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# Reverse Logistics and Challenges: Supply Chain Management of Automobile Industry

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**Abstract:** The concept of reverse logistics has gained immense popularity in the recent times. There is no doubt about the fact that reverse logistics in the supply chain management of automobile industry is becoming important. The purpose of this paper remains to introduce the importance of reverse logistics in the domain of supply chain management, largely focusing over the automobile industry. Highlighting the important challenges for reverse logistics in the automobile industry also becomes an important aim of this paper. Reverse logistics is basically a phenomenon which refers to the management of products when they are of no use to the consumers. Using such products with an aim to maximize the economic value for the automobile companies reflects the importance of reverse logistics. The underlying challenges like less willingness to pay, cannibalization, competition, lack of support from retailers, dealers and distributors, and consumers' perception create hurdles for companies for implementing the reverse logistics successfully, are highlighted in this paper.

**Keywords:** Reverse Logistics, Supply Chain Management, Automobile Industry, Challenges, Importance of Reverse Logistics, Reverse Supply Chain

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## 1. Introduction

According to Baenas, Castro, Battistelle and Junior (2011), reverse logistics has become an important topic within the domain of supply chain management in the recent times. Reverse logistics basically means the reutilization of products and materials. All the manufacturing concerns are keen to be involved in the process of reverse logistics due to the relevant advantages associated with it. There would not be any exaggeration if it is suggested that there are several challenges for reverse logistics in supply chain management of the automobile industry. With the passage of time, the importance of reverse logistics is enhancing. Many companies, professionals and even academics are researching for the benefits of reverse logistics. We live in a society where resources are scarce and demands seem to constantly maximize.

Demirel, Demirel and Gokcen (2014) and (Syed Abdul Rehman Khan (2015) believe that entire business community

seems to be interested in the reverse logistics. For instance, the major sectors like transport, consumer electronics, textiles, press, and media remain few of the most important ones to name involved in the reverse logistics. This particular project would revolve around the importance and challenges of reverse logistics in supply chain management in reference with the automobile industry. An in-depth introduction of the concept of reverse logistics will be provided in order to assess the implications for supply chain management domain of the automobile industry. The underlying challenges for the reverse logistics to become prominent in the supply chain management will be highlighted in this paper. The main source of information for this research remains the supply chain managers of automobile industry, who will be surveyed through a well-developed questionnaire.

## 2. Literature/Theoretical Underpinning

The concept of reverse logistics remains an evolving one. There is no doubt that the concept of reverse logistics has

always been in place; however, the usage of reverse logistics became prominent in 1980s. Reverse logistics can easily be defined as one of the most important processes that plans, implements and control the backward flows of raw material (Rubio & Parra, 2014). This is majorly done in the process inventory, packaging and finishing of goods within an aim to manufacture or distribute, to a point of recovery or point of appropriate disposal. In simple words, recovery of value is the basic essence of reverse logistics. People usually wonder about the logic behind involving in the process of reverse logistics (Bai & Sarkis, 2013; Khan, Qianli, & Zhang, 2016). There are many reasons for implementing or operating through the reverse logistics systems. Economic, legal, and social reasons are the few important ones to name. The economic reasons are the direct reasons behind the popularity of reverse logistics. Reverse logistics essentially helps in reduction of disposal costs and the usage of raw materials.

Also, any indulgence in the reverse logistics essentially depict the significance of environmentally responsible behavior for the ensuring the improvements in customer relations (Ravi & Shankar, 2012; Khan, Zaman, & Zhang, 2016). There are also several legal bindings for being indulged in the reverse logistics. For instance, the companies in European Union are required to ensure the most appropriate disposal or recovery of waste that is a result of their production activities. According to Grabara, Man and Kolcun (2014), social reasons behind the popularity of reverse logistics can also not be undermined. There is an ever increasing awareness in the society for protecting the environment and capitalizing over the scarce resources. Thus, reverse logistics facilitate the companies to be environment friendly as carbon emission and waste generation is immensely reduced (Rubio & Parra, 2014).

### 3. Reverse Logistics and Automobile Industry

The significance of reverse logistics for the automobile industry remains undeniable. It can be easily traced that the concept of reverse logistics is becoming prominently dominant in the automobile industry. There are various obvious reasons behind this dominance. The most important reasons to name are the constant product recalls, changing legislative requirements, and focus over environmental sustainability. With the passage of time, the increased requirement for recovering the returned vehicles is gaining more attention than ever mainly owing to the enhanced environmental concerns. The most important aspect to analyze in this aspect is that despite the obvious advantages of the reverse logistics to the industry of automobiles, not many manufacturers have successfully implemented the system of reverse logistics (Aitken & Harrison, 2013).

Researchers suggest that reverse logistics only account for three to four percent of a company's total logistics costs in the automobile industry. Ravi (2014) believes that the advantages of reverse logistics systems essentially suggest

that automobile companies can save up to ten percent from their yearly logistics. Companies like Bosch, Volvo and General Motors are the few ones to name which have successfully implemented the reverse logistics in their supply chain management. Reverse logistics is an expanding domain and is essentially emphasized by many automobile companies. Companies realize the importance of reverse logistics for their business operations (Lee & Lam, 2012). However, the underlying challenges create hurdles for companies to implement the reverse logistics in an effective manner.

### 4. Challenges for Reverse Logistics

There are different challenges which underline the implementation of reverse logistics in the supply chain management of automobile companies. According to Demirel, Demirel and Gokcen (2014) and Khan, Qianli, SongBo, Zaman, & Zhang, (2017) these are the challenges due to which automobile companies hesitate to become involved in the process of reverse logistics. With the passage of time, it is important to overcome these challenges in order to capitalize the available resources in the most effective manner (Chan, Chan & Jain, 2012). Few of the most important challenges for the implementation of reverse logistics in the supply chain management of automobile companies are highlighted below.

- **Willingness to Pay:** One of the most important challenges that highlight the utilization of reverse logistics is the minimum willingness to pay for the products. There is a general assumption amongst consumers that remanufactured products are not as effective and useful as the newly made products are. This assumption directly impacts the willingness to pay for the remanufactured products. Consumers essentially believe that the remanufactured products have lesser value than the original products (Chan, Chan & Jain, 2012). Consumers are not at all willing to pay any premium prices for such products as compared to the genuine products. This is one of the most important challenges that force the organizations not to be involved in the reverse logistics process. Consumers urge that companies must clearly state that the products are remanufactured. If the remanufactured products are priced low, consumers would believe that the quality is low and thus only few consumers would pay for such products (Ravi & Shankar, 2012).
- **Cannibalization:** Cannibalization can be seen as another important challenge related to the reverse logistics in the supply chain management of automobile industry. Remanufacturing of old products can essentially cannibalize the sales of new products, if the customers are convinced to purchase the remanufactured products. This might lead to a situation where companies are not able to sell their new products. However, the underlying benefits associated with the remanufacturing can easily outcast the costs of cannibalization (Aitken & Harrison,

2013).

- **Competition:** The immense competition from the end of original automobile manufactures essentially has an impact over the companies involved in remanufacturing. In today’s competitive environment, it becomes increasingly important for the organizations to remain competitive in the market. According to Ravi (2014), in the situations where new designs and technologically advanced automobiles are manufactured every other day, the survival of companies doing reverse logistics becomes difficult. The ongoing competition in the industry creates important challenges in implementing the reverse logistics.
- **Consumers’ Perception:** Another important challenge that entails the domain of reverse logistics is related to the consumers’ perceptions. Understanding the importance of consumer behavior is relevant to understand in this regard. Consumers do not buy products without the satisfaction of the product’s quality. Ahsan (2013) believe that there is a general consumers’ perception that the remanufactured products are low in quality. This perception impacts the sales of remanufacturing products (Lee & Lam, 2012). Thus when consumers’ are not ready to buy remanufactured products, there is no point in being involved in the entire process. Therefore, consumers’ perception becomes an important challenge for the reverse logistics in the automobile industry.

**Lack of Support from Retailers, Dealers and Distributors:** Manufacturers always remain concerned about the support from retailers, dealers and distributors. Grabara, Man and Kolun (2014) believe that one of the most important challenges for reverse logistics is related to the lack of support from retailers, dealers, and distributors. Retailers, dealers and distributors do not support the remanufactured products mainly because of the lack of interest of customers to buy such products.

## 5. Methodology

Selecting an appropriate methodology remains extremely important for righting an effective research paper. The basic purpose of this paper is to highlight the importance of reverse logistics and the relevant challenges in supply chain management of automobile industry. The automobile industry within United States of America remains extremely well-developed and efficient. However, not all the automobile companies are encouraged to use the reverse logistics in their supply chain mainly due to the associated challenges. The methodology deployed in this research project is mainly primary quantitative. About 200 supply chain managers of different automobile companies were surveyed through a designed questionnaire.

The basic aim of this survey was to identify the importance of reverse logistics and the basic challenges in the supply chain management of automobile industry relevant to the implementation of reverse logistics. Primary quantitative technique was adopted in order to gain the most relevant first hand information about the topic from the relevant managers. The data gathered through the questionnaires essentially reflect the opinions of different supply chain managers within the automobile industry in references with the importance and challenges of reverse logistics. The data gathered through questionnaires was analyzed through descriptive statistics in order to present some important findings. The most important findings and results of the questionnaires are discussed in the next section.

## 6. Results/Findings

200 supply chain managers are surveyed in order to gain the first hand information about the importance of reverse logistics and the underlying challenges faced. Following most important highlights are identified through the survey.

*Table 1. Relevance of reverse logistics in supply chain.*

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
4. On a scale of 0 to 4 (0 being the lowest and 4 being the highest) how would you rate the relevance of reverse logistics in supply chain management for automobile industry?	200	4.00	.00	4.00	1.3250	.06907	.97680
Valid N (listwise)	200						.954

The question asked about the importance of reverse logistics in supply chain management of automobile industry. Almost all the respondents were aware of the importance of reverse logistics in supply chain management for automobile industry. This aspect clearly reveals that reverse logistics is becoming important with the passage of time for the automobile industry.

*Table 2. Improvement of overall firm’s supply chain.*

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
5. Has your company’s overall supply chain management improved due to the implementation of reverse logistics?	200	1.00	.00	1.00	.1700	.02663	.37658
Valid N (listwise)	200						.142

This question asked about the level of improvements witnessed in the company’s supply chain due to the implementation of

reverse logistics. Almost all the respondents agreed that the overall supply chain management was improved due to the implementation of reverse logistics. This aspect also reflects that reverse logistics is significance for the supply chain management.

**Table 3.** Reverse logistics of supply chain in automobile industry.

	N	Range	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
6. On a scale of 0 to 4 (0 being the lowest and 4 being the highest) does the challenges in reverse logistics of supply chain management in automobile industry create hurdles in its effective implementation?	200	3.00	.00	3.00	.6950	.07060	.99848	.997
Valid N (listwise)	200							

The question asked the significance of challenges in reverse logistics of supply chain management in automobile industry. The answers reveal majority of supply chain managers were hesitant to implement the reverse logistics due to the underlying challenges associated with its implementation.

**Table 4.** Less willingness to pay for remanufactured products.

	N	Range	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
7. Less willingness to pay for remanufactured products is an important reason behind the less utilization of reverse logistics?	200	4.00	.00	4.00	1.3700	.06884	.97357	.948
Valid N (listwise)	200							

The question asked whether willingness to pay for remanufactured products is an important challenge due to which companies do not focus over the implementing the reverse logistics. The answers clearly reveal that majority of respondents agree that less willingness to pay for remanufactured products is a major challenge for companies.

**Table 5.** Cannibalization of new products sales.

	N	Range	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
8. Cannibalization of new products sales can occur due to reverse logistics in the automobile industry?	200	4.00	.00	4.00	1.7900	.06558	.92747	.860
Valid N (listwise)	200							

This question asked for the importance of cannibalization as a challenge for reverse logistics. Almost all the respondents strongly agreed with the cannibalization as an important challenge for the automobile industry while considering about reverse logistics.

**Table 6.** Implementation of reverse logistics in the automobile industry.

	N	Range	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
9. Increasing competition in the market also impacts the implementation of reverse logistics in the automobile industry?	200	4.00	.00	4.00	1.7600	.06621	.93637	.877
Valid N (listwise)	200							

This question considered the increasing competition as an important challenge for implementing the reverse logistics. Supply managers agreed that the increasing competition eventually results in creating hurdles for the reverse logistics.

**Table 7.** Challenge for reverse logistics in automobile industry.

	N	Range	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
10. Negative consumer perception regarding the remanufactured products is an important challenge for reverse logistics in automobile industry?	200	4.00	.00	4.00	1.2800	.05980	.84568	.715
Valid N (listwise)	200							

Negative perception of customers is one of the most important challenges for reverse logistics. Respondents agreed that negative perception of customers makes it difficult for the automobile companies to successfully implement the reverse logistics.

**Table 8.** Lack of support from retailers, dealers and distributors.

	N	Range	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
14. Lack of support from retailers, dealers and distributors also hinder the adoption of reverse logistics in automobile industry	200	4.00	.00	4.00	1.2800	.05722	.80924	.655
Valid N (listwise)	200							

Lack of support from retailers, dealers, and distributors immensely impact the implementation of reverse logistics in automobile industry. Participants agreed that the lack of support remains an important challenge for the reverse logistics implementation.

## 7. Discussion

Survey results remain extremely important to depict the importance of reverse logistics in the supply chain management of automobile industry. All the questions asked in the survey were majorly related to the importance of reverse logistics and the underlying challenges faced in the implementation of reverse logistics. All the participants of the survey were the supply chain managers of different automobile companies within United States of America. All the participants provided some important information regarding the reverse logistics and its implementation in the supply chain management of the industry. The concept of reverse logistics is essentially relevant to the domain of supply chain management. There would not be any exaggeration if it is suggested that the concept of reverse logistics is meant to impact the supply chain management in a positive manner. According to Baenas, Castro, Battistelle and Junior (2011) and Rehman Khan & Qian Li, (2015), companies realize the importance of reverse logistics but are not capable of implementing it in an effective manner.

The challenges for reverse logistics in supply chain management of automobile industry remain one of the most important reasons due to which companies do not implement the system successfully (Bai & Sarkis, 2013). In simple words, not all the companies have been capable of handling the challenges of reverse logistics for recovering and reusing the returned vehicles in an effective manner. The most important challenges identified from the research revolves around less willingness of customers to pay, cannibalization, competition, negative perception of consumers, and most importantly the lack of support from dealers, retailers, and manufacturers towards the remanufactured products. All the highlighted challenges are mainly related to the fact that consumers perceive the remanufactured or refurbished goods as low in quality. According to Ahsan (2013), it is important for the marketers to change the perception of consumers in order to promote the reverse logistics in the supply chain management of automobile industry.

## 8. Implication to Research and Practice

The implication of this research to the automobile industry remains significant. Throughout the research, it was

prominent that there are many significant challenges that impact the implementation of reverse logistics in the automobile industry. Through the identification of most important challenges, the supply chain managers of the automobile industry can essentially gauge the solutions to deal with the specified challenges. The implication of this research to practice can be seen in the manner that supply chain managers are aware of all the potential challenges related to the implementation of reverse logistics. Thus, supply chain managers can make strategic decisions and devise relevant strategies to cope up with the challenges and fully deploy the concept of reverse logistics in the automobile industry. Overall, the supply chain managers can also realize the various benefits associated with implementing reverse logistics in the company and will be motivated to handle the challenges abruptly.

## 9. Conclusion

Reverse logistics can be seen as the procedure of transferring the good from their final destination in order to capture value, or making appropriate disposals. With the passage of time, the importance of reverse logistics is increasing in the automobile industry. It can be immensely beneficial for the world to focus over reverse logistics in order to capitalize over the resources available. This research essentially focused over the importance and different challenges faced by the automobile companies in implementing the reverse logistics. The most important challenges identified in the research are less willingness to pay, cannibalization, competition, negative perception of consumers', and lack of support from retailers, dealers and distributors. Supply chain managers must come up with appropriate strategies in order to deal with all the challenges highlighted in the research.

## Future Research

Not every research is always perfect. Every research is conducted with an aim that it would provide reliable and valid results for the industry. However, it is not practically possible for researchers to cover all the aspects of any given topic. Likewise, this research was meant to explore the importance of reverse logistics along with the major challenges faced by the automobile companies in implementing the reverse logistics. Due to the shortage of time, resources, and other factors, the research might have some limitations. Therefore, the future researches must be directed towards exploring further potential challenges along with the relevant solutions for the challenges explored. Also,

researches can be made regarding the reverse logistics and its importance in other industries than automobiles.

## Appendix I – Questionnaire

1. How long have you been working in the supply chain industry?
  - Less than 6 months
  - 1 year to less than 3 years
  - 3 years to less than 5 years
  - 5 years or more
2. Are you aware of the concept of reverse logistics in supply chain management?
  - Yes
  - Somewhat
  - No
3. On a scale of 0 to 4 (0 being the lowest and 4 being the highest) how would you rate the importance of reverse logistics in supply chain management?
  - Strongly Important
  - Important
  - Neutral
  - Not Important
  - Strongly Not Important
4. On a scale of 0 to 4 (0 being the lowest and 4 being the highest) how would you rate the relevance of reverse logistics in supply chain management for automobile industry?
  - Strongly Important
  - Important
  - Neutral
  - Not Important
  - Strongly Not Important
5. Has your company's overall supply chain management improved due to the implementation of reverse logistics?
  - Yes
  - No
6. On a scale of 0 to 4 (0 being the lowest and 4 being the highest) does the challenges in reverse logistics of supply chain management in automobile industry create hurdles in its effective implementation?
  - Strongly Agree
  - Agree
  - Neutral
  - Disagree
  - Strongly Disagree
7. Less willingness to pay for remanufactured products is an important reason behind the less utilization of reverse logistics?
  - Strongly Agree
  - Agree
  - Neutral
  - Disagree
8. Cannibalization of new products sales can occur due to reverse logistics in the automobile industry?
  - Strongly Agree
  - Agree
  - Neutral
  - Disagree
  - Strongly Disagree
9. Increasing competition in the market also impacts the implementation of reverse logistics in the automobile industry?
  - Strongly Agree
  - Agree
  - Neutral
  - Disagree
  - Strongly Disagree
10. Negative consumer perception regarding the remanufactured products is an important challenge for reverse logistics in automobile industry?
  - Strongly Agree
  - Agree
  - Neutral
  - Disagree
  - Strongly Disagree
11. Designing reverse supply chain process is a difficult task, which affects adoption of reverse logistics by automobile industry
  - Strongly Agree
  - Agree
  - Neutral
  - Disagree
  - Strongly Disagree
12. It is difficult for customers to follow return authorization details or returns policy
  - Strongly Agree
  - Agree
  - Neutral
  - Disagree
  - Strongly Disagree
13. Financial constraints also hinder the adoption of reverse logistics
  - Strongly Agree
  - Agree
  - Neutral
  - Disagree
  - Strongly Disagree
14. Lack of support from retailers, dealers and distributors also hinder the adoption of reverse logistics in automobile industry
  - Strongly Agree
  - Agree
  - Neutral
  - Disagree
  - Strongly Disagree

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