

Reverse Logistics in Developing Countries: The case study of food retail sector in Angola

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Abstract

Reverse Logistics studies have been focused on the manufacturing industry and in developed countries. Therefore exists a scarcity of Reverse Logistics studies related to developing countries and other industry sectors as food retailing, which is an important sector in developing countries.

The present study aims to fulfill the identified gap, by conceptualizing a methodology that will guide the implementation of Reverse Logistics in the food retail sector in developing countries. For that purpose, it will be studied the case study of Angola.

The main conclusion to be drawn from the work developed is that the Reverse Logistics is at the range of food retail chains in developing countries and that its main barrier to be overcome is the reactive attitude of companies.

Keywords: Reverse logistics, sustainability, developing countries, Angola, food retail.

1. Introduction

In the recent years, Humanity struggles to develop in a sustainable way. The Earth's natural regeneration capacity shows to be insufficient to cope with the excessive consumptions of natural resources. The impacts of such consumption are felt not only on the environment, but also on economies and societies, especially in developing countries. This problem requires that communities, organizations and countries start to implement sustainable practices like Reverse Logistics.

Its implementation extends to almost all sectors of industry. However the factors that influence it, vary from sector to sector and also according to the country of activity (Agrawal et al. 2015). The studies conducted to date are focused mainly in the sectors of manufacturing and are consider

within developed countries (Adebambo & Adebayo, 2014). Therefore exists a gap related to the study of the application of reverse logistic in developing countries and in other sectors. Being the food retail sector an important sector in any economy, where reverse logistics is an important activity this sector is taken as the focus of the present study.

The objective of this study is than to develop a methodology that will guide the implementation of Reverse Logistics in the food retail sector in developing countries. For that purpose, and to in order to deal whit the lack of information about the implementations of reverse logistics in developing countries, a case study is carried out, namely in the food retail sector of Angola.

The remain of this paper is structured as follows. In the next section is developed a review of the relevant literature to the study

of reverse logistics implementation in the food retail sector. In the third section the case study is presented. The fourth section, discusses the developed methodology, main objective of the present study. Finally, section five summarizes the conclusions of the study and indicates further research needs.

2. Literature Review

2.1 Reverse Logistic

According to Rogers & Tibben-Lembke (1998) Reverse Logistic is "the process of planning, implementing, and controlling the efficient, cost effective flow of raw materials, in-process inventory, finished goods and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirements". However, according to Brito & Dekker (2003) these definitions don't include the entire concept because, the reverse flows of goods can be raised from excess inventory through the entire supply chain and not necessarily in the points of consumption and on the other hand, the final destination can be a recovery point, also at an intermediate stage of the supply chain, and not necessarily at the source.

2.2 Reverse Logistic key processes

Based on previously works, the authors Agrawal et al. (2015) made a detailed analysis of the reverse logistic and identify their key processes, as shown in Figure 1.

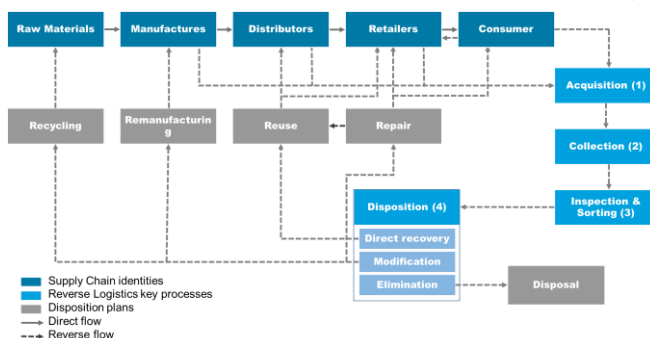


Figure 0.1 - Reverse Logistic key processes, adapt from Agrawal et al. (2015)

1) Acquisition – Reverse Logistic begins with the acquisition of goods. This process is usually done by consumers or retailers (Agrawal et al., 2015), but according to the definition presented earlier by Brito & Dekker (2003), any other person involved through the supply chain can also create a reverse flow of goods.

2) Collection – Next, is the process of collection, transport (if necessary) and delivery for inspection and sorting. According Kumar & Putnam (2008) this process can be done directly from the client, through retailer, or by outsourcing, and depends on the quantities and associated costs (Atasu et al., 2013).

3) Inspection and sorting – The third stage of reverse logistics is the inspection and sorting. In this process the goods are accepted in the reverse chain, and usually evaluated and separated according to their condition (Brito & Dekker, 2003).

4) Disposition – The last step of reverse logistic is treatment / final destination of goods. According to Agrawal et al. (2015) literature is full of alternatives and variants, however five of these alternatives are discussed more often: reuse, repair, remanufacturing, recycling and disposal.

2.2 Implementation

Once understood the key processes of reverse logistics, is important to understand what influences its application. According to Brito & Dekker (2003) it's important to take into account, five fundamental questions, which are: "Why (return)?"; "Why (receive)?"; "What?"; "How?" and "Who?"

- **Why (return)?** – The actual reasons for the reverse flows.
- **Why (receive)?** – The driving forces behind reverse logistics.
 - **What?** – What is being returned? Which goods characteristics makes recovery attractive or compulsory?
 - **How?** – How the value is recovery? The actual process carried out in reverse logistics systems.
 - **Who?** – Who are the actors and their role in the reverse supply chain?

The research carried in this field focus mainly on the **driving forces** and **barriers**. Noted that they are not mutually exclusive, in fact they are highly related and there is sometimes a very thin line between them (Carter & Ellram, 1998). The absence of a driver is often seen as a barrier to the

implementation and development of reverse logistics (Hung Lau & Wang, 2009).

The drivers and barriers are:

External – General Environment

- **Environmental:** environmental drivers are those that lead companies to practice reverse logistic with the direct goal of improving its eco performance and protect the environment.
- **Government / legislative:** the rules imposed by any legal authority to dictate the obligation of a company to do reverse logistic. Traditionally this laws obligate companies to collect their products or packaging after their use (Álvarez-Gil et al., 2007). These regulations often have an indirect objective of protect the environment.
- **Society and non-governmental organizations:** those incentives that lead companies to meet the expectations of the community and society (Shaik & Abdul-Kader, 2014).

External – Operational Environment

- **Suppliers:** the responsibility of the reverse logistic in supply chains should be viewed collectively and not individually, so the relationship with suppliers can generate positive or negative counterparts for several companies. For example the need for materials from suppliers, can be fulfil through collaboration and the use of reverse logistics (Toffel, 2003).
- **Competitors / market and aftermarket:** These drivers are concerned whit the competitive advantages that companies can achieve through reverse logistic enterprises (Janse et al., 2010). Reverse logistic also takes a key role in the strategies related to the aftermarket. The company can use it to explore these secondary markets or to defend from them.
- **Clients / consumers:** the use of reverse logistic may enhance the access to new consumer segments that show greater concern for environmental aspects (Álvarez-Gil et al., 2007)

Internal

- **Social responsibility:** social responsibility drivers are set of values and principles embodied in the organization

that motivates reverse logistics. These values usually give the company a "green" image, attractive for many customers (Akdogan & Coşkun, 2012).

- **Economic / financial:** all economic benefits obtained, directly or indirectly, through reverse logistic (Brito & Dekker, 2003).
- **Infrastructure and technology:** infrastructure and technology (technological know-how, monitoring systems etc.) are mainly barriers to the implementation of reverse logistic, especially when missing (Abdulrahman et al, 2014.).
- **Management / individual factors:** the drivers of management / individual factors are related to awareness, experience and commitment of workers, especially managers (Abdulrahman et al., 2014).
- **Human resources:** Lack of skilled labor, or labor-skilled workers (Abdulrahman et al, 2014).

Taking into account all factors, companies can take two attitudes toward this activity. **Reactive attitude**, when is implemented in order to comply with the imposed legislation, and is seen as a cost. Hence the goal in its management is to reduce at most their impact on business results. **Proactive attitude**, the company includes the activity in its long-term strategy, in order to gain competitive advantage. In this case reverse logistic is seen as a capacity which adds value to the product and not a cost (Zhu et al., 2011). Is important to mention that the above studies were focused in a developed countries context.

2.3 The Food Retail Sector

Losses in this sector can be distinguished in two ways, food surplus (when still in the conditions suitable for human consumption), and food waste (when no longer suitable for human consumption) (Papargyropoulou et al., 2014). The first can be recovered through donations. These products can also be treated as food waste, thus losing part of the value they still have. The food waste have a greater variety of alternatives to its recovery. Traditionally they can be recycled into animal feed or fertilizers, or can used for biofuel and energy production. The inability to recover some value in these products result in their elimination. In figure 2 are depicted traditional processes in the food industry waste management.

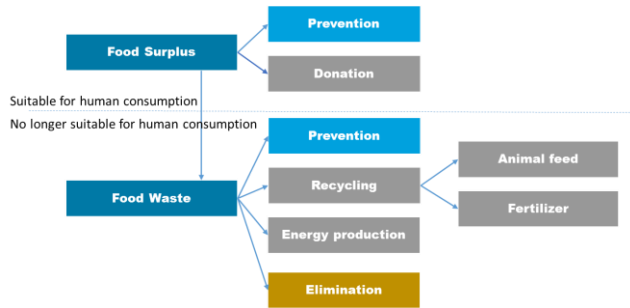


Figure 2 – Food waste management adapted from Papargyropoulou et al., (2014)

2.4 Developing Countries

In recent decades, globalization has brought to the least developed countries, access to capital, technology and knowledge. As consequence many of these countries have shown great economic growths. However, the development of reverse logistic in these countries is at an early stage of maturity (Hung Lau & Wang, 2009). The literature in this area is also limited, and the study focuses mainly in the manufacturing industry as a whole, and in particular in the electronic industry and automotive (Adebambo & Adebayo, 2014). Only a reduced percentage of developing countries have these sectors evolved, so the study of implementation of reverse logistic in developing countries, is focus mainly in China, India or Malaysia (Sharma et al., 2011).

Other important issue is that usual drivers and barriers associated with developed countries do not occur in these less developed economies. Government bonds / laws that obligate companies in developed countries don't occur in most developing countries (Sharma et al, 2011; Vijayan et al, 2014; Bouzon et al, 2015; Shaharudin et al, 2015; Kannan et al, 2014). In fact, in most of developing countries the legislation is still in a preliminary state due to poor governance and lack of resources for monitoring (Kannan et al., 2014). Another factor common to developed countries that encourages the implementation of the reverse logistic, and also not present in the countries studied is the public awareness of environmental issues (Kannan et al, 2014; Vijayan et al, 2014; Shaharudin et al, 2015). Added to this factor, the private sector in most of these countries also don't recognize the importance of environmental issues, for example much of Malaysia's manufacturing industry sees environmental activities as expensive (Shaharudin et al., 2015). On the other and, factors that may

lead to the implementation of the reverse logistic in these countries are the economic/financial gains, and the resource scarcity (Eltayeb et al, 2011; Kannan et al., 2010; Kannan et al, 2014). Studies relating to other developing countries, like Brazil (Bouzon et al., 2015) and Nigeria (Adebambo & Adebayo, 2014) confirm this trend in developing countries.

3. Case Study – Food Retail Angola

Angola is a developing country that presents a wide range of opportunities, but also high risks and difficulties. Currently is going through a difficult period marked by the economic crisis, resulted from low oil prices. Thus the Angolan market in the coming years will not be as attractive compared to the years that preceded it. The investment will be reduced, and the triggering of events can lead companies to focus on strategies and solutions to improve the efficiency of their operations in order to reduce costs.

The food retail in particular, has enormous growth potential, however, given the slowdown of the economy, it has also been a period of lower growth. Since this is a market where profit margins are considerably low, the focus on logistics and sustainable development, as has happened in other economies, can take great relevance.

3.1 Reverse Logistics in the food retail sector of Angola

A detail study about reverse logistics in food retail in Angola, was conducted based on questionnaires and aimed to identify the activity level of development in the market, characterize the attitude of the key players in the industry and also sought to identify clearly what the main drivers and barriers. The study concluded that the activity is already present in some companies in the food retail sector in Angola, but is not assumed as an independent activity. It conclude that there is widespread interest in the subject, confirming the trend for companies to seek more sustainable solutions. With regard to drivers and barriers, it was concluded that the main limiting factors found in the literature review, for developing countries, there are also in this market, they are the absence of legislation and societal pressure. However, it was found others limiting factors with great importance such as the absence of pressure from suppliers and customers /

consumers and the lack of infrastructure and technology. On the other hand it was found that the main motivating factor in developing economies, the creation of economic / financial benefits, takes a less important role in this situation, showing reactive attitude toward reverse logistics.

4. Methodology – Implementations of Reverse Logistics in food retail sector in developing countries

The implementation of reverse logistics activities in the food retail sector, in developing countries should taken as basis the framework developed by Brito & Dekker (2003). However there are some points of this framework that need to be analyzed in detail given the context of developing countries, such as:

- 1) Identify the goods that should be incorporated into the reverse logistics.
- 2) Develop the necessary guidance for companies to do so.

As mentioned above, the goods to be incorporated in the reverse flow of this companies are the same as in developed countries: perishable food, non-perishable goods, recyclable waste and transport accessories. Thus the important thing is not identifying the goods to be incorporated, but define to them a priority.

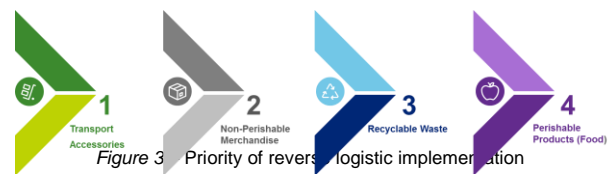
Based on the work developed it was concluded that the implantation should follow the priority suggested in figure 3. This should start by analyzing the transport of accessories and end up in perishable products, however this priority is not constrained and should be adjusted to the reality of each situation.

Nonetheless, the study conducted shows that many companies practice this activity subconsciously. So, it's suggested for companies to answer the following questions before the implementation:

- "The company reuses some sort of transportation accessories such as pallets, plastic boxes, etc.?"
- "The company practices return activities to the supplier or returns from the store to distribution center?"
- "The company reuses or recycles any type of waste produced?"
- "The company donates part of the food products not sold?"

The affirmative answer to any of these questions may indicate that the company already practices reverse logistics activities. In this situation the proposed methodology should be used as a tool of improvement for the identified activities. Each of the issues is associated with a type of good to be incorporates in the reverse flow of the supply chain. If the answer to correspondent question is affirmative the company should realize if their processes are being developed in the best way and look up for other measures presented in this paper that, can improve their operations.

If the answer to all the questions is negative, the company should follow the implementation priority suggested in the methodology, and detailed below.



4.1 Transport accessories

The earlier study suggests that transport accessories should be the priority in the implementation of the reverse logistics.

There is no ideal implementation process that companies in the market should adopt, but there are important factors to keep in mind. Given the differences found in developing countries, the implementation of transport accessories reverse logistics, should focus initially, on the operations that occur within the retail chain.

The retail chains should ensure that all products have the right transport accessories in order to optimize the direct distribution operations. It should also ensure a high control over the inventory of such goods, being constantly aware of the unused inventory and losses.

When the transport accessory fulfills its purpose, it must be collected for reuse. The collection process should take advantage of the return of vehicles, responsible for direct distribution. In the distribution center should be an area dedicated to the treatment and reuse of this goods. The area should be installed close to the direct distribution operations, given that its main function is the provision of accessories to direct distribution. Its facilities should include one or more arrival docks,

depending on the volume handled, a storage area and an operation zone.

Consequence of its size and importance, this particular operation will require more human resources and capacity than the remaining reverse logistic activities.

5.2 Non-perishable goods

The reverse logistic of non-perishable goods is a common practice in the food retail chains, in developed countries. These goods, if not sold in the pre-specified time period, may preserve a considerable value to be recovered. The reverse logistic of non-perishable goods should play a primary role in the implementation of the activity in food retail sector of developing countries. Its process should include the following steps:

1. Negotiation of contracts with suppliers and definition of return policies.
2. Identification of the reverse flows based on their return reasons and the final destinations.
3. Development of the reverse logistic process.
4. Monitoring and continuous improvement.

5.2.1 Suppliers contracts

The development of return policies is a key incentive to the implementation of the reverse logistic for non-perishable. But what policies should the company negotiate with its suppliers in order to create value for the company?

Based on the work developed by Simchi-Levi et al. (2008), the following contracts are suggested:

Buy-Back Agreement - In this type of contract the supplier agrees to buy back unsold goods at a pre-agreed price, higher than the residual value. This agreement encourages the retail chain to make larger orders, since the risk associated with products not sold decreases. On the other hand, the supplier risk increases, but also increases the quantity sold to the retail chain. In the case of non-perishable goods supplier ends up, with the unsold goods that can be resold to other customers. This agreement aims to increase the quantity ordered by the buyer, reducing his probability of stock out.

Contract Quantity, Flexibility – In this type of contract the supplier agrees to pay back the full price for returned goods to a certain, pre-agreed amount. This agreement motivates the retail chain to sell

more, in order to avoid exceed the pre-agreed amount of returned goods. At the same time the risk that the supplier incurs decreases.

The development of return policies for unsold goods could stimulate the return volume and in addition create value from it. However, this is not the only driver to the development of reverse logistic of non-perishable goods. It's important to study other drivers found in the market and distinguish the different reverse flow of non-perishable goods.

5.2.2 Types of reverse flow

The process reverse logistic for non-perishable goods, which will be explained in the following section, must fit the needs and characteristics of the each type of reverse flow. So it's important to distinguish the traditional reverse flows in food retail companies

The reverse flows of non-perishable goods are generated for various reasons, namely the seasonality of demand, the amount of returns, quality issues and the existence of devolution agreements. The different reasons that trigger this reverse flow also dictate different destinations for each type of goods. The most common destinations are return to the supplier or reinsertion in the direct chain of distribution. The company must therefore group the reverse flows depending on the return reasons and final destinations.

In the scheme of Figure 35 are identified the traditional reverse flows of non-perishable goods found in food retail. Companies must analyze each of these streams individually and see if there is the need to integrate into its inverse chain and most important how to do it.

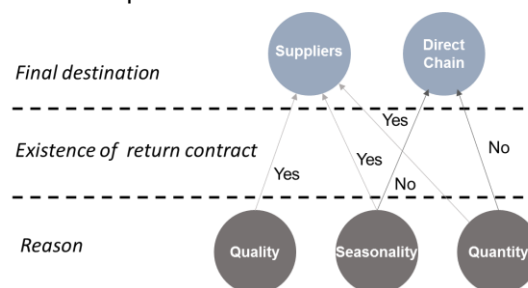


Figure 4 – Traditional reverse flows in food retail

Quality - Contract The first identified reverse flow, is concern whit the goods that are removed from store, or returned by quality issues. These goods, if don't have a return contract concern whit quality issues,

they don't represent value for the company, as such, they must be destroyed. If they hold back a contract, they must be collected and returned to the supplier. Usually this type of return occurs sporadically and under uncertain quantities. Therefore, it requires some flexibility by the part of those who collect the products. Some retail chains choose so impute the responsibility of collecting to the supplier. If the company take over the operations of this reverse flow should adopt a system in warehouse pick-by-line type, to avoid create stock. The goods are received by store, pallets, pallets are broken and used to create new pallets per vendor.

Seasonality - Contract The second type of non-perishable good identified are seasonal goods that have returned contracts. The collection of this type of merchandise may require additional efforts in certain periods of time. In the warehouse the goods should take a pick-by-line system similar to the goods quality-contract to avoid stock.

Seasonality - No Contract The seasonal goods that do not have contracts must be collected by the company and stored during times of lower demand. This type of goods requires a dedicated area in the warehouse and as well as seasonal goods with contracts, may require additional efforts to collect in certain periods of time. The operation in warehouse is quite simple. The goods are received, separated by product and stored in a dedicated area. Then, when demand is up again, the products must be reinserted in the direct chain of distribution.

Quantity - Contract The quantity is a factor behind any reason to return. If the amount of discards not justify the collection, then whatever the goods shall be, the reverse logistic is not justified. However, in certain goods, the amount of discards is a reason enough for your collection. The amount of discard may result from commercial business strategy, it can be seen that a strong promotional strategy results in increasing returns. The existence of devolution agreements they shall be collected and returned. The process of collection may be made by the supplier in exceptional occasions, but normally should be made by the retail company. This is a constant reverse flow that requires good coordination with suppliers and a high control over the various inventories of goods in store and warehouse. In

warehouse operations should resemble the flow quality-contract.

Quantity - No Contract Non-perishable goods collected by number of reasons but have no contract can also be used. Demand in stores may differ from store to store and also at different periods of time. Excess inventory in a particular store can be used to address the lack of inventory in other stores across the IL. This process reduces the amount of goods ordered through the use of stock accumulation in some stores. When they reach the pallets of the goods must be broken and must be created new pallets per product. These new pallets, depending on the need for direct distribution chain can create stock or directly to reintegrate direct distribution.

5.2.3 Reverse Logistic process

The reverse logistic process of non-perishable goods depends on the previously identified streams. There are common steps for all streams and depending on their quantities and destinations, may exist flows that can be handled together.

The process, regardless of the type of flow begins with the return order. The order, can be done by various entities. The most common case and applies to all goods except those returned for quality reasons, is given by the entity responsible for defining the range of products on sale and the stock management. In the particular case quality returns, the order may come from the supplier, quality department or the store itself in agreement with the other departments.

When received the order to return, the store must prepare the goods on pallets to be picked up. They should be used the minimum number of pallets to optimize the resources and the same pallet may get different types of reverse flow properly identified. Besides organized by flow, products must still be arranged by the supplier in order to facilitate the process in the warehouse. It is suggested to shops that reuse the cardboard boxes that are no longer used to accommodate the returned goods. The pallets must be accompanied by the store identification and collection orders for the right control of the collected products and to able be track them throughout the supply chain.

Then follows the collection process, this should use the empty trucks on their return

journeys. The collection process is the same as in the direct distribution.

When the goods arrive at the warehouse, the pallets should be checked and the products returned in order to realize if the order of return was well done. The goods of the type quantity-contract, seasonal-contract and quality-contract should follow to pick-by-line operation. The objective of this operation is to create pallets per supplier with various returns, avoiding creation of stock. Seasonal – no contract goods must be stored in pallets per product. Finally the goods quantity- no contract, should also form new pallets, by product and next there are sent to the stock of direct distribution.

The last step is the collection of goods by the supplier. This may require a new conference to check the condition of the goods or accept their return without checking their condition. The first option requires the presence of an operator to check the quality of the goods to the supplier.

The process described should require a dedicated area or warehouse, nearby the distribution center. This proximity becomes important when there is reinsertion of goods into the direct distribution. This process also requires one or more loading (depending on the amount of returns), a temporary storage area for seasonal merchandising, and a working area for the pick-by-line operation.

This study concludes that the implementation of the reverse logistics for non-perishable is a simple process and does not require significant human resources, infrastructure or technology.

5.2.3 Monitoring and continuous improvement

Once implemented the process of reverse logistic for non-perishables, companies must take into account some factors that can compromise the activity.

It's important to have a good control over the merchandise along the supply chain. All departments involved in the direct and reverse chains must have a good coordination. It is important to be able to trace back any goods and know, in real time where they are. One of the main obstacles is related to the condition that the goods are returned to the supplier. The criteria of acceptance must be clearly defined in the

initial contract, in order to avoid any disagreement between retail chains and suppliers.

5.3 Recycle waste

Municipal waste management systems in developing countries lack the means necessary for the right management of the various types of waste, especially recyclable waste.

The municipal waste recycling process involves several steps, starting with the disposal of waste, followed by the collection, sorting and finally recycling which results recycled materials. The step of collecting is, in most cases, where operating costs are higher. This step is traditionally performed in two ways, by collecting door-to-door or Eco points, which requires high transport means and costs or by depositing the waste in centralized voluntary delivery points. This second process minimizes the need for means and cost but also has a lower adherence.

The food retail chains, present ideal conditions for the establishment of voluntary centralized collection points. Their facilities already are responsible for producing high amounts of waste. Furthermore they have direct contact with the consumer, who goes regularly to the food retail stores to stock up on food.

The implementation of centralized voluntary collection points can generate several direct benefits to sector. First, the creation of these point avoid inadequate disposal of waste nearby the facilities. These cooperative systems can also create a secondary business. The recycled materials can be sold in the market so they have economic value.

As mentioned, the main drawback of the collection method through voluntary collection points centralized is the adherence by the population. In addition to awareness campaigns, there are recycling programs that provided monetary rewards to the customer for waste disposal. The companies can choose to pay monetarily or provide discounts on their next purchase, thereby encouraging consumers to buy more

5.4 Perishable goods

The inverse flow of perishable goods (food) is divided into two major groups: food surpluses, while still suitable for human

consumption and food waste when no longer suitable for human consumption.

The reverse logistic of food waste is an activity associated to highly developed retail chains. Those, independently or by way of cooperation, use the food waste for the production of fertilizers, biofuels, energy production or animal feed production. The implementation of these activities in developing countries should not be a priority. The investment is high as well as the required resources. However, in countries where there is a high growth of the agriculture and livestock sectors, there is opportunity to be created support industry, like the production of fertilizers or animal feed production. The food retail market should therefore be alert to the emergence of these industries. Collaboration with those industries can generate huge benefits, with a reduced amount of effort by the part of retail chains.

The amount of food surplus produced is smaller in developing countries, but the need for them is considerably higher. The donation of food surplus should be viewed as a very important activity by the food retail in developing countries. However, given the difficulties encountered on those markets, the development of operations should be at the responsibility of charity institutions. The food retail companies should only take control and responsibility over the activity, when the expectations of society and social responsibility factors so request. These measures, in addition to the social image generated, can benefit from a free collection service.

5. Conclusions

From the study developed it can be concluded that reverse logistics is within the reach of companies that operate in the food retail sector in developing countries. Barriers to its development are high, but the main influencing factor is the reactive attitude of companies towards activities such as reverse logistics. It is important, in this context, to change the attitude described in terms of sustainable development. On the other hand barriers such as lack of financial resources or capacity infrastructure and technologies, described as extremely relevant in these countries, take a minor importance, given the simplicity of the reverse logistics process and its implementation.

Although the present study has an exploratory nature, the work developed should be further developed. The use of a case study to generalize the reality found in developing countries limits the application of the developed methodology. It is therefore necessary, in a further development, to study the application of the proposed methodology to other developing countries. This action will help to validate the methodology in the context in which it was proposed. The study also reveals that there is a high need to develop the awareness of companies and firms for the reverse logistic problematic. The reactive attitude of companies is critical and must be overcome.

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