

A SHORT COMMUNICATION ON REVERSE LOGISTICS ROLE IN THE SUPPLY CHAIN

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ARTICLE DETAILS

Article History:

Received 12 June 2019

Accepted 15 July 2019

Available online 27 August 2019

ABSTRACT

With the emergence of e-commerce and rising digital literacy among the consumers, the global logistics industry has been changing significantly in the recent years. Factors such as rising disposable incomes, dual-income households, and constant urbanization have encouraged consumers across both developed and emerging economies to follow upcoming logistics trends. Logistics environment is assessed to become more dynamic, complex, and unstable. Competition is increasing in most markets and more severe than before. Product life is getting shorter, and business conditions are always changing. All these factors force companies to change their business strategy. Companies - large or small, face a lot of new problems, such as Global Logistics (Global Logistics), the diversified appearance of logistics services (3PLs, 4PLs, 5PLs), Logistics e-commerce (E-Logistics), Logistics (Logistics Partnerships) partners, and reverse logistics. The recovery of goods, scraps, and packaging from products that businesses produce are becoming a phenomenon that businesses and logistics companies must face regularly. Especially under severe competitive pressure and the current environmental severe pollution problem, reverse logistics is considered an outstanding solution to help businesses reduce costs, increase revenue, improve qualifications. Service and reduce environmental impact; thereby winning a competitive advantage and excellent performance of corporate social responsibility.

KEYWORDS

Logistics environment, supply chain, reverse logistics, E-Logistics.

1. INTRODUCTION

The theory of reverse logistics has begun to be carefully studied and researched and systematically developed in developed countries like the US and Europe since the 90s of the last century[1]. So far, there are many different concepts of reverse logistics. According to Rogers and Tibben - Lembke (1999), reverse logistics is the process of planning, implementing and effectively controlling the flow of raw materials, semi-finished products, and related information from consumption points to points origin, to recover the value or handle appropriately. Thus, reverse logistics includes all logistics activities of the supply chain but operates in the reverse cycle [1][2]. This concept refers to the function of logistics in the recovery of goods, recycling, replacement and reuse of materials, renew, repair, replace equipment or restore products by the reasons for uncontrollable such as malfunction, crop inventory, replacement of goods, warranty errors or high inventory rates[3].

The reverse Logistic process is divided into 4 steps, including,

- Revocation
- Check selection and classification
- Recycling or restoring
- Redistribution

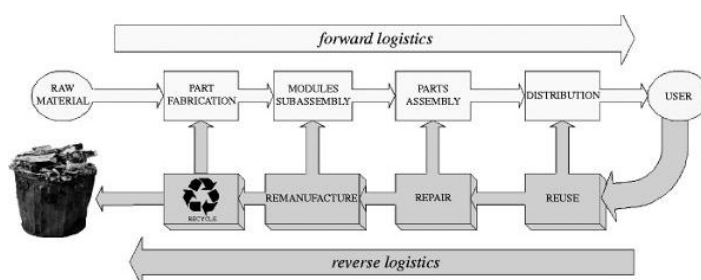


Figure 1: Traditional Logistics process and Reverse Logistics [4]

The first step in the reverse logistics process is "Revocation" which includes the necessary activities to collect unsold products, defective products or packages and transport them to the recovery point [5]. At the recovery point, the product will be "Tested" through activities such as product quality inspection, product selection, and classification. The result of phase 2 is an essential and necessary basis for determining the next process for most commercial products [6]. In phase 3 "Handling" when a product is recalled, the enterprise will have many ways of dealing: Direct "reuse" or resale; "Rehabilitate" products (repair, renew, re-produce, remove to get spare parts...); and "Disposal" of waste (incineration or release to the environment) [7].

1.1 Resale handling

Resale is applied when products are put on a particular market for a long time but cannot be sold because there is no demand or saturated demand can be recalled switching to another market in demand or sell through discount stores.

1.2 Reuse

This is the case where the quality of revocation products is still guaranteed to be able to continue to be used as components, various types of packaging (glass bottles, jars), pallets, containers, and most Outsourced equipment.

1.3 Rehabilitate

For products whose uses, colors, design, features... do not meet the needs of customers, it is necessary to recover through repair, upgrade, refresh, re-production... and then continue to be put into the distribution network.

1.4 Disposal

For products and packaging that cannot be handled in the above forms because of its adverse conditions or due to legal responsibilities and environmental limitations, the enterprise will try to dispose of the product with the lowest fee.

1.5 Final phase

The final stage is "Redistribution" the recovered product. This stage refers to logistics activities to bring products back into the market and deliver it to customers such as reserve, sales, and shipping activities. Thus, reverse logistics includes all the activities such as forward logistics. However, they operate in reverse cycles. Therefore, reverse logistics is the process of effectively planning, implementing and controlling the flow of goods and services and related information from consumer points (D) back to the origin (O) in order to the purpose of recovering the remaining value of the goods or discharging it reasonably[8]. Operating reverse logistics is more complicated than slow logistics because, in reverse logistics, forecasting demand is more complicated, shipping from many points to one point, price and product quality are not identical [9]. In addition to the differences shown in the Logistics, the product packaging is often not intact; the product quality is heterogeneous because the product is returned for various reasons, the price depends on many factors. However, it is not possible to reduce the direct cost, and the speed is often not considered a priority.

2. CLASSIFY REVERSE LOGISTICS STRUCTURE

Based on the structure, reverse Logistics consists of two main types: Centralized Structure and Decentralized Structure.

2.1 Centralized structure

The main point in this system is that information gathering, control, and classification activities are concentrated in one organization or company. Physical processing can take place at the same organization, company, or other company. An example of this type of model can be obtained through the closed loop of IBM's supply chain - International Business Machines, a multinational computer technology group based in Armonk, New York, USA [10]. Here returned items include personal computers, laptops, and printers. These products are used to supply spare parts. Efficiency here can be improved because some products are returned through an industrial corporation.

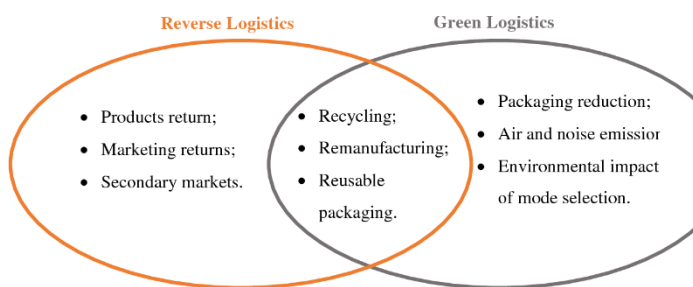


Figure 2: Relations between reverse logistics and green logistics[4]

Therefore, in this example, the first step is to retrieve the photocopier from the customer; the product will then act as the input material for the reproduction process. Recovered photocopiers will be returned to one of four centralized recovery logistics centers. Here, they will be checked, processed, and classified into 4 levels [8]. The first level is repairing, the second is re-manufactured, the third is partially reproduced, and the fourth is recycled. In the level of repair and reproduction, they will be redistributed to customers through the traditional, transitional supply chain. The financial benefits of re-manufactured equipment and reused parts can be up to several hundred million dollars a year.

2.2 Decentralized structure

This model starts from the left where products or items go into the reverse supply chain on the retail level. After that, specific stores will act as gatekeepers (responsible for checking incoming information). This department evaluates the product and then sends it to one of the three concerned departments, including restock (additional), test and repair facility (testing and repair), scraping (removal). In order to determine the status of products, specific principles and social skills are required to be able to carry out initial testing, especially in logistics infrastructure to deliver goods or products into operation. An advantage of this type of model is that products and items can be sent directly to the specific improvement part it needs. This model supports time-based strategies that support value-added efforts such as refurbishing high-value products.

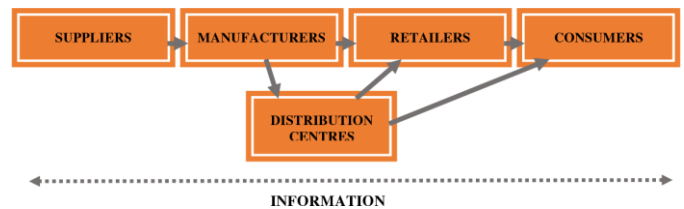


Figure 3: Traditional supply chain[9]

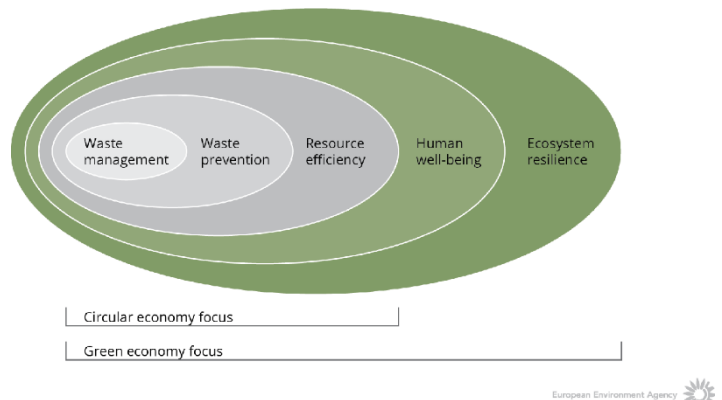


Figure 4: The difference between circular and green economy[10]

3. REVERSE LOGISTICS MODELS

3.1 Closed-loop model

This model refers to all downstream logistics activities such as procurement of supplies, reverse distribution and logistics to collect and process returns (used or unused) of products or parts of products in an organized manner to ensure sustainable socio-economic and ecological restoration. Benefits that Closed-loop model brings as following:

3.1.1 Profit

This model creates cheap resources through the recovery of materials, parts, and waste products. Therefore, allow companies to produce cheaper products with higher profits.

3.1.2 Ecological environment

The recovery of materials, spare parts, and products scientific and reuse them not only reduces the need to exploit materials and energy but also avoids landfilling and destruction affect the environment. Recycling aluminum uses 90% less energy than aluminum from aluminum ore. Reuse and repair hardly use any natural resources, while emissions are significantly lower than production.



Figure 5: Steps to implement reverse logistics[11]

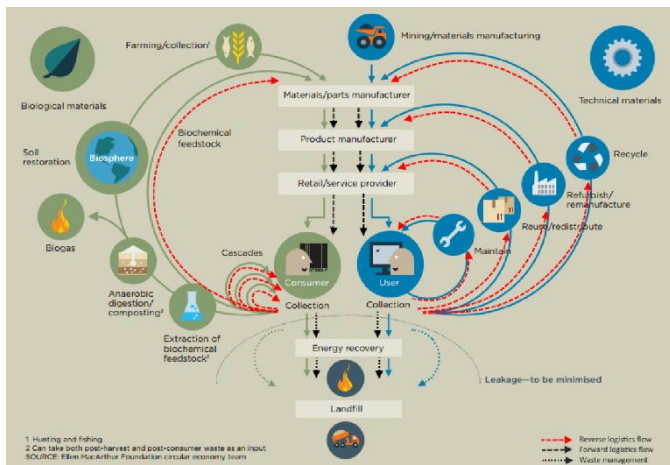


Figure 6: The model of the circular economy[5][2]

3.1.3 People

The need to recover sophisticated recycling products creates more jobs than waste and landfill disposal. However, it should be noted that optimizing the closed supply chain configuration depends heavily on the characteristics of the product and the circumstances in which the product will be collected.

3.2 Open-loop model

In the Open-loop model, the manufacturer may decide to outsource the recovery operation from a 3PL service provider specializing in a specific product group. This supplier will undertake reverse Logistics functionality including maintenance, repair, and recall on behalf of the manufacturer.

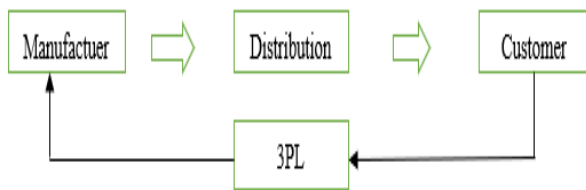


Figure 7: Open-loop model[13]

The benefits of this model are:

3.2.1 Extensive service network

Allows 3PL to implement and optimize logistics activities not only within the territory but also to the global market.

3.2.2 Save time and cost

Help limit additional investment in the purchase of transport vehicles, equipment, and the cost of hiring a carrier. Moreover, inefficient logistics management will cause many losses and cost.

3.2.3 High expertise

3PL staff are well trained and experienced in the field of transportation. Besides, they know how to apply advanced technologies to manage Logistics activities effectively[14].

3.2.4 Expandable and flexible space

3PL's extensive warehouse and distribution center help shorten transport distance, save cost and time, and increase flexibility.

3.2.5 Continuous optimization

3PL companies manage the supply chain process thanks to having advanced systems that can adjust links in the supply chain, track and analyze inefficiencies, and fix errors[15].

3.3 Independent Operation Model

In this model, the reverse logistics function is entirely outside the supply chain of Original Equipment Manufacturers (OEMs). These independent operators are mostly waste dealers and traditional junkies or service businesses.

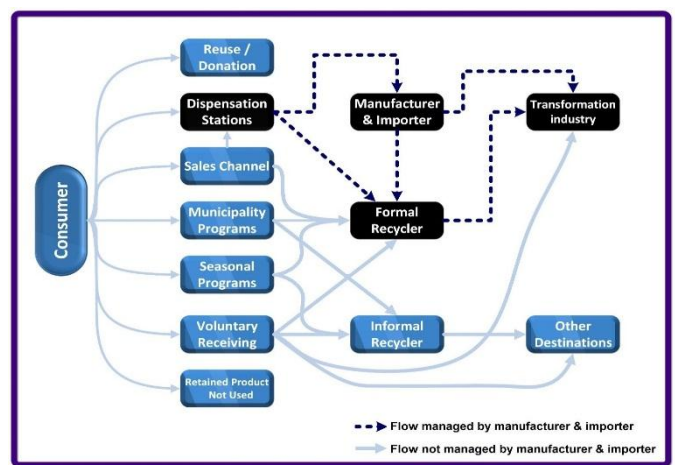


Figure 8: Independent operator model[15]

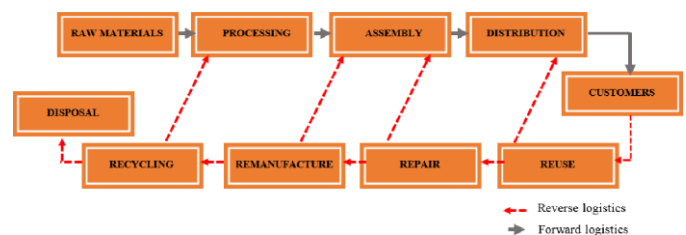


Figure 9: Reverse logistics in closed-loop supply chain[16]

4. BENEFITS OF REVERSE LOGISTICS

Reverse logistics is believed to be a solution to help businesses reduce costs, increase revenue, and especially attract customers. The benefits it brings are immense and have very positive impacts on the economy, people, and the environment.

Reverse logistics creates smoothness for the logistics process. In many stages of the logistics process, some products do not meet the requirements of repair, and defective packaging must be re-labeled ... To ensure that these products are returned quickly and promptly to the logistics channel. At the most time, it is necessary to generate a series of reverse logistics activities to support this downstream movement. This shows that the operation of reverse logistics lines will contribute to ensuring a smooth logistics process. In other words, in order to be effective in downstream logistics managers, companies need to work together with reverse logistics activities[17].

4.1 Reverse logistics contributes to improving the customer service level

Through the recovery of products that do not meet the needs of customers to overcome, repair, operate, maintain ... will contribute to satisfying customers' requirements better, improve the customer service of level business goods. Therefore, a good recovery policy will contribute to a competitive advantage for businesses[18].

4.2 Reverse logistics save costs for businesses

When goods must be recovered in the reverse logistics channel, the costs related to transportation, storage, restoration, repair ... goods recovered will increase. It is estimated that the cost for backward logistics activities on average accounts for 3% to 15% of the total cost of the business. However, if the logistics line is well - organized and implemented, enterprises will save significantly other expenses, such as saving the cost of raw materials due to regeneration, reducing the cost of packaging due to the using packaging many times[19]. Recovering the remaining value of products that have been removed or resold products (though it may not be equal to the price of new products) to increase revenue ... Economic benefits That require businesses to invest more and more seriously in reverse logistics programs. Because the costs they have to pay for handling returned goods are uncontrollably far beyond the amount, they invest in managing logically backward logistics programs.

4.3 Reverse logistics helps create a "green" image for businesses

Human production and business activities cause one of the leading causes of severe environmental pollution. Therefore, businesses need to pay more attention to reducing the negative impact of production and business

on the environment through the recovery of materials, products, and packaging to recycle or dispose of it in a manner responsibility. Not only that, customers, functional and public management agencies often highly appreciate the environmental friendly behaviors of enterprises. This once again affirms, if the business is good at reverse logistics, it will contribute to creating a "green" image in the minds of customers and well implement their social responsibilities[20].

5. REVERSE LOGISTICS IN VIETNAM

In Vietnam, logistics has long been known as officially waste management and recovery system operated by the State. Parallel to that is the private informal recovery activity to increase income and seek and utilize scrap for reproduction. Moving to a market economy along with the policy of socializing the urban environment, there have been environmental management enterprises in Vietnam [2]. State management functions on the environment and waste transfer to these enterprises, forming a waste recovery market. However, at present, these enterprises only recover and process a small part of discarded products and wastes of industries, businesses, shop, and households [21]. Besides, in Vietnam nowadays, reverse logistics only focuses on recovering products from customers to change, repair, warranty, or recover packaging for reuse. Enterprises do not have a deep awareness of the role of reverse logistics in creating competitive advantages and sustainable development of enterprises [22]. At the same time, restrictions on management skills, weak infrastructure, and technology have made Vietnamese enterprises have not organized, implemented, and controlled logically and professionally logistics activities career [19].

From the above reality, logistics development in Vietnam is essential for businesses, industries as well as on the national level. Especially in the context of sustainable development has become the Party line, the policy and policies of the State and Vietnam have signed many international commitments on sustainable development such as: Framework Convention of United Nations on Climate Change and Kyoto Protocol, Vienna Convention on the Protection of the ozone layer and the Montreal Protocol on ozone-depleting substances, Basel Convention on the control of trans-boundary transport border of hazardous wastes and their destruction, Stockholm Convention on persistent organic pollutants [2]. In recent times, the logistics industry in Vietnam is changing actively. Vietnam's logistics market has an estimated total value of 60 billion USD. In total there are about 1,000 logistics companies, of which 25 are foreign companies. Notable companies are Maersk Logistics, APL Logistics, NYK logistics, and MOL logistics. Most foreign companies can provide third and fourth-party services, while Vietnamese companies can only provide second-party services. Foreign companies in Vietnam currently dominate the market, with a total market share of about 80%[23]. Vietnam's economy, as well as Vietnam's trade with other countries, has continued to grow over the past two decades, helping the demand for transportation increase sharply, putting pressure on limited resources. In the current situation, Vietnam has a lot of potential and advantages for the development of the logistics industry in general and logistics in particular.

6. REVERSE LOGISTICS APPLICATION IN THE INDUSTRY

6.1 Reverse Logistics application in the automation industry

Today, the use of automation technologies and equipment is becoming more and more popular than ever, along with increasing competitiveness in the market, promoting the demand for use, the birth of institutions law on environmental protection and optimization of natural resources. For example, through the recovery of automated machinery products will make companies and businesses receive more satisfaction from customers, by improving the reproduction process and increasing the product life cycle. To minimize the pollution that may cause the environment. Logistics applications back into the automation industry are becoming increasingly important [3]. Automation production is holding a prominent position in the overall industrialization supply chain. In the reverse logistics process, there are many unified relationships among businesses in the downstream supply chain with customers of automation manufacturers. If automating businesses adopt effective recovery policies and laws, they can reduce complaints from wholesalers, retailers, and end-product consumers [12]. It allows automated manufacturing enterprises to agree with downstream suppliers to minimize and address ambiguous information. Thus, reverse logistics in the automation industry, is the recovery and re-production, reuse of products in automation industry such as machinery and equipment. Logistics reverse also contributes to the production export activities, and customer use are smoother and efficient.

6.2 Evaluate the importance of reverse logistics applications to optimize costs in the automation industry

From the theory of reverse logistics as well as the actual requirements of minimizing environmental pollution or minimizing cost and logistics in general and reverse logistics in the automation industry, in particular, has been born and played a vital role. In the automation industry, the implementation of reverse logistics not only improves the quality of the logistics service of the business, improves production efficiency but also reduces the cost of production. Manufacturers can see the gaps and shortcomings in production, service, and management sources, thereby promoting the improvement of product design, content management, and production process operations[18]. From a social and logistics perspective, reverse logistics also helps to reduce significant negative impacts on the environment, use resources most effectively, and enhance the green logistics process. Also, reverse logistics in the automation industry also helps businesses promote their image to customers and ensure their trust. Defective products will be recovered and repaired to make the services provided to customers more reliable. It can be seen that reverse logistics is gradually becoming prominent in the current and future supply chains. Forward and backward logistics needs smooth and flexible cooperation and operation to create the best customer service and become an advantage in a fiercely competitive business environment paralysis.

6.3 Building a reverse logistics model in the automation industry

In Vietnam, the reverse recycling process for old vehicles such as cars, motorbikes, ships is still entirely new and does not have strict legal regulations. Therefore, the following, we will introduce the basic reverse logistics model for the means of transport beyond the expiry date. The process of recovery, reuse of parts, and recycling of machine components often accounts for a low rate on a vehicle, but the overall benefit value they bring from several recycling vehicles is enormous. Mainly from parts containing alloy, metal.

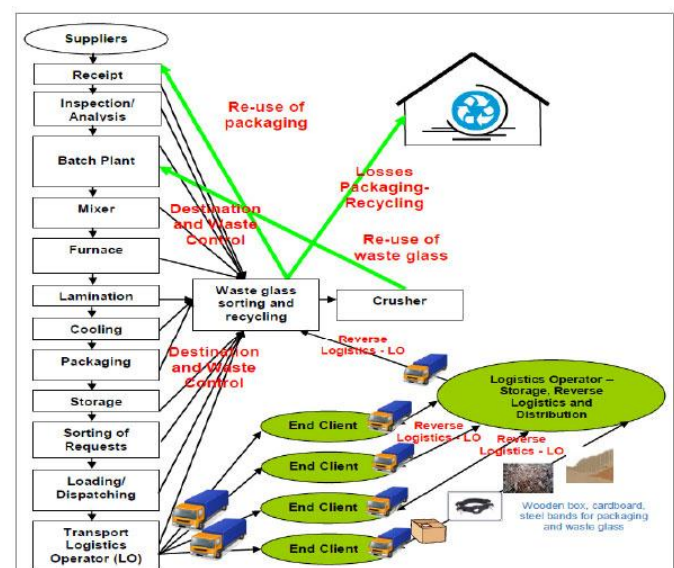


Figure 10: Model and process of recovery and recycling of used vehicles in the automation industry[17]

6.4 Reverse logistics in the plastic industry

Plastic is an integral part of the life of the 21st century. They not only provide us with useful, light, and durable products but also play a vital role in the sustainable development of our world. All activities in modern life are influenced by plastic, and many depend entirely on plastic products. Therefore, the effective use of reverse supply chains in plastic products is significant. In the issue of reverse logistics, recycling is the best choice for plastic products after the first use. Most recycled plastics are from the commercial and industrial sectors, with bottles recovered from domestic sources. The revised Wastewater Framework Directive (WFD) provides a model to promote waste management activities in the EU. The foundation of this Directive is the recognition of a five-step waste hierarchy as a priority order that is flexibly applied by using life cycle thinking of allowing each waste stream to be handled in a right way most environmental, considering economic and technical feasibility. The hierarchy to improve resource efficiency has a descending order of priority as follows: 1) reduction, 2) reuse, 3) recycling, 4) recovery, and 5)

processing. The most efficient approach to resources is not to generate waste from the beginning or create as little as possible. The next option is reusing (reuse again). If reuse is not feasible, products should be recycled, provided that it is more ecologically efficient from a life cycle perspective than a recovery plan. The last option is processing, and one thing needs to be minimized. The plastics industry has developed its long-term vision for waste management. An essential goal of plastic manufacturers is to reduce the impact of plastic waste on the environment by:

- Transfer as many organic waste streams as possible from the landfill and therefore, conserve critical resources;
- Use a combination of recovery options to save energy resources, taking into account ecological efficiency;
- Handling and recovering plastic waste streams according to the defined environmental quality standards;
- Full access to all stages of the plastic product life cycle to create the most significant environmental benefits can be achieved in the use of plastic products.

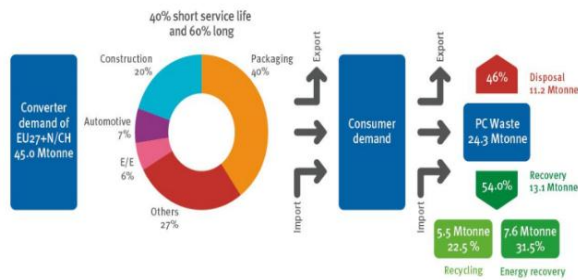


Figure 8: The revised Wastewater Framework Directive (WFD) [20]

7. CONCLUSION

It can be seen that reverse Logistics is an integral part of the supply chain management system because of the costs and scale of services related to this process in the chain. The first impetus for conducting reverse logistics and reproduction is due to legal issues, which have helped to ensure improved image and brand recognition while eliminating legal costs when an accident due to the use of used components. Reverse logistics is considered a tool to help businesses improve their competitiveness, increase profits, and satisfy customers better. This requires businesses to be more aware of the role of reverse logistics and make appropriate investments for this activity. A major cause of severe environmental pollution is production and business activities. Therefore, businesses need to pay more attention to reducing the negative impact of production and business on the environment through the recovery of materials, products, and packaging for recycling or to dispose of it responsibly mission. Not only that, customers, functional and public management agencies often highly appreciate the environmental friendly behaviors of enterprises. This once again affirms, if enterprises perform well in reverse logistics, they will contribute to creating a "green" image in the minds of customers and well implement their social responsibilities.

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