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"To study of Reverse Logistics Management System''

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ABSTRACT
In the competitive world of manufacturing, companies are often searching for new ways to improve their process, customer satisfaction and stay ahead in the game with their competitors. Reverse logistics Management has been considered a strategy to bring these things to life for the past decade or so. This thesis work tries to shed some light on the basics of reverse logistics Management and how reverse logistics can be used as a management strategy. This paper points out the fundamentals of reverse logistics Management and looks into what kind of decisions today's logistics managers have to take on a daily basis for the improvement of their logistics model. A growing concern has been developing to control rising global pollution, this paper also brings out some of the effects of reverse logistics decisions on the environment and vice versa. The thesis starts out by compiling the works of researchers and logistics experts in the field of logistics in the theoretical background section. Through a survey conducted in a few manufacturing firms in India, a small picture of the extent to which reverse logistics has penetrated the manufacturing world has been drawn.

KEYWORDS: *Reverse Logistics Management, Green Image, Corporate citizenship, Reverse Logistics activities, Returns*

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I. INTRODUCTION

This section of the paper will give the reader an idea of the fundamentals of the thesis project. The reader will be able to get a fair idea of what this paper is all about. In the following subsections one can understand the objectives and obstacles for this project.

Background

Competition can be seen in every field these days, and the manufacturing world is no different. Companies are always looking for newer and newer opportunities and defects in the system so they can be tackled. Logistics plays an important role in any manufacturing firm, as it involves the optimal use of man, machine and material. Reverse logistics Management is a small part of the total logistics of a company. Reverse logistics Management deals with the handling of the goods that are being returned to the manufacturer by the customer. It covers all the activities that determine the fate of these returned goods.

This thesis tries to understand the basic concepts of reverse logistics. It tries to give an idea of how various researchers and logistics experts have defined reverse logistics. It also covers some basic reverse logistics activities and how these activities affect the decisions that managers have to make on a regular basis in their company.

The ever growing manufacturing world and the advent of automation has resulted in mass production and increased the number of products released into the market. This exponential growth has resulted in the overuse of the natural resources thus increasing the amount of industrial waste. This thesis also sheds some light on what activities in the reverse logistics help companies to work towards green production and green logistics.

Aim

The aim of this project is to understand the concept of Reverse Logistics management and its role in the manufacturing industry. It also focuses on learning different aspects of the reverse logistics and how these aspects affect the decisions made by manufacturing firms. The study also tries to look at the environmental aspects of reverse logistics.

Problem Definition

Reverse logistics Management is a fairly new concept and not until recently have researchers and logistics companies tried to focus on its effects on the managerial decisions. Also in recent years customer satisfaction has been considered a very important aspect in the growth of any company and the focus on improving customer satisfaction

has increased greatly. Recently researchers have found that reverse logistics can play an important role in improving customer satisfaction.

The main focus of this thesis would be to answer the following questions:

- What is the definition of reverse logistics?
- What are the principal steps involved in reverse logistics?
- What do companies do with the returned products?
- How do the returns affect the decisions made in manufacturing firms?
- How do environmental issues affect the reverse logistics decisions?
- And so on...

Problem Delimitation

Reverse logistics Management has been found to play an important role in almost any manufacturing firm, regardless of size, product and geographical reach of the firm. The focus initially was to conduct the survey and/interviews in manufacturing firms within Sweden focusing on firms that manufacture FMCG and electronic goods. The reason for choosing FMCG and electronic goods was because FMCGs are consumed more frequently which increases the importance of logistics decisions to deliver them to consumers. And the reason for choosing electronic goods is because of the growth of electronic products in the market over past two decades, and the frequency with which newer products reach the market these days.

Unfortunately after waiting for almost 45 days for the replies to the conducted survey there was no response by even one of the 30 different manufacturing firms in Pune. After which a quick decision was made to change the target group to the manufacturing firms in Pithampur M.P.. And by the time this decision was made there was very little time for choosing the companies and conducting survey and/or interviews. Somehow I managed to get 6 people from 5 different companies to respond to the questionnaire. Also some sort of an interview was conducted through telephone calls and chatting over the internet to get a better understanding of the responses given by them.

II.METHODOLOGY

The methodology followed to achieve the set objectives of this thesis is in two parts: survey and interview.

The survey

A thorough literature study on the topic of this paper: Reverse Logistics Management was conducted for a short period. Several articles were found on the topic over the internet. After getting somewhat of a fair idea about reverse logistics, a preliminary set of questions were formulated for the survey. Most of the questions were either taken directly or inspired by the questionnaire developed by Rogers and Tibben-Lembke (1998), for their paper *"Going Backwards: Reverse Logistics Trends and Practices"*. And one might even say that to a great extent this thesis has been inspired by the above mentioned paper.

The questionnaire was formulated to achieve the following objectives of the thesis:

- Understanding the level of knowledge of the respondents about the concept of reverse logistics
- The economical and customer satisfaction impact of returns in the past year.
- Return policies, if any.
- Decisions made to maintain the company environmental friendly.

Interview

After receiving the responses to the survey for this thesis, interviews were conducted with the respondents to better understand their responses and also to get a better idea of their understanding of the concept of reverse logistics. The interviews more like discussions were conducted with the respondents over the phone and through online chats.

These discussions were mainly along the lines of the survey questions, since some of them had failed to answer the survey completely. Further the purpose of this thesis was explained to the respondents in brief, so as to give them an idea of the objectives and goals of the thesis. This led to open up the discussion, and give the respondents an opportunity to throw light on their thoughts on supply chain and reverse logistics. Thus the results and analysis sections are based on both the survey and interviews or discussions conducted with the six respondents

III.LITERATURE REVIEW

This section will try to summarize the various definitions of the concept of reverse logistics as given by various companies, logistics experts and researchers. The primary steps involved in the reverse logistics process will be defined in this section. This section will also cover the role of reverse logistics and how developing a reverse logistics model for a specific product or group of products will affect the decisions taken by the companies. Also how different reverse logistics models affect the environmental liability of these companies has been explained in this

partofthisthesis. Finallyanideaofthefinancialbenefitsand/or drawbacks involved in the reverse logistics process will be explained.

DEFINING REVERSE LOGISTICS MANAGEMENT

Reverse logistics Management, what is it? It sounds interesting, doesn't it? In simplest words it is the management of the path of the products from its end users back to the manufacturers. Below are a few ways of defining the concept of reverse logistics:

In the paper "Going Backwards: Reverse Logistics Trends and Practices", August 1998, Dale S. Rogers and Ronald S. Tibben-Lemke use the definition for Logistics given by The Council of Logistics Management to define Reverse Logistics. The definition for Logistics given by The Council of Logistics Management is:

"the process of planning, implementing, and controlling the efficient, cost effective flow of raw materials, in-process inventory, finished goods and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirements."

Therefore, reverse logistics according to Rogers and Tibben-Lembke is:

"the process of planning, implementing, and controlling the efficient, cost effective flow of raw materials, in-process inventory, finished goods and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal."

Fundamentals of reverse logistics management

Fleischmann and Dekker (2004) give the fundamentals of Reverse Logistics by analyzing the topic from four viewpoints:

- *Why are things returned? and why do companies get involved in reverse logistics?*
- *How Reverse Logistics works in practice?*
- *What is being returned?*
- *Who is executing reverse logistics activities?*

Why do companies get involved in reverse logistics activities?

In general companies get involved in reverse logistics 1) because they can profit from it; or/and 2) because they have to; or/and 3) because they "feel" socially motivated to do it. Furthermore Fleischmann and Dekker categorize these three driving forces as:

- Economics (direct and indirect)
- Legislation
- Corporate citizenship

Economics

Reverse logistics programs bring both direct and indirect gains. Direct gains can be:

- In the form of raw materials for new products.
- Some parts of the returned product maybe recycled to manufacture new products, thus reducing the manufacturing cost.
- Value added recovery.

Indirect gains can be:

- Anticipating/impeding legislation
- Market protection
- Green image
- Improved customer/ supplierrelations

Legislation

In many countries customers are legally entitled to return the product and legislation states that the companies are responsible for recovery as well. And sometimes companies themselves participate in recovery programs to keep or create a clean and green image.

Corporate citizenship

Many companies take responsibility for the safe disposal or recycling of their products to maintain the environment safe. Often companies get involved in recovery and recycling programs and turn create awareness among their customers as well.

Why are things returned?

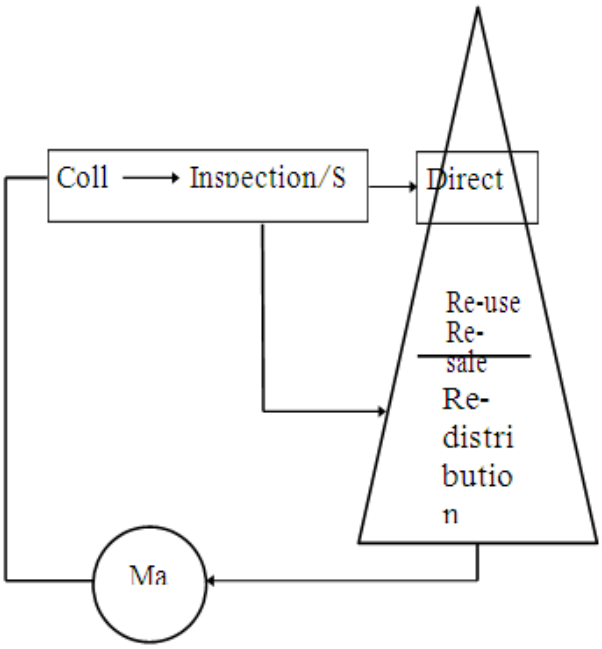
Customers return the products for several reasons. Products once bought may be returned due to physical damage, some of them are returned because the customers are unhappy with the functionality of the product (expectations not met), sometimes customers return products because they discover an alternative product with better functionality after they have made the purchase, sometimes customers misuse the return policy and return it without any reason. These are only some of the major reasons for the return of a purchased product by majority of the customers.

How Reverse Logistics process works in practice?

The how view point deals with how is value recovered from the products that are returned back to the manufacturer.

Recovery is actually only one of the activities involved in the whole reverse logistics process. First there is collection, next there is the combined inspection/ selection/ sorting process, thirdly there is recovery, and finally there is redistribution. Collection refers to bringing the products from the customer to the point of recovery. At this point the products are inspected, i.e. their quality is assessed and a decision is made on the type of recovery. Products can then be sorted and routed according to the recovery that follows. If the quality is (close to) "as good as new", products can be fed in the market almost immediately through re-use, re-sale and re-distribution. If not, another type of recovery may be involved but now demanding more action, i.e. a form of re-processing.

The **Fig. 1** below gives the reverse logistics processes.



Overview of the reverse logistics flow

Once a product enters the reverse logistics flow, the logistics manager has to decide where the product has to be sent: either return to vendor, to the landfill, or to the secondary market.

There are several reasons why a product enters the reverse logistics flow. The **Table.1** below as given by Rogers and Tibben-Lembke (1998) shows some of them. There are, of course more reasons why a product will enter the reverse logistics system, but these are the most common.

Often, two identical products will follow different routes to different destinations, depending on where in the distribution channel they enter the reverse logistics flow. One such example as mentioned by Rogers and Tibben- Lembke (1998), a book that is returned to a store by a customer may not end up at the same place as a book returned by the store to its supplier due to overstocking. Neither of these books may end up in the same place as the books returned by the distributor.

Source	Reasons
Customer	1. Product did not meet customer's needs. 2. Customer did not understand how to properly use the product. 3. Product was defective. 4. Customer abuse of liberal return policy.
Retailer	1. Product packaging outdated. 2. Seasonal product. 3. Product replaced by new version. 4. Product discontinued. 5. Retailer inventory too high (overstock, marketing returns, or slow-moving). 6. Retailer going out of business.

Returned Product Types

Rogers and Tibben-Lembke (1998) classify the retail products in a reverse logistics flow as follows:

1. Close-outs: first quality products that the retailer has decided to no longer carry;
2. Buy-outs or "lifts": where one manufacturer buys out retailers' supply of competitor's product;
2. Job-outs: first quality seasonal, holiday merchandise;
3. Surplus: first quality overstock, overrun, marketing returns, slow-moving merchandise;
4. Defective: products discovered to be defective;
5. Non-Defective Defectives: products thought incorrectly to be defective;
6. Salvage: damaged items, and
7. Returns: products returned by customers.

Returns Management

Return management is the process of returning product as well as the transformation of the product back to reusable condition. Returns Management uses tools and systems to maximize profits in the process.

Rogers and Tibben-Lembke (1998) mention seven channels for disposing the products that have been returned to the manufacturer. They are:

1.Return to Vendor
2.Sell as new
3.Sell Via Outlet or Discount
4.Sell to Secondary Market
5.Donate to Charity
6.Remanufacture/Refurbish
7.Materials Reclamation/Recycling/Landfill

Remanufacture and Refurbishment

Thierry, et al. (1995) defined five categories of remanufacture and refurbishment. These five categories, shown in **Table.2**, are repair, refurbishing, remanufacturing, cannibalization, and recycling.

Table.2

1. Repair
2. Refurbishing
3. Remanufacturing
4. Cannibalization
5. Recycling

Reverse Logistics Activities

All the activities that a company carries out to collect the used, damaged, unwanted, or outdated products, as well as packaging and shipping materials from the end-user or reseller can be considered as reverse logistics activities. Once a product has been returned to the company, the firm has many disposal options from which to choose. Rogers and Tibben-Lembke (1998) classify some of these activities as in **Table.3**.

Classification of reverse logistics activities

Rogers and Tibben-Lembke (1998) classify reverse logistics activities based on whether the goods in the reverse flow are coming from the end user or from another member of the distribution channel such as a retailer or distribution center; and whether the material in the flow is a product or a packaging material as given in **Table.4**.

Challenges in Reverse Logistics

Most challenges in managing reverse logistics can be traced to two broad categories-Process and Investment (*Two Steps Forward, One Step Back...*, Saty Chawla, May 2007).

Retailer-Manufacturer conflict

Rogers and Tibben-Lembke (1998) mention another one of the difficulties in managing returns as the difference between manufacturers and retailers. According to them the retailer and manufacturer may disagree on any one of the following:

- Condition of the item
- Value of the item
- Timeliness of response

Problem Return Symptoms

Dr. Richard Dawe of the Fritz Institute of International Logistics identified six symptoms of problem returns. The **Table.5** below gives those six problem return symptoms:

Symp
• Returns arriving faster
• Large amount of returns inventory held in the warehouse
• Unidentified or unauthorized

Table.5

Factors considered for the RL networks categorization

Marco Serrate gives the categorization of reverse logistics network in his paper based on two factors that determine the structure and characteristics of every RL system which are the length of the product's life cycle and the variability in the rate of returns in any particular period.

IV.RESULTS

As mentioned earlier the questions for the survey were designed to get an understanding of the concept of reverse logistics as understood by the manufacturers and the logistics experts working in the companies. In this section of the paper an attempt has been made to present the answers given by the respondents in a tangible form, to give an idea of their perception of the concept of reverse logistics. In the next section i.e., **Analysis,** analysis of the responses and correlating them with concepts in the theoretical background section is shown. Also, it should be noted that in this section only the responses as given by the participants through survey alone will be discussed. A more detailed analysis of those responses along with the discussions carried out with the participants is given the Analysis section of this report.

The survey targets at answering 6 basic questions:

- Which companies are affected by reverse logistics?
- What do they know about reverse logistics?
- How do customers choose their suppliers?
- How do returns affect the manufacturers?
- What happens to the returned goods?

In the following parts of this section these questions have been explained based on the responses to the survey.

The respondents

Around 40 people in the manufacturing and supply chain division of about 20 companies were contacted for the survey. The **Table.6** below gives the names of the respondent companies with some details about them.

Company	Primary Product	Position of the respondent
Either Motors Hewlett-Packard Textron India Pvt. Ltd Pgya Auto Bhagwan Works	Automotive Electronics and Computers Auto motive Consulting Automotive spare parts	1. Deputy Manager (Product Development) 2. Purchase Engineer 3. Supply Chain Executive 4. Supply Chain Manager 5. Production Manager

Table.6

How do customers select their suppliers?

It is a difficult task for customers when they have to decide which supplier to choose. Customers look for different characteristics in their supplier. A list of some of the common factors that customers consider when choosing their supplier were given, and the respondents were asked to rate the importance of each of these factors to their customers according to them on a scale of 1 through 7. The **Table.9** below gives the overall scores for each of these factors

	Participant						Overall score
Factor	P 1	P 2	P 3	P 4	P 5	P 6	
Cost reduction	6	7	5	5	6	6	35
Price	5	6	5	3	4	6	29
Quality of Service	6	6	7	7	6	4	36
Return Policies	4	3	2	5	4	4	22
Speed of Delivery	5	4	5	5	5	5	29
Variety of products	3	3	2	3	3	4	18

Often customers choose products that have liberal return policies, because customers prefer the option of returning the product in case they don't like it after they have used it for a short while. Manufacturers on the other hand do not like the idea of returns and hence have to device return policies lenient enough to attract customers but strict enough to avoid goods being returned for no apparent reason. The respondents were asked to score between 1 for very strict and 7 for very liberal return policy in their company. The **Table.10** below gives the scoring as given by the 7 respondents.

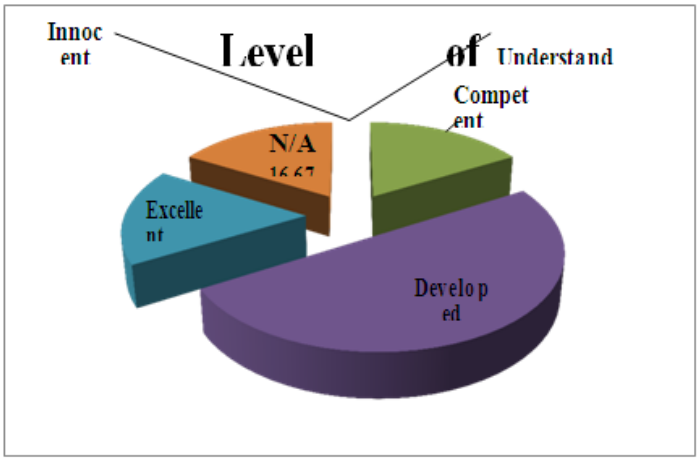
Participant	Strict						Liberal
	1	2	3	4	5	6	7
P1			3				
P2				4			
P3			3				
P4			3				
P5				4			
P6					5		

What happens to the returned goods?

Once the product has been returned and brought to the collection center, the manufacturer has several options to choose to get value out of the returned product. In the survey a few of those options were picked out and the respondents were asked to estimate the percentage of goods represented by each of the options mentioned in the survey. The bar chart in **Fig.3** below represents the distribution of the each of the options for the six participants.

The **Table.11** gives the responses for the 6 participants associated with the bar chart above.

Through the literature study it can be seen that although the reverse logistics costs do not make a significant part of the total cost for the company, by reducing the reverse logistics cost the company can make a small reduction in the total cost. According to the participants' replies reverse logistics cost represents about 5 to 10% of their total logistics costs.



Maintaining a green image for any company is important, and safe disposal of waste material makes them a good corporate citizen. At a time when landfill costs are high and governments imposing strict rules for waste disposal, it has become difficult for the manufacturers of today. The participants were asked to list out a few measures they take to ensure safe disposal of waste material in their company. They are as follows:

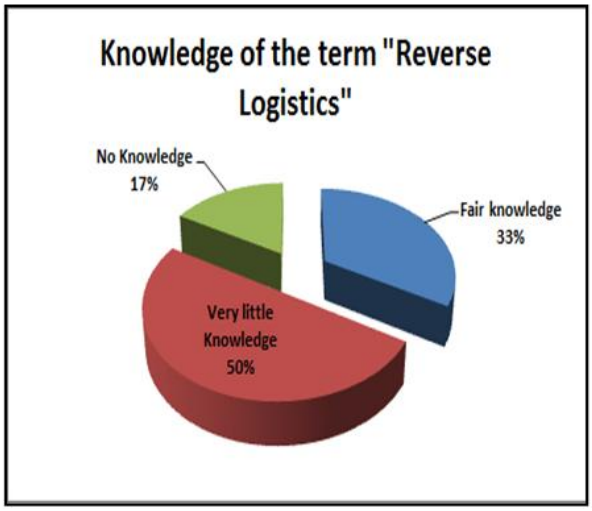
- Cleaning and refining solid and liquid waste before dispatching for dumping grounds.
- Making sure to do business with companies that follow standard safe waste disposal procedures.
- Ensuring the partner firms are certified by environmental safety organizations.
- Trying to recycle as much as possible to reduce usage of hazardous material.
- Always follow the rule reduce-reuse-recycle.

ANALYSIS

In this section the responses given by the participants to the survey have been analyzed in a detailed manner. The analysis is also based on the conversations with the participants that were conducted after the survey was done. Also an attempt to correlate the participants' responses to the theoretical background has been made to understand the thoughts of the respondents on the topic.

Since this thesis is based upon a survey and discussions, the number of responses collected plays a very important role and so, as many companies as possible were contacted to collect a decent amount of data to analyze and generalize some of the concepts. Unfortunately only six responses were collected and I have tried to analyze them as effectively as possible.

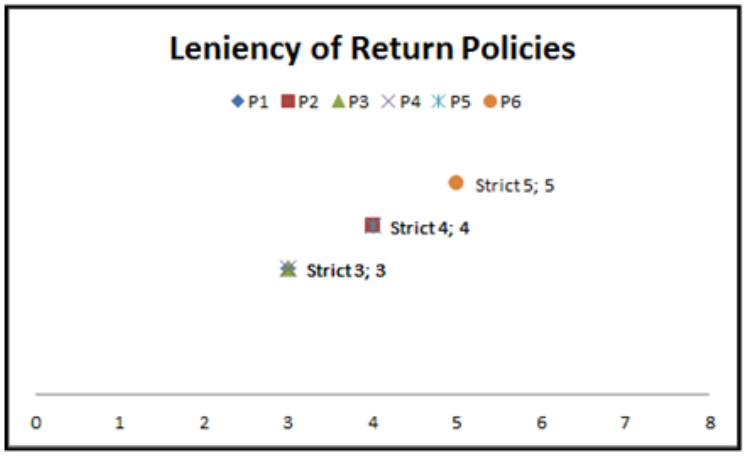
As explained in the results section the participants had never heard of the term reverse logistics, which led them to search it over the internet to find out what exactly the term meant. The responses to the survey given by the participants were based upon what they learnt through the internet. During the discussion the participants explained that although they had never heard of the term, once they understood the concept they found that they had performed at least some of the reverse logistics activities in their company.



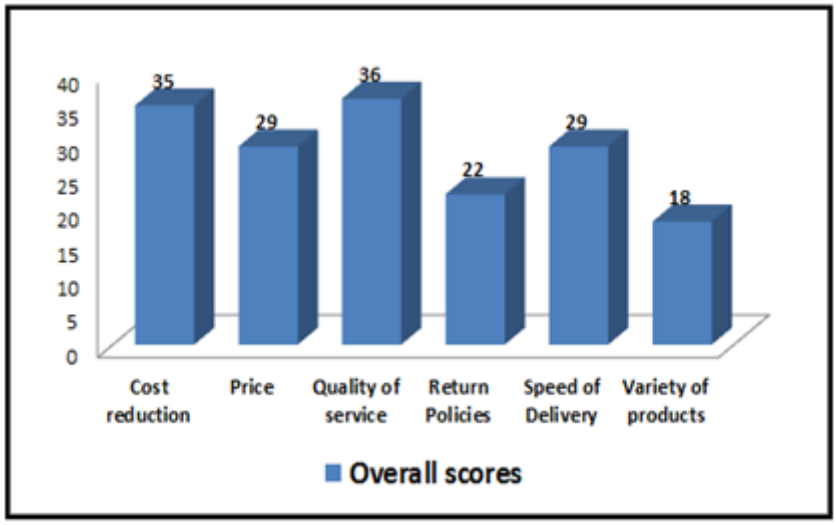
The **Fig.5** above gives the distribution of participants who had a fair knowledge about reverse logistics as opposed to those who had very little or no knowledge whatsoever.

From the **Fig.5** it can be seen that the share is pretty even Steven. Since the number of participants involved in this survey is very small, it cannot be fairly judged whether this would stand true for the whole of the manufacturing world.

But since all the participants admitted during the discussion that they had performed some or most of the reverse logistics activities in their company, it can be said that reverse logistics activities happen on a daily basis in every manufacturing company, and it does play an important role.



The **Fig.7** below shows the overall scores of the factors considered by the customers when choosing suppliers according to the participants. It can be seen that cost reduction and quality of service are the two most important factors which customers consider while choosing suppliers. Speed of delivery is the third most important factor according to the responses given by the participants. A good reverse logistics process will increase the speed of delivery which in turn will improve the quality of service.



V. CONCLUSIONSANDRECOMMENDATIONS

This project has tried to put together the basics concepts of reverse logistics and the benefits of having a good reverse logistics process. It was a tedious job to gather the information necessary to complete this project starting from collecting the data for the theoretical background, going through numerous articles to find the right kind of information, understanding the concepts, formulating the survey, getting the right people to respond on time, and finally analyzingthegathereddata.

After all this drama it can be seen that a majority of the manufacturing firms have no idea of what reverse logistics means. However, digging deeper it can be seen that reverse logistics processes and activities happen on a daily basis in the manufacturing world with or without the knowledge of the participants. During the discussions with the participants of the survey it was found that many of the reverse logistics strategies are in place in these firms, it's just that they are not aware that the activities that they perform on a regular basis is collectively known as reverse logistics.

It can be seen that reverse logistics does play an important role for the manufacturing firms to stay competitive. Also that having a good reverse logistics process in place leads to reduction in cost, optimal use of resources, better customer satisfaction and improved customer loyalty, reduction in returns process time, and creating a green image.

It is further recommended for these companies that they pay more attention to the reverse logistics processes as the cost for reverse logistics is around 5 to 10% of the total costs for logistics which is a small percentage but nevertheless an opportunity for improvement. And it is important for any company to try to continue improving their process if it has to survive for a long period in the market

LIST OFREFERENCES:

[1].Chawla, Saty, 2007,"Two Steps Forward, One Step Back…", p2-p3
[2].*2+ Cope, David, 2006,"The increasing importance of reverse logistics in technology",
[3].de Brito, Marisa P.; Dekker, Rommert; April 2003,"A Framework for Reverse Logistics", p1-p21
[4].Dekker, Rommert; Fleischmann, Moritz; Inderfurth, Karl; Van Wassenhove, Luk N., 2004,"Reverse Logistics: Quantitative Models for Closed-LoopSupplyChains",Springer- Verlag, ISBN 3-540-40696-4
[5].Fleischmann, Moritz, 2000,"Quantitative Models for Reverse Logistics", p5
[6].Rogers, Dale S.; Tibben-Lembke, Ronald S., 1998,"Going Backwards: Reverse Logistics Trends and Practices"
[7].+ Serrato, Marco; Ryan, Sarah M.; Gaytan, Juan, 2003,"CHARACTERIZATION OF REVERSE LOGISTICS NETWORKS FOR OUTSOURCING DECISIONS", p7-p12
[8].+ Stock, James R., 1998,"Development and Implementation of Reverse Logistics Programs", Business Briefing: Global Purchasing and SupplyChainStrategies
[9].Thierry, Martijn; Salomon, Marc; Van Nunen, Jo; Van Wassenhove, Luk, 1995, "Strategic Issues in Product Recovery Management", CALIFORNIA MANAGEMENT REVIEW, Vol.37 NO.2,p117-p120