

Reverse Logistics and Market-Driven Management*

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Abstract

The reverse logistics applies to the flow of products and materials in the opposite direction to direct logistics, from the market to the production sites or the specialised centres, where they are sent to be appropriately treated.

The growing attention to reverse logistics is explained primarily by the need to comply with regulations on environmental protection, Given the intensified competition caused by rising costs of energy and raw materials, the truly market-driven companies cannot consider the residual value as solely residual anymore.

In global competition, the management of the products rejected by the market, previously considered a costly activity, that companies had to deal with to avoid negative consequences for the management, is now presenting unexpected opportunities.

Keywords: Global Markets; Market-Driven Management; Logistics; Reverse Logistics; Direct Supply Chain; Reverse Supply Chain; Closed-Loop Supply

1. Introduction

Among the research streams recently born in logistics studies, the most theoretically promising appears to be the one that treats ‘reverse logistics’ (RL hereafter), a topic that is also crucially important to management.

While the term direct logistics refers to all the activities that regulate both the physical flow of raw materials and finished products and the intangible flow of information associated with goods in transit, towards the end market, the reverse logistics applies to the flow of products and materials in the opposite direction, from the market to the production sites or the specialised centres, where they are sent to be appropriately treated.

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The growing attention to RL is explained primarily by the need to comply with regulations on environmental protection, which in many industries imply the producer's responsibility for the sold goods, even after the sale transaction, and in particular when the products' life cycle is over.

Another explanation of the interest for RL is the concern of some companies for their image in front of the growing number of those customers who in their purchase decisions evaluate not only the product's performance, quality, or price, but also the company's respect for the environment demonstrated by environmentally friendly initiatives, such as the use of recycled raw materials in the production process, or the design of such products and packaging that ensure that waste disposal problem is not further intensified.

However, the goal of this work is to highlight how the attitude of firms towards RL is not necessarily the result of a reactive behaviour, adopted to avoid administrative penalties or the risk of image damage and the consequent market share decline. On the contrary, the attention to RL may be a deliberate conduct of the company with the objective to appropriate the residual value of the consumed, broken or obsolete products and waste in general. Given the intensified competition caused by rising costs of energy and raw materials and the *chain* effects of the recent speculations that shook the fundamentals of the world economy, the *truly market-driven companies cannot consider the residual value as solely residual anymore*.

This paper, after a brief introduction that highlights the position of the RL in the evolution process of logistics, treats the meaning and the strategic and operational implications of this activity.

The conclusion includes a discussion of implications for the management of market-driven corporations.

2. Extending the Operational Content and the Strategic Boundaries of Logistics

A long time has passed since Kotler (1972) in the introduction to the Chapter 16 of one of the first editions of his famous handbook, reported an excerpt of an article from *Business Week* in which logistics, at that time considered synonym to *physical distribution*, was qualified as the last frontier of the struggle for management efficiency. It was also noted that, contrary to what were the more consolidated business functions (production, organisation, finance and marketing), in logistics there were still considerable margins for improvement both in regard of the technical-productive side, and the economy side. This would, therefore, be the field where companies would in future fight the decisive battle for the construction of the truly differentiated and permanent competitive advantage.

Since then, a process of intensive modernisation of logistics took place, which has been characterised, among others, by progressive enlargement of its operational boundaries.

In fact, the original focus of logistics was *in-house* and its first priority were the activities that ensured the availability of production processes input, primarily for those processes that consisted of multiple phases and therefore needed careful

temporal and spatial co-ordination among production departments and facilities. This perspective attributed the utmost importance to *inbound logistics*¹ and thus the attention of management was directed towards the inside of the company on the one hand, ensuring the smooth running of the production process, and towards the outside on the other hand, selecting and contracting the right suppliers. The main, and often only, objective was to guarantee the supply continuity and regularity, acquiring the necessary factors of production (raw materials, parts, components, etc.) with the most advantageous conditions for the buyer, that were often achieved thanks to their greater bargaining power.

As a result of the evolution of the competitive landscape that we do not want to discuss here any further, the manufacturing firms have recognized that the relationship of severe tension with suppliers, typical of conventional negotiating approach, that brought temporary economic benefits, in the medium term determined conditions of inefficiency in many sections of the buyer company².

A thorough reflection on the successful business models has led assembly companies to recognise first, the strategic importance of suppliers and second, the importance of basing the relationships that lie at the basis of the processes of labour division among firms, on mutual trust and a just sharing of objectives and results.

The onset of this new climate in relations between buyers and suppliers has encouraged the process of widening the boundaries of logistics operations.

The achievement of relations of true partnership with supplier companies willing to share detailed information, knowledge and skills has naturally led to a different interpretation of production cycle, recognising that the final output is the outcome of a much wider and articulated process, shared by a number of different actors who participate with equal worthiness (although obviously with different roles). This has led to the affirmation of the concept of supply chain as a group of economic actors (suppliers, production or processing corporations, warehouses, distribution centers, logistics operators, etc.) that, having signed operational agreements and accepted the commitment to pursue a common strategy, create products or services with better results than they would have achieved operating independently on the market.

The concept of *supply chain* originated, therefore, as an expansion of logistics outside the confines of a single production unit. The traditional logistics, as noted in the beginning of the paragraph, dealt primarily with the optimisation of flows inside the firm; its institutional boundaries were limited to activities related to transferring, handling, storage of materials and stock management.

The supply chain revolution of the 90s has helped, however, to change this *air-tight-compartment* attitude, making companies aware that the best practices require the integration of the operational activities performed by the other actors of the *same chain*. The production process, therefore, is no longer confined within the plant as required by the Fordist managerial models, but is extended upstream and downstream of the factory, involving a number of supplier and sub-supplier companies.

The affirmation of a new logic of production processes has provided further impetus to expand the boundaries of logistics, involving mainly the downstream stretch of the chain, which regards mainly companies that enable products to be purchased by the final customer.

The renewed attention for the logistics of distribution and the recognition of its strategic importance attributable to the direct contact with (and control of) the final market it ensures, seemed to have definitely closed the circle of the supply chain, leading to the affirmation of *supply chain management* (SCM), according to which the integration inside the company is not sufficient and it is necessary to efficiently connect suppliers, manufacturers, distributors and retail outlets. The SCM focuses, therefore, on the development of relationships and the promotion of business activities that can generate greater value for consumers (Lambert *et al.*, 1993) and for the corporation, in a way that this value is composed of contributions from each stage of the supply chain (Christopher, 1998)³.

Furthermore, the SCM presumes even further extension of its sphere of influence, dictating not only strategic and operational collaboration with suppliers but also with clients, in order to achieve the lowest total cost, as also specified in the model of extended corporation, according to which the capacity of governance of the relationships between the actors of the supply chain assumes a decisive importance.

The famous *five rights*⁴ (Gecowets, 1979) find fulfilment in the new organisational forms which cross transversally the supply chain: upstream, at level, and downstream the manufacturing company.

Yet, in the recent years, the belief that the SCM approach represented the squaring of the circle for all logistical issues and that with it the impetus for expanding the boundaries of logistics was finally exhausted, registered some cracks. Over the last years, the importance of already present, but underestimated, movements in the traditional logistics circuits, has emerged with growing evidence.

Indeed, even in the past there was a felt need to employ the supply chain management in an opposite direction, in order to simplify the procedures for the products return and make them faster and less costly. Such needs, in fact, can occur along any tract of the chain.

Manufacturing corporations, for example, may need to return materials, defective components, or elements not corresponding to what was ordered to their suppliers. Consumers may present the same need when returning products claiming a refund of the purchase price or a replacement or repair of goods still under warranty, or when responding to the producer's call for defective products' return.

In the past, however, as the examples mentioned above show, the need to go back up the supply chain was associated with incidents or consequences of accidents, malfunctions or errors that occasionally disturb the smooth running of the logistics cycle. In practice, moving upstream the supply chain was an emergency or an element of further complication that the management would have gladly done without⁵, and it certainly was not considered either a potential source of value, or an area in which to find items relevant to the construction of competitive advantage.

3. The Reverse Logistics: Definition and Implications

The term reverse logistics, which has become only recently part of the current managerial/academic vocabulary⁶, is a process by which a manufacturing company

governs the return of its products, parts and materials from the consumption sites, in order to reuse them, recover their residual value, or to dispose of them⁷.

It is, therefore, an activity of logistics, since it governs the tangible and intangible flows from the market to the production site, and it is reverse, because, in practice, it can be seen as a distribution channel operating on the contrary, where the freight route goes in the opposite direction than normal, that would imply a downstream movement from the sub-contractors towards the consumers.

The circumstances that give rise to a reverse flow are numerous, as are the types of handled materials: (1) products returned by buyers because defective or because malfunctioned within 7 days from the date of purchase⁸, or because the customer has changed his/her mind or did not remain satisfied after having tried the product⁹, (2) products returned by intermediate buyers (retailers) because defective or not corresponding to the order, (3) products recalled by the manufacturer to the factory, after a discovery of technical problems or defects, in order to perform the necessary operations on the products to restore their full functionality and security, (4) excessive stock in warehouses that have exhausted the available space and are not able to receive additional products (overstock), (5) return of special packaging or containers after the product has been delivered or installed and, finally, (6) products sent to the factory to be subjected to planned maintenance or development¹⁰.

According to this first signification¹¹, *the primary purpose of RL is to create the technical and operational conditions necessary for the efficient (for all interested companies) return of the products to the factory*, so that the components and materials of the products that for one reason or another have been rejected by the market, can be recovered and reused.

In the past, most corporations were almost exasperated by the necessity to manage the reversed flow, not only because such activity does not generate any profit but, on the contrary, the returns' recovery and transportation and especially operations of waste disposal were cumbersome and often problematic (especially when it came to managing special waste, characterised by the presence of substances harmful to humans and the environment).

Today, however, firms are confronted with laws less and less tolerant to those who do not respect the environment (Lambert and Stock, 1993, p. 75). The motivation of these rules is to assign further responsibility to companies for the manufactured products; in practice, the companies are required to assess the consequences of the 'life-long' presence of their products on the market: from the raw materials to the final disposal.

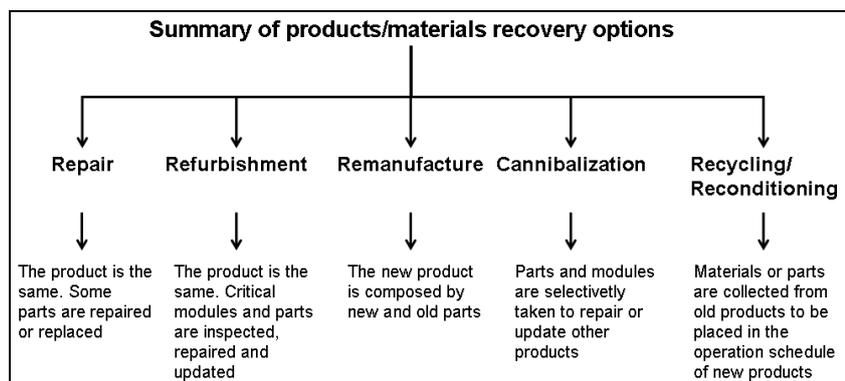
On the other hand, however, there is an emerging awareness that the reverse logistics flows do not simply move the waste, but also goods that still have a residual value that the company has (and will increasingly have in the future) interest to recover.

This new attitude has contributed to the assertion of another interpretation of RL in the scientific literature and among practitioners, that combines the traditional one, centred, as stressed at the beginning of the paragraph, on the logistical aspects, especially the activities of returns' transportation, with a second component, that focuses on how to recover the value present in the reverse flow of products and/or materials.

Thierry *et al.* (1995) defines *Product Recovery Management* (PRM hereafter) as all the operations executed on used, malfunctioned or consumed goods and, in general, on all the materials of which the manufacturing company is considered to be legally or contractually responsible.

The objective of the PRM is to recover as much of the items' ecological and economic value as possible, and it takes on the concrete form of the choice of the most adapt recovery mode, depending on the type of goods, its conditions and the market's demand for similar goods that use the same components or are made with the same raw materials (Figure 1).

Figure 1: *The Recovery Options in the Reversed Flows*



First, the product returned to the factory can be repaired, in other words, returned to its original state, replacing broken or worn parts. The result of the intervention is a product as good as new, similar to the original.

Secondly, the property may be subjected to a procedure of restoration or refurbishing, which, after careful verification, involve the replacement of some of its parts and modules, including upgrading the key components to the latest technology in cases where this is possible and economically justified. The result of this procedure is a new improved product that often exceeds the quality standards and performance of the original one.

Thirdly, the product may be remanufactured. This intervention involves the test of functionality of all the modules and, also in this case, the update to the latest version. The result of the intervention consists in a new product composed of some used parts or components. In the case of materials, this treatment is called regeneration. The recyclable materials (glass, paper, PET, rubber tires, etc.) are sent to specialised centres where they are catalogued and where the flows are selected. After the treatment, the regenerated material is ready to be re-inserted in a direct logistics chain.

The product can also be disassembled through the process of *cannibalisation*¹² that consists in a deconstruction (usually of a appliance or a machinery) and the selective recovery of spare parts or parts usable to repair or upgrade similar models or to obtain raw materials.

Finally, the last option implies the recycling of the materials that make up the items. The recycled products are reduced to collections of materials and subjected to cleaning processes. The high quality materials are used to fabricate the original

components, the standard materials to manufacture products of medium and low quality.

The non-recoverable products are disposed of without any further process of value recovery, by means of incineration or landfill.

In the context of RL, burning and disposal are two of the possible destinations of returns; however, *they cannot be considered as options for value recovery, because the end result of these processes is that the removal of the product from the SC of its original belonging.*

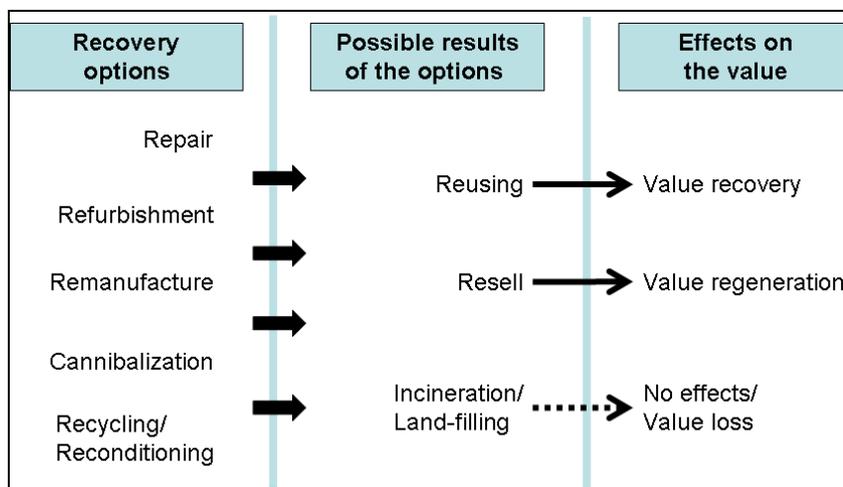
Ultimately, the final outcome of the goods or materials' opposite direction movement through the supply chain may be: reuse, resale or disposal (Figure 2).

Assets eligible to be re-used are re-inserted into the production process and distributed back to the market. An example of reusable assets is represented by refillable containers, for example: metal barrels for beer served on tap, refundable bottles and the toner cartridges for printers.

The circuit of resale, on the other hand, comprises items returned to the store by customers, items in excess of the order made by the retailer (to the wholesaler), or returned in late-season because unsold. These products, after having been checked, cleaned and re-packaged, are sent to the same retailers from which they had been shipped, or are directed to an alternative distribution channel¹³.

This area includes perfectly intact and functioning durables, which, due to the phenomenon of technological ageing, can no longer be sold on the market because obsolete, but can be, once recovered and directed towards less developed countries, still of value to businesses and consumers.

Figure 2: Options for Recovery and Implications for the Value of Returns



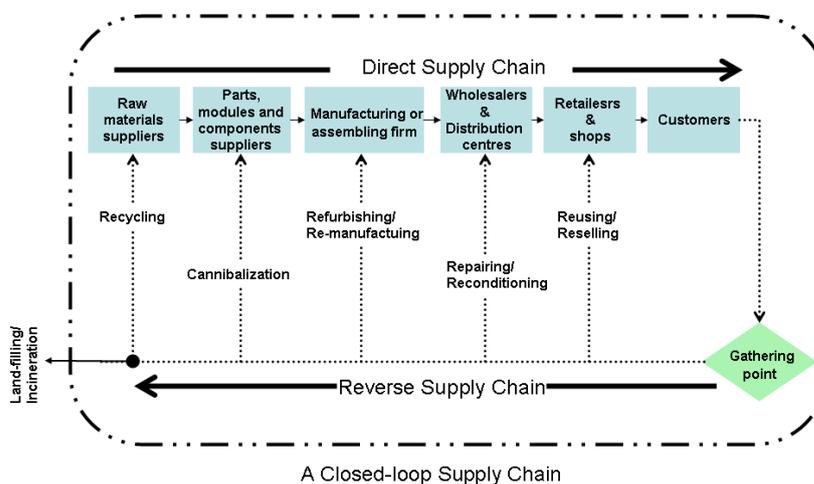
4. Direct Supply Chain, Reverse Supply Chain and Closed-Loop Supply Chain: What Are the Implications for Market-Driven Businesses?

The set of economic operators, infrastructures, services and processes that the material encounters along the path that leads up to the final consumer is called direct supply chain.

When, however, for the reasons mentioned above, a good performs a similar path but in the opposite direction, such movement upstream through a reverse supply chain is often identified with the concept of RL (Tibben-Lembke and Rogers, 2002).

The closed-loop supply chain arises from the integration of activities from direct and reverse chains. This type of chain, as will be explained further in this paragraph, is a new and particularly relevant issue of environmental sustainability and has begun to attract interest both from the industry and the scholars. This interest is motivated by the difficulties that companies face in adapting to the environmental regulations, but also by the interest to seize the opportunities that may arise from a more attentive and organised waste management (Figure 3).

Figure 3: *Direct, Reverse and Closed-Loop Supply chain*



In recent years, both in Europe and the USA, the products returned from the market have gone from a limited quantity of goods of high unit value, to a huge volume of low-value articles (Visich *et al.*, 2007).

This phenomenon is explained first, by the dramatic reduction of the length of the products' life cycles registered in various product categories, and second, by the behaviour of many companies - especially those engaged in manufacturing convenience goods - which have introduced very favorable conditions for the refund to consumers as a strategy for customer retention or image improvement.

The growing numbers of returns have increased costs for manufacturing firms forcing them to think about how to create more efficient and less costly systems to manage these returns. Moreover, as noted above, the recovered parts and materials can often be used to reduce production costs and provide a convenient source of components and re-usable materials (Toffel, 2004). Therefore, as a result of the acknowledgement of the benefits that might result from the integration of the direct and inverse chains businesses, *the development of efficient and effective closed-loop supply chain strategies has become an area of major concern and reflection.*

The representation of the *closed-loop supply chain* (Figure 3) presents the essential characteristics: the supply chain actors, the place of collection and the options of value recovery which close the circuit.

Consumer goods are usually purchased at retail level, but today alternative sale methods are available: catalogue, call centre or Internet; similarly, capital assets - such as machinery or measuring equipment - can be purchased directly from the manufacturer, outside the traditional distribution channel. Therefore, since not all products are or may be returned to the store where they were purchased, the place of collection in Figure 3 does not coincide with the place of sale.

Examples in this regard include centres for product recycling, where consumers themselves transport the goods, waste recovery on call and deposits of motor vehicles destruction.

In the place of collection, the returned product is identified to determine its most appropriate destination. The correct allocation of the product in the recovery circuit affects the level of the recovered value, the environmental impact of the treatment and the volume of not-recoverable materials that must be processed.

Market-driven companies recognize the key role of intangible factors, including logistics, and the intangible assets (particularly the corporate culture and the brand heritage). The latter two, in particular, are the catalysts that enable the survival of businesses in hyper-competitive contexts with permanently excessive supply, where the production systematically exceeds the absorption capacity of the market and where the products, as sophisticated as they may be, become quickly obsolete because of the easy imitation.

Today, many markets present excessive supply as a structural element in the development of corporations, which use the overproduction of goods as a competitive factor, offering their products in a wide variety of alternatives to satisfy the more and more sophisticated consumer needs. While globalization and excessive supply require the use of a new philosophy of management based on customer value management (Brondoni, 2007), the resulting excess of production determines rising levels of pollution, contributes to the consumption of natural resources and therefore points to the need to confront the issue of respect for the environment.

From a competitive point of view, market-driven management offers a systematic and direct comparison with competitors in global markets, where it is necessary not only to innovate continuously in order to satisfy changing and unstable demand, but also to develop new measures of evaluation at the corporate level, mostly of intangible nature, that can significantly influence the performance of the business.

In this sense, considering the above mentioned changes in the criteria underlying the purchasing behaviour of a growing portion of consumers, the attention to the environment may be an important competitive lever.

In particular, the cultural dimension that characterizes the market-driven orientation is permeated by values and standards of conduct consistent with the complexity and transparency of the global markets. This, then, forms another point of attention, because the logic of corporate responsibility is combined with the recent environmentalist patterns of conduct.

Over the last years and due to the heightened competitive pressure, many distributors and manufacturers have greatly simplified the conditions for the return of the goods. Businesses, in fact, are aware that a satisfied consumer is their main asset and that a significant component of that satisfaction, especially in the

convenience goods markets, is constituted by the possibility to return the products that for various reasons are not desired.

The recovery or restoration of products can also be part of a corporate image (re)construction or be used to improve the relationship with a particular customer or supplier.

As mentioned earlier, in many countries the extension of the producer's responsibility has become a key element of public policy in the field of environment. In connection with this trend, manufacturers operating in specific industry sectors (primarily in consumer electronics) are required to withdraw or to reinstate their products after they had been used, in order to reduce the volume of waste requiring disposal. The withdrawal of the used products and their restoration is an important element to highlight the company's commitment to the environment.

Some companies use the opportunities offered by RL to communicate their social commitment, and these activities help to improve the corporate image of the firm and increase market share. In the U.S., Hanna Anderson, distributor of clothing for young children, has developed a program called 'Hannadowns' (www.hannaanderson.com), in the customers are asked to send used clothing to the company that then provides for its distribution in schools, centers for the homeless and voluntary associations. The company offers a 20% discount off the price of the new clothes to the customers who join the initiative.

5. Conclusions

In all industrialised countries, the efforts to reconcile environmental objectives with economic growth is a no longer avoidable challenge. Many governments, corporations and a growing number of citizens have started to invest economic resources, as well as free time and energy, to the so-called environmental issue.

RL, the process of goods transfer from their final destination effectuated to recover its residual value or to proceed to the proper disposal, is increasingly attracting companies' interest. The reason for this growing interest can be seen in the significant increase of the returns volume and the increasing appreciation of the potential recovery of resources that otherwise would be lost with negative consequences for the businesses and the environment.

Despite all that, the management of the returns is still a relatively neglected (Norek, 2002) part of the logistic circuit. This work has shown that *the RL is not the 'downside' cost of logistics* (Stock, Speha and Shear, 2002, p. 16), *but, on the contrary, a new opportunity that businesses may use to create their competitive advantage, reduce costs and improve customer satisfaction.*

The management of the products rejected by the market, previously considered a costly manifestation of pathological processes involved in production and distribution, that companies had to deal with to avoid negative consequences for the management, is now presenting unexpected opportunities. Thanks to the optimisation of reversed flow controls, companies have a new source for value creation that can result in tangible and intangible benefits.

As for the tangible benefits, through RL, companies can significantly reduce production costs thanks to the possibility to reduce supply costs either by recovering components, parts and materials for reuse, and by reducing the use of 'new' raw materials to the use of the 'recovered'.

In terms of intangible benefits, on the other hand, companies can benefit from important positive effects on the corporate image, because an efficient RL program can serve as a witness of the company's interest for the environment. Moreover, as the recent scandal of the toxic paint in Mattel toys manufactured in China has demonstrated, in case of serious accidents, the ability to promptly withdraw defective products or products dangerous for the consumer from the market may reduce, at least in part, the negative consequences of such incidents.

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Notes

¹ The *inbound logistics* includes activities associated with the receipt, storage and handling of raw materials. Managerial decisions in this area concern the consolidation of loads, the choice of transportation modalities and carriers, material handling and warehousing.

² The conditions of inefficiency or *sub-optimality* include, among others, the problems of low quality, a consequence of poor or inadequate supplies, and poor motivation of suppliers to share specific skills and experience with the buyer to improve and innovate the components of the product assembled by the purchaser.

³ According to this perspective, logistics as '*that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements*' (www.cscmp.org) is an activity that is involved in the value creation process. The possibility to have within the corporation or to control (through outsourcing) certain logistical capacities is fundamental for the creation of competitive advantage.

⁴ Gecowets (1979, p. 5), in fact, highlights '*... neither would be possible without getting the right items needed for consumption or production to the right place at the right time and in the right condition at the right cost.*'

⁵ In the beginning, to go back through the supply chain '*... has been described as going the wrong way on a one-way street*' (Daugherty, Richey *et al.*, 2003, p. 49) and this attitude clearly shows a suspicious attitude towards this possibility.

⁶ Dowlatshahi (2000, p. 145) notes that until the early 2000s '*... reverse logistics is a fairly new concept in logistics and supply-chain management. Most articles on reverse logistics are in practitioner-related journals, rather than academic journals.*'

⁷ Among the most reliable definitions in the literature is that suggested by Rogers and Tibben-Lembke '*... the process of planning, implementing and controlling the efficient flow of 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.*' (Rogers and Tibben-Lembke, 2001).

⁸ The clause of the refund within 7 days, widespread especially in stores that sell durable consumer goods, such as appliances and IT products, allows the purchaser to replace immediately the not functioning or defective product with an identical or equivalent one.

⁹ Examples of this case are the exchange of not desired or ill-fitting (especially in clothing) gifts, common during the periods following major gift-giving occasions (Christmas, Easter, etc.).

¹⁰ The so-called re-workings are a common practice in the field of spare parts for vehicles, where it is frequent to withdraw worn parts and components, which - after being re-worked and re-checked - are re-offered for sale.

¹¹ This interpretation refers to the study of Lambert and Stock, who claim that the RL is the *administration of returns* (Lambert and Stock, 1993, p. 19).

¹² In this context, the meaning of the term is completely different from that assumed in the jargon of marketing, where '*cannibalisation*' is *the phenomenon whereby two or more products of the same company steal market share to each other, rather than reducing that of similar products of rival companies.*

¹³ This is the case of branded clothing that in the end of the season is diverted towards other forms of distribution than the boutiques, such as factory outlets, or even open air markets.