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Determinants of Reverse Logistics Execution in the Brazilian supermarket industry

Track: OM in Latin America and the Caribbean

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ABSTRACT

The paper aims to describe the determinants of reverse logistics execution for post-consumption in the Brazilian supermarket industry. The method involved multiple case study, non-participant observation and semi-structured interviews. A conceptual model was developed mapping the determinants and, then, those most and least used by the sample were identified.

Keywords: Brazil, Determinants, Reverse logistics, Supermarket Industry.

INTRODUCTION

Logistics is of great importance for organizations. Time and quality are demanded by customers and should be pursued by organizations that wish to remain competitive. As important as managing the products and information´s flow from supplier to customer, is managing the information and products´ reverse flow, with those products that were discarded or returned by customers. According to (Carter & Ellrain, 1998). “Reverse logistics is a process whereby companies can become more environmentally efficient through recycling, reusing, and reducing the amount of nialerials used”.

Reverse logistics covers the management of reverse channels and becomes a relevant area to get the correct revaluation or disposal of these products, it contributes positively to the environment and the social focus of many studies and debates today.

Given the pollution and natural resources scarcity, society has become aware of the importance practice of the attitudes that aimed the nature preservation. Questions as how you can contribute on a daily basis in support of environmental and if organizations positive environmentally acted begin to be made. In this context, laws have sought a balance between economic development and environmental management. This reality requires companies to incorporate in their strategic planning issues related to environment and social assistance, thus meeting government and society´s interests.

The waste generation is a reality experienced by several companies, among them supermarkets. Aiming to understand the determinants of post-consumer treatment of the waste generated by supermarkets, comes the question: why post-consumer reverse logistics is performed in the supermarket sector?

In this sense, this study´s objective is to understand the performance determinants of post-consumer reverse logistics in the supermarket sector. Specifically we sought to identify the main theory determinants in the reverse logistics literature, see how post-consumer reverse logistics processes businesses are developed in the supermarket sector, and then compare those determinants in different supermarkets sizes and try to identify the relationships between these determinants.

One importance of this study is that it enhace the scientific literature by filling gap. In the literature review we found few studies that had as a research focus the companies motivation in performance a reverse logistics. Thus, instead of working on consumers' perception about the environmental issue, as many scientific articles, we

tryied to look the business manager. The knowledge of the determinants in performancing a reverse logistics helps government, community and other interested parties to understand the level of companies development in relation to environmental issues, assists in shaping public and environmental policy, corporate decision making and choice of place where purchase for socially conscious customers.

THEORETICAL BACKGROUND

REVERSE LOGISTICS

Every day, many products of several models are released and dropped. The life-cycle of products is increasingly limited by various determinants, such as the renewal of models, use of less durable materials, which emphasizes the disposability, rapid obsolescence, little use, among others (Leite, 2009). Given these facts, it is extremely important the proper treatment to these products not to be simply released into the environment, but to return to the business cycle, or to be reused, repaired or properly disposal.

The reverse logistics, according to Rogers and Tibben-Lembke (1998) 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 point of consumption to the point of origin for the purpose of recapturing value or for proper disposal." ROGERS AND TIBBEN-LEMBKE (1998, p.108)

(Dowlatshahi, 2010 p.1361) understands reverse logistics (RL) "as a process by which a manufacturing entity systematically takes back previously shipped products or parts from the point- of-consumption for possible recycling, remanufacturing, or disposal."

A RL system can be viewed as a redesigned supply chain to systematically manage the flow of parts and products that were destined for remanufacturing, recycling, or disposal activities (Dowlatshahi, 2010).

A well managed reverse logistics program can result in savings in inventory carrying, transportation, and waste disposal costs as well as improving customer service (DAUGHERTY et al, 2001; LEITE, 2009)

It is observed that the literature on the subject highlights the possibility of adding value to products that often go to waste. If the revaluation of these products is not possible, they should be discarded, but in a properly way. Chaves e Batalha (2006, p. 425) argue that the focus of the reverse logistics involves the reintroduction of products or materials in the production or business cycle value chain. Therefore, the product´s disposal should be the last option to be considered.

Reverse logistics can be divided into the post-sale reverse logistics and post-consumption reverse logistics. Leite (2009) understands that this differentiation is necessary, despite the areas interdependence.

Leite (2009) classifies after-sales reverse logistics as the area that manages the information and physical goods flow after the sale and that goes back into the productive cycle with little or no use due to defects, errors in processing, among others.

The reverse logistics of post-consumer, according to Leite (2009), is concerned with solving the flows of products discarded when their usefulness ends, and these can be transported to final destinations such as incineration or landfill, or have your useful prolonged once they return to the production cycles. There are several possibilities for marketing and treatment of post-consumer goods extinguished after its original use. According to the author, remanufacturing and recycling add economic, ecological and logistics value to post-consumer materials, enabling them returning to productive cycle. The reuse allows revaluation of the asset. The incineration system can transform those waste in energy, adding economic value.

Large amounts of materials can be recycled: cardboard, aluminum, plastic, glass, among others. It can be noted that this is one of most activity practiced by supermarkets. Corrêa (2007) associated with a recycling as a socio-environmental attitude, because it helps in preserving the environment and environmental resources, beyond generate employment in the industry of post-consumer.

The structure of the reverse logistics system is justified by several determinants, which are exposed in the next section.

Determinants that lead to the adoption of reverse logistics

There are many reasons for the implementation and maintenance of the reverse logistics channel. According to the literature, the main determinants are: 1) reducing costs, 2) revenue gains, 3) existence of environmental laws, 4) adaptation to

environmental issues, 5) generation of a differentiated company imaging for the customer, 6) material flow efficiency.

Cost reduction can be mentioned as one of main reasons for the practice of reverse logistics by companies. Pires (2007) states that acquire new products is often more expensive than recycling. As the author, cost savings can be realized in the acquisition, manufacture and disposal of materials, because if a material is not reused, it can generate cost to be disposed of in a controlled manner.

Leite (2009) says that there are three types of costs associated with reverse logistics: accounted logistics costs, management logistics costs and intangible costs. The accounted costs refer to the sums of the costs of reverse channels related to transportation, warehousing, consolidation and information system operations costs of products destination selection and redistribution of reused products. The management of logistic costs translate into controllable costs, opportunity, improvement, among others. The intangible costs refer to costs involving brand image, corporate image and corporate reputation in the society.

Not all companies recognize reverse logistics as an essential part in relation to the costs of the organization. It is difficult to determine the exact amount of reverse logistics activities because most companies that have reverse logistics systems, does not maintain or can not measure their costs. Therefore, a better structuring of reverse channels becomes much difficult because of this lack of information (Chaves and Martins, 2004).

Leite (2009) states that it is important and necessary that economic goals, such as earned income, are targeted at various stages of the reverse logistics, because the absence of gain in one or more link in the chain can lead to disruption of reverse flow.

Costa and Valle (2006) state that the economics of reverse logistics can be viewed by means of direct gains in the reuse of materials and adding value in the recovery.

Another form of motivation for many companies to act more environmentally responsible is the existence of environmental laws. Konstantaras (2010) states that reverse logistics has received increasing attention in recent years due to strict environmental standards and the growing environmental concerns, but also because of the awakening to the economic attractiveness of reusing products instead of discarding them.

Many laws have been published in the world mainly targeting the control over the garbage. Castanho and Sacomano Neto (2009) believe that the most effective way to the products return to the revaluation is through laws and regulations. The authors state that in Germany there are high rates of recycling due to the existence of laws that make the manufacturer responsible for the disposal of their waste. Kang et al. al. (2009) claim that the European Union, the collection and recycling of waste is mandatory.

With regard to the Brazilian legislation, on August 2, 2010 was enacted the Law 12,305 establishing the National Solid Waste Policy, which makes government, comunity and firms responsible for all solid waste produced. Among the various law instruments, the reverse logistics systems are included (BRAZIL, 2010).

The adequacy of environmental issues, provided by the practice of reverse logistics, can add positive impact and reputation on society. As Kang et. al. (2009), due to the importance of environmental issues, people are more interested in sustainable production process, which referes mainly to the recycling of produced waste. Leite (2009) states that companies that act ethically and environmental responsible with society are better valued by consumers, employees, suppliers, shareholders of

companies or equity funds. In recent decades there was a greater awareness of society regarding the impact of products on the environment.

The creation of differentiated image and beeter reputation of the company can also be considered determinant of the practice reverse logistics. Leite (2009) states that in recent surveys conducted in Brazil, the corporate image has been identified as one of the strongest motivations of reverse logistics activities by companies from different business sectors. Given the high competitiveness and globalization, firms recognize that not only the profit motive is important. It is necessary to meet the social, environmental and government, ensuring profitability over time. Must be met different stakeholders - shareholders, employees, customers, suppliers, local community (society), the government - which evaluate companies from different perspectives.

Dale and Tibben-Lembke (2001) argue that for many industries, learn to manage the reverse flow is of paramount importance, because the high volume of returned products represents a significant cost. The untreated waste increases the company's operating cost (cost of transport, storage, handling and disposal of products).

The identification of determinants in the literature for use of reverse logistics was the basis for the development of a descriptive model of the relationship between them. The mapping relations between the determinants is described in Figure 1 with the identification of directly involved stakeholders: customers, society, government, employees, shareholders / owners, and the dimensions that affect the company's strategies: marketing, environmental, operational and financial.

The model helps to understand the emergence of the factor(s) or reason(s) for the reverse logistics performance by the companies and their splits within the dimensions and stakeholders involved. The intenttion was better understand the level and degree of

company´s maturity and development in the legal, environmental, marketing and finance relations.

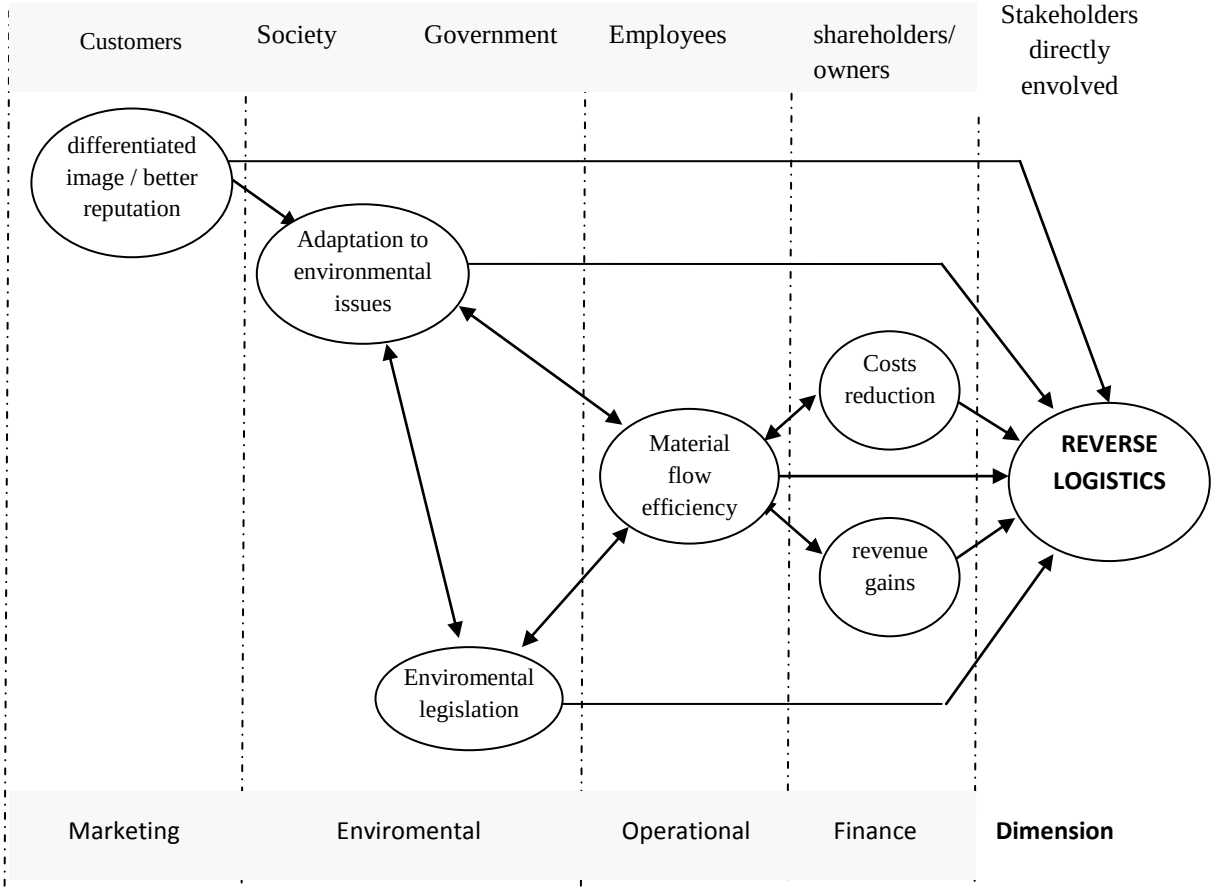

Figure 1 - Model of the existent relationship between the determinants of reverse logistics

Source: The authors

According to the literature review, the reasons for reverse logistics adoption are complementary. This relationship is demonstrated in the model trough arrows between the determinants. For example, when the company´s determinant is material flow efficiency (cause), the consequence would be a cost reduction (effect). Now, if the determinant is costs reduction (cause), a consequence would be the efficiency of material flow (effect). The cause-effect relationship between the determinants will depend on how the company deals with the reverse logistics issues and how develop their strategies.

Packaging and retail supermarket

There are several types of packaging in the market. They enable the transport, protection and containment products. Novaes (2009) states that the package is responsible for maintaining product integrity throughout his career in supply chain, ensuring that it reaches the customer in order and presentable condition.

The reverse channel packaging is considered one of the most important, due to the revaluation by the system of recycling of constituent materials. According to data collected by the brazilian association Business Commitment for Recycling in Brazil (CEMPRE[1]) in the years 2000 to 2006 there was an increased rate of recycling of various materials, including corrugated cardboard, those cartons that are widely used by industry, increased from 60% to 77% in the period (Leite, 2009). Being recyclable is one of the characteristics of cardboard, which highlights the importance of this type of packaging in environmental reality (Novaes, 2009).

The retailer receives daily many cartons packages, used to contain and protect different supplier´s products. Because of the high amount of this stuff, it becomes interesting to sell for recycling or reuse in other functions. Braga Junior et. al. (2009) believes that the secondary market represents a new market niche, because the number of discarded packaging by the retailer can be sold to these markets, representing a new source of revenue.

Retailers can be defined as trading activity that sells products and services to final costumers. If the buyer is not the end customer, the institution can not be classified as retail (Daud; Rabello, 2007). Supermarket is the retail store organized into

[1] Brazilian Acronym for "associação Compromisso Empresarial para a Reciclagem – CEMPRE".

departments that provides a variety of food products, cosmetics, hygiene products, cleaning products, among others. The stores are based on the self-service practice, ie, products are available on shelves within easy reach and people make purchases without the help of a salesperson (Silva et al. Al., 2008).

According to Braga Junior et. al. (2006) the process of reverse logistics in retail is little explored and consequently the retailer ends up leaving out an alternative source of revenue. Parente and Gelman (2006 apud Braga et JUNIOR. Al., 2009) claim that the retail sector can have some functions that contribute to the recycling and reuse of leftovers. Retailers may be a social communities articulator because they have links with both the supplier and the end consumer. Thus, they may have a role in modifying the value chain, as stimulating actions in partnership with suppliers or receiving donations from costumers.

METHODS

This research is considered explanatory because works on questions of "how" and "why" and, in this case, according to Yin (2010) it is importante use a qualitative methodological approach and the most appropriate metodology is case study.

Voss *et al*. (2002, p. 196) states that it is very important consduct and publish case researches, not only because they are good at investigating how and why questions, but also because they are “particularly suitable for developing new theory and ideas and can also be used for theory testing and refinement”.

(Eisenhardt, 1989) states that a a case study is a research wich focuses on understanding the dynamics present within single settings. According to Roesch (1999) in qualitative research the researcher attempts to capture the perspective of respondents. This study aims to understand, through the information and perspectives of people involved in the activity of reverse logistics of cardboard packaging in supermarkets.

This research is characterized as a multiple case study because it involves two supermarkets inttentionaly selected, because as Eisenhardt (1989) noted, when using a limited number of cases, it is very important choose them as extreme situations and polaar types in wich the process of interest is “transparently observable”.

Since reverse logistics is a broad topic and practiced by many companies, the retail universe was chosen. Since the sample is caracterized as "a subset of the universe" (Marconi, Lakatos, 2009, p.225), in this study it consists of two supermarkets, one being classified as a small/medium and another one as large, as ranked by BNDES (1996) that considers the amount of check-outs in each supermarket, 7 (for a small) and 28 (for large). We chose the supermarket sector as an object of study because of its importance in the retail sector and the large volume of cardboard packaging received by them every day.

For confidentiality reasons, the small/medium sized supermarket will be presented as the supermarket “A” and the large size supermarket will be presented as the “B”. The respective managers interviewed are cited as the respondents A and B respectively.

The supermarket A has 900 m² and is located in an outlying district of the Itabira, a 100.000 people living city at Minas Gerais state (MG – located in the middle region of Brazil), which has intense commercial movement of people from their own

neighborhood and adjacent neighborhoods. In total there are three stores under the same administration that are part of a small/medium sized supermarkets associates. The store investigated used to have seven check-outs and 60 employees, divided into the following sectors: grocery, general merchandise, meat and poultry, fish market, bakery, dairy and cold. In the supermarket A it was interviewed the general manager, who has, in that period, 18 years in the company, six years in the current position.

Located in central Itabira/MG, the supermarket B has a total area of 4,200 m² and employs 210 people on the staff. The store has grocery sectors, general merchandise, meat and poultry, fish, bread, cold cuts and dairy products, textiles and electronics. This store has 28 check-outs and serves customers in many differents neighborhoods. Currently there are 62 units throughout Brazil, which is a supermarket chain. The interviewed was the manager trainee,who works for the company for four years and two months, being about a month in the current position.

As data collection instruments, it was used non-participant observations and semi-structured interviews. As Marconi and Lakatos (2009) in the non-participant observation despite the researcher had contact with the reality studied, he does not participate, playing the role of spectator. Through out non-participant observation, it was sought to register the various interactions in the study sites without interference. We also used semi-structured interviews with the the supermarkets´ managers in order to capture their perceptions on the subject through an open dialogue and open to approaches beyond those presented. Hair Junior et. al. (2006) states that, in semi-structured interview the interviewer is free to ask questions that were not included because they were not previously imagined. Such approach may result in unexpected and enlightening informations.

All data were processed through content analysis. As Bardin (2008, p.45) "content analysis seeks to know what is behind the words on which leans". Therefore, through the content analysis, all the information obtained was examined for a correct interpretation, in order to discover what was beyond, “between the lines” of those informations.

RESULTS

Reverse logistics process of cartons carried by supermarkets surveyed

In the supermarket A, it was identified four different destinations for cardboard packaging: recycling, return to supplier, the reuse for costumer´s packaging and as organic waste if they werw not appropriate for any of the earlier options.

> The box is opened and taken to a warehouse. (...) The boy collects and sells in Belo Horizonte, for a company that recycles cardboards. (...) The boxes that come with eggs and oranges are returnable. (...). We have clients who like to carry purchases in boxes, so we pack in cardboard boxes. (...) The box that has blood, because comes with meat, we turn it into organic waste. (Respondent A).

In the supermarket B, two options were cited to reverse the cardboard boxes: sell most of the boxes for recycling and the reuse to pack purchases.

> Once the goods replacement is done and so the box is empty, it is openned and tooked to the collection room. There, the cardboard is pressed by an outsourced employee, whot is an official employee of the company that

> makes the collection of cardboard. (...) The collection firm comes, picks up the cardboards and send them to Belo Horizonte[2] to recycle. (...) sometimes we use cardboard box, in order to replace the plastic bags. (Respondent B).

The different ways sought by supermarkets in the revaluation of cardboard packaging, reintroducing them into the production cycle in reverse, taking the garbage disposal as the last option, meet the Chaves and Batalha (2006) claim that the reverse logistics focus is precisely the return of materials to the production cycle, and the disposal must be the last option of the company.

A common factor found in both supermarkets is the large amount of cardboard generated per day, since most of the products that they sell, come packaged in that kind of material.

> It's too many cardboard, but in money amount I am not sure (...). After loading the goods on shelves, the cardboard is disposed, is recyclable, we separate them. It's too much cardboard. (Respondent A).

> It is a very large amount of cardboard. (...) If we keep them in the supermarket, we run the risk of loss, damage (...) so it is easier get those cardboard and sell them to a company that will recycle. (Respondent B).

It appears that, faced with the reality experienced by these supermarkets in relation to the large amount of cardboard generated, it becomes necessary to seek a form of disposition for the material. The sale to the recycling process was the first option pointed out by both supermarkets and therefore, the primary purpose for such waste. The option of recycling as main destination is explained by Chaves et. al. (2005), who claim to be one of the most options developed by supermarkets.

[2] The city that is the Minas Gerais state capital, far 63 miles from Itabira.

Determinants of the staging of the reverse logistics of cardboard packaging by supermarkets surveyed

It was found that in both supermarkets, A and in B, there were a system for determining the reverse logistics activities of the cardboard boxes costs. The Respondent A believes that the only cost in the process corresponds to the existing space for the cardboard storage. The respondent B assigns the only process cost to the outsourced employee who performs the pressing.

> I do not see any cost, the cost is the space that we could use enjoying something else and we take use with the cardboards. (Respondent A).

> It costs the guy that presses. It is not only throw the cardboard there and pressing, the machine does not do it alone, it needs someone to put the cardboards in the machine just at the point to press and hold them. (Respondent B).

It was not considered by the respondent A another costs, such as the cost of employee.

> We have six people working with replacement, each is responsible for replenishing his industry. (...) During the 8 hours of his work, he's always in contact with the cardboard, but I'll take just 40 minutes a day for each employee to be placing the cardboard. (...) To work 8 hours a day, the employee receives around R$ 610.00[3] per month. (Respondent A).

Thus, considering the average monthly salary of the supermarket A stockers, R$ 610.00 (or US$ 396.00) for eight hours of work, it is estimated that R$ 50.83 (or US$

[3] Considering that US$ 1.0 could be exchanged for R$ 1,540 approximately in 2011, July; the employee´s sallary was about US$ 396.0 per month.

33.01) of this amount are allocated to the reverse logistics activity, in other words, almost 10% of employee's salary. It is noteworthy that, doing or not doing the job, the employee receives R$ 610.00 per month; but the activity, as explained, is part of the stockers routine activities. In this sense, although not measured, there is the emplyee cost in the process.

The supermarket B, likewise, does not quantify the costs of reverse logistics processes, not being considered, for example, the 24 m² space for the cardboard storage that could have been used for another purpose and, the cost of time spent by repositories for collect and take the material to the warehouse.

> They are stored in a part of the deposit, a small room. (...) The room should be 4 meters by 6 meters or so. (Respondent B)

Thus, only some tangible cost is considered by the supermarkets. Other costs that are still parts of the tangible costs, logistics costs as well as management and intangible costs cited by Leite (2009) are not considered by them.

Of the reverse logistics process that were cited as developed by supermarkets, only supermarket B encourages the cardboard boxes reuse by through a poster in the store and some cardboard boxes placed below it. But at no time it was observed any emplyee indicating or offering such a choice of packaging for customers. The other processes were not disclosed by both supermarkets.

Because they do not have a especyfic policy of greater incentive for reuse of cardboard boxes instead of plastic bags, companies do not benefit the economy in the purchase of the plastic bags. In this sense, they stilll can not even see the economics of reverse logistics, translated into gains in direct reuse of materials posted by Costa and

Valle (2006). A greater incentive for the use of cardboard boxes by customers could substantially reduce the existing cost to buy plastic bags.

Both supermarkets do not realize the reverse logistics área as an integral part on the organization costs, probably because they do not maintain or measure the costs of activities that comprise it. This reality is presented as common for many companies by Chaves and Martins (2004). Consequently, it is difficult to determine the exact amount of the reverse processes.

Revenue gains were not ppointed as decisive by both supermarkets.

> The boy said that he would pay some especific amoun, we agreed to get rid of the cardboard. (...) the gain is minimal, we do that just for the environment. (Respondent A).

> The sale of the cardboard is not in a financial vision , it is too little (...). The activity brings benefits, not financial, now on social and environmental issues, the company is on track. (Respondent B).

It is important that these supermarkets sell these packages in order to gain something, even if they do not consider the amount so much, because according to Leite (2009) the lack of gain in one or more reverse link in the chain can lead to interruption or absence of reverse flow. However, it is clear that despite selling these packages, financial purposes are not qualified as determinants for the reverse process adoption by these organizations, in other words, the sale of packaging by retailers can be a new source of revenue, as Braga Junior et. al. (2009) says, this is not the end sought by the researched supermarkets.

Both respondents said they do not perform such reverse activities by legal pressure. When asked about the recently law signed by President Lula, referring to the

National Solid Waste Policy, both respondents reported they do not even known it, but they agreeded about such legislation´s importance, because it can be a way to force companies that still do not have the environmental awareness work for the environment. This thought is consistent with the words of Castanho and Sacoman Neto (2009) who believe that through laws the return of products will be more effective.

Although companies do not perform the reverse logistics activities by legal pressure, respondents showed concern about the adequacy of their practices to environmental issues regarding the handling of cardboard boxes. It could be observed in respondents speak, the concern to not aware cardboard box in any place on the environment.

> By doing this, recycling, we can contribut much more to the environment and society. (Respondent A).
>
> The company today has grown immensely in the marketplace. It may not always aim to profit at all. It´s concern, besides being a competitive company, is also a company that thinks about the environment, in social thinking. (Respondent B).

It can be noted in those reports, social and environmental concerns demonstrated by the companies. These lines represent what is placed by Leite (2009) that recognize that modern businesses need to look beyond profit, take social, environmental and governmental care to ensure the business and profitability over time. This way, both supermarkets show that they want to remain competitive in the market, giving direct attention and efforts not only to aspects, but acting with social and ecological responsabilily in the environment they are inserted.

Although the supermarket A do not incentive the reverse logistics processes and supermarket B only encourage the reuse of cardboard boxes in a minor way, both respondents believe that customers should approve such behavior if they know them.

> If it was released, I think that everything that is good and promote welfare,attention, (...) we are helping the environment, and I think the client would like that. (Respondent A).

> I think the customer should value, because what is necessary to be seen today, is that a company that does this, it is thinking not only benefit , sin its benefits, it is benefiting the whole planet. (Respondent B).

Thus, the different imaging or better reputation, was not considered crucial to the reverse activities conduction by supermarkets. This fact is contrary to what is reported by Leite (2009) that corporate image was cited as one of the strongest motivations of reverse logistics activities by companies from different business sectors in recent surveys conducted in Brazil. However, through their words, it is clear that respondents believe that such activities would be well regarded by customers if disclosed, but they still failed in associate such situation as an opportunity to create better corporate image.

The primary reason for adopting the reverse process cited by both supermarkets is the large volume of cardboard boxes generated what require large storage space in stores.

> It is more confortable for us that the boy collect (the cardboard) every day to avoid an accumulation. (Respondent A).

> Indeed the vision is to target this cardboard, so it will not obstruct the progress of the store. (Respondent B).

As previously explained, the amount of cardboard generated by supermarkets is very large. The accumulation of material generates visual pollution, disturbs movement of customers and employees and occupies space that could be used, eg for transport or storage another products. In this sense, adopting reverse logistics processes for packaging cardboard helps supermarkets to improve the efficiency of material flow.

Given the literature review and analysis of data collected in the companies participating in this research, it was possible to identify the determinants and non determinats issues of reverse logistics implementation in supermarkets studied, and assess the relationships between those determinants. We did not attempt in identifying intensities and degrees of these relationships, because it was not within this paper scope, but it would be a good question for future research.

Both supermarkets have identified the same determinants for the implementation of reverse logistics, mainly related to the operational dimension (efficiency of material flow: employees), and then to the environmental dimension (adaptation to environmental issues: society), did not identified the marketing dimension (differentiated image/better reputation: client) and financial (cost and revenue: shareholders/owners) as being crucial. Figure 2 shows the mapping relationships between the perceived determinants in the researched supermarkets.

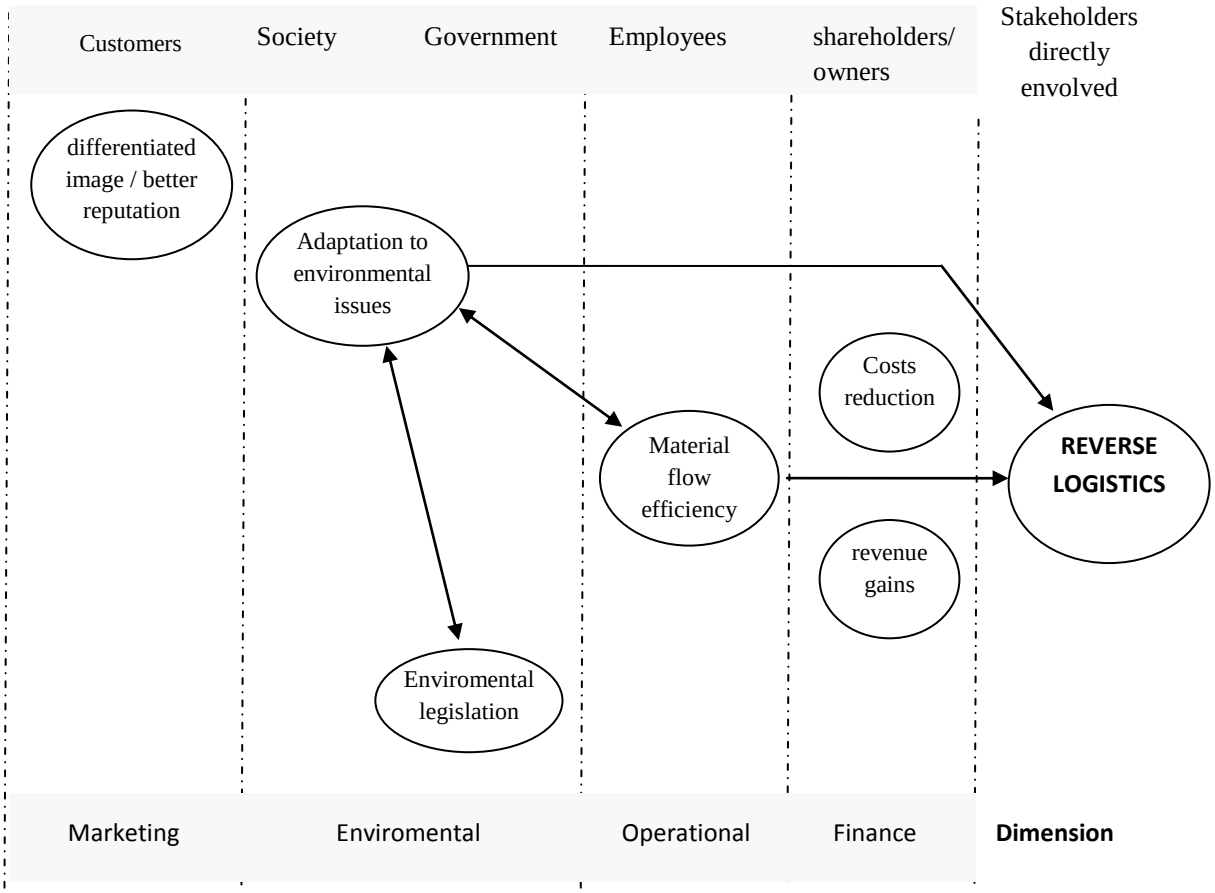

Figure 2 - Mapping of relations between the determinants of reverse logistics in researched supermarkets.

Source: The authors

This result demonstrates managers concern in solving na operational problem of efficiency that directly affects their daily work and then the environmental issue that involves the society in which they are inserted. Regarding the environmental issue, the companies studied was vulnerable in relation to: 1) the legal requirements, which can directly affect their business, not paying attention from a government demand, 2) their market positioning, not seeing the demand of possible customers and 3) monitoring their financial results involving costs, revenues, loss, inefficiency, rework and other issues that influence the company outcome, not meeting in some perspective, the

business owners. Looking at Figure 2, the two companies have many opportunities to be exploited and worked to improve their results.

FINAL CONSIDERATIONS

Currently, the preservation of the environment is the focus of many discussions and studies. In this context, reverse logistics is a relevant area because it proposes return of products management, either in after sale and after consumption to a revaluation or proper disposal.

The motivations for carrying out the reverse logistics of cartons found in the surveyed companies are represented by the need to release space due to the large volume of material generated daily and the importance of adaptation to environmental issues. It is concluded that the attitudes of such companies are aligned with current trends in social and environmental responsibility. Thus, these supermarkets while they solve their own problem of material accumulation, they still positively collaborate with environmental preservation.

Financial returns, reduced costs, legislation and distinctive image have not been singled out as decisive reasons for the activity. It is concluded that the respondents associate financial returns only the income, failing to see indirect gains that reverse logistics can provide. Another conclusion is that the legislation was not considered due to lack of knowledge of the recent establishment of the Law called National Solid Waste Policy. We believe that would be interesting to both supermarkets, to get informed

about this new legislation, in order to identify which resolutions they are already working on, and which aspects still need to be developed. It could also be concluded that because the companies surveyed do not consider the distinctive image as a determinant for the implementation of reverse logistics, they do not enjoy the benefits that the disclosure of such attitudes toward the environment could bring, face to increasing environmental awareness of society.

Faced with the problem presented "why post-consumer reverse logistics is performed in the supermarket sector? It was found that the reverse logistics of the cardboard packaging in the researched companies was developed due to the need to improve the operational efficiency of the store (material flow) with the release of space in stores, mainly through recycling, which is a way to revalue this material and adapt to environmental issues.

About resarch limitations, since the study was conducted in specific supermarkets, the results may not show the reality of others, and can not be generalized. It is also important considering the fact that only one person in each grocery store was interviewed and asked to transmit information from the reverse logistics process as a whole. Another limitation is geografic, because the survey was conducted in companies of a especif city in Minas Gerais, dealing with a very specific reality.

Future research could be conducted including supermarkets customers in order to understand and relate their perceptions in relation to reverse logistics implementation by the companies. It is also interesting to conduct researches with a quantitative approach (survey) covering many other supermarkets. Another issue to be developed is measuring the correlation between the use ratios of reverse logistics determinants described in our model and validate it quantitatively. This initial model serves as a basis

for future research, aiming to help better understand the phenomenon studied by this research.

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