



Review

A literature review and perspectives in reverse logistics



Saurabh Agrawal*, Rajesh K. Singh, Qasim Murtaza

Mechanical, Production & Industrial Engineering Department, Delhi Technological University, Delhi 110042, India

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ABSTRACT

In recent years, reverse logistics (RL) has become a field of importance for all organizations due to growing environmental concerns, legislation, corporate social responsibility and sustainable competitiveness. RL refers to the sequence of activities required to collect the used product from the customers for the purpose of either reuse or repair or re-manufacture or recycle or dispose of it. Perusal of the literature shows that research in the field of RL is in evolving phase and issues pertaining to adoption and implementation, forecasting product returns, outsourcing, RL networks from secondary market perspective, and disposition decisions have not been reviewed extensively. This study attempts to fill the existing gap through literature review on these issues, and outline the future directions for research based on research gap analysis. Total 242 published articles were selected, categorized, analyzed, and gaps in literature were identified to suggest for future research opportunities. The review may be useful for academicians, researchers and practitioners for better understanding of RL and guidance for future research.

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* Corresponding author. Tel.: +91 9911924907.

E-mail addresses: agrawals.iit@gmail.com (S. Agrawal), rks.dce@yahoo.com (R.K. Singh), qasimmurtaza@gmail.com (Q. Murtaza).

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1. Introduction

The research on RL has evolved over the years and authors have defined RL in different ways. Earliest definition of RL was found to be given by [Murphy and Poist \(1989\)](#) mentioning about the reverse flow of goods. Later on [Carter and Ellram \(1998\)](#) introduced the term “environment” in the definition of RL. [Rogers and Tibben-Lembke \(1999\)](#) stressed on the purpose of the RL and established the most widely accepted definition as “*RL 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*”. [Stock \(1998\)](#), [Dowlatshahi \(2000\)](#) and [Srivastava \(2008\)](#) have also defined RL from different perspectives. Definition of RL has been changing over time and widening its scope with the interest of researchers.

Researchers and practitioners have consistently given attention to the forward supply chains and ignored the reverse flow of supply chains ([Bernon and Cullen, 2007](#)). The scope for the forward supply chain has been extended to include the reverse flow of products from the point of consumption back to the source ([Rogers and Tibben-Lembke, 2001](#)). RL has recently received growing importance and more firms are adopting it as a strategic tool for economic benefits and corporate social image ([Kannan et al., 2012a](#)). Firms have also realized that a better understanding of product returns and efficient RL can provide a competitive advantage ([Stock and Mulki, 2009](#)). Although many industries have realized that RL is a necessity for sustainable competitiveness, there is a lack of agreement on timing of adaptation and implementation of RL system ([Richey et al., 2004](#)). RL has been beneficial to some of the organizations like General Motors, Canon, Dell, and Hewlett-Packard. [Jayaraman and Luo \(2007\)](#) have mentioned that Kodak is able to reuse up to eighty percent of the used camera’s parts. [Wu and Cheng \(2006\)](#) investigated the possible advantages of RL implementation in the publishing industry. [Kumar and Craig \(2007\)](#) studied computer assembly line of Dell. [Lau and Wang \(2009\)](#) studied the electronics industry in China and explored the problems encountered in RL implementation. [Subramanian et al. \(2014\)](#) worked on end of life products in the Chinese manufacturing sector. [Jayaraman et al. \(2003\)](#) discussed RL systems for recycling and reuse of beverage containers. Studies on reverse logistics implementation have been done in many sectors such as carpet industry by [Biehl et al. \(2007\)](#), retail industry by [Bernon et al. \(2011\)](#), bottling sector by [González-Torre et al. \(2004\)](#), paper industry by [Ravi and Shankar \(2006\)](#), packaging firms by [González-Torre and Adenso-Díaz \(2006\)](#), cell phone industry by [Rathore et al. \(2011\)](#), pharmaceuticals industry by [Narayana et al. \(2014\)](#), and battery recycling by [Wang et al. \(2014\)](#).

Literatures on RL have been reviewed by many researchers in the past. [Fleischmann et al. \(1997\)](#) studied RL from the perspectives of distribution planning, inventory management and production planning. [Carter and Ellram \(1998\)](#) focused on the environmental aspects of transportation, packaging and purchasing. [Dowlatshahi \(2000\)](#) developed a theory of RL successful implementation considering various strategic and operational factors. [Prahinski and Kocabasoglu \(2006\)](#) identified ten research propositions to

analyze current practices, critical issues, and managerial techniques. [Fleischmann et al. \(2000\)](#), [Akçali et al. \(2009\)](#), [Chanintrakul et al. \(2009\)](#), [Sheriff et al. \(2012\)](#) reviewed the literature on RL network design issues. These reviews provide insight to the RL previous research on various issues. However, it was observed that issues like adoption and implementation, forecasting product returns, outsourcing, RL networks from secondary market perspectives, and disposition decisions are not covered in depth. For example, [Govindan et al. \(2015\)](#) reviewed 382 articles covering whole area of RL providing in depth insight from different perspectives but reviewed very few articles on forecasting product returns and outsourcing. Adoption and implementation as well as disposition decisions are not dealt. [Pokharel and Mutha \(2009\)](#) reviewed 164 articles on important RL features such as product acquisition, pricing, collection of used products, RL network structure vis-à-vis the integration of manufacturing, and remanufacturing facilities of location of facilities for inspection and consolidation activity. However, select issues for the proposed study are not reviewed in this article also. [Krapp et al. \(2013a\)](#) observed that there are very few reviews focusing on the issue of forecasting product returns. [Rogers et al. \(2012\)](#) and [Hall et al. \(2013\)](#) stated that disposition is one of the major RL issues and need more attention. [Rogers et al. \(2012\)](#) also stated that there is an acute need for exploring the secondary market networks given the size and profitability potential of this market. [De Brito and Dekker \(2002\)](#), [Linton et al. \(2007\)](#), [Meade et al. \(2007\)](#), [Rubio et al. \(2008\)](#), [Lambert et al. \(2011\)](#) reviewed published literature on various aspects of RL but select issues are either under-represented or not reviewed in their articles. The proposed article aims at filling these gaps in literature by reviewing these issues and finding research gaps for identifying future scope of research.

This study makes an attempt to present a comprehensive review of the published literature on these RL issues. Subsequently, study analyzed the research gaps in the literature to facilitate further study, and research directions. Remaining part of the study is organized as follows: Section 2 defines the basic RL processes. Research methodology is presented in Section 3. In Section 4, detailed discussions on specified classifications are undertaken. Section 5 discusses and critically analyzes research gaps, and the study is summarized in Section 6 by offering conclusions along with its limitations.

2. RL processes

RL processes have been explained by many authors in different perspectives. Based on the work carried out by [Rogers and Tibben-Lembke \(1999\)](#), [Fleischmann et al. \(2000\)](#), [Fleischmann \(2001\)](#) as well as [Guide and Wassenhove \(2003\)](#), different key processes of RL have been identified and are shown in [Fig. 1](#). The used or returned products are collected after their acquisition and are inspected for sorting into the different categories. The next step is to dispose them for repair, remanufacturing, recycling, reuse or final disposal depending on the decision taken to either recapture value or dispose of it. The key processes are identified as product acquisition, collection, inspection/sorting, and disposition are described in the following section.

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