Reverse Logistics Strategies and Their Implementations: A Pedagogical Survey

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Abstract:

Reverse Logistics and the management of returned or used merchandise is a growing problem among manufacturers today. In this study we begin by presenting the nature and magnitude of the reverse logistics problem in the industry and a literature survey of the previous research in this area. Reverse Logistics deals with the processes associated with the reverse stream from users/owners to re-users. This paper provides content analysis of scientific literature on reverse logistics. Over thirty articles are included. In addition, we give an overview of particular issues, which we rink with strategies, practices and thus directions for future research.

Article:

1. INTRODUCTION

Reverse Logistics (RL) may be defined as the management of returned materials from customers, including their restoration, reengineering, recycling, liquidating or disposal of waste in an environmentally friendly manner. The objective is to minimize the handling cost while maximizing the value from the goods, or proper disposal. The key thing is to speed up this cycle. Essentially, reverse logistics is the opposite of logistics management. Goods or materials move in the opposite direction of the supply chain, that is, from the customer back to the supplier. Products are returned to the manufacturer or retailer for any number of reasons. Some of the more common reasons are warranty failures, damaged products, product recalls, incorrect product orders/shipment, exchange of impaired products for functional ones, reusable packaging materials, product upgrading and so on. Whatever the reason, returned goods have to be processed in the best manner possible.

Reverse Logistics has become a fairly serious issue in recent times primarily because retailers have been forced, due to increased competition, to take a liberal stand as far as returns are concerned. Meyer (1999) believes that returns have increased to as much as 30-50% in some cases. He observes that returns can be as high as 50% for goods sold on-line. Meyer (1999) also refers to a study conducted by the Reverse Logistics Executive Council, in that, U.S. firms spend more than an estimated $35 billion annually on handling, transportation, and processing of returned products. This estimate does not include disposition management, administration time, and the cost of converting impaired materials into productive assets. An issue of such dimension should be dignified with appropriate measures to implement reverse logistics.

Although the phenomenon of Reverse Logistics was in existence for a long time, it did not gain recognition until recently. This area has intrigued many people in terms of the impact it has had and continues to have on the business world. People have approached the subject in different ways and given their perspective on the same. The next section briefly mentions some of the study and analysis done in the area of reverse logistics. Reverse logistics is a complicated process that requires detailed planning in terms of continual audit of returns, determining the best disposition of products that is both economically and technically feasible, warehouse and transportation management, recycling programs, and other related areas.

2. LITERATURE REVIEW

During the early nineties, the Council of Logistics Management started publishing studies where reverse logistics was recognized as being relevant both for business and society (Stock, 1992). Other studies followed stressing the opportunities on reuse and recycling (Kopicki et al., 1993) In the late nineties, Kostecki (1998) discussed the marketing aspects of reuse and extended product life. Stock (1998) reported in detail how to set up and to carry out reverse logistics programs. Rogers and Tibben-Lembke (1999) presented a broad collection of reverse logistics business practices, giving special attention to the US experience (see also Lund, 2001). Recent reviews and literature compilation either on models to support reverse logistics or on the business perspective can be found at Fleischmann et al., 1997, Guide et al., 2000, Guide and van Wassenhove, 2003, and Dekker et al., 2003. Former studies have argued that the processes, actors, types of reuse and actors are relevant to characterize reverse logistics (Fleischmann et al., 1997). De Brito and Dekker (2002) provide typologies of the what, whom and how of reverse logistics.

Recently, many articles dedicated to the analysis of the practice of reverse logistics have appeared, including Canon (Meijer, 1998), Philip Morris (Andriesse, 1999), Kodak (Toktay et al., 2000) and Nortel Networks (Linton and Jonhson, 2000). Meyers (1999) writes that in a survey of logistics managers, Rogers and Tibben-Lembke (1999) found that four in ten logistics managers consider reverse logistics relatively unimportant compared to other company issues. In terms of resource recovery, the most often described option was recycling and re-use/redistribution (De Koster et al., 2001). Parker (1996) has consolidated the proceedings of the First Annual International Congress on Reverse Logistics Management held in 1996 that focused on the important contribution of accounting for environmental issues. Epstein of Stanford University observed that ABC costing provided an opportunity to minimize costs and increase profitability. Stinson of the University of Texas, Austin, commented that environmental accounting spread across many accounting areas and standards, including financial, managerial, regulatory, tax, and national accounts.

In the area of disposition and environmental concerns, Amato (1999) gives statistics on the amplitude of refuse in the United States. In 1997, more than 430 billion lbs. of garbage was disposed. That is just the benign municipal solid waste. Each year American industries emit, pump, and dump more than 2.5 billion lbs. of chemicals such as lead compounds, chromium, ammonia, and organic solvents into the air, water, and ground. Amato (1999) also mentions an interesting place in Denmark, that promulgates recycling and resource sharing. This place is called an "eco-industrial park" that houses a power company, a pharmaceuticals firm, a wallboard producer, and an oil refinery. All these companies share in the production and use of

steam, gas, and cooling water. The excess heat warms nearby homes and agricultural greenhouses. One company's waste becomes another's resource. The power plant sells the sulfur dioxide it scrubs from its smokestacks to the wallboard company, which uses the compound as a raw material. Dozens of these eco-industrial parks are being developed all over the world. Linton (1996) points that many of the current "take back" programs for non-defective used products are recycling programs.

3. REVERSE LOGISTICS STRATEGIES

This section analyzes and evaluates the RE strategies according to the following decision-making focus: Reverse Logistics Network Structure, Relationships, Inventory Management, and Planning and Control (see Ganeshan et all, 1999; Fleischmann et al, 1997). Furthermore, we give an overview of deposition for processing and transmitting environmental sensitive material.

3.1. Return Management

Both products and packaging return for a variety of reasons, but returns can be broadly divided between those that are unplanned and those that are planned and desired. Unplanned returns are typically limited to products which customers have purchased. The list of reasons for return is lengthy and each requires different physical handling. It is important that the reason for return is recorded and used to modify future business behavior.

Returns of new products
* The customer changed his/her mind
* The product was defective
* The customer perceived the product to be defective
* The product was damaged in transit
* A vendor error (such as wrong item or quantity sent)

Returns of used products
* Warranty returns
* Product recalls

The effect on margin of not reselling the maximum amount of stock within the season can be substantial, yet it is often given little senior management attention. Unsold stock is reputed to cost 25% of its value annually. Credit disputes with suppliers can run to millions of dollars per year. Moreover, there could be a similar cost hidden in the shops. The cost to the business of price reductions and mark-downs is enormous and is often the factor that sets retailers apart at year end. Good stock management and information can help retailers to buy and sell better. Retail buyers are motivated by the sale of goods and often factor into the bought price an allowance for returns, but this ignores the real costs and the unsold stock issues. Management of slow sellers can turn stock into cash. Retailers can have stockrooms jammed with unsold product, waiting months before it goes into sale. Money is tied up, damage and theft increases, it blocks the fire exits and when finally put on sale it does not make a coherent customer offer. Sale remainders are often dumped. Manufacturers can be deluged with batches of product returns due to retailers overstocking, end of promotion, end of accounting year, unseen build up in warehouses, water damaged packaging or product recalls. The retailers often deduct credit from the next invoice but it takes months to retrieve the item, if at all.

For retailers, returns are costly than they need to be in several ways. First, the returned inventory is idle while processing occurs and may take up to six weeks to be returned to the selling floor. Second, because processing takes so long, the item may be obsolete or past season before it's available for resale, and consequently must be sold at a deep discount. Third, the customer relationship suffers if returns of an item purchased through one channel can't be handled efficiently through other channels. Also, consumers may return items through several channels, including mailing the item back to the DC or returning the item to a local store.

3.2. Recycle and Redistribution

Another dimension in the area of reverse logistics is recycling and redistribution that focuses on environmental awareness through effective value management. Reuse and Recycling, Reverse Logistics Opportunities, published by the Council of Logistics Management in 1993 talks briefly about the advent of recycling laws in different countries. The German Waste and Packaging Law was enacted in April 1991. Under this law, manufacturers, distributors, and retailers were responsible for recycling packaging waste. Many other European countries also established recycling programs. In fact, to resolve discrepancies in legislation between member countries, the European Community proposed a " New Approach Standard" for reuse and recycling in July 1992. The standard was to replace the packaging rules in member countries at the time. The book also mentions mandatory recycling laws adopted by most states in the United States of America. These laws covered recycling goals for state governments, curbside collection requirements, commercial recycling requirements, and more general mandates for local governments to establish recycling programs.

The CLM book (1993) in Reuse and Recycling, Reverse Logistics Opportunities, discusses the emerging issues and different options in non-hazardous waste reduction, and describes how these issues affect the supply chain. This book explains the concept of recycling, reusing, and source reduction--the three components of waste reduction. A short definition of each of these components would be appropriate at this point. Recycling is a four-stage process, involving:

* Collecting recyclable materials from waste generators;
* Processing recyclables materials, which are called secondary, as opposed to virgin, materials;
* Using these secondary materials to manufacture new products; and
* Returning the products to commerce.

Reusing is a process similar to recycling, except that instead of processing the products to create raw materials, the products are refurbished or repaired and used again in their original form. Source reduction involves reducing the amount and/or toxicity of material consumed or wastes generated (e.g., light-weighting packaging). Reuse may be considered as a type of source reduction. The CLM book (1993), on reuse and recycling, has, based on interviews with 17 companies and an extensive literature review, recognized that reuse and recycling programs often follow a three-phase pattern of development, namely: Reactive, Proactive, and Value-Seeking These phases represent increasing levels of corporate commitment to waste reduction and related environmental concerns. The reactive phase aims at compliance of existing laws, fulfilling individual environmental commitments, and achieving of cost savings. The objectives of the proactive approach are to preempt new environmental laws by voluntarily starting programs, developing competitive advantage through more efficient compliance, and sell

products that satisfy customers' environmental concerns. Finally, the value-seeking phase aims at integrating environmental activities into a business strategy, and operating the firm to reduce its impact on the environment.

3.3. Deposition and Environmental Concerns

Traditionally, reverse logistics has attracted little attention, as organizations focused on the forward moving supply chain including marketing, sales, procurement, manufacturing, and distribution. Waste reduction includes recycling, reuse, and source reduction of returned products or packaging wastes from end-users. Green Logistics has gained increased momentum in recent years among manufacturers and retailers following government mandates and social responsibilities to the society. The catalyst that sparked this interest in reverse logistics has been environmentalism. Reverse logistics practices have often been environmentally driven, particularly in European countries such as Germany, where environmental regulations are more stringent than in the U.S. However, many organizations are discovering that improving their reverse logistics processes can be a value-added proposition that may or may not have anything to do with environmental concerns (Retzlaff-Roberts, 1998). The added value could be attributed to improved customer service leading to increased customer retention and sales. The added value could also be through reduced cost and/or reduced cycle time. So while environmentalism is and will continue to be a driver behind reverse logistics, it is by no means the only one. In fact the reverse logistics study described in this article is driven by customer satisfaction. It involves a direct marketer that is considering an innovative reorganization of its returns process in order to increase the convenience of the process, while reducing the cycle time.

The pathways that product can follow are:

* Sell as new.
* Return to supplier for credit. Financial penalties for faulty manufacture are common.
* Sell at discount in shop or via an outlet.
* Sell into secondary market.
* Donate to charity.
* Refurbish, inspect, test, remanufacture, repackage.
* Recycle component materials.
* Scrap to a licensed agent.

Also, the lack of information on the product may prohibit higher levels of product recovery. Yet reuse and remanufacturing are generally economically more attractive than materials recycling. The economic efficiency of deposition programs is a major concern, particularly if a significant fraction of the products sold is returned through the deposition program. Guidance on sustainable product deposition design has to be provided. Especially higher product recovery levels require sound remarketing concepts. Reverse logistics in the context of deposition (collection, storage, and transportation of end-of-life products from the point of return to the point of product recovery and disposal) has not yet been well documented. A major problem in reverse logistics is the irregular return flow of end-of-life products and the uncertainty about the expected number of products returned through a deposition program. Concepts are required that allow the manufacturer to influence the customer's decision about when and where to return a product.

REFERENCES

Andriesse F.G., "Successful implementation of reverse logistics at Philip Morris" in A.R. van Goor, S.D.P. Flapper and C. Clement (eds.), Handbook Reverse Logistics, Kluwer B.V., Deventer, The Netherlands, 1999.
COUNCIL OF LOGISTICS MANAGEMENT, Reuse and Recycling: Reverse Logistics Opportunities, 1993
De Brito M.P. and E.A. van der Laan, "Inventory control with product returns: the impact of information" Econometric Institute Report El 2002-29, Erasmus University Rotterdam, the Netherlands, 2002.
Dekker R., K. Inderfurth, L. van Wassenhove and M. Fleischmann (eds.), (2003) Quantitative Approaches to Reverse Logistics (forthcoming).
De Koster M.B.M., M.A. van de Vendel and M.P. de Brito, How to organise return handling: an exploratory study with nine retailer warehouses, Int. J. of Retail & Distribution Management, 2001, 30(8):407-421.
Doherty, K., "What Goes around- Comes Back", U.S. Distribution Journal, 1996
Fleischmann M., J.M. Bloemhof-Ruwaard, R. Dekker, E. van der Laan, J.A.E.E. van Nunen, L.N. van Wassenhove, Quantitative Models for Reverse Logistics: a review, European Journal of Operational Research 1997, 103:1-17.
Ganeshan R., E. Jack, M.J. Magazine and P. Stephens, "A taxonomic review of supply chain management research" in S. Tayur, R. Ganesham and M. Magazine (eds.), Quantitative Models for Supply Chain Management, Kluwer Academic Publishers, 1999, 840-879.
Guide Jr. V.D.R., Technical Note: Production planning and control for remanufacturing: industry practice and research needs, Journal of Operations Management, 2000 18:467-483.
Guide Jr. V.D.R., V. Jayamaran, R. Srivastava and W.C. Benton, "Supply Chain Management for Recovarable Manufacturing Systems," Interfaces 30(3): 2000, 125-142.
Kopicki R.J., M.J. Berg, L. Legg, V. Dasappa and C. Maggioni, Reuse and Recycling: Reverse Logistics Opportunities, Council of Logistics Management, Oak Brook, IL. 1993.
Kostecki M., The durable use of consumer products: new options for business and consumption, Kluwer Academic Publishers, 1998.
Linton, J., Reverse Logistics: A Primer, Circuits Assembly: The Magazine for Surface-Mount & Board-Level Assembly, 1996.
Linton J.D. and D.A. Jonhson, A decision support system for planning remanufacturing at Nortel Networks, Interfaces 30: (6), 2000 17-31.
Lund H.F., The McGraw-Hill recycling handbook, McGraw-Hill, 2001.
Meijer, H.W., "Canon Benelux and Reverse Logistics" in A.R. van Goor, S.D.P. Flapper and C. Clement (eds.), Handboek of Reverse Logistics, Kluwer B.V., Deventer, The Netherlands. 1998.
Melbin, J.E., "The Never-ending Cycle," Distribution, 1995.
Meyer H., "Many happy returns," The Journal of Business Strategy, 1999, 20: (4) 27-31.
Parker, J.N. (1996), The Importance of Environmental Cost Accounting, Management Accounting
Rogers, D.S. and R.S.Tibben-Lembke, Going Backwards: reverse logistics trends and practices, Reverse Logistics Executive Council, Pittsburgh, PA. 1999.
Stock J.R., Reverse Logistics, Council of Logistics Management, Oak Brook, IL. 1992.
Stock J.R., Development and Implementation of Reverse Logistics Programs, Council of Logistics Management, Oak Brook, IL, 1998.
Toktay L.B., L.M. Wein and S.A. Zenios, "Inventory Management of Remanufacturable Products," Management Science, 2000 46(11): 1412-1426.