

# Preface

The evolution of Reverse Logistics (RL) has been remarkable lately. In the last decades, not only in academia, but also in the world of businesses, RL has started to bloom. More specifically, in the manufacturing sector the fact that companies get increasingly involved in RL should be attributed mainly to (i) environmental concerns and the pursuit of sustainability, (ii) the implementation of legislation that dictates the production and sale of environmentally friendly products, and (iii) the fact that companies become progressively aware of the profitability of the various reuse activities.

However, the RL level of organization should rise much further. For example, RL activities are vulnerable in various types of information inaccuracies, such as the uncertainty with respect to timing, quantity, and quality of product returns. So far, the research community has made significant efforts and progress to reduce the impact of these uncertainties. However, there is still a long way to go.

Focusing particularly on the quality level of returns, one can intuitively expect that the significant growth of Quality Management (QM) in “conventional” production processes as well as the impressive amount of knowledge that has been accumulated since the appearance of the first quality Gurus, could—but most importantly should—be exploited in the world of RL as well. Statistical Quality Control, QM Systems, Total Quality Management techniques, Quality tools are only some of the methods that are expected to be exploited in RL, in the near future.

In this book we deal with various quality issues in an attempt to recognize areas where the existing knowledge on QM could be implemented—perhaps appropriately modified—in RL. Moreover, we discuss more extensively than ever the role of QM in RL and examine broadly the interaction of various QM issues with the design and processes of Closed-Loop Supply Chains (CLSCs).

The introductory chapter presents the state-of-the-art regarding the relationship and interaction between the research areas of QM and RL. More specifically, a literature review identifies the most important research articles that probe the impact of quality issues on RL.

Quality uncertainty of returned products is the main source of uncertainty and, consequently, a major determinant of creating value in CLSCs. However, there is a gap in literature regarding the identification of all quality dimensions and the ways they affect CLSC processes. Therefore, the main contribution of Corbacioglu and van der Laan is the construction of a quality framework that detects the dimensions of quality in CLSCs, defines these dimensions explicitly, and links them to various CLSC processes. Hence, the developed framework enables the analysis of CLSCs through a quality point of view and the finding of new ways of value creation.

In a chapter devoted to the contribution of standardization on RL, Pirlet first explains the main characteristics of standardization in order to specify the existing standardization bodies and the alternative standardization deliverables. Then, some important challenges in RL are analyzed and the possible structures for developing new standards are presented. A framework which can improve the efficiency in the management of RL is finally developed.

The [Chap. 4](#) by Nikolaou and Evangelinos is dedicated to the presentation of a new methodological and conceptual framework, which consists of a set of indicators. The latter permits companies and other stakeholders to measure the social responsibility quality and performance of their RL activities. The suggested framework is based on the Triple Bottom Line approach and, more specifically, on the Global Reporting Initiative guidelines. Moreover, it helps to overcome the limitations of all the existing models, by evaluating the overall social responsibility performance and not only by designing a strategic and decision support mathematical system.

Sroufe finds out that there is lack of information in literature on the role of small demanufacturers within recycling systems and on the way these entities leverage Quality Assurance (QA) standards and certifications. Consequently, a primary objective of his chapter is to enhance the understanding of how small companies overcome emerging challenges as well as take advantage of opportunities appearing in CLSCs that focus on recycling of consumer electronics and IT assets. Moreover, conducting a field study, the author sheds new light on how QA has evolved through the use of existing ISO standards and new certifications to meet the needs of RL and recycling systems.

Emerging information technologies, such as sensors and radio-frequency identification (RFID) tags, are discussed by Ondemir and Gupta in [Chap. 6](#). They argue that recovery decisions can be made more effectively for end-of-life products equipped with embedded sensors. The information collected and provided by these devices enables the accurate identification of the end-of-life products' quality, so that disassembly, recycling, and remanufacturing operations can be carried out in a more effective way. The authors provide an integer programming model which determines the minimum cost solution to process each and every end-of-life product on hand.

An RFID integrated QM system for a RL network is presented in the next-to-last chapter by Awasthi and Chauhan. The proposed tool integrates data collection, analytical processing, quality monitoring, and recommendations generation.

They also provide a numerical case study to demonstrate the application of the proposed product quality monitoring tool.

Finally, in the last chapter Denizhan and Konuk investigate the causes of damages in a Third-party Logistics provider and propose a framework which permits the accurate classification of damages. Overall, damages that occur in forward logistics processes constitute a significant reason why products enter the RL stream. The specific system of classifying and categorizing cases of damage enables the discovery of patterns and correlations in the incidents of damage which can be used to determine appropriate prevention actions. Consequently, it helps to manage and reduce potential damages both in forward supply chains and in CLSCs.

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