A Study of Literature Review and Gap Analysis of Reverse Logistics System and Implementation

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ABSTRACT: Reverse logistics is for all operations related to the reuse of products and materials. It is "the process of moving goods from their typical final destination for the purpose of capturing value, or proper disposal. The logistics system defined for the organization helps in defining the return of value to the organization. This value should be either consistent or of increasing value so that refinements along the value chain can be implemented for better benefits. The following paper discusses the different views researchers have taken for the concept of reverse logistics and its implementation. A literature review of the concept and its implementation has been done and a thorough gap analysis has been conducted in terms of the importance of the system, its implementation methods, benefits and challenges.

I. INTRODUCTION

Society, government and industry are increasingly confronted with the results of our throw-away society. Dumping grounds are already congested. Large areas of land are no longer fit for habitation as a result of the enormous pollution of the ground. Water has to be filtered before consumption, fish in large economically important rivers is not consumable, and smog in the urban areas, caused by traffic and industry, creates severe health problems for elderly people and children. Added to this, the world of today has to deal with the destruction of the rain forest, acid rain, ozone depletion, global warming, hazardous waste and the depletion of non-renewable natural resources. Studies have proved that most, if not all, of the problems mentioned above are directly related to industrial and agricultural emissions. Fortunately, the world has come to a situation in which society feels that a change in attitude towards the environment is an absolute necessity. One of the solutions that industry has come up with is the collection, recycling and reuse of products and materials. This development is not only stimulated by a growing responsibility towards the environment and regulations from the government; more and more companies see valuable commercial opportunities in collecting, recycling, and reusing products and materials.

In this context, Reverse logistics is an important issue. Reverse logistics refers to the logistics management skills and activities involved in reducing, managing and disposing of hazardous or non-hazardous waste from packaging and products. It includes reverse distribution, which causes goods and information to flow in the opposite direction from normal logistic activities. From an environmental perspective there are few products perceived or as authentically green as paper based packaging such as corrugated board. Paper based corrugated packaging is truly manufactured from a renewable source. That of course makes it uniquely biodegradable, compostable, and easily recyclable just about anywhere. Compared to other metal or plastic options, reusable corrugated containers are also relatively low cost. The fact that it is so recyclable also makes it one of the leading reusable packaging products containing a high percentage of recycled content or even post consumer recycled content.

Much of the world does not yet care much about the reverse flow of product, many firms have begun to realize that reverse logistics is an important and often strategic part of their business mission. In this research project, many examples of large bottom-line impact were identified. There is a lot of money being made and saved by bright managers who are focused on improving the reverse logistics processes of their company. It is clear that, while sometimes derisively referred to as junk; much value can be reclaimed cost-effectively. While the efficient handling and disposition of returned product is unlikely to be the primary reason upon which a firm competes, it can make a competitive difference [1].

'A model for reverse logistics entry by third-party providers', The International journal of management science .Reverse logistics has become an important entity in the US economy. Nonetheless, many companies are not capable of or are unwilling to enter the reverse logistics market. Such reluctance appears to be attributed to lack of knowledge of reverse logistics. This paper reviews current industry practices in reverse logistics. Specifically, we examine the issues and processes that an organization has to address to engage in the reverse logistics business. A reverse logistics decision-making model is developed to guide the process of examining the feasibility of implementing reverse logistics in third-party providers such as transportation companies. The purpose of this model is to help those companies who would like to pursue reverse logistics as a new market. A field study was conducted with a larger US transportation company to validate the proposed model [2].

There is growing social pressure for organizations to reduce their rates of consumption of nonrenewable natural resources and in parallel, to also reduce the release of post-production and post consumption waste to landfills, water bodies and air, thereby causing damage to the environment. To respond to the pressure it is necessary that organizations' operations prioritize the "3R" goals: Reduce, Reuse and Recycle. In this context, the so called reverse logistics flows have grown in importance in the study of supply chains. Examples are the components and materials that are collected after they are consumed or used. Instead of being sent to the landfill companies use reverse logistics to transport them back in supply chains to be reused or, recycled and incorporated as secondary input material for new production. This article aims, through the review of related legislation in Brazil, relevant literature and a number of Brazilian and international case studies to develop a basic framework to be used in the development and implementation of reverse logistics systems (RLS) [3].

In Germany the system described in the case study has already been operating successfully for a number of years. Of course, there the success is stimulated by strict environmental legislation, and by the problems of the Duales System Deutschland. The success of the system in a different environment, and on a larger scale, is still be proved. The following paper discusses the advantages and disadvantages the system has in terms of pricing, the user side and the handling model [4].

In the study it was revealed that Reverse logistics deals with the processes associated with the flows of products, components and materials from users/owners to re-users. This paper provides a review and content analysis of more than sixty case studies on reverse logistics. The case studies deal with issues such as the structure of the networks, the relationships between the different parties involved on the networks, inventory management, planning and control, and information technology. The analysis concerns the following questions: what is returned, why do these return flows exists, i.e. what are the drivers/reasons for these flows, how are these return flows being recovered, and finally, who is involved? [5].

This paper describes a study in the manufacturing sector in the central area of Cuba, to classify its reverse logistic strategies in generic typologies. At the end of the research, it has been possible to identify three types of reverse logistics strategies in the object studied: Commercial strategies, Environmental strategies and Recapturing value strategies. It also offers the profile of each strategy in the studied sector, it can be used to characterize the reverse logistic strategy developed in another manufacturing company of Cuba. This research provides a general diagnosis of the reverse logistic status in the sector studied. About 25 percent of companies do not have any strategy for returns and residual management. The 7 percent of the companies do not have it properly written and formalized. It demonstrates the low strategic level reached by companies studied on reverse logistic management. An 11% of the residuals generated by companies are not recovered, and the 26 % of the companies do not manage their product returns, it means that there are still reserves unexploded [6].

The paper was able to present important observations concerning the rotation management practices not covered by previous literature. The previous characterization of rotation management models can be deemed outdated, as it did not consider single package level tracking as a means of monitoring. However, the case results implicate that single package level tracking can significantly increase the efficiency of rotation management. The cases indicated that the

benefits, which were well in line with the benefits of shipment tracking presented in previous logistics information management literature. However, further studies are needed to more accurately pinpoint the exact effects of single package level tracking. Based on the results, single package level tracking appears superior to account based monitoring, but demands for the standardisation of package identities and an agreement on operating methods. Therefore, it is easier to take into use with a strong governing body for the package rotation system [7].

This article surveys the recently emerged field of revere logistics. The management of return flows induced by the various forms of reuse of products and material in industrial production processes have received attention in the recent decade. Many authors have proposed quantitative models taking those changes in the logistics environment into account. However, no general framework has been suggested yet. Therefore the time seems right for a systematic overview of the issues arising in the context of reverse logistics [8].

This paper reflects a research project done on behalf of a manufacturing company that was experiencing difficulties in tracking and managing its returnable containers. The company uses returnable containers to transport purchased parts from some of its suppliers. The company does not have an effective system in place for tracking and locating these containers in the supply chain. The inability to effectively track the containers has created many problems and negatively impacted the company, its logistics provider, and suppliers. As part of the research project, the information and physical flow of containers through the supply chain were documented and analyzed. From the analysis, a number of problems and their relationship to the company, logistics provider, and suppliers were identified. The overarching problem was inadequate visibility of the containers throughout the logistics chain. To eliminate or reduce the problems, three recommendations were proposed. One was to improve the communication and information flow by adding additional capabilities to the existing computerized supplier network, which could improve the continuous tracking of the number and locations of containers in the logistics chain. These improvements would result in more efficient planning by the company, the logistics provider, and the suppliers. The end result would be reducing shortages of parts, late shipments, and excessive transportation costs [9].

This article was designed to study the reverse logistics operation of a unit of mineral water filling the city of Recife-PE. The company has a source in Aldeia and a distribution center in Imbiribeira. The study was aimed at highlighting the return of bottles of mineral water of 20 liters with a view to reusing them in the process of filling of mineral water. The physical distribution of the bottles of mineral water is made by 8 zone delivery in the city. The study describes all the reverse process, and outline key issues and limitations of the practice of reverse logistics of bottles due to lack of adequate infrastructure for the practice of returning the bottles [10].

It is reported that reuse practices contribute to the environmental and economical sustainability of production and distribution systems. Surprisingly reused closed loop supply chains have not widely researched for the moment. In this paper it is explored that scientific literature on reuse and a framework is proposed for reusable articles. This conceptual structure includes typology integrating under the reusable articles term different categories of articles and addresses the management issues that arise in reuse [11].

Reverse logistics (RL) stands for all the operations related to the reuse of used products, excess inventory of products and materials including collection, disassembly and processing of used products, parts, and/or materials. Over the past few years, RL has received much attention because many companies are using it as a strategic tool to serve their customers and can generate good revenue. An efficient reverse distribution structure may lead to a significant return on investment as well as a significantly increased competitiveness in the market. Therefore, analysis of barriers hindering the successful implementation of RL is a crucial issue. These barriers not only affect RL but influence each other also. In existing models, the holistic view in understanding the interrelation between the barriers is not accounted for but is diagnosed independently. This paper utilizes the Interpretive Structural Modeling (ISM) methodology to understand the mutual influences among the barriers so that barriers that are at the root of some more barriers (called driving barriers) and those which are most influenced by the others (called driven barriers) are identified [12].

Reverse logistics, which is induced by various forms of used products and materials, has received growing attention throughout this decade. In a highly competitive environment, the service level is an important criterion for reverse logistics network design. However, most previous studies about product returns only focused on the total cost of the reverse logistics and neglected the service level. The model considered not only the traditional cost factor but also the service level, which was represented by the total tardiness of the cycle time and the coverage of consumer zones. The model can help a computer manufacturer decide the optimal number and location of collection points and repair centres and the transportation arrangement of the returned products from the customer zones to the repair centres

Aljapurkar and Ingawale **142**

through the collection points after a trade-off of the total cost of the reverse logistics and the service quality level [13].

The contribution of the RL practices to the firm's supply chain performance is also well established through various researches. Corporates have started considering RL processes as an integrated strategy in their design and execution of the supply chains. Field research outputs are going in the various sectors in showing the reverse supply chain practices and their increased importance in the system. This research paper reflects a comprehensive analysis of the RL practices with respect to distillery industry in India. The field, distillery industry is highly an unexplored and a complex one. In this domain, the scope for controlled practices in Reverse logistics is having a direct impact on the performance of established supply chain. The paper has attempted a pioneer step to analyze the area of RL operations in distillery Industry by understanding their various factors and their mutual relationship with respect to distillery industry by using established modeling technique ISM (Interpretive Structural Modeling). It finally recommends factors to be focused in increasing the RL performance in the Distillery Industry [14].

Gap Analysis

The literature reviewed by the researcher mainly focuses on creating awareness about usage of reverse logistics systems. The literature focuses on usage of reverse logistic systems in the supply chain management system to capitalize on the advantages it shall have.

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