Reverse Logistics in the management of packaging and packaging waste in the context of COVID-19

La Logística Inversa en el manejo de los residuos de empaques y embalajes en el contexto del COVID-19

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Abstract

The new challenges currently faced by companies regarding reverse logistics during the COVID-19 crisis are numerous, such as high uncertainty in supply timing, quantity, and quality. During this crisis, there has also been an increase in the use of plastic packaging due to health protocols and safety measures, making them unrecyclable and creating the need to modify practices to protect the environment. In this context, reverse logistics provides knowledge about ways to reintegrate goods, which have gone through production processes, back into the market as an alternative to identify the main factors characterizing environmental impact in the product supply chain. The aim of this study is to provide a review and content analysis of the scientific literature on reverse logistics in order to establish a reference framework and conceptualize the management of packaging and packing waste. The paper concludes by offering a reasoned characterization of this new aspect of reverse logistics to reflect on the adoption of best practices in packaging logistics, aligning existing standards with current needs.

Keywords: Reverse Logistics, waste, reuse, COVID-19.

JEL Codes: Q57, M1, L60

Resumen

Los nuevos desafíos que actualmente enfrentan las empresas sobre la logística inversa durante la crisis de la covid-19 son varios, tales como alta incertidumbre de suministro en tiempo, cantidad y calidad. Durante esta crisis, también ha habido un aumento del uso de empaques de plástico debido a los protocolos y cuidados sanitarios, por lo que no podrán ser reciclados surgiendo con ello la necesidad de modificar prácticas para proteger al medio ambiente. En este sentido, la logística inversa proporciona el conocimiento de las formas de reintegración al mercado de los bienes beneficiados por los procesos de producción como una alternativa para identificar los principales puntos que caracterizan el impacto ambiental en la cadena productiva de algún producto. El estudio tiene como objetivo proporcionar una revisión y análisis de contenido de la literatura científica de estudios de logística inversa con la finalidad de proporcionar un marco de referencia y conceptualizarlo sobre el manejo de residuos de empaques y embalajes. el trabajo concluye proporcionando una caracterización razonada de esta nueva parte de logística inversa para reflexionar sobre la adopción de mejores prácticas de la logística de empaques y embalajes, conjuntando las normas existentes con las necesidades actuales.

Palabras claves: Logística Inversa, residuos, reutilización, Covid-19.

Código JEL: Q57, M1, L60

1. Introduction

A few years ago, logistics was basically related to the management of a company's supply chain. Today, the definition of logistics is much broader and is characterized by being complex, dynamic, and uncertain. This is partly due to the impact of economic and environmental regulations, which have created a new set of general problems within reverse logistics (Bei and Linyan, 2005; Feal Vázquez, 2010).

Reverse logistics has become one of the most relevant aspects of logistics, attracting increasing attention from professionals and researchers in recent decades. For over thirty years, supply chains have been diligently optimized from raw materials to end customers. Under different approaches, supply chain managers have typically thought "forward," focusing on the downstream movement of products. It is now widely accepted that reverse logistics is a key competency in modern supply chains and, as such, must be properly managed (Ortega Mier, 2008).

Challenges in this field have been caused by the rapid growth of e-commerce, the rise of online retailers, and similar developments. Competition is fiercer than ever in most markets, product life cycles have shortened, and business conditions are constantly changing. Once again, companies suffer major losses due to high return volumes driven by return policies. Therefore, to add value for customers, improve customer relationships, and strengthen their competitive advantages, companies must find ways to reduce waste and recover value from used products for other purposes. These factors have pushed companies to reshape their strategies. New topics such as Global Manufacturing, Third-Party Logistics, Alliances, e-Logistics, and SMEs have emerged. All of these challenges make reverse logistics a contemporary area of interest for managers and researchers alike (Soto and Ramalhinho, 2002; Bei and Linyan, 2005).

In today's context, and in the wake of the COVID-19 pandemic, several sectors of society have been affected, and logistics in businesses has been no exception. However, not all consequences have been negative. In the case of logistics, it has taken on an important role due to the sharp increase in online sales. While this has benefited society by preventing virus spread, it has posed a major challenge for reverse logistics, which must now adapt its usual practices to the standards and protocols of the "new normal." Moreover, due to the rise in waste (e.g., containers and packaging), raising awareness among companies and encouraging them to implement reverse logistics as a primary activity plays a key role in our society's future benefiting the environment above all and also having a positive impact on economic and social aspects.

In light of the above, the aim of this study is to provide a review and content analysis of scientific literature on reverse logistics to establish a reference framework and conceptualize its role in the management of packaging and packing waste. To achieve this objective, the first section analyzes the evolution and emergence of the concept of reverse logistics and its ties to environmental concerns and economic drivers. The notion of reverse logistics is addressed in both broad and narrow terms, including differences between reverse logistics and traditional forward logistics. The third section explores the management of waste through reverse logistics within the supply chain. The fourth section discusses the challenges reverse logistics faces in the context of COVID-19. Finally, brief conclusions are presented.

2. Literature review

2.1 Background of reverse logistics

A few years ago, logistics was essentially tied to the management of a company's supply chain. Today, the definition is much broader. Modern logistics considers topics that fall within the realm of public policy decisions locally, nationally, and internationally such as transport infrastructure and logistics activity zones (Feal Vázquez, 2010).

Regarding reverse logistics, this area has received growing attention, especially over the last decade, due to the convergence of various factors. As noted by Fernández (2003) and Rahman and Subrayarían (2012), there is a clear concern for environmental issues and sustainable development. In addition, economic motivations have contributed to the growing importance of reverse logistics, as returned products allow companies to recover both raw materials reducing future purchasing needs and added value. Whether savings come solely from reduced material purchasing costs or from materials, labor, and overhead, companies are increasingly interested in participating efficiently in reverse logistics as competitive pressure narrows profit margins.

Given this scenario, and perhaps due to its growing relevance, the concept of reverse logistics remains vaguely defined. As several authors have argued (Fleischmann, 2000; Mason, 2002; Soto and Ramalhinho, 2002; Kivinen, 2002; Tan and Kumar, 2003), there is still no widely accepted definition of reverse logistics in practice, partly due to the wide range of related topics activities, products, supply chain points, and so on.

According to the literature review, Quesada (2003) notes that early authors such as Beckley and Logan (1948), Terry (1869), and Giultinian and Nwokoye (1975) had already addressed product returns, although not referring to them as part of reverse logistics flows. Murphy & Poist (1989) are among the first to use the term "reverse logistics." They introduced "reverse distribution" as an equivalent term, and this dual terminology has persisted in some studies (Barry et al., 1993; Carter and Ellram, 1998; Jayaraman et al., 2003).

However, contributions to the understanding of reverse logistics began in the 1960s and 1970s (Seitz and Wells, 2006). One of the most comprehensive studies in the field was conducted by Kopicki et al. (1993), who observed that companies implementing environmentally conscious programs typically go through three phases: reactive, proactive, and value-seeking. Recently introduced environmental standards often force companies into reactive responses.

It wasn't until the 1990s that the management of reverse logistics systems and the term "reverse logistics" (in English, "reverse logistics" or "inverse logistics") were more thoroughly studied (Ortega Mier, 2008).

Regarding the origins of the term, in 1992, the Council of Logistics Management (CLM) defined reverse logistics as the role of logistics in recycling, waste disposal, and hazardous materials management. A broader perspective includes all logistics activities related to source reduction, recycling, substitution, reuse of materials, and disposal (De Brito and Dekker, 2003:17).

Thus, given the short history of reverse logistics and the relatively recent research in the field, it is understandable that a universally accepted terminology has yet to be established.

2.2 What is reverse logistics?

To illustrate the various interpretations found in the literature, this study considers the definitions identified in the literature review, which are regarded as relevant within the field of reverse logistics and serve as a foundation for this area of research.

In one of the first referenced publications, edited by the Council of Logistics Management (CLM), Stock (1992) introduces reverse logistics as "the term normally used to refer to the role of logistics in recycling, waste disposal, and the management of hazardous materials. A broader perspective includes all activities related to material reduction, recycling, substitution, and the reuse of materials and waste" (Ortega Mier, 2008, p. 19).

A similar definition is offered by Kopicki (1993), also from the CLM: "it is a term that refers to the logistics management capabilities and activities involved in the reduction, management, and elimination of hazardous or non-hazardous materials, ranging from packaging to final products. It includes reverse distribution, as just defined, which causes the flow of products and information in the opposite direction to normal logistics activities" (Ortega Mier, 2008, p. 19).

Krikke, H. (1998) defines Reverse Logistics as the collection, transportation, storage, and processing of discarded products.

Fleischmann (1997) states that Reverse Logistics is a process that encompasses logistics activities from used products that the user no longer needs to products that can be reused in the market.

Dowlatshahi, S. (2000) explains Reverse Logistics as a process in which a manufacturer systematically accepts previously shipped products or parts, from the point of addition for possible recycling, remanufacturing, or disposal.

V. Daniel (2000) says that Reverse Logistics is the task of recovering discarded products (cores); it may include packaging and shipping materials and bringing them back to a central collection point for recycling or remanufacturing.

Kroon and Vrijens (1995) say that Reverse Logistics involves the skills and logistics management activities related to the reduction, management, and disposal of hazardous or non-hazardous waste from packaging and products. It includes reverse distribution, which causes goods and information to flow in the opposite direction to normal logistics activities.

Finally, Rogers, D. and Tibben-Lembke, R. (1998), define Reverse Logistics as the process of planning, implementing, and controlling the efficient and cost-effective flow of raw materials, in-process inventory, finished products, and related information from the point of consumption back to the point of origin for the purpose of recapturing value or proper disposal. Considering the elements of these definitions, we believe the definition given by Rogers, D. and Tibben-Lembke, R. (1998) is the most complete and incorporates the main characteristics of what we think Reverse Logistics is.

2.3 Green logistics

A common problem when talking about Reverse Logistics is the confusion between reverse logistics and green logistics. The threat posed by the scarcity and deterioration of natural resources has made companies more aware of the need (obligation in some countries) to develop green alternatives or ecological ways of doing business. Reverse logistics is often confused with the concept of green logistics. Redesigning packaging to use less material or reducing energy and pollution from transportation are important activities but could better fit under the umbrella of "green" logistics.

If goods or materials are not sent "backwards," the activity is unlikely to be a reverse logistics activity. The confusion remains because most reverse logistics activities fall within the green logistics area. (Soto and Ramalhinho, 2002).

According to de León, Zavala, and Gálvez (2008), one way to help establish the relationship between Green Logistics and Reverse Logistics is to cite the definitions of both practices referenced academically and/or by practitioners. The fact that an explicit definition of Green Logistics is lacking confirms what Murphy and Poist (2003) state about the limited literature on this practice. This limitation includes the absence of a formal definition of the term Green Logistics.

For his part, Soto (2005) indicates that Green Logistics pursues objectives such as reuse of containers, recycling packaging materials, redesigning packaging, using fewer materials, and reducing energy consumption and pollution related to product transportation.

Finally, we can say that Green Logistics is more related to traditional logistics than to Reverse Logistics; this relationship occurs when the environmental impact during the development of traditional logistics is measured, and proposals arise from this measurement seeking to reduce that impact. Achieving this would allow Green Logistics to help traditional logistics complete its tasks efficiently according to the environmental criteria sought.

Regarding its relationship with Reverse Logistics, the following is presented:

1. They are mutually exclusive processes.

2. Green logistics proposes the reuse of containers as well as the recycling of packaging or packaging materials; these proposals are activities identified within Reverse Logistics.

3. Green Logistics poses, as an activity, the search for redesign to minimize material consumption both in the final product and its packaging, and one of the results obtained from developing Reverse Logistics practice is the generation of such information. It could be said that Reverse Logistics provides this information to Green Logistics for redesign aimed at minimizing material consumption and packaging. (León, et al., 2008).

2.4 Classification of Reverse Logistics for returned or returned products

Regarding classification for returned or return products in reverse logistics and using the analysis conducted by Bei, W. and Linyan, S. (2005), we find that there are all types of product categories related to the reverse logistics system, such as consumer or industrial goods, construction waste, household waste, packaging, distribution items, production by-products, electronic equipment, electronic devices, etc. (See Table 1), a general classification is offered of returned or return products that frequently occur considering the reasons for return and product varieties.

We can highlight the most important and representative elements: handling of goods, products, packaging, and containers, reduction at source, that is, through the product life cycle we must employ and use tools capable of obtaining the minimum possible amount of waste, debris, and non-recyclable or unrecoverable materials. It is a new environmental commitment in the supply chain which fosters the development of cleaner production (or service) aligned with better environmental practices and production.

3. Reverse Logistics and its relationship with waste management through supply chain

Since reverse logistics is a relatively new research area in the literature, it may also be found under other terms such as return logistics, inverted logistics, reverse distribution, and retro logistics. It is important to note that many people confuse the terms reverse logistics and waste management. The latter mainly refers to the collection and processing of products or materials that are disposed of. When referring to the term "waste," legal consequences may arise, such as regulations governing the import/export of waste, whereas reverse logistics focuses on the flows (both forward and reverse) where there is some value to be recovered from the products and materials, which can then be reintroduced into a new production chain (Maquera, 2012).

Therefore, based on a company's functionality, two types of reverse logistics can be distinguished:

1. Reverse logistics for waste: This involves the collection, recycling, and treatment of waste generated by the final product after it has

Table 1. Classification of Reverse logistics (RL)

Classification of RL	Driving forces	Processes	Referenced Product-Cases	
Manufacturing yields : Surplus raw material Production waste	Economic Legislation	Recycling/ Reuse Remanufacturing	Ferrous scrap/ Pharmaceutical materials	Johnson, P. F. (1998). Managing Value in Reverse Logistics Systems, Logistics and Transportation Review, 34, 3, pags. 217-227
				Simon M G, Bee G, Moore P et at,(2001). Modeling of the Life Cycle of Products with Date Acquisition Features, Computers in Industry, 45, pags., 111-122
Distribution returns: Product recalls due to safety/healthy issues Adjustment of outdated/obsolete stock B2B commercial returns (products)	Economy (legislation)	Recycling/ Repair/ Resale/ Remanufacturing	Consumer Monitor- Industrial goods	Krikke, H. R., Van Harten, A. & Schuur, P. C.(1999) Business Case Roteb: Recovery Strategies for Monitors, Computers & Industrial Engineering, 36, 4, pags, 739-757
				Fleischmann, M. (2001).Reverse Logistics Network Structures and Design, ERIM Report Series Research in Management, ERS-2001-52-LIS, pags, 1-21
				Bartel T., (1995).Recycling Program for Toner Cartridges and OpticalPhotoconductors, Proceedings IEEE Symposium on Electronics and the Environment, Orlando Florida, pags, 225-228
Returns after distribution B2C Used distribution items	Economy (legislation)	Reuse/ Recycling	Pallets/ Packaging	Anderson, S., Browne, & M., Allen, J. (1999). Logistics Implications of the UK Packaging Waste Regulations, International Journal of Logistics: research and Applications, 2, 2 (1999), 129-145
				Duhaime, R., Riope,l. D., & Langevin, A. (2000). Value Analysis and Optimization of Reusable Containers at Canada Post, Interface, 31, 3, pags, 3-15
Commercial returns from customers Money-back guarantee for unsatisfactory new products.	Economy (legislation)	Resale/ Reuse	Clothing/ Commercial goods	De Brito, M. P., & Dekker, R. (2003). Modeling Product Returns in Inventory Control – An Empirical Validation of General Assumptions, International Journal of Production Economics, 81-82, pags, 225-241
				Meyer, H. (1999). Many Happy Returns, The Journal of Business Strategy, 20, 4, pags,27-31
Customer service returns Upgrade/repair requests	Economy (legislation)	Repair/ Recovery	Machines/ Circuit boards	Klausner, M., & Grimm, W. M, Hendrickson, (1998).Reuse of Electric Motors in Consumer Products, Design and Analysis of An Electronic Date Log, Journal of Industrial Ecology, 2, 2, pags, 89-102
				Diaz A, & Fu M C,(1997) Models for Multi-echelon Repairable Item Inventory Systems with Limited Repair Capacity, European Journal of Operational Research, 97, 3, pags, 480-492
Post-use returns from customers End-of-use returns End-of-life returns	Economy (legislation)	Remanufacturing/ Recycling	Electronic device/ Sand/ Batteries/ Carpet	Simon, M. G, Bee, G., Moore, P., et at,.(2001). Modeling of the Life Cycle of Products with Date Acquisition Features, Computers in Industry, 45, (2001), 111-122
				Barros, A. I., Dekker, R. & Scholten, V. (1998). A Two-level Network for Recycling Sand: A Case Study, European Journal of Operational Research, 110, 2 pags., 199-215
				Louwers, D., Kip, B. J., Peter,s E. et at,(1999) A facility Location Allocation Model for Reusing Carpet Materials, Computers & Industrial Engineering, 36, 4, pags, 1-15

Source: Own elaboration, adapted based on Bei, W. and Linyan, S. (2005:23) been commercialized. The aim is to reduce the environmental impact of this waste and to fulfill the logistical objective of reusing it to generate value again, whether as raw materials, spare parts, etc.

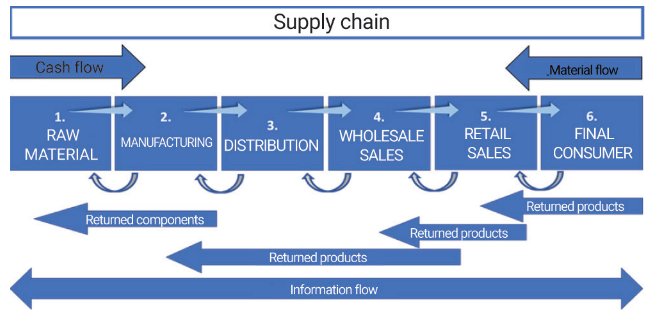
2. Reverse logistics for returns: This involves returning the product from the final customer back to the point of origin. This may occur due to customer dissatisfaction, delivery errors, defective products, among other reasons. Specifically, reverse logistics for returns is most closely related to the operations of e-commerce[1] platforms. ECOMMERCE. (2021).

In this sense, reverse logistics aligns with waste management (e.g., packaging, containers, and hazardous waste) through the most commonly used reprocessing options in the industry, such as remanufacturing and recycling (Dowlatshahi, 2005). Remanufacturing refers to the process in which used products are restored to a like-new condition, while recycling is a process that recovers materials from used products without preserving the identity of their components. These reprocessing options link reverse logistics with sustainable development, assuming that society should make full use of the value contained in products (de Brito and Dekker, 2004).

Furthermore, according to the guidelines from the American Production and Inventory Control Society (APICS) in their Certified in Logistics, Transportation and Distribution (CLTD) program, a complete supply chain must include a reverse logistics process dedicated to returning, repairing, remanufacturing, and/or recycling products and materials (APICS, 2019). This process begins with the planning and control of the movement of goods from the point of consumption back to the point of origin for disposition into any of the aforementioned processes.

This APICS proposal is considered comprehensive as it provides a solid conceptualization and analysis of current information, linking the concept of the supply chain with reverse logistics, giving relevance to the latter, and indicating the minimum aspects of the process. It also makes clear that there are simple, medium, and highly complex schemes depending on the size of the organization in question, as each has different transformation and manufacturing processes. Moreover, APICS serves as a guide for human capital development and policy formation in reverse logistics for organizations. (See Figure 1).

Figure 1. Flow of a supply chain with reverse logistics



Source: APICS CSCP Learning System (2016)

It is important to mention that there are different waste transformation processes:

• Return of products rejected by the final customer or surplus inventory at the end of their life cycle.

• Return for reuse of containers, packaging, and handling units for their reconditioning and reuse.

• Reuse of materials in processes where they can be used again in the same production cycle.

• Reconditioning of defective rejected products, which can be restored for resale. Waste and residue management sent to recycling facilities and specialized centers due to their hazardous nature.

• Waste management for destruction and final disposal.

• Management of substitute recycled materials that reduce the use of current materials, which implies innovation and improvements in product design. (Reverse Logistics Association, 2002).

Understanding these different transformation processes, it is necessary to specify that this paper focuses solely on the return for reuse of containers, packaging, and handling units for their reconditioning and reuse, as this process is particularly relevant to the authors due to the environmental impact of not carrying it out.

[1]Worldwide, buyers return an average of US$642.6 billion in merchandise each year, which significantly reduces profit margins and increases logistics costs for companies. In this regard, the reverse logistics process and its associated transportation and other costs related to order returns present a complex challenge for 83% of retailers in Latin America. (ECOMMERCE, 2021).

Regarding the functionality of reverse logistics in companies, it is divided into three aspects known as the Triple Bottom Line (TBL). This approach is used in sustainable businesses to measure the economic, social, and environmental impact of an organization's activities with the goal of delivering value to shareholders (APICS, 2019).

The actions implemented under the TBL are directly related to reverse logistics since the economic, environmental, and social solutions generated under this ideology often involve savings, recycling, and the reuse of materials, inputs, and finished products which is precisely the goal of Reverse Logistics within companies.

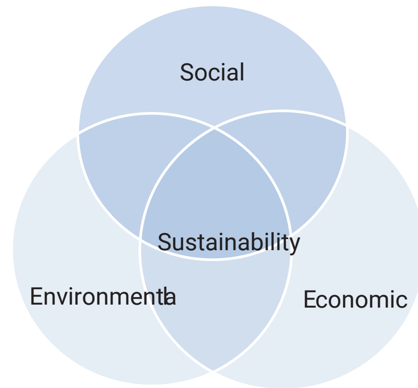
According to the TBL, reverse logistics functions in companies are divided as follows:

1. Economic: It involves capital savings and product improvement based on cannibalization, recovery of value from containers, packaging, and recycling units. All of this is driven by the implementation of new technologies, investment in eco-friendly processes aimed at resource efficiency and cost reduction, and the implementation of environmental policies that include energy savings in buildings and transport, reduction of carbon emissions, reduction of office waste (e.g., paper), and promotion of interactions with sustainable companies and the consumption of eco-friendly products by both clients and suppliers (APICS, 2019).

2. Environmental: Derived from the protection of health and the environment, and considerations for waste management and processing. It is constantly monitored by environmental organizations focused on the supply chain and its use in manufacturing environmental processes and the movement of raw materials and finished goods (APICS, 2019).

3. Social responsibility: Driven by non-governmental organizations and consumers empowered by their purchasing power, seeking safer and more environmentally friendly products. Socially oriented environmental protection organizations are responsible for creating policies and programs that contribute to society. These associations aim to create a sense of social responsibility by promoting the successes and failures of labor practices within the company. An example of this is the "Socially Responsible Company" label awarded through good environmental labor practices (APICS, 2019). (See Figure 2)

Figure 2. TBL Diagram



Source: APICS CLTD Learning System, (2019).

Regarding the implementation of the process and according to the Reverse Logistics Association, which estimates that in 2013 the total volume of returned products ranged between US$150 and US$200 billion, another report from the Aberdeen Group an organization dedicated to collecting and analyzing consumer behavior data in more than 200 sectors states that the average company invests between nine and fourteen percent of its total revenue in the reverse logistics process. This indicates that practicing reverse logistics does not represent a high cost and that its implementation is feasible within any company. However, the most surprising data point is that forty-five percent of existing companies do not implement a reverse logistics strategy in a systematic and efficient manner for the return of products (APICS, 2019). From this, it can be concluded that even today, many companies still lack awareness of the benefits and advantages that reverse logistics offers within the supply chain.

4. Reverse Logistics in the context of COVID-19

Following the pandemic caused by the SARS-CoV-2 virus, several sectors of society if not all have been affected, and logistics within companies has been no exception. However, not all consequences have been negative; in fact, logistics has taken on a significant role due to the skyrocketing growth of online sales which, despite offering benefits to society by helping avoid virus spread, has left reverse logistics with the difficult task of readapting its usual practices to the standards and protocols that adapting to the "new normal" will require. Nevertheless, due to the increase in waste (e.g., packaging and containers), raising awareness among companies and motivating them to implement reverse logistics as a core activity plays a very important role in the future of our society, especially in terms of environmental impact, and also positively affects economic and social aspects. Below are some relevant statistical data reported by several authors:

Figures indicate that during the pandemic, approximately seventy-five percent of the plastic used for manufacturing face masks, gloves, and hand sanitizer bottles will become waste that will seriously harm both ecology and the economy (UNCTAD, 2020).

As for the everyday use of plastic for packaging during the pandemic, it is estimated that less than ten percent will be recycled, and more than seventy percent will directly harm the environment, remaining in streets and oceans. It is said that the SARS-CoV-2 virus can survive on plastic surfaces for up to three days, which contributed to increased use of single-use plastics, resulting in a spike in packaging and wrapping waste (UN, 2021).

The increase in online purchases has reached nearly ninety percent and has caused a corresponding rise in solid waste generation (cardboard boxes, packing materials, Styrofoam protectors, plastic, and other materials with high environmental costs), ranging between forty and sixty percent (AMVO, 2020).

The rise in online purchases has also led to a proportional increase in returns; due to logistical blockages between countries and internally, reverse logistics has been disrupted, which could cause a future bottleneck as supply chains are gradually reopened. Some companies have even opted to temporarily suspend certain return policies as an economic and health measure (Kirve, 2020).

New health protocols have been created within the supply chain to prevent the spread of the virus, such as disinfecting and cleaning returned items. Warehouses are spaces where worker safety is of utmost importance, and government safety measures and recommendations must be followed with the corresponding procedures established. There has been a reassignment of store workers to warehouses to efficiently manage the workload. This has affected the efficiency of reverse logistics, especially for companies lacking economic or technological resources to meet health measures or to replace personnel with technology in their supply chain processes, according to reverse logistics firm goTRG (goTRG, 2021).

There have been cases where companies that encouraged the reuse of bottles and plastic bags had to suspend these practices. One example is Starbucks, which, just one week after the first U.S. case of SARS-CoV-2 was confirmed, temporarily banned the use of reusable coffee mugs and tumblers (Plastics Technology México, 2020).

In light of these developments, it is necessary to generate and propose new readaptation methods that increase the adoption and reactivation of reverse logistics. It is crucial to create proposals whether public or private (from governments or chambers of commerce, for example) that encourage small, medium, and large enterprises to apply sustainable methods that have less environmental impact, taking into account the scenario of the "new normal" and its sanitary consequences.

Some processes are beginning to be proposed by large companies and global logistics leaders. While not all procedures can be applied or adapted by all businesses due to economic or other factors, it is important to consider them as starting points for strategies that promote good reverse logistics practices without compromising the health of personnel executing these processes. Below are some of the procedures implemented:

- Following government policies: It is important that the population and businesses are informed and able to implement the public policies that government agencies recommend to prevent the spread of COVID-19 (Kirve, 2020).
- Creating more flexible return policies: This helps avoid return congestion. By extending the return window, pressure to immediately return products is reduced, allowing items to arrive gradually. Some policies, like those implemented by Walmart and Amazon, even allow the customer to keep the product while still receiving a refund (Kirve, 2020).
- Hiring third-party logistics companies (3PL): These firms offer reverse logistics services to both large and small businesses. They handle transportation and storage challenges, manage

returns and route them to warehouses or replenishment centers, oversee inventory and supply chains, process customer refunds, and more (goTRG, 2021).

• Frictionless returns: This process uses software to automate exchanges and returns, providing customers with a seamless self-service experience or allowing them to choose among several convenient options to return items through applications like Happy Returns (Happy Returns, 2021).

• Adopting a fully integrated e-commerce platform, as Amazon does, which—through this type of system allows the management of terminals on a single store server, reducing contact between individuals and minimizing returns due to "wrong size or product" (NCR, 2021).

For this to be possible, it is necessary to raise awareness among business owners, implement training programs for human resources in the supply chain, and foster a social commitment from higher education institutions to provide knowledge on the topic and train professionals with sufficient competencies to perform in these contexts. Furthermore, governments must support by financing reverse logistics programs and by promoting and encouraging social, economic, and environmental development commitments, as well as enforcing the international and national agreements and treaties already in place.

It should be remembered that reverse logistics for packaging and wrapping waste during COVID-19 is a complex phenomenon that requires collaboration among different sectors to move forward.

5. Conclusions

Based on the literature review, it can be concluded that reverse logistics is gaining significant importance in today's world. Currently, companies are facing new challenges related to reverse logistics during the COVID-19 crisis, including high uncertainty regarding supply time, quantity, and quality.

Additionally, the increase in the amount of waste, returned or remanufactured products, and other reverse flows is creating a new issue—one that years ago may not have been considered as important, or if it was, not with the same level of relevance. This growing importance is prompting the publication of various laws or decrees by different authorities (local, national, or supranational) and the emergence of numerous companies seeking to address the challenges that arise.

For this reason, it is essential to continue researching processes, especially those related to the management of products or materials that can re-enter the supply chain and have associated environmental impacts, which represent a challenge for companies. To address these challenges, strategies like reverse logistics can be implemented, which involve a series of operations to recover value from solid waste or to dispose of it appropriately. It will be necessary to redesign and develop proposals that align with health protocols, customs, and practices that will be implemented in the "new normal." These proposals should enable, promote, and encourage companies to adopt reverse logistics for packaging and wrapping, combining existing regulations with current needs.

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