

# The Dynamic model approach for Reverse Logistics in India by third party logistics

Ashish Kumar, Rajkumar Ohdar, Manoj Kumar

**Abstract**— This third party logistics (3PL) is drawing the due attention at government, industrial, academicians and practitioner's levels. If the logistics cost in India can be brought down from the current level of 13% of GDP to 9% (level in the U.S.), the savings would be around Rs 3 lakh crore approximately per annum. Reverse Logistics has received various countries' universal attentions facing short of the global resources; while inventory management is playing a key role in setting up efficient closed loop supply chains. As cost pressures continue to mount in the competitive logistics industry, a growing number of third-party logistics providers have begun to explore the possibility of managing product returns in a more cost-efficient manner. However, few studies have addressed the problem of determining the number and location of repair facilities where returned products from retailers or end-customers were inspected, repaired, and refurbished for redistribution. To fill the void in such a line of research, the proposed paper reviews current industry practices in reverse logistics. Specifically, examine the critical 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.

**Index Terms**— Third-PartyLogistics(3PL),Reverse Logistics,efficient, redistribution, decision-making model, feasibility, Cost.

## 1. INTRODUCTION

A **third-party logistics provider** (abbreviated **3PL**, or sometimes **TPL**) is a firm that provides service to its customers of outsourced (or "third party") logistics services for part, or all of their supply chain management functions. THIRD-PARTY logistics (3PL), which is growing around the world is drawing the due attention at government, industrial, academicians and practitioner's levels. The worldwide trend in globalization has led many companies to outsource so as to focus on their core competencies. The annual logistics cost in India is estimated to be 13% of India GDP in comparison to less than 9% of their respective GDPs in the developed countries such as the U.S. and Germany (Source: <http://www.worldbank.org>). The annual logistic cost in India is around USD 160 billion (Indian GDP is USD 1232.7 billion in 2008 ranked 5th in the world). World wide logistics is about 2 Trillion US dollars. For any country, the logistics cost are estimated to be between 9 - 20% of GDP[2]. If the logistics cost in India can be brought down from the current level of 13% of GDP to 9% (level in the U.S.), the savings would be around \$64 billion (Rs 3 lakh crore approximately ) per annum.

In order to handle its logistics activities effectively and efficiently, a company may consider the following options.

(1) It can provide the function in-house by making the service.

(2) It can own logistics subsidiaries through setting up or buying a logistics firm.

(3) It can outsource the function and buy the service.

Currently, a growing interest in the third option, i.e., outsourcing has been indicated by the volume of writings on the subject in scholarly journals, trade publications and popular magazines.

The process of model development is multi-faceted. We begin by defining logistics and reverse logistics and discussing the significance of reverse logistics in supply chain management. Next we conduct a comprehensive review of current industry practices in reverse logistics. Finally, we present and discuss the reverse logistics decision-making model followed by a field study to validate the model.

## 2. REVERSE LOGISTICS: DEFINITION AND SIGNIFICANCE

Logistics involves the movement of physical goods from one location to another and third-party transportation companies (such as JB. Hunt) provide a substantial portion of this service. Weiner referenced an article written in 1898 describing logistics as a strategy for handling troops during war including the moving and quartering of troops. The military has since defined logistics as encompassing all activities and methods connected with supplying the military, including storage requirements, transport and distribution A study conducted by (CLM, 2003) [ Council of Logistics Management's], involving 400 representative from representatives from North America, Western Europe and Asia Pacific concluded that logistics outsourcing is a growing business globally.

It is moving in two directions:

- (1) increase in the number of buyers of logistics services,  
And
- (2) Increase in the extent of usage of logistics services.

The extent of usage includes number of activities outsourced, geographical coverage, nature and length of contract, percentage of total logistics budget allocated to 3PL companies

- Ashish Kumar is currently pursuing PhD degree program in Department of Forge Technology in NIFFT Hatia,Ranchi, India PH-+91-9546693566. E-mail: [bala.ashishjha@gmail.com](mailto:bala.ashishjha@gmail.com)
- Rajkumar Ohdar is currently Associate Professor in Department of Forge Technology in NIFFT, Hatia,Ranchi,India, PH-+91-8986719859. E-mail: [rkohdar@yahoo.com](mailto:rkohdar@yahoo.com)
- Manoj Kumar is currently Associate Professor in Department of Forge Technology, in NIFFT, Hatia,Ranchi,India, PH-.+91-9934369266 E-mail: [mkniffit@gmail.com](mailto:mkniffit@gmail.com)

and level of commitment [8]. A total of 1,568 logistics executives located in 61 countries from North America, Europe, Asia Pacific and Latin America, South Africa and the Middle East participated in the survey conducted [10]. Respondents indicate a greater propensity to outsource freight bill auditing and payment, transportation. Asia Pacific and Latin American organizations have a greater incidence of outsourcing customer service, forwarding and customs clearance outsourcing than in the rest of the world[7]. Warehousing, Transportation, Freight Forwarding, Customs Clearance, Freight Consolidation, Freight Brokerage, Break Bulk Operations, Cargo, Insurance Packaging/Labeling, Distribution, Reverse Logistics, Consulting Services Import/Export Management, NVOCC(Non-Vessel Operating Common Carrier), Inventory Management Order Processing, Payment Collection, and Vendor Management are the activities being outsourced in India in 2008[8].

Reverse logistics can be defined as the reverse process of logistics. Traditionally, reverse logistics has been viewed primarily as the process of recycling products. Today, definitions vary depending on what company or segment of industry is attempting to define it. Retailers see reverse logistics as a way to get product that has been returned by a consumer back to the vendor. Manufacturers tend to view reverse logistics as the process of receiving defective products or reusable containers back from the user. CLM defines reverse logistics as “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” [4].

Fig. 1 illustrates the concept of forward and reverse logistics within the supply chain system. It involves events necessary to retrieve, transport and dispose of goods. These goods are moved backward from the consumer and the process includes the information flows associated with tracking and credit processes. A complete supply chain system includes both forward logistics and reverse logistics as shown in Fig. 1. Management traditionally concentrated on improving forward logistics operations to enhance a firm’s competitiveness. Forward logistics operations subsequently increase reverse logistics activities and thus its importance to an organization’s success. US companies are spending in excess of \$35 billion per year on handling, transportation, and processing of returned goods. These estimated costs do not include the management of these processes as well as the transformation process of converting unusable goods into usable goods. On average reverse logistics activities make up approximately 4% of total logistics costs to a company. Companies who purchase reverse logistics assistance from third-party providers could reduce up to 10% of their company’s annual logistics costs. High-tech companies have reduced inventories along with improving field engineer productivity by as much as 40% through appropriate handling of reverse logistics. Reverse logistics is obviously emerging as very important entity in the supply chain[9].

World Bank (November 25, 2007) ranks India at 39th in global trade logistics which publishes first ever Logistics Performance Index (LPI) to rank country’s logistics compe

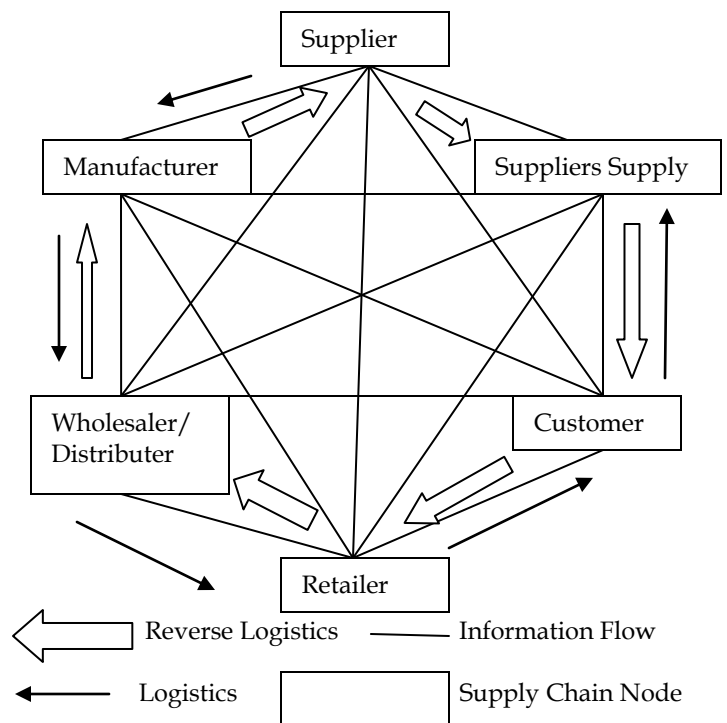


FIG.1. CONSUMER SUPPLY CHAIN SOURCE:[14] Lummus et.al

tence, cost structure, and infrastructure (World Bank Global Logistics Report: available at SC Digest). The 3PL market in India is least developed. A survey conducted by Frost & Sullivan estimates the logistics market in India at \$298.7 million in 2003 (0.48% of the logistics cost in 2003) and it increased to USD 2 billion in 2008 (1.25% of the logistics cost in 2008) whereas worldwide logistics industry is about 2 Trillion US dollars. There are very few service providers, who generate substantial revenues (more than Rs. 50 crore) in India. However, things are changing for the better at a fast pace. According to a TCI-MDI survey of 130 Indian firms, 55.4% respondents indicated that their firms use 3PL services. Available literature focuses either on the best practices[10] or on re-engineering of internal operations of the firms[11],[13]. All these studies indicate that the Indian firms generally lag behind their counterparts in the developed countries.

### 3. Current industry practices of reverse logistics

A comprehensive review of reverse logistics practices was conducted through literature review, WEB searches and survey methodologies. The purpose was to determine the needs of third-party logistics company customers in reverse logistics as well as current strategies of their competitors and the needs of the competitor’s customers. In general, the practice of reverse logistics involves three distinct stages: retrieval, transportation, and disposition. Table 1 is a list of terms generally used in all stages. Each stage has a set of people or organizations involved with the reverse logistics process, each having their own special interests [7]. Each stage will be discussed in detail.

#### 3.1 Stage 1—Retrieval

Retrieval can best be described as the process of collecting and removing goods from a customer. This stage is affected by the

type of product picked up and who does the retrieval from the customer.

Table: 1

TERM	DEFINATION
PRODUCT RECALLS	Goods the manufacturer has recalled and must be pickup for return.
INVENTORY RETURNS	Goods returned to reduce inventory at an outlet other than the manufacturer.
WARRENTY RETURNS	Goods store/distributor/ wholesaler are in need of warrenty returns.
CORE RETURNS	Reusable goods, those items that can be remanufactured.
REUSABLE CONTAINER	Shipping containers that product was shipped in and must be returned to the manufacturer
DAMAGED GOODS	Goods damaged in shipment or damaged on site.
HAZARDOUS MATERIALS	Items considered hazardous and yet must be returned.Also known as HAZMAT

There are several different operations of the retrieval process. These operations include:

(a) Store level returns retrievals—Store level returns are those returns that are retrieved from any type of store/outlet. This type of return is made up of product recalls, inventory returns, warranty returns, core returns, reusable containers, damaged goods, seasonal items, hazardous materials (HAZMAT) and stock adjustments.

(b) Consumer returns retrievals—Consumer returns are collected from the ultimate consumer. These returns include product recalls, warranty returns and damaged goods.

(c) Collection center retrievals—These retrievals involve product recalls, warranty returns, inventory returns, core returns, reusable container returns, damaged goods, seasonal items and hazardous materials.

### 3.2 Stage 2—Transportation

The transportation stage of the reverse logistics process is considered to be the actual movement of goods from one location back to another location. The transportation stage is extensively involved in all aspects of reverse logistics, since manufacturers are often unwilling to be the final destination of their returned goods. Instead, they prefer to have an outside source or third-party logistics company dispose of these goods. As a result, transportation companies are often left holding the goods waiting for disposition information. These companies are recognizing the profitable situation of handling otherwise unwanted return goods.

### 3.3. Stage 3—Disposition

The disposition process involves decisions and actions associated with the fate of a product once a customer demonstrates product dissatisfaction. There are two types of disposition, on-

site and off-site. On-site disposition involves activities that take place at the customer’s facility to handle issues related to product concerns. The product may be repaired or replaced on-site. Off-site disposition involves shipping the defective product to a different facility for repair, replacement, or disposal.

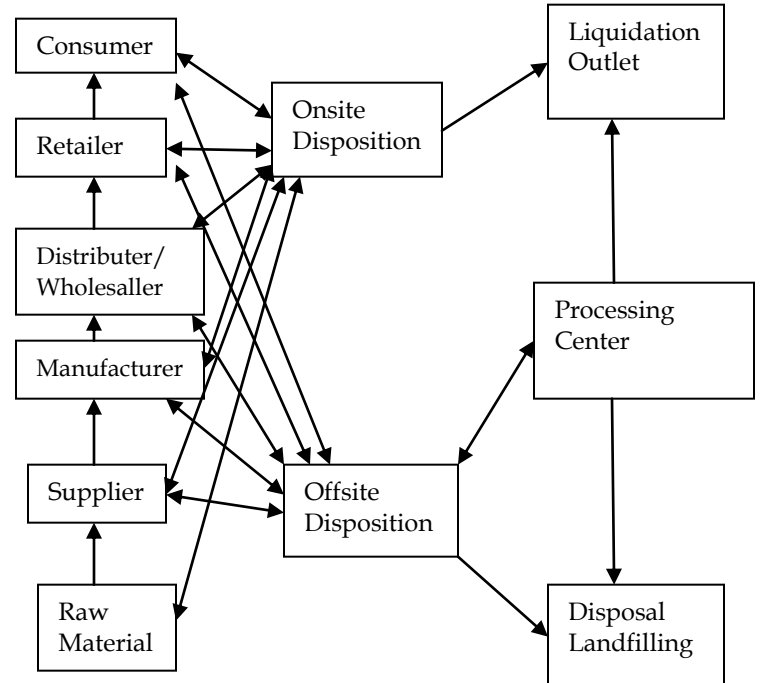


Fig 2. Source: On-site and off-site disposition processesservice provider TOTAL LOGISCTICS PVT. LTD.

A basic flow of the disposition process can be seen in Fig. 2. This figure illustrates the forward movement of goods, or forward logistics, in the supply chain by the use of narrow arrows. Bold arrows illustrate possible reverse logistics flow at all nodes in a product’s forward logistics path. At every node, there is potential need for on-site or off-site disposition. The forward movement of goods represents the normal flow of material from raw material to finished goods to the ultimate consumer. Corporate-owned transportation systems, such as Big Bazaar, or third-party logistics companies, such as Total Logistics India Pvt. Ltd., perform this process. The reverse logistics flow is more complicated as the product being disposed can be handled in many different ways. As Fig. 2 illustrates, the returned product can be serviced at the customer’s facility (on-site disposition) or sent off for the further consideration. The product would be shipped once again using either corporate-owned transportation systems or third-party providers to off-site facilities (off-site disposition). The off-site disposition can include product repair, replacement, disassembly, liquidation sales, or even landfill disposal.

Companies such as Big Bazaar use dedicated redistribution or processing centers for their off-site processing efforts. A processing center can be responsible for many aspects of the reverse logistics effort which include:

(a) Repairs— Goods that have been returned and are in need of repair at a processing center

(b) Replacement part return to customer—Items that have been collected from the end user upon delivering the replacement part to the consumer.

(c) Inspection—Returned goods shipped to a processing center that require inspection, which may include visual, mechanical or electrical testing.

(d) Salvage—Goods that are either physically destroyed, disposed of (such as delivered to a landfill), or dismantled.

(e) Reworks—Goods that need to be modified such as upgrades (putting a new module in a system per upgrade instructions), refurbishments and repackaging.

In practice, the off-site disposition stage can also involve liquidation centers and secondary market outlets. Liquidation outlets resell returned goods either through a WEB site (click) consignment process or a brick and mortar (brick) consignment process. Returned goods processed in this manner are auctioned off to the highest bidder. This liquidation process is usually called the secondary market and is broken down into its own primary and secondary markets[9]. Based on industry practice this primary market consists of major discount retail “brick” chains such as Reliance-Mart, and the secondary market consists of second level discount stores such . In relation to “click” operations, online auctions like eBay.in, homeshop18.com, almostfree.in, starfree.in etc sell everything from computers to cameras to household products and appliances on the WEB. Ebay even goes further with the sales of automobiles, car parts, furniture, and other such diverse items. Some of these items are refurbished returns, others are overstocks and out of date products. Many of which are returned to a central point or consolidation points for resale. With the knowledge of current industry practices, we developed a model that would serve as a guideline for implementing reverse logistics[3]. The model is discussed in detail in the following section.

#### 4. Reverse Logistics Decision-making Model

We developed a reverse logistics decision-making model for strategic reverse logistics decision-making (Fig. 2). The model was based on literature review and interviews with logistics managers at prominent third-party logistics companies headquartered in Mumbai. The interviews were informal with conversation directed around their perceptions of issues that would affect their desire to enter the reverse logistics market. A common pattern emerged that lead to the model. The purpose of this model is to help third-party logistics companies desiring to pursue reverse logistics as a potential new market. The model depicts several key steps necessary for a company to take in determining its current and future potential in the reverse logistics market.

The steps of this process of evaluation are discussed below.

(1) Research existing reverse logistics issues and identify customers. A third-party logistics company that is considering entering the reverse logistics market must first research

current issues pertaining to reverse logistics. The company should conduct market research involving literature review of current academic findings in reverse logistics in conjunction with WEB-based research [13]. The knowledge gained will provide the company with current best practices allowing for educated decisions to be made in their reverse logistics endeavor. This step is especially important as the reverse logistics market is expanding and changing so rapidly that even a month of lapsed time can make a substantial difference in the needs of the reverse logistics customer base.

(2) Survey existing repeat customer needs. Once potential customers are identified, the third-party logistics company should survey their existing and potential needs for reverse logistics service. With the understanding of current reverse logistics issues, this survey would obtain information related to existing or potential reverse logistics needs that their customers may have. This information is invaluable when determining the company’s current position regarding reverse logistics and establishing direction for the future of the company’s reverse logistics involvement..

Survey competitors and competitor’s customers. Viable competitors of the third-party logistics company should be identified to assess their capabilities in reverse Logistics capabilities. WEB usage and other research prove to be very effective in this step. A survey developed to understand competitors should be conducted to further understand the strength of competitors. Another source of information that must be studied is the competitor’s customers. The same process that is used to understand competitors is applied.

(4) Conduct gap analysis, based on the needs of existing customers and competitors’ customers, the 3PL logistics company can then perform a gap analysis. The gap analysis evaluates and compares the company and its competitors’ current reverse logistics position in the market with the needs of current and future customers. The analysis will provide the company with necessary information to make decisions on its strategic positioning in the reverse logistics market.

(5) Perform feasibility study. In this stage the third-party logistics company should utilize all information gained from previous efforts to conduct a feasibility study, which involves analysis of its current financial position and the feasibility of entering the reverse logistics market. The company should compute the costs of obtaining the necessary additional resources to provide the extended service identified through the gap analysis. The company must also revisit its existing customers to determine if reverse logistics would benefit these customers using existing resources. These benefits could be realized through a more planned and effective.

(6) Develop a positioning strategy. All of the previous steps of the model were developed to aid in making the third-party logistics company’s final decision, “What will their position in the reverse logistics market consist of?” If the feasibility study indicated the company could enter the reverse logistics market with reasonable expectation of making a profit and if the resources are available, the company should decide to proceed. With this information, management could then strategically position reverse logistics in the company’s long-term plans. For instance, the company may decide that it will offer a



full reverse logistics service.

## 5. Field study

This study was performed following the reverse logistics decision-making model. Based on this model, the transportation company researched current reverse logistics issues. The company then identified their existing reverse logistics customers. The company conducted a feasibility study based on the gap analysis. This analysis revealed the need for processing centers, which were not in existence. The feasibility study indicated that such an expense could not be justified based on the company's existing customer base. If they chose to become involved in all reverse logistics stages, they would have to significantly expand their customer base and move into market segments that would require substantial investment. The company considered their situation and decided that their best strategic position was to stay in their current position while attempting to develop a richer reverse logistics customer base.

## 6. Conclusion

Reverse logistics has become an important segment in the Indian economy. Increasingly, customers are demanding resolution for products that are considered to be defective. They are returning items more frequently as companies are driven to loosen return policies due to competition. Many of these companies having items returned to them will not be able to afford the resources necessary to effectively handle the processes required for appropriately handling increasing volumes of returned goods. The Indian 3PL market is set to grow tremendously in the next 5-7 years, spearheading the growth of logistics market.

The need for third-party companies providing partial or full reverse logistics services for companies receiving returned goods will increase as policies affecting returned products continues to favor the customer. Unfortunately, many third-party companies desiring to enter the reverse logistics service market are not prepared to effectively address these service needs due to the lack of knowledge of reverse logistics [1]. They are either not capable or unsure of the process of entering the reverse logistics market. All of these third-party companies would benefit from a framework for decision making to determine if entry into this market is feasible for them. In this study we investigated and summarized the current status of reverse logistics. We then developed a reverse logistics decision-making model. We also conducted a field study using the reverse logistics decision-making model to evaluate its use by a third-party logistics company considering expanding its reverse logistics business. The model helped the third-party logistics company in making the decision to more aggressively enter the reverse logistics business or to decline. The model provided structure to the decision and gave the company the guidance needed for such a decision. Based on the results of the field study conducted, the model proposed will guide third-party providers through the process of deciding if they should enter the logistics market. If they decide to

enter, they should gain enough pertinent information to provide a sound basis for decisions related to the depth of their involvement. Those companies who decide not to enter after following the model should also have gained enough information to help them decide to take a "do nothing" stance. Naturally, these third-party logistics companies should continue to evaluate the market, their customers, and the competitors and their customers to determine if their status has changed.

## 7.Future research

Future research should be performed to further validate the reverse logistics decision-making model. A field study using the model provided invaluable information for the company involved. However, additional field studies would provide further evidence of the models value.

## REFERENCES

- [1] J.S. Dowlatshahi S. Developing a theory of reverse logistics. *Interfaces* 2000;30(3):143-55.
- [2] Viswanadham N. and Roshan Gaonkar, "Leveraging Logistics To Enhance Indian Economic Competitiveness", CII Logistics 2003 Theme paper.
- [3] Cottrill K. Return to sender. *TraNc World* 2000;262(7): 17-8.
- [4] Andel T. Reverse logistics: a second chance to profit. *Transportation and Distribution* 1997;38(7):61-3.
- [5] Klausner M, Hendrickson CT. Reverse-logistics strategy for product take-back. *Interfaces* 2000;30(3):156-65.
- [6] Discount Store News. Outsourcing: reverse logistics push into high gear (March 22) 1999;38(6):8-10.
- [7] Gooley TB. Reverse logistics: Ove steps to success. *Logistics Management and Distribution Report* 1998;37(6):49-55.
- [8] Subrata Mitra, The 2008 Survey of Indian Third-Party Logistics (3PL) Service Providers: Comparisons with the 2004 Survey of Indian 3PLs and 2006 Survey of North American 3PLs WPS No. 633/ February 2009.
- [9] R. Bhatnagar, A.S. Sohal and R. Millen, "Third party logistics services: a Singapore perspective," *International Journal of Physical Distribution & Logistics Management*, vol. 29 No. 9, pp. 569-587, 1999
- [10] Simpson JA, Weiner ESC. *The Oxford English dictionary*. Oxford: Clarendon Press, 1989. p. 1111-2.
- [11] E. Luttwak . *A dictionary of modern war*. New York: Harper & Row, 1971.
- [12] Langley Jr., C.J.(2007), "Third party logistics study: results and findings of the 12th annual study", Georgia Institute of Technology, Atlanta, GA
- [13] Cox III JF, Blackstone Jr. JH, Spencer MS, editors. *Dictionary*, 9th ed. Falls Church, VA: The APICS Educational and Research Foundation, 1998. p. 51.
- [14] Council of Logistics Management (CLM). *What it's all about*. Oak Brook, IL: Council of Logistics Management, 1998. p. 4-6.
- [15] Buxbaum P. The reverse logistics Oles. *Inbound Logistics* (September) 1998;64-7.
- [16] S.G. Deshmukh, and RP. Mohanty, . (2004). *.Re-engineering of Supply Chain: Lessons from Select Case Studies.*, In Sahay, B.S. (ed.), *Supply Chain Management for Global Competitiveness*, 2nd edition, Macmillan, New Delhi, pp. 509-526.
- [17] DS Rogers, RS Tibben-Lembke. *Going backwards: reverse logistics trends and practices*. The University of Nevada, Reno, Center for Logistics Management, Reverse Logistics Council, 1998.

- [18] RR Lummus, DW Krumwiede, RJ Vokurka. The relationship of logistics to supply chain management: developing a common industry definition. *Industrial Management and Data Systems* 2001;101(8):426-31.
- [19] T,Minahan. Manufacturers take aim at end of the supply chain. *Purchasing* 1998;124(6):111-2.
- [20] B Caldwell. Reverse logistics. *Information Week* 1999;4(729):48-56.
- [21] Rosen C. Ready for returns? *Information week* (January 8) 2001;819:22-4.