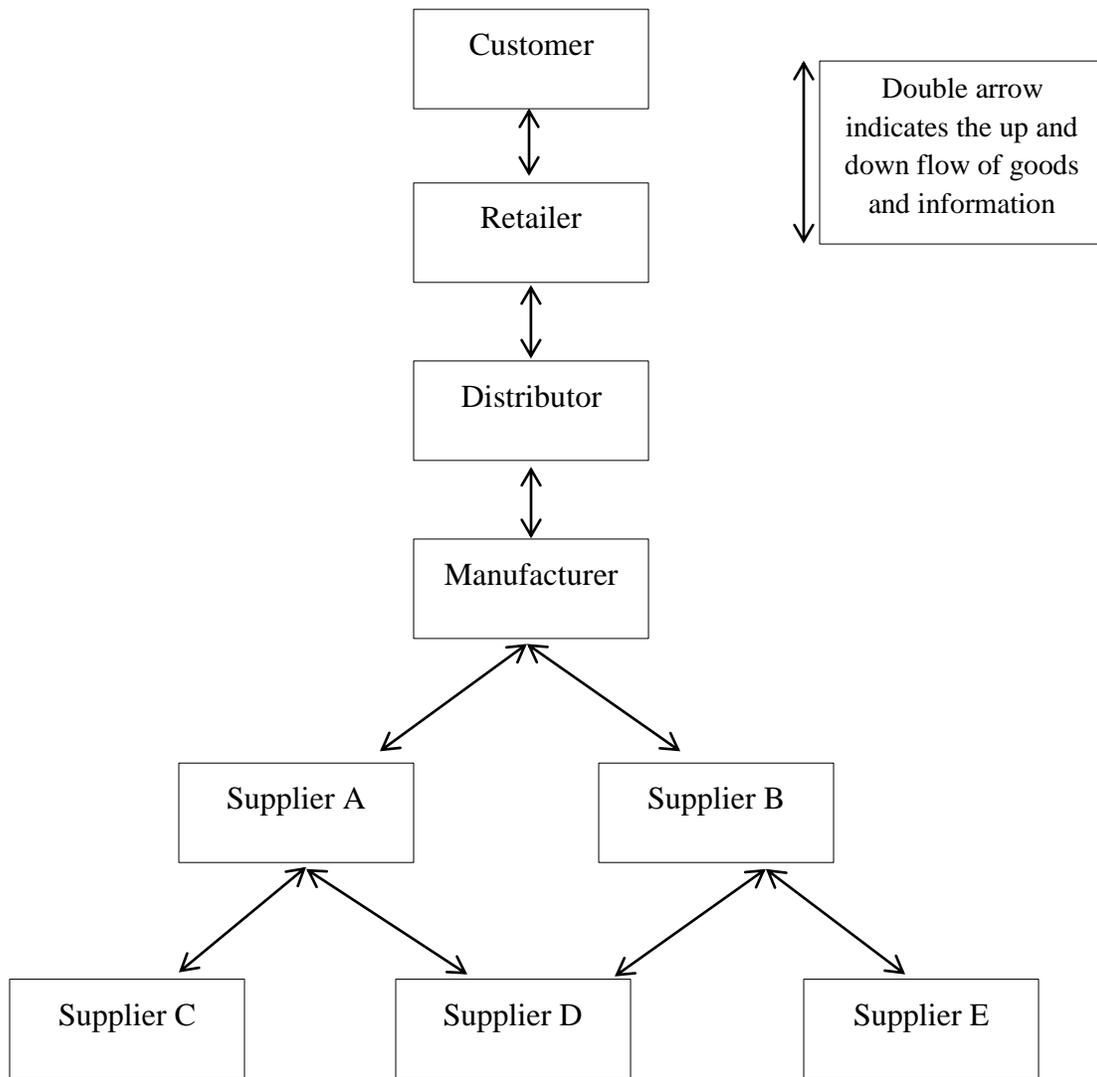
Figure 2.1. Conceptual Model of the Supply Chain (Handfield and Nicholas, 1999)

Supply Chain Management

Supply Chain Management (SCM) is managing the flow of goods and services throughout the supply chain. It is also coordinating the activities of suppliers to meet the requirements of customers above them in the supply chain (Russell & Taylor, 2007). Supply chain management practices are positively related to performance at both the retail and supplier levels (Hamister, 2012). The goal of supply chain management is maximizing customer value in

the supply chain and achieving a sustainable competitive advantage. It covers all the activities within the supply chain including product development, sourcing, production, and logistics, as well as the information systems required to coordinate these activities.

Development of a Lean Supply Chain

After several decades of applying lean principles in order to stay competitive, companies decided to extend implementation of lean tools beyond the factory walls. They sought to identify every step involved in getting a product to a customer, including not just manufacturing processes, but every action in the supply chain as well. This involved the entire supply chain which includes customer, retailer, distributor, manufacturer, and supplier.

Delphi Company is one of the pioneers in a lean supply chain. Delphi is a global company with about 200 manufacturing sites and roughly 200,000 employees, and obviously getting their products to customers is a very complex process as Mark Lorenz, Vice President of operations and logistics, said: "it takes 171 organizations and a total of 288 handoffs just to bring the product to the customer." Delphi started to establish its Global Logistics Network and strived to streamline every aspect of that network. They compressed the size of the supply chain by using value stream mapping and focusing on eliminating waste from its manufacturing operations (Productivity press, 2005).

While the principles of lean have been applied to the manufacturing field for several decades, the notion of lean supply chain management is relatively new. Today lean tools are used to reduce wasteful activities across the supply chain.

Lean Supply Chain

Lean supply chain can be defined as a set of organizations directly linked by upstream and downstream flow of products, services, finances, and information that all work together to reduce waste and the cost of waste by pulling the demand from customers. It includes a value stream through customers and suppliers, and plays a strategic role to achieve a lean production system. In order to achieve a lean supply chain it is necessary to apply the following tactics:

- Knowing suppliers as an extension of the internal manufacturing process and cultivating them as long-term business partners.

- Establishing long-term purchase and supply commitments.

- Improving communications with suppliers.

- Involving suppliers in early stages of new product planning.

- Using supplier expertise to improve design manufacturability and reducing product cost.

Having a lean supply chain will provide many benefits to companies such as reducing paperwork, waste, and costs between business partners (Langenwalter, 2000). In June 2006 the Aberdeen group conducted a survey, presented in Figure 2.2, in which 125 companies were involved in lean practices. This survey showed only about one third of the survey participants have lean manufacturing programs and less than 20% have implemented these principles in their supply chain to make it lean. The survey also showed that many manufacturers are beginning to separate the lean philosophy from the tools and techniques used in manufacturing to apply the same philosophy with other tools and techniques in different parts of the supply chain (Aberdeen Group, 2006).

Relative Lean Maturity of Respondents

Lean Manufacturing	57%	59%	28%
Lean Enterprise	31%	23%	39%
Lean Supply Chain	12%	18%	32%

☐ Mature >5 yrs ■ Some Lean ☐ Just Beginning
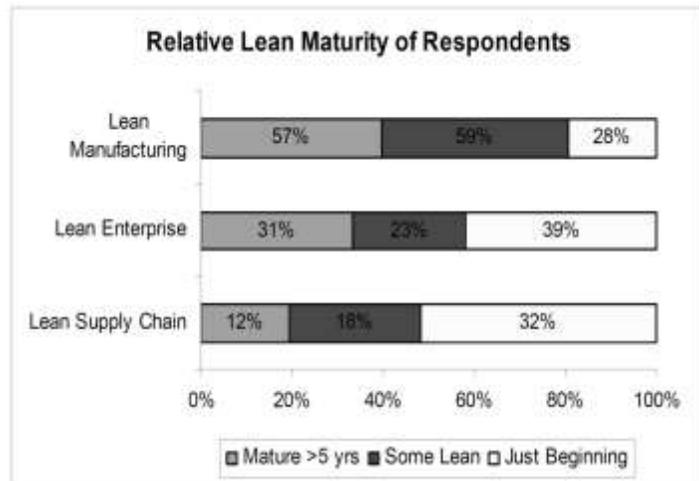
Figure 2.2. Relative Lean Maturity of Respondents (Aberdeen Group, 2006b)

Lean Technology and Tools

Lean has an extensive collection of tools and concepts which can improve the processes by reducing waste. Some tools of lean manufacturing are shown in tables 2.1 and 2.2.

Table 2.1. Lean Tools (Vorne Industries Inc., 2010)

Lean Tools	Definition	Application
5S	Organize the work area: Sort (eliminate that which is not needed) Set In Order (organize remaining items) Shine (clean and inspect work area) Standardize (write standards for above) Sustain (regularly apply the standards)	Eliminates waste that results from a poorly organized work area (e.g. wasting time looking for a tool).
Bottleneck analysis	Identify which part of the manufacturing process limits the overall throughput and improve the performance of that part of the process.	Improves throughput by strengthening the weakest link in the manufacturing process.
Continuous flow	Manufacturing where work-in-process smoothly flows through production with minimal (or no) buffers between steps of the manufacturing process.	Eliminates many forms of waste (e.g. inventory, waiting time, and transport).
Just-in-time	Pull parts through production based on customer demand instead of pushing parts through production based on projected demand. Relies on many lean tools, such as Continuous Flow, Heijunka, Kanban, Standardized Work and Takt Time.	Highly effective in reducing inventory levels. Improves cash flow and reduces space requirements.
Kaizen	A strategy where employees work together proactively to achieve regular, incremental improvements in the manufacturing process.	Combines the collective talents of a company to create an engine for continually eliminating waste from manufacturing processes.
Kanban	A method of regulating the flow of goods both within the factory and with outside suppliers and customers. Based on automatic replenishment through signal cards that indicate when more goods are needed.	Eliminates waste from inventory and overproduction. Can eliminate the need for physical inventories (instead relying on signal cards to indicate when more goods need to be ordered).
Muda	Anything in the manufacturing process that does not add value from the customer''s perspective.	Eliminating muda (waste) is the primary focus of lean manufacturing.
Overall equipment effectiveness	Framework for measuring productivity loss for a given manufacturing process. Three categories of loss are tracked: Availability (e.g. down time) Performance (e.g. slow cycles) Quality (e.g. rejects)	Provides a benchmark/baseline and a means to track progress in eliminating waste from a manufacturing process. 100% OEE means perfect production (manufacturing only good parts, as fast as possible, with no down time).

Table2.1 (continued)

Lean Tools	Definition	Application
Poka-Yoke	Design error detection and prevention into production processes with the goal of achieving zero defects.	It is difficult (and expensive) to find all defects through inspection, and correcting defects typically gets significantly more expensive at each stage of production.
Root cause analysis	A problem solving methodology that focuses on resolving the underlying problem instead of applying quick fixes that only treat immediate symptoms of the problem. A common approach is to ask why five times – each time moving a step closer to discovering the true underlying problem.	Helps to ensure that a problem is truly eliminated by applying corrective action to the "root cause" of the problem.
Single minute exchange of die	Reduce setup (changeover) time to less than 10 minutes. Techniques include: Convert setup steps to be external (performed while the process is running) Simplify internal setup (e.g. replace bolts with knobs and levers) Eliminate non-essential operations Create standardized work instructions	Enables manufacturing in smaller lots, reduces inventory, and improves customer responsiveness.
Six big loses	Six categories of productivity loss that are almost universally experienced in manufacturing: Breakdowns Setup/Adjustments Small Stops Reduced Speed Startup Rejects Production Rejects	Provides a framework for attacking the most common causes of waste in manufacturing.
Smart goals	Goals that are: Specific, Measurable, Attainable, Relevant, and Time-Specific.	Helps to ensure that goals are effective.
Takt time	The pace of production (e.g. manufacturing one piece every 34 seconds) that aligns production with customer demand. Calculated as Planned Production Time / Customer Demand.	Provides a simple, consistent and intuitive method of pacing production. Is easily extended to provide an efficiency goal for the plant floor (Actual Pieces / Target Pieces).
Total productive maintenance	A holistic approach to maintenance that focuses on proactive and preventative maintenance to maximize the operational time of equipment. TPM blurs the distinction between maintenance and production by placing a strong emphasis on empowering operators to help maintain their equipment.	Creates a shared responsibility for equipment that encourages greater involvement by plant floor workers. In the right environment this can be very effective in improving productivity (increasing up time, reducing cycle times, and eliminating defects).
Value stream mapping	A tool used to visually map the flow of production. Shows the current and future state of processes in a way that highlights opportunities for improvement.	Exposes waste in the current processes and provides a roadmap for improvement through the future state.
Visual Factory	Visual indicators, displays and controls used throughout manufacturing plants to improve communication of information.	Makes the state and condition of manufacturing processes easily accessible and very clear – to everyone.

Agile Manufacturing

Agility means using market knowledge and a virtual corporation to exploit profitable opportunities in a volatile marketplace. Agile manufacturing is about alliances formed between suppliers and customers to provide increased speed to the products' market (Russell and Taylor, 2007). Flexibility, customer-supplier negotiations, a time-phased approach to production, contingency modeling for consideration of dynamic trade-offs and dynamic paths forward, and a continuous re-planning process triggered by events and time, are some strategies used in agile manufacturing. Flexibility is the key component of agile manufacturing, and also an important lean principle where production is driven by the customer's changing demand.

In some organizations it is suggested to strive for agility after achieving leanness, although these two have some differences. In an agile production, suppliers reserve capacity that may additionally be needed to be made available at a very short notice. Demand is unpredictable and it is considered a business risk, but in lean environment the demand is relatively predictable and this facilitates the level schedule requirements necessary for (a) lean supply chain (Suzaki, 1987). Table 2.2 shows a comparison between agile manufacturing and lean production attributes (Groover, 2008). Agile manufacturing is included considering each supply chain strives to address lean and agile system in a combination.

Table2.2. Comparison of Lean Production and Agile Manufacturing Attributes

Lean production attributes	Agile manufacturing attributes
Enhancement of Mass Production	Break with mass production; emphasis on mass customization
Flexible production for product variety	Greater flexibility for customized products
Focus on factory operations	Scope is enterprise wide
Emphasis on supplier management	Formation Virtual enterprises
Emphasis on efficient use of resources	Emphasis on thriving in environment marked by continuous unpredictable change
Relies on smooth production schedule	Acknowledgement and attempts to be responsive to change

Value

Value is defined by the customer who is the one paying for the product which is created by the producer. It is also the production capability provided to the customer at the right time and at an appropriate price (Womack and Jones, 2003). A value-added activity is defined as the opposite of waste in a process and has three attributes. First, the customer must be willing to pay for the activity. Second, it must change the product or service in the way that it comes closer in the form in which the customer would like it. And lastly, it is done right the first time.

Apparel Retail Industry

The retail industry can be defined as the composition of companies that sell merchandise to customers. The apparel industry is one of the most prominent industries in the United States. It is the second largest industry in terms of businesses and employees, and in spite of the recession in recent years, it has continued to grow at a rate faster than many other industries. In

2012, retail industry sales have increased by 3.4 percent to $2.53 trillion according to the National Retail Federation (NRF, 2012). The apparel retail industry has become overstored, especially the department and specialty channels due to the large number of retailers and changes in consumer buying habits (Johnson, 2005).

Customer Satisfaction and Dissatisfaction

Satisfaction is the consumer's fulfillment response. It is basically a judgment on how a product or service feature provided a pleasurable level of fulfillment including a level of under, or over-fulfillment. It can be an individual pursuit, a goal to be attained from are product or the patronization of service (Oliver & Webber, 1992).

Dissatisfaction is the opposite of satisfaction and comes from displeasure by under-fulfillment. Surprisingly, over-fulfillment could be dissatisfying if it is unpleasant, as in the case of too much of good things (Oliver & Webber, 1992). Also, sometimes dissatisfaction is desired by some marketing organizations like the fashion industry when they introduce a new product to the market and start to create dissatisfaction with the prevailing style.

The notion of fulfillment implies that a goal exists and something should be met or filled. This fulfillment or satisfaction can be judged by some standard, which can be different for different types of customers. For this study, it is considered that the customer is the retailer, who is the customer of the manufacturer in the supply chain. Satisfaction and dissatisfaction are defined considering standards in the retailing industry. Since retailers are not the final consumers, they have different expectations in terms of quality, design, cost, delivery, and other important features of a product. Expectations are a key factor in satisfaction. When customers

have high expectations and reality falls short, they will be disappointed and will likely rate their experience as less than satisfying.

Supply Chain Challenges for Retailers and Manufacturers

Research conducted by White Space Insight (Edwards & Hardyment, 2010) shows that the importance of supply chain and waste in the supply chain system is completely understood by retailers and manufacturers to the extent that they mostly consider having a lean supply chain system as the best way to compete with competitors when they do not have as much power as them. They interviewed representatives from middle and senior management within the supply chains and related business divisions from several different areas of retail and manufacturing to find out what the major challenges are when it comes to a lean supply chain. The followings were identified as some lean supply chain issues for retailers and manufacturers (Edwards & Hardyment, 2010):

- Bottom line performance fundamentally drives supply chain and logistics initiatives.
- Role of supply chain is now an area in which organizations can add value and differentiate, not as a cost of sales.
- Organizations have different definitions of waste while they are implementing initiatives to remove 'waste' from the supply chain in order to create more efficient processes.
- For continuous improvement, all client companies want and expect logistics suppliers to proactively come forward with improvement initiatives. Although most of the organizations strive for continuous improvement, not all of them have a precise plan for continuous improvement.

- Alignment with end customer is another issue. Although the goal of all supply chains is to serve the end customer, there are differing levels of focus on customer needs versus internal efficiency. Most of the organizations tend to look for cost-based improvements rather than focusing on higher levels of service.

- Partnerships are a problem. Although almost all organizations are seeking logistics providers to meet current and future needs, only 26% of the respondents were currently experiencing that level of proactive partnership.

- Supplier proactivity, consolidation of contracts and suppliers, shared-use of logistics and vehicle tracking, better forecasting systems and further cost savings are some of the common unfulfilled needs.

CHAPTER 3. METHODOLOGY

Chapter 2 reviewed literature of lean, supply chain and retail industry in order to develop an understanding of various lean supply chain concepts. In this chapter, a three-phase methodology is created to describe the research objective, research design and the methodology which concludes determining the retailers' satisfaction when it comes to the lean supply chain.

Participants

To get the eligibility to conduct the survey, Collaborative Institutional Training Initiative Institutional Review Board (CITI IRB) modules were completed (Appendix A). The CITI IRB test is mandatory for all human subject research and consists of a series of modules such as:

- History and Ethical Principles

- Defining Research with Human Subjects

- The Regulations and The Social and Behavioral Sciences

- Assessing Risks in Social and Behavioral Sciences

- Informed Consent

- Privacy and Confidentiality

Since survey respondents for this research were Human Subjects (store managers, department managers, and assistant managers as shown in Figure 3.1 and Table 3.1) IRB approval has been taken to conduct the survey for this research. IRB approval document is also included in Appendix A.

To examine the retailers' satisfaction, a paper survey is conducted among some apparel retailers, mostly clothing stores like Marshalls, Dillard's, Nordstrom, etc., in Texas in spring 2013. The survey included 12 close-ended questions and was given to participants in person.

The retail representatives who completed questionnaires for this study were store managers, department managers, and assistant managers. Figure 3.1 and Table 3.1 show the demographic characteristics of the sample.

Table 3.1 Demographic Characteristics of Sample

Job title	Percentage %
Store manager	45
Department manager	25
Assistant manager	30
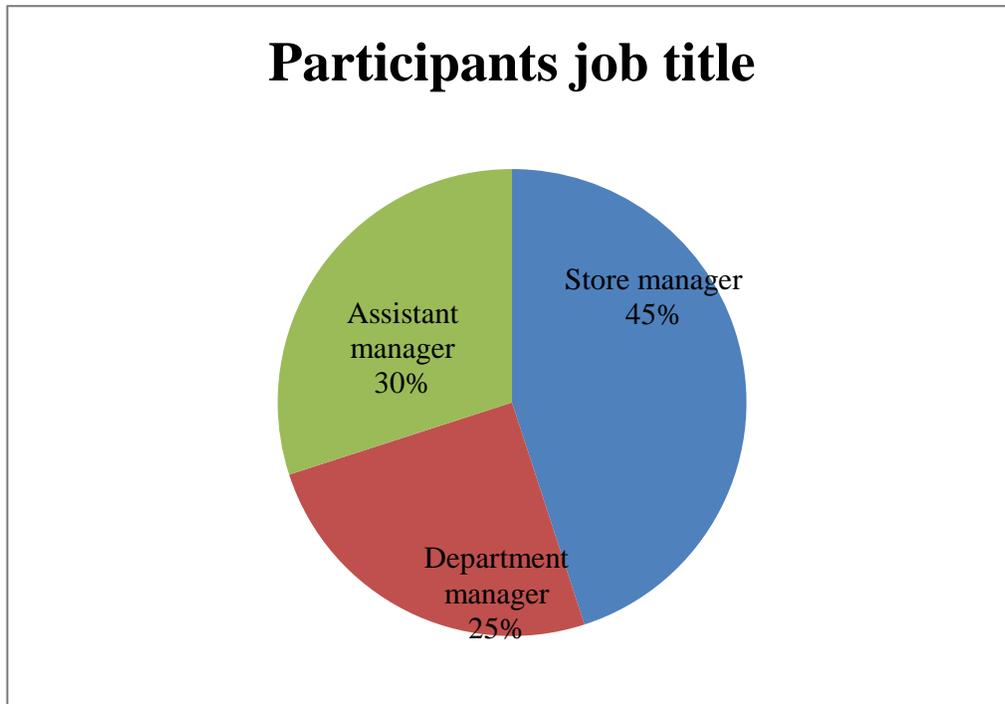
Figure 3.1 Demographic Characteristics of Sample

As is shown in Figure 3.1 and Table 3.1, the greatest number of participants, were store managers, followed by assistant managers and lastly department managers.

Instruments

This paper-based retailers' satisfaction survey was conducted for the purpose of studying the rate of retailers' satisfaction and to further develop and refine an instrument that gathers information on retailer-manufacturer relationship. Paper surveys are designed to work on one or more pages that are printed in a very high resolution compared the computer screens. It is possible to fit more information on one piece of paper than on a comparably sized monitor. Also, the practitioner can ask as many questions as the participant can tolerate and get more detailed information regarding their answers if necessary. On the other hand, paper-based surveys take

from several weeks to months to distribute, collect and encode for analysis. Compared to web-based surveys, paper-based surveys are not quick in the data analysis phase.

A paper survey with 14 questions was created and pilot-tested with a similar group of retailers. The following two questions were removed from the survey after testing:

- How frequently do you purchase or order the product?

- How would you rate your overall satisfaction from manufacturer/producer?

To order the products, each retailer had different procedures. Some of them had special software to estimate the required products and the frequency of ordering might be different based on the purchasing rate. Some of the retailers would receive different products every day and their frequency did not depend on retail stores, and everything was controlled from a special department that worked as the retail headquarters. Also the survey questions eventually determine the overall retailers' satisfaction from the manufacturers, so there was no need for them to rate their overall satisfaction from manufacturer in such a question.

The questions in the survey are defined based on lean supply chain goals. The goal of a lean supply chain is delivering better customer value by responding more efficiently, quickly, and predictably to customer needs (Srinivasan, 2007). A very basic concept of lean is continuous flow which focuses on cost reduction by improving quality and through-put. Considering these concepts from lean supply chain, four fundamental factors of quality, delivery, cost, and manufacturer-retailor relationship were selected to be the major pillars of the questions in the survey, and all other questions were created to have some relation with these.

The Both categories of questions in the survey are oriented in a frame of lean supply chain features and value added practices. The results of the survey are expected to show among

quality, delivery, price, and manufacturer-retailer relationship, which one is the most important

parameter for retailers and the one where manufacturers performed the best from the retailers

point of view (Appendix B).

Procedures

The procedure for this study was to take the paper survey to retail stores and ask someone

who is familiar with the operation to fill out the survey. Usually, they requested a time of one or

two days to fill out the survey, and in some cases they filled it out right after receiving.

Results were sent to participants via email if they had provided their email addresses.   Privacy

concerns of participants were respected.

CHAPTER 4. RESULTS

Chapter 1 established the need for empirical research that would determine the level of retailers' satisfaction in a lean supply chain system. Chapter 2 focused on literature related to the lean supply chain and retail industry and explained how lean supply chain can be applied to the results in customer satisfaction in a supply chain. Chapter 3 described the methods and procedures used to determine the overall retailers' satisfaction and clarify whether the manufacturers' performance in the supply chain is acceptable for retailers in meeting their expectations or not. This chapter will describe the participants in the study and the results of analysis performed to examine the research questions.

Characteristics of Sample

The study sample consists of managers of 21 apparel retail stores located in Texas and North Carolina who agreed to participate in this study. The demographic characteristic of the sample is shown in Figure 3.1 and table 3.1.

To examine retailers' satisfaction, a paper survey was taken to the clothing stores and was filled out by participants. Among more than 60 stores, only 21 completed the survey (sample size $n = 21$), so the response rate for this survey was around 30%.

Descriptive Statistics

The survey instrument was designed to measure participants' levels of satisfaction from manufacturers. Participants rated their choices from one to four on a Likert scale, one being the lowest and four being the highest rating. The participants could use one number more than once in a question. The survey involved twelve close-ended questions (Appendix B). The first two

questions are independent questions about the importance of other parts of the supply chain like customer, manufacturer, supplier, and distributer, and manufacturer performance attributes like quality, delivery, cost, and relationship from retailers' point of view. Tables 4.1 and table 4.2 show sample responses to the first two questions.

Table 4.1 Most Important Retailer's Partners in Supply Chain System

Supply Chain Parts	Sum	Mean	Var
Manufacturer	79.8	3.80	0.23
Customer	68.25	3.25	0.65
Supplier	67.2	3.20	0.42
Distributer	73.08	3.48	0.77

According to Table 4.1 the manufacturer has the most influence on retailers and distributors. Suppliers and customers are the next entities in supply chain that affect the retailing.

Table 4.2 Most Important Factor for Retailer

Factors	Sum	Mean	Var
Quality	68.25	3.25	1.78
Delivery	78.75	3.75	1.10
Cost	65.1	3.10	1.90
Manufacturer-retailo relationship	53.76	2.56	1.36

As is shown in Table 4.2, retailers chose delivery as the most important attribute in their interaction with manufacturers and the least important attribute is their relationship with the manufacturer. Quality and cost have the second and third place according to the data captured in the above table.

The rest of the questions are divided into two categories. One category is about the retailers' expectations from manufacturers in quality, delivery, cost, and their relationship with the manufacturer and the second category is how the retailers rate the manufacturers for their current performance in four aforementioned attributes. In this study, the difference between retailers' expectation and current performance of manufacturer is defined as retailers' satisfaction.

Table 4.3 shows the retailers' expectations from manufacturers. Mean and variance of the data are also shown in the table. According to the statistics in this study, quality is the most expected factor from the retailers' point of view, and among the four sub-factors of high quality product, reliable product, responsive customer service, and consideration of the customer's needs in designing the product, "responsive customer service" had the highest rating with a maximum average of 3.66 and minimum variance of 0.65. Cost is the second high-rated factor according to Table 4.3, and pricing factor with an average of 3.44 and a variance of 0.92, is the most expected sub-factor among the four sub-factors in cost.

Delivery and manufacturer-retailer relationship have the 3rd and 4th place based on average of expectations with a value of 2.88 and 2.73 respectively. The sub-factor of "joint problem solving" has the least average with a value of 2.13.

Table 4.3. Retailers' Expectations

Factor	Sub-Factor	Mean	Var	Average of the Means	SD
Quality	High quality product	3.12	1.02	3.24	0.960
	Reliable product	3.47	0.87		
	Responsive customer service	3..66	0.65		
	Consideration of final customer needs in designing the products	3.12	0.98		
Delivery	On time delivery	3.10	0.87	2.88	0.951
	Quick accomodation capability in change in quantity or quality of products	2.60	0.77		
	Flexibility in order quantity and delivery time	2.63	1.25		
	shipment tracking and expediting through online and other communication	3.20	1.11		
Cost	Pricing	3.44	0.92	3.17	1.016
	Having stable price for each order every time	3.10	0.46		
	Trying to reduce transaction costs	3.17	1.12		
	Delivery costs	2.95	0.93		
Manufacturer-retailor relation ship	Exchanging information with you about design changes, long term plans,	2.56	1.21	2.73	0.951
	Joint problem solving	2.13	0.83		
	Joint training planning	3.23	0.56		
	Joint cost and quality improvement planning	3.00	0.98		

Table 4.4 shows data on how retailers rate the current performance of manufacturers in four factors of quality, delivery, cost, and their relationship. According to Table 4.4, retailers gave the highest points to the cost factor and they rated manufacturers' performance high in two sub-factors of "having stable price for each order every time" with mean value of 3.33 and "delivery cost" with mean value of 3.55. They gave the lowest points to the relationship factor and rated "the joint training planning" item the least.

Table 4.4. Manufacturers' Current Performance

Factor	Sub-Factor	Mean	Var	Average Mean	SD
Quality	High quality product	3.01	0.93	2.90	0.987
	Reliable product	3.22	0.76		
	Responsive customer service	3.24	0.80		
	Consideration of final customer needs in designing the products	2.11	1.56		
Delivery	On time delivery	2.22	0.88	2.83	0.967
	Quick accomodation capability in change in quantity or quality of products	2.76	1.32		
	Flexibility in order quantity and delivery time	3.21	1.65		
	shipment tracking and expediting through online and other communication	3.14	0.65		
Cost	Pricing	2.64	1.34	3.19	0.750
	Having stable price for each order every time	3.33	1.12		
	Trying to reduce transaction costs	3.25	0.23		
	Delivery costs	3.55	0.45		
Manufacturer-retailor relation ship	Exchanging information with you about design changes, long term plans, production schedules and problems	3.10	1.30	2.65	0.898
	Joint problem solving	2.06	1.11		
	Joint training planning	2.34	0.45		
	Joint cost and quality improvement planning	3.10	0.65		

Table 4.5 shows the difference between what the retailers expect and the current performance of manufacturers. The average of expectations minus the average of current

performance is equal to a number which shows the average of retailers' satisfaction. The smaller the number is, the higher the satisfaction will be. According to Table 4.5, retailers are most satisfied with cost and least with the quality factor. The biggest difference between the amount of what retailers expect and the amount of how they rate the current performance of the manufacturer is appeared in "Joint training planning" sub-factor. This number shows dissatisfaction of the retailers. Cost, delivery, retailer-manufacturer relationship, and quality are factors in descending order according to the statistics shown in table 4.5.

Table 4.5. Retailers' Satisfaction Data

Factor	Sub-factor	Expectations Ave.	Current Performance Ave.	Difference	Factor Difference
Quality	High quality product	3.12	3.01	0.11	1.79
	Reliable product	3.47	3.22	0.25	
	Responsive customer service	3.66	3.24	0.42	
	Consideration of final customer needs in designing the products	3.12	2.11	1.01	
Delivery	On time delivery	3.1	2.22	0.88	0.2
	Quick accomodation capability in change in quantity or quality of products	2.6	2.76	-0.16	
	Flexibility in order quantity and delivery time	2.63	3.21	-0.58	
	shipment tracking and expediting through online and other communication	3.2	3.14	0.06	
Cost	Pricing	3.44	2.64	0.8	-0.11
	Having stable price for each order every time	3.1	3.33	-0.23	
	Trying to reduce transaction costs	3.17	3.25	-0.08	
	Delivery costs	2.95	3.55	-0.6	
Manufacturer-retailor relation ship	Exchanging information with you about design changes, long term plans, production schedules and problems	2.56	3.1	-0.54	0.32
	Joint problem solving	2.13	2.06	0.07	
	Joint training planning	3.23	2.34	0.89	
	Joint cost and quality improvement planning	3	3.1	-0.1	
	Total Sum	48.48	46.28	2.2	
	Total Average	3.03	2.89		

Regression Analysis

In this study, single linear regression is used to model the relationship between satisfaction and the retailers' expectations and the manufacturers' performance, and to determine the trend of retailers' satisfaction based on four major factors of quality, delivery, cost, and retailer-manufacturer relationship. Regression analysis is used as it helps understand how the value of a dependent variable changes when any of the independent variables is varied, and the slope of the trend line shows the amount of dependency of variables. Also, the regression coefficient from the regression line shows the extent of contribution of a factor to satisfaction when the regression line is "$y = ax + b$", and the regression coefficient is the constant "a" that represents the rate of change of one variable (y) as a function of changes in the other variable (x) which is also the slope of the regression line (IPSOS Belgium, 2009).

In Figures 4.1 through 4.4, the regression charts for expectations and current manufacturers' performance show the relation between retailers' satisfaction and each factor, and Figure 4.5 shows the overall trend of satisfaction with all four factors.

Figure 4.1 shows the regression analysis for quality and the retailers' satisfaction. As it is shown in the graph on the left, the slope of the trendline is negative and the retailers' satisfaction is negatively related to their expectations from quality. This suggests that the more their expectations from the quality of a product, the harder they are to be satisfied, which shows their sensitivity and care for the quality of the products. The graph on the right shows the relation between the retailers' satisfaction and the ratings given to current performance of manufacturers in quality by retailers. Here also the slope of the trendline is negative and the retailers showed

less satisfaction with high quality products, which shows the growth of the retailers expectations and their satisfaction from manufacturers' performance in terms of the quality of the products.

Figure 4.2 shows the regression analysis for delivery of products and the retailers' satisfaction. The graph on the left shows the retailers' satisfaction is positively related to their expectations from delivery. This suggests that the higher the retailers' expectations are from delivery of product, the harder they will be satisfied. This shows their sensitivity and care to delivery of the products. The graph on the right shows the relation between retailers' satisfaction and ratings given to current performance of delivery by retailers. The slope of the trendline is negative and the retailers showed less satisfaction with better delivery of products, which shows that retailers' satisfaction is negatively related to manufacturers' performance in terms of the delivery of products.

Figure 4.3 shows the regression analysis for cost and the retailers' satisfaction. As it is shown in the graph on the left, the slope of the trendline is positive and the retailers' satisfaction is however when the expectations are higher. This shows that manufacturer's performance is not satisfactory on this factor.
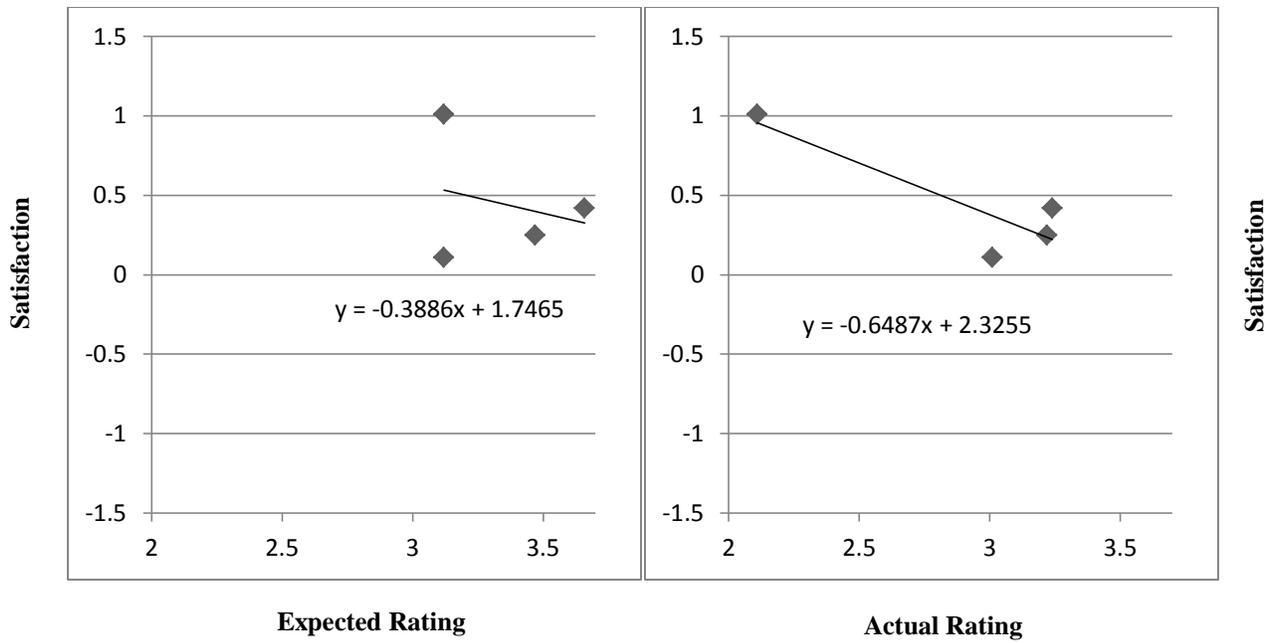
Figure 4.1. Regression Chart – Quality and Satisfaction
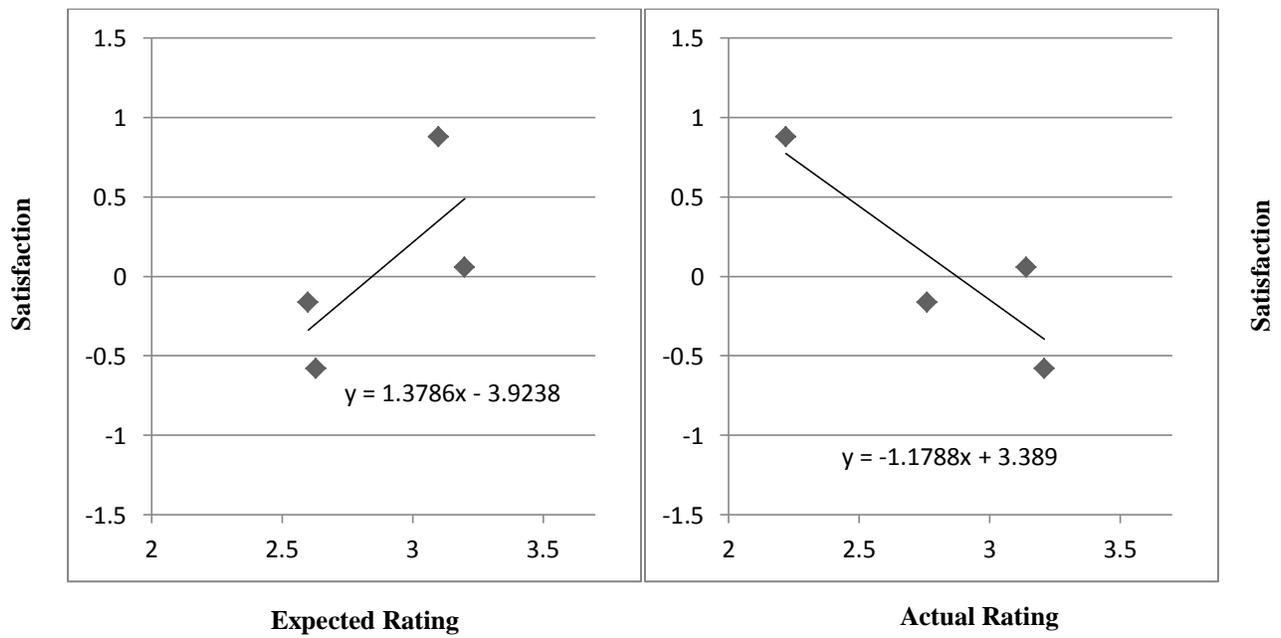
Figure 4.2. Regression chart – Delivery and satisfaction
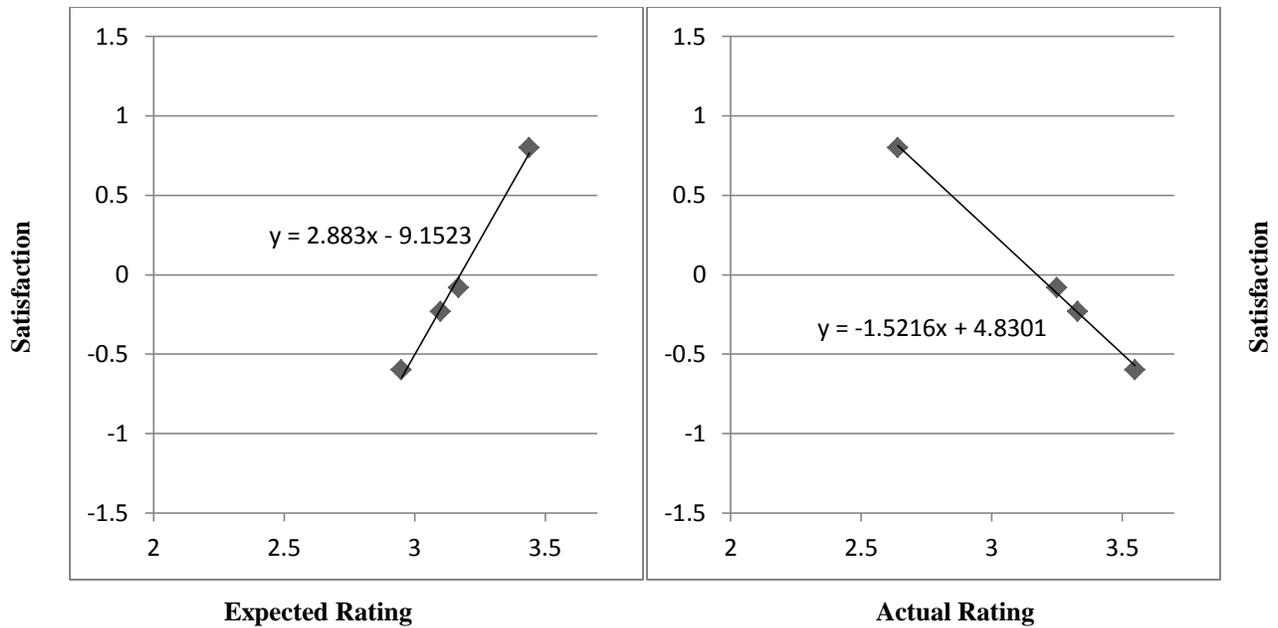
Figure 4.3. Regression Chart – Cost and satisfaction

The Figure 4.4 shows that the retailers' satisfaction and expectations are positively related and higher satisfaction is the result of higher expectation. Also the retailers' satisfaction and manufacturers' performance in their relationship factor are negatively related to each other. This means that a better relationship between them does not increases the retailers' satisfaction.

Figure 4.5 shows the regression analysis for all four factors and the retailers' satisfaction. The left graph shows positive dependency which suggests that when the retailers have more expectations, they are more satisfied. The graph on the right shows higher ratings in manufacturers' performance is accompanied with less satisfaction from retailers which show the retailers' dissatisfaction from manufacturers in general.
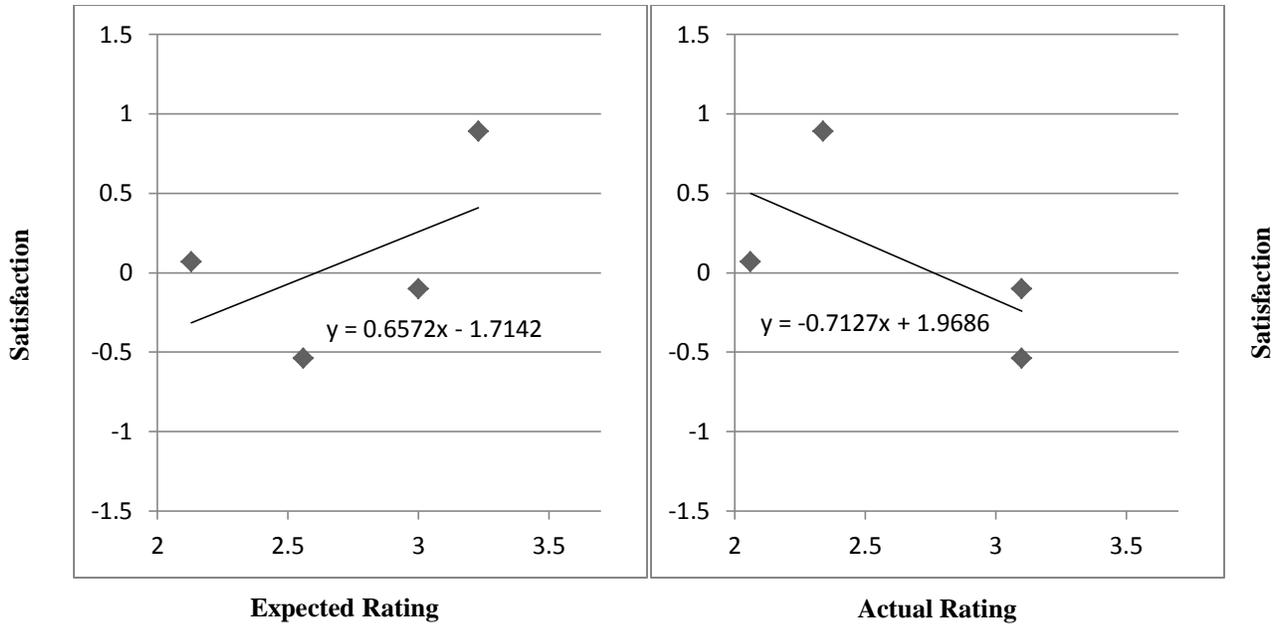
Figure 4.4. Regression Chart – Relationship and Satisfaction
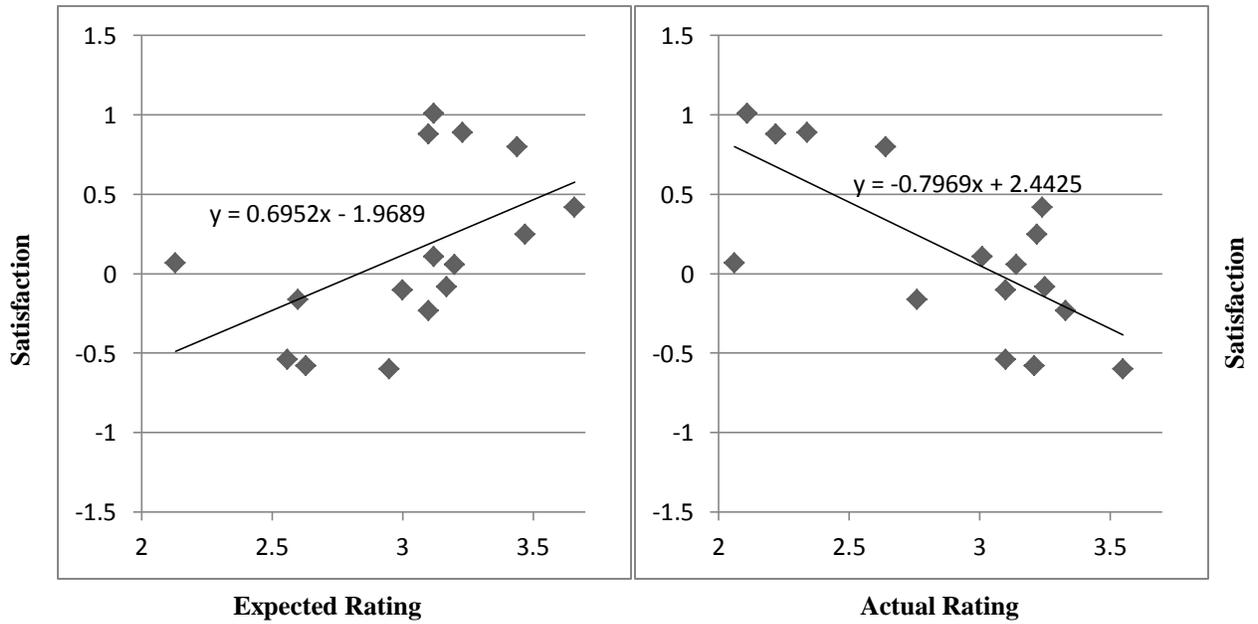
Figure 4.5. Regression Chart – All Factors and Satisfaction

Hypotheses

The purpose of this study was to determine the retailers' satisfaction considering four major factors of quality, delivery, cost, and retailer-manufacturer relationship in a lean supply chain. The initial data analysis was performed by descriptive statistics and calculating the mean and variance of the data. After showing the general trend for the data by regression analysis, it was decided to use the T-test to support or reject the hypothesis. The T-test is used to evaluate the

$$t = \frac{\overline{x} - \mu_0}{s/\sqrt{n}},$$ difference in means between two groups and assumes that the variables are normally distributed within each group and that the variation of scores in the two groups is not reliably different (Wienbach and Grinnell, 2007). For the T-test, the null hypothesis is that the population mean is equal to a specified value μ_0. The t-value or statistic is found by using:

Here $\overline{x}$ is the sample mean, s is the sample standard deviation and n is the sample size. In this study the data is categorized into two samples of expectations and current performance of manufacturer, so there are two samples, two means, and two standard deviations. The t-value or statistic is calculated as follows:

$$t = \frac{\overline{x_1} - \overline{x_2}}{\sqrt{\frac{SD_1^2}{n_1} + \frac{SD_2^2}{n_2}}}$$

The two-sample T-test was chosen as a hypothesis test to examine whether the mean of manufacturers' performance is smaller than the mean of retailers' expectation.

Hypothesis one: The retailers are satisfied with manufacturers' performance on quality of products and the change in quality of products will have no effect on overall retailers' satisfaction.

Hypothesis one states that quality is not an important factor in the retailers' satisfaction in current situation and changing the quality will not change the retailers' satisfaction. The definition of quality factor in this study includes high quality of products, reliability of products, having responsive customer service, and considering the final customer needs in designing the products. As it was mentioned earlier, the retailers are satisfied when the mean of their expectations is smaller than the mean of manufacturer's current performance. This difference shown in Table 4.5 is negative. The independent sample T-test was chosen as the statistical measure for testing this hypothesis. This will examine whether the difference between two means of each sample is zero or not. It is assumed that the two groups of samples (expectations and current performances) have equal variance with an alpha level equal to 0.05 to limit a Type I error, of falsely accepting the null hypothesis. In this sample, the mean score for expectation was 3.24, standard deviation (SD) = 0.96, N=21, whereas the mean score for manufacturers' performance is 2.90, SD= 0.987, N=21.

$$t = \frac{3.24 - 2.90}{\sqrt{\frac{0.922}{21} + \frac{0.974}{21}}}$$

$t = 1.17$ (calculated value)

The critical value of t is less than 2.53 ($t_{0.025}$, 20), so the score showed no statistical significance between the retailers' expectation and manufacturer performance scores for quality factor, and the hypothesis was not supported.

Hypothesis two: The retailers are satisfied with manufacturers' performance on delivery of products and the change in delivery of products will have no effect on overall retailers' satisfaction.

Hypothesis two states that the manufacturers' performance on delivery, is satisfactory and the retailers' expectation is lower than manufacturers' performance. The delivery factor considers time, capability in terms of accommodating orders of different sizes with varying requirements, flexibility in quantity of orders, and online services for retailers. According to the table 4-3, the mean score for expectation was 2.88, SD = 0.951, N=21, whereas the mean score for manufacturer performance is 2.83, SD= 0.967, N=21.

$$t = \frac{2.88 - 2.83}{\sqrt{\frac{0.904}{21} + \frac{0.935}{21}}}$$

$t = 0.17$ (Calculated value)

The critical value of t is less than 2.53 (t $_{0.025}$, 20), so the score showed no statistical significance between the retailers' expectations and manufacturer performance scores for delivery factor and the hypothesis was not supported.

Hypothesis three: The retailers are satisfied with manufacturers' performance on pricing and the change in pricing will have no effect on overall retailers' satisfaction.

Hypothesis three states that in the current situation pricing is not an important factor in the retailers' satisfaction and changing the price of products will not change the retailers' satisfaction. The price factor includes the price of the products, stability in prices, reducing transaction costs, and delivery costs. According to the table 4-3, the mean score for the

expectation of cost was 3.17, SD = 1.016, N=21, whereas, the mean score for manufacturer performance is 3.19, SD= 0.750, N=21.

$$t = \frac{3.17 - 3.19}{\sqrt{\frac{1}{21} + \frac{0.562}{21}}}$$

$t = 0.07$ (Calculated value)

The critical value of t is less than 2.53 (t $_{0.025}$, 20), so the score showed no statistical significance between the retailers' expectations and manufacturer performance scores of the cost factor and the hypothesis was not supported.

Hypothesis four: The retailers are satisfied with manufacturers' performance on their relationship and the change in their relationship will have no effect on overall retailers' satisfaction.

Hypothesis four states that in the current situation the relationship between retailer and manufacturer is not an important factor in retailers' satisfaction, and changing this relationship will not change the retailers' satisfaction. The relationship factor in this study includes exchanging information with retailers about design, production schedules, joint problem solving, creating joint training plans, and joint cost and creating quality improvement plans. According to Table 4-3 the mean score for expectations for relationship factor was 2.78, SD = 0.975, N=21, whereas the mean score for manufacturers' performance is 2.59, SD= 1.073, N=21.

$$t = \frac{2.78 - 2.59}{\sqrt{\frac{0.975}{21} + \frac{1.073}{21}}}$$

$t = 0.61$(calculated value)

The critical value of t is less than 2.53 (t $_{0.025}$, 20), so the score showed no statistical significance between the retailers' expectations and manufacturer performance scores of the relationship factor and the hypothesis was not supported.

CHAPTER 5. DISCUSSION

The purpose of this chapter is to summarize key findings of the study, present conclusions drawn from the results, and describe implications for future research. The first section summarizes the key findings about the retailers' satisfaction and the impact of quality, delivery, pricing, and retailer-manufacturer relationship regarding the retailer's satisfaction. The second section draws conclusions and discusses the results of the study.

The last section suggests applying related lean tools to improve processes and increase the retailers' satisfaction of the manufacturer, and propose future research opportunities.

Summary of Findings

Results of the survey on apparel retailers were analyzed to determine the level of retailers' satisfaction from manufacturers. The scores given by retailers on what they expect from manufacturers and how they assess their current performance, based on four major attributes of quality, delivery, pricing, and retailer-manufacturer relationship, show that the level of retailers' satisfaction and the factor which contributes most to their satisfaction. The key findings from regression analysis and each hypothesis is summarized as follows:

1. Delivery is the most important factor for retailers. According to Figure 4.2 in current delivery performance of manufacturers, regression analysis shows the delivery factor to have the largest regression coefficient of 0.79. This makes delivery the most important factor among quality, pricing, and retailer-manufacturer relationship to provide satisfaction from retailers' point of view. This finding supports the theory that describes delivery and logistics as an important attribute which directly affects the retailers'

performance and helps them to reduce lead times and minimize inventory, giving greater product availability to customers in the stores (Greasley, Assi, 2012).

2. Retailers are not satisfied with the manufacturers' performance on quality of products. It can be said that change in quality will affect the retailers' overall satisfaction.

   In this sample, the mean for retailers' expectations is 3.24, whereas, the mean score for the manufacturers' current performance is 2.90, so the results are indicating that the expectations are greater than current performance and retailers are not satisfied with manufacturer performance on quality of products. The results of hypothesis of retailers' satisfaction with quality of products were not proven to be statistically significant, and hence it can be concluded that increasing the quality and reliability of products, having responsive customer service, and considering the consumers need in designing the products will affect the overall retailers' satisfaction. This result is supported by the study in physical quality that states quality of products plays a key role in consumers' spending habits and consequently influences the retailers (Wheatley and Chiu, 1977). The regression analysis also showed that retailer's satisfaction negatively relates to the manufacturers' performance in quality of products.

3. The retailers are not satisfied with the manufacturers' performance on delivery of products and improving this factor will affect the retailers' overall satisfaction.

   In this sample, the mean for retailers' expectations is 2.88, whereas, the mean score for the manufacturers' current performance is 2.83. The results indicate that the current performance score is less than expectations and retailers are not satisfied with the manufacturer's performance on delivery of products. This result supports the results of the hypothesis which does not support the retailers' satisfaction regarding the delivery

factor. We may conclude from this that on-time delivery, quick accommodation capability, flexibility, and online tracking systems are some factors that will affect the overall retailer's satisfaction. The regression analysis also showed that the retailers' satisfaction is positively related to manufacturers' performance in delivery of products.

4. The retailers are not satisfied with the manufacturers' performance on cost of products and improving this factor will affect the retailers' overall satisfaction.

   In this sample, the mean for retailers' expectations is 3.17, whereas, the mean score for the manufacturers' current performance is 3.19. In spite of this result the results of the hypotheses on the retailers' satisfaction with cost of products were not proven to be statistically significant, so can be concluded that changing the cost variables will increase the retailers' satisfaction. Regression analysis shows the retailers' satisfaction is positively related with cost, indicating that improving this factor will increase the retailers' satisfaction. This factor includes pricing, stability in prices, reducing the transaction costs and delivery costs.

5. Retailers are not satisfied with the relationship they have with manufacturers and improving this factor will affect retailers' overall satisfaction.

   In this case, based on our data the mean score for the retailers' expectations is 2.73, whereas, the mean score for the manufacturers' current performance is 2.65. Hence, the results indicate that the expectations are greater than the current performance and retailers are not satisfied with their relationship with them. This finding supports the result from the hypothesis which showed dissatisfaction of retailers from manufacturers with their relationship. In regression analysis, the trendline shows the retailers' satisfaction and the manufacturers' performance in their relationship are negatively related to each other. This

means a better relationship between them does not increase the retailers' satisfaction. This could be due to high retailer expectations for this attribute or the defined sub-factors for the manufacturer-retailer relationship factor in this study may not be the best possible parameters from a retailers' point of view. Dissatisfaction of retailers with this factor is supported by a survey on manufacturer and retailer relationship which shows retailers rated manufacturers' support activities that directly supported their competitive strategies are significantly more important than activities that did not directly support their strategies and independent retailers pursuing explicit competitive strategies, performed better than retailers who were not (Wortzel, 1991).

Discussion and Conclusions

This study examined the overall level of the retailers' satisfaction from manufacturers in the supply chain. It also showed the level of retailers' expectations and their assessment of the manufacturers' performance on four major factors of quality, delivery, cost, and their relationship with retailers. These four factors and their sub-factors were defined based on lean supply chain principles which take the approach to remove waste from all processes related to the supply chain.

The results of the study showed an overall retailers' dissatisfaction from the manufacturers' performance and regression analysis introduced delivery as the most important factor among all four factors. This section will discuss the importance of each factor and how lean principles can help to improve the level of satisfaction.

1. Quality and Retailers' Satisfaction

 In a total supply-chain system, retailers are the ones who are in direct contact with the final customers, and customer spending habits substantially affect the retailers' annual revenue. Quality of products is one of the most important factors for the consumer, and hence it is important for manufacturers to consider this factor as an effective one that significantly affects the final consumers as well as retailers, who are the manufacturers' first customer in the supply chain.

Based on the findings of this study, the retailers are not satisfied with quality of the products, and regression analysis showed that improvement in the quality of products will increase the retailers' satisfaction. There are several lean principles which can be very applicable when it comes to improving the quality of products. To produce better quality products and have the minimum number of defects in products, manufacturers can use lean tools such as Poka-Yoke, value stream mapping, 5S workplace organization and Kaizen. Poka-Yoke detects defects in processing stages and prevents the high cost of correction in the final steps of processes. Value stream mapping exposes waste in processes and provides a roadmap for improvement through the creation of an envisioned future state map based on lean principles. 5S workplace organization can be used to get better results from an organized area, and Kaizen can help to continually eliminate waste and improve the process.

2. Delivery and Retailers' Satisfaction

This study found that delivery is the most important factor which is directly related to the retailers' satisfaction. In the apparel industry, improvement in economy brought more consumers to retailers and shopping areas. This explains why retailers became more demanding for fast deliveries to survive in a competitive market. However, it is not easy for manufacturers to meet

the retailers' expectations on delivery if they do not follow lean principles to overcome problems, like delays in production and delivery, or having a pile of inventory of the wrong kind that incurs extra expenses.

Some of the lean principles that manufacturers can use to reduce waste of any kind in the process are Kanban, continuous flow, and just-in-time. Kanban regulates the flow of goods both within the factory and outside with suppliers and customers, and eliminates waste associated with excess inventory and overproduction. To avoid delays in production and delivery, continuous flow can be used where work-in-process smoothly flows through production with minimal buffers between steps. Just-in-time, or products only produced based on customer demands is another lean principle which effectively helps to reduce inventory and the associated storage space to store the excess inventory. Improving communications within activities in processes and making processes visible for all parties, is another lean principle which can help improve satisfaction on delivery.

3. Cost and Retailers' Satisfaction

Delivery cost and transaction cost are two factors that retailers consider important when choosing between competing manufacturers. Retailers cannot succeed in business they cannot control these costs．

The findings of this study showed the customers' dissatisfaction with cost even though the regression analysis as well as descriptive analysis, showed a good performance of manufacturers on the cost factor and some items such as pricing, stability in prices, reduced transaction cost, and delivery cost.

To increase the retailers' satisfaction with cost, every lean tool which can reduce waste from the process to decrease the final production cost should be considered for implementation by manufacturers. Other kinds of waste in the delivery process such as excessive labor and extra time for delivery will increase delivery costs for retailers. Lean tools such as 5S, root cause analysis, small goals and value stream mapping extended through the entire supply chain can play a pivotal role to increase the retailers' satisfaction with the cost factor.

4. Manufacturer-Retailer Relationship and Retailers' Satisfaction

Neither manufacturers nor retailers can do the entire job of product marketing effectively without the help of each other, and both stand to gain from a partnership between them. Strategic marketing partnerships between manufacturers and retailers offer the possibility of increasing market shares for both (Wortzel, 1991). The relationship between retailers and manufacturers can be further divided into sub factors of exchanging information about design changes, long term plans, schedules and problems, joint problem solving, joint training planning, and joint cost and quality improvement planning. The findings of this study showed dissatisfaction of retailers from manufacturers on their relationship, and regression analysis showed a negative relationship between manufacturers' performance and retailers' satisfaction. Based on this finding, it can be assumed that retailers have high expectations from manufacturers in terms of product quality and other services in addition to merely a buy-sell relationship. There may also be some unexpressed requirements which are unknown to us. A second assumption is denied by the results of a survey on the manufacturers and retailers' relationship which showed independent retailers rated manufacturers' support activities that directly supported their competitive strategies as

significantly more important than activities that did not directly support their strategies (Wortzel, 1991).

To increase the retailers' satisfaction, manufacturers need to have a strategic partnership plan to establish and develop their relationship with retailers. Making good use of information technology and operating as a partnership rather than operate in an adversarial or power-driven mode will allow manufacturers to serve retailers efficiently and profitably.

Future Research

The opportunities for future research are summarized as follows:

1. There are several lean tools that can be implemented in manufacturing processes to reduce lead time, increase quality and improve delivery processes. This will reduce manufacturers' production, delivery and transaction costs and ultimately contribute to increasing retailers' satisfaction towards manufacturers. However, there are not enough effective lean tools to improve their relationship with retailers. An opportunity exists to develop and suggests lean tools to improve manufacturers and retailers relationship and to increase the retailers' satisfaction consequently.

2. In this study the T-test is used to test the hypotheses. Using other tests, like ANOVA, or a full factorial design can make it possible to determine the coefficients of factors to compare the effect of each attribute on the overall retailer's satisfaction, and interactions between factors on the response variable can be used to define more accurate relationships between the factors.

3. There is an opportunity to compare current performance of manufacturers with potential performance with gap analysis. Gap analysis determines, documents, and approves the variance between business requirements and current capabilities. Identifying the gaps between the current performance and potential performance reveals the areas that can be improved. There is also the opportunity to conduct benchmarking and other assessments to understand the general exception of performance in the industry and then compare the exception with the current level of performance and accomplish the gap analysis.

6. References

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Appendix A

CITI certificate

CITI Collaborative Institutional Training Initiative

Human Research Curriculum Completion Report
Printed on 8/8/2012

Learner: Zahra Nakhostin (username: nakhostinmaherz10)
Institution: East Carolina University
Contact Information Quality systems
Houston, TX 77056 US
Department: Computer and technology
Phone: 2523281618
Email: a_nakhostin@yahoo.com
Group 2.Social / Behavorial Research Investigators and Key Personnel:

Stage 2. Refresher Course Passed on 06/03/12 (Ref # 8026344)

Required Modules	Date Completed	
Biomedical 101 Refresher Course - Introduction	06/01/12	no quiz
SBR 101 REFRESHER MODULE 1 - History and Ethics	06/01/12	5/5 (100%)
SBR 101 REFRESHER MODULE 2 - Regulatory Overview	06/02/12	3/5 (60%)
SBR 101 REFRESHER MODULE 3 - Risk, Informed Consent, and Privacy and Confidentiality	06/02/12	5/5 (100%)
SBR 101 REFRESHER MODULE 4 - Vulnerable Subjects	06/03/12	3/4 (75%)
SBR 101 REFRESHER MODULE 5 - Education, International, and Internet Research	06/03/12	4/5 (80%)
How to Complete The CITI Refresher Course and Receive the Completion Report	06/03/12	no quiz

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI participating institution. Falsified information and unauthorized use of the CITI course site is unethical, and may be considered scientific misconduct by your institution.

EAST CAROLINA UNIVERSITY
University & Medical Center Institutional Review Board Office
4N-70 Brody Medical Sciences Building· Mail Stop 682
600 Moye Boulevard · Greenville, NC 27834
Office 252-744-2914 · Fax 252-744-2284 · www.ecu.edu/irb

IRB Approval (Notification of Exempt Certification)

From: Social/Behavioral IRB

To: Zahra Nakhostin Maher

CC:
        Kanchan Das

Date: 3/20/2013

Re: UMCIRB 13-000504
        A survey on retailer's satisfaction

I am pleased to inform you that your research submission has been certified as
exempt on 3/17/2013. This study is eligible for Exempt Certification under category #2.

 It is your responsibility to ensure that this research is conducted in the manner reported in your
application and/or protocol, as well as being consistent with the ethical principles of the Belmont
Report and your profession.

This research study does not require any additional interaction with the UMCIRB unless there
are proposed changes to this study. Any change, prior to implementing that change, must be
submitted to the UMCIRB for review and approval. The UMCIRB will determine if the change
impacts the eligibility of the research for exempt status. If more substantive review is required,
you will be notified within five business days.

The UMCIRB office will hold your exemption application for a period of five years from the
date of this letter. If you wish to continue this protocol beyond this period, you will need to
submit an Exemption Certification request at least 30 days before the end of the five year period.

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

Appendix B
Questioner

Please give a number between 1 and 4 to each item on following questions.

1) As a retailor how do you rate each of the following based on their influence on your business?
   - Manufacturer /producer
   - Customer
   - Supplier
   - Distributer

2) For the products that you receive from manufacturer/producer, how do you rate the importance of the following items? Please give them a number between 1 to 4
   - Quality
   - Delivery
   - Cost
   - Manufacturer-retailor relationship

3) How do you rate the manufacturer/ producer on following attributes?
   - High quality product
   - Reliable product
   - Responsive customer service
   - Consideration of final customer needs in designing the products

4) As a retailer how do you rate the following attribute based on their importance from your business point of view?
   - High quality product
   - Reliable product
   - Responsive customer service
   - Consideration of final customer needs in designing the products

5) How do you rate the manufacturer/ producer on following attributes?
   - On time delivery
   - Quick accommodation capability in change in quantity or quality of products
   - Flexibility in order quantity and delivery time
   - Shipment tracking and expediting through online and other communication

6) As a retailor how do you rate the following attribute based on their importance from your point of view?
   - On time delivery
   - Quick accommodation capability in change in quantity or quality of products
   - Flexibility in order quantity and delivery time
   - Shipment tracking and expediting through online and other communication
7) How do you rate the manufacturer/ producer on following attributes?
   - Providing product support
   - Ensuring you safety of the products
   - Providing required training for you as retailor after sale
   - Post-service follow up

8) As a retailor how do you rate the following attributes based on their importance from your point of view?
   - Providing product support
   - Ensuring you of safety of the products
   - Providing required training for you as retailor after sale
   - Post-service follow up

9) How do you rate the manufacturer/ producer on following attributes?
   - Pricing
   - Having stable price for each order every time
   - Trying to reduce transaction costs
   - Delivery costs
10) As a retailor how do you rate the following attribute based on their importance from your point of view?
   - Pricing
   - Having stable price for each order every time
   - Trying to reduce transaction costs
   - Delivery costs

11) How do you rate the manufacturer/ producer on following attributes?
   - Exchanging information with you about design changes, long term plans, production schedules, and problems
   - Joint problem solving
   - Joint training planning
   - Joint cost and quality improvement planning

12) As a retailor how do you rate the following attribute based on their importance from your point of view?

- Exchanging information with you about design changes, long term plans, production schedules, and problem
- Joint problem solving
- Joint training planning
- Joint cost and quality improvement planning