

Green supply chain management practices in the purchasing of food products' packaging

Marcos N. Fascina - UNINOVE

Rosângela M. Vanalle (rvanalle@uninove.br) - UNINOVE

Abstract

The article aims to identify environmental practices used in the supply chain management of food packaging in Brazil. Through questionnaires in three companies we were able to identify that the reuse of packaging is the main environmental management practice required from suppliers of the product packaging.

Keywords: Green Supply Chain, Sustainability, Packaging.

Introduction

The changes in the competitive model required by the new competitive drawing, bringing inside the organization, a new high necessity to reinvent in your processes; Beyond the visible pression exercised by the consumers to the products and companies don't pass to offer a low quality and price, but, also that them carry out their goal together the society, in special the connecteds to the environmental preservation, this reflect in a concern to researchers in developing management techniques to reconcile these requirements.

One of the techniques it's the environmental management conduct the companies to the necessity to not compete just in your owns capacities, but also with the supply chain (HULT et al., 2007). This same technique has show possible significant benefits in the organizations performance, starting for a better management in the relationship with the most notorious suppliers.

Among the competitive advantages resulting from environment management are, therefore, the practices of sustainability about the environment preservation, that, it's of high importance, and the high importance, between others factors, depending on the products being marketed, this products stored in discarded packaging, to a residue after use or consumption of products by consumers.

With this increases external environmental requirements, such as, more stringent rules and pressure from customers regarding the disposal of these wastes. These rules are imposed by the government in the form of laws, and the pressures from customers materialize in punishments made by themselves, to the companies by simply buying from your competitors. So, the companies need to develop their capacities to assess, manage and monitor the environmental performance of its operations (BJÖRKLUND et al., 2012).

In this context, the main objective of this paper is to identify the environmental practices used in managing the supply chain (procurement) of packaging for food products. For this was performed initially a bibliographical about the practices of sustainability management, used by organizations and in particular those related to food packaging, as well as on sustainability indicators and indicators of organizational performance.

In parallel was performed a case study in three companies through interviews with the responsables for the logistic of each. Companies are localized in the state of Paraná and producing instant coffee and its derivates. A comparison between the practices found in the literature, and the found in the companies, was realized and presented in the final considerations, contemplating their points of convergence and divergence.

The importance of environmental aspects in supply chain

Increasing external environmental requirements, between them, stricter regulations and pressure from customers has guided the necessity for companies to develop their capacities to assess, manage and monitor the environmental performance of its operations (BJÖRKLUND et al., 2012).

Veleva et al., (2003) ponts that a growing number of companies already starts to develop and use indicators of environmental sustainability. Contributing Zhu et al (2008), and Zsidisin and Sifert, (2001) declare that the managers of the supply chain must consider the impact of corporate performance in the environment. Therefore, environmental performance can be an important manager to measure organizational performance, and this way increase the competitive advantage of the organization.

Björklund et al (2012), claim that the need for more knowledge about the performance related to the environment between the different actors in the supply chain is recognized by practitioners and researchers.

The measurements of environmental performance are becoming increasingly important part of business and include logistics service providers as a way to differentiate the product, i.e., the logistics become indicators of performance in a very competitive market.

Another important indicator is related to issues of product packaging. According C  zar et al (2010) "packages whose main function contain, maintain and preserve food through better insulation product with the external environment". The authors also emphasize the development of society which "resulted in the need to develop packaging that allowed transport them to points more distant and distinct, with minimal losses in quantity and quality."

Therefore it is indispensable component that accompanies the product to final consumption, and that after this phase, need to have special attention in relation to their discard seeking to reduce their environmental impact and can become an important performance indicator.

Considering these two factors, packaging and logistics, the organizations can adopt mechanisms to control and monitor the flow of materials from its origin to its final destination.

It is suggested to start a mapping of the supply chain of these materials knowing your process from its origin to become raw materials for packaging, requiring suppliers of environmental management practices, beyond quality and price commonly controlled by the organization.

As a sequence to practice environmental management of packaging, the organizations need to create indicators, that monitor and evaluate the flow of this material after used in the

products passing through its distributors and customers, so that they know the final destination and may intervene in a better allocation of this material.

Cuthbertson and Piotrowicz (2008) commented that most studies on performance indicators, focuses on the company's internal issues instead of the entire supply chain. Corroborating Vasileiou and Morris (2006) says that sustainability issues tend to focus on a particular stage of the supply chain, instead of the supply chain as the main factor.

Resuming Cuthbertson and Piotrowicz (2008), the authors concluded that environmental aspects are often overlooked when it comes to supply chains. Therefore this article seeks to identify the management practices of green supply chain in the acquisition of packaging.

Environmental management practices in packaging

There are numerous packaging characteristics to be considered by consumers independently of the product that is inside of it. Vermeiren et al (1999) emphasize the "concern to maintain food safety". The author also states that "the new packaging should also consider seeking a market increasingly, products that come close to their natural way of freshness and quality".

Over the years and the evolution of society, the packaging assumes the communication of the product to the consumer there are several studies that show the importance of packaging in the purchase decision of consumers (MESTRINER, 2005). Cezar et al (2010) comments that "another feature incorporated in the design of packaging development refers to the practicality, the greater value given to convenience when purchasing emphasizes the importance of this feature".

Given the importance of packaging for products and considering that these can increase the damage or impact on the environment, need to pay attention to the preservation of this, are shown are shown clear evidence and it's necessary to seek mechanisms to ensure that these packages at lower rates can affect less the environment. According to Vachon and Klassen (2008) there is a gap in scientific research related there is a gap in scientific research related to the recycling and practices of disposal of packaging.

To Gonçalves-Dias (2006) "From a broader point of view, the package is not just a wrapper for a product, it represents the company's environmental philosophy". This philosophy comes to understand and concern. This philosophy comes to understand and concern by the companies around the life cycle of the packaging. Figure 1 shows an approach to packaging life cycle.

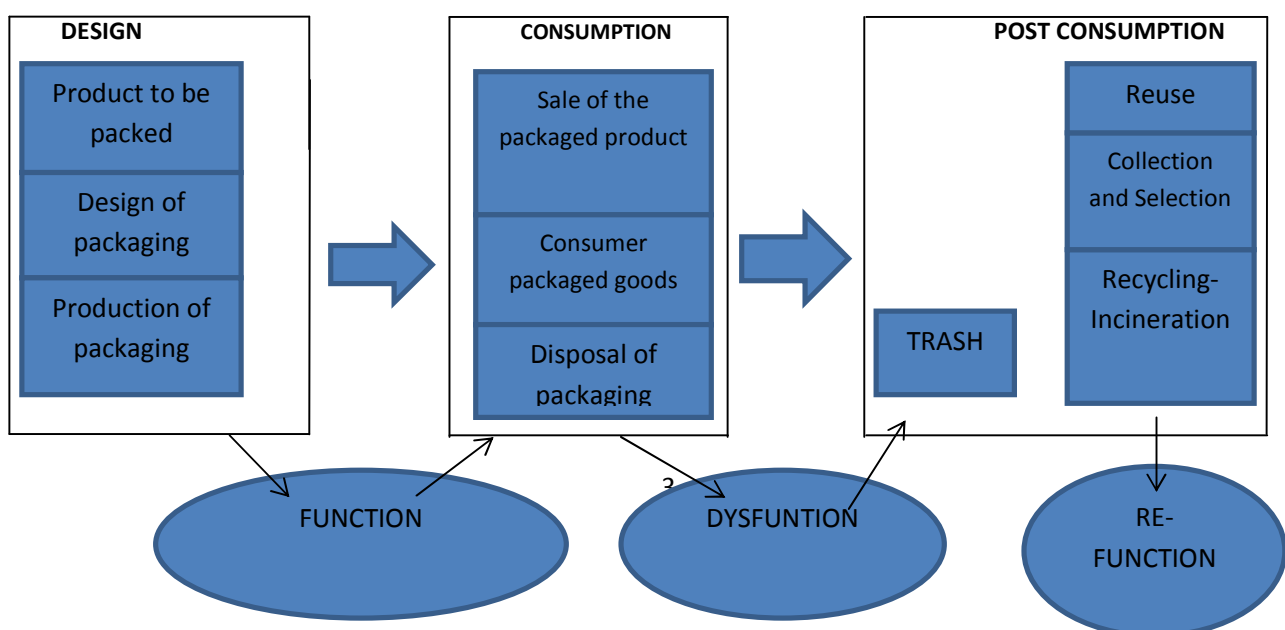


Figure 1 – The life cycle of the packaging (Adaptation of Santos e Pereira, 1999)

The figure 1, represents three stages for the life cycle of the packaging, and them have the function, dysfunction and re function about that object, and in the packaging conception (function) takes into account what will be packed (type of products and its requeriments), following their process (materials and production system) culminating with the production itself (implementation and management).

In the consumption are considered consumer information, availability, transportation and storage, following the facility in handling, customer perception and ending with the intake in the form of waste disposal, or, there is loss of function (dysfunction) of the pack.

Finally, the author stresses another possibility reduction at the source by using less raw material, recyclable product designs and also changing the pattern of production and consumption.

In this view there is opportunity to think about the life cycle of packaging in economic and ecological terms.

For applications in food products, recycled packaging had worldwide ban until the mid 90s, now this activity is considered a challenge for the industry and became a market to be exploited (SANTOS et al., 2004).

Methods

To research this article was based on a literature on existing information on the topic. There was also a case study to understand the supply chain of companies in packaging food producer. Finally was compared the practices found in research with companies with the literature on the subject.

The research is about the objectives of the exploratory type, it will be restricted to "set goals and get more information on the subject to be studied (Cervo and Bervian, 2002). It is also characterized as being the research literature because it can be performed independently or as part of a research or experimental specification, the latter being the case of this article.

Marconi and Lakatos (2002) stress that a literature does not merely repeat what already exists about certain subject but provides a new approach to the topic.

The method employed is a descriptive qualitative research, with application of a semi structured interview. According to Cervo and Bervian (2002) in the research descriptive the facts are observed, recorded, analyzed and correlated with phenomena without manipulating them. In this case an interview is used to collect data.

About the approach form, a qualitative research is descriptive, in qualitative research can not quantify the information obtained, because it's is analyzed inductively.

In choosing to collect data for interview, Cervo and Bervian (2002), explains that it is the most used because it enables better to know exactly what is intended. Yin (2005) claims to be a case study as "an empirical investigation of a contemporary phenomenon within its real life context."

Three interviews were conducted and analyzed three companies, interviewed companies are identified as Enterprise A, Enterprise B and Enterprise C. In each undertaking was interviewee the responsible for logistics with the intention to gather information on how you select your packaging suppliers, requirements regarding certifications and origin of its products how the integration between company and supplier works.

At the end was presented a framework where it presents the main requirements of companies on issues related to environmental practices considering the requirements that have been identified by all companies surveyed. It is emphasized that these issues are related to the environmental practices of food packaging.

Case study

Enterprise "A"

The company demonstrated as respondents, that they perform internal management practices strongly focused on the existence of certifications, besides of having an environmental management system, considering very important the existence of certifications that ensure their environmental management practices.

They also have Eco label in their products, which guides consumers at the time of purchase or consumption. Also they consider very important to give support to the environment regulations, as well as there is a stronger commitment of managers with higher levels of green supply chain management.

Regarding green purchases, the company demands that working with suppliers in a cooperative way it's considered of some importance, so they can reach their environmental goals. Likewise is considerably a friendly relation from vendors' audit, based on the ISO 14000 certification, which also occurs with the second-tier suppliers.

Even not doing this intervention, it is required that the suppliers have certifications such as ISO 9001 and ISO 14001, in addition to that, it is required that they have OHSAS 18000 and AS 8000 certifications. They consider between very important and extremely important that vendors have those requirements, which would ensure quality of the company on environmental goals.

It's very important and extremely important that their suppliers have an environmental management system; similarly it is very important that they complies (Brazilian Standard Regulatory - NBR) NBR 13230 and NBR ISO 14020, which are the recyclability indication, plastic materials and environmental statements on their products (containers).

The company showed a concern about the resources optimization to improve recycle and reuse, thus the company prioritizes renewable materials, maximizing the reutilization of their components, demanding the company suppliers fulfills that purpose, which according to the researched company it is between very important and extremely important.

It is considered of extreme importance that the company supplier 'A' have environmental permits emitted by state organizations. Regarding the existence of management processes of atmospheric emissions (measurement and control); the company finds it important in some level, only that their suppliers have it.

Finally the company 'A' considers it very important that their suppliers have policies about the environment that identify the environmental aspects of their activities, as well as management of generation of hazardous waste, including emergency plan for possible environmental accidents. It is also very important, that their suppliers properly teach those involved with activities that help the impact they will have on the environment and meet whenever recommendations arising from environmental audits.

Regarding of the influence over the company due to the implementation of a management system in green supply chain on the environment, the company pointed out that it was fairly

significant in respect to the reduction of carbon gas emissions, wastewater, hazardous materials consumption, as well as environmental accidents.

Regarding the economic aspect, the company identified relatively significant influences such as cost reduction of material purchases, energy consumption, waste discharge rates and fines for environmental accidents. There was also an increase relatively significant on the investment to implement a supply chain management, with training sessions about green environmental practices and purchase of Environmentally-Friendly Products.

Finally, on matters that motivate the company to implement a green supply chain management, the company considers important the influence generated by the demands of government regulations and the Brazilian Coffee Industry on the environment.

Enterprise "B"

The company 'B' considers between very important and extremely important internal management practices on the environmental goals in addition to that, the commitment by the upper level managers and mid-level support, regarding the green supply chain management.

About the existence of certifications like ISO 9001, ISO 14001, and OHSAS 18000 and AS 8000, it's considered very important, the same way it's considered regarding to the existence of an environmental management system and support regulations on the environment.

In relation to green purchasing practices, the requirement for the suppliers to cooperation on the fulfillment of environmental objectives, It's considered as some important and very important. The same way is considered of some importance, internal audit practices on suppliers based on ISO 14000. However it's evaluated a friendly realization of environmental practices on second-tier suppliers.

The company 'B' considers that is extremely important that their suppliers have ISO 9001 and ISO 14000 and very important that they have OHSAS 18000 and AS 8000.

For this company, it is very important that their suppliers have an environmental management system, likewise that they respect the NBR 13230 of ISO 14020 NBRs, which means indication of recyclability, plastics and environmental statements. The company's suppliers must optimize resource utilization, prioritize renewable materials, also they must have alternatives to maximize the reuse their product, as well as prevent pollution and waste generation.

According to the company, it's very important that they demand their suppliers to have environmental permits from state agencies, an environmental policy defined and documented, procedures to identify the environmental aspects of their activities also indicators for those aspects.

It is necessary that their suppliers have a hazardous waste management system of control and measuring atmospheric emissions, ensuring reductions on these emissions. Regarding the existence of emergency plan against environmental accidents, they have training for all persons involved in activities that impact the environment also immediate correction of notes on environmental audits, it's considered very important by the company 'B', then so it is required that their suppliers meet those requirements.

Concerning the questions about the influence the company's performance in managing the deployment of a green supply chain, more precisely on the aspects of the environment, the company affirmed to be on some level or relatively significant about reduction of carbon gas emissions and water residual, relatively significant about reduction of solid waste also relatively

significant or significant about reduction of the consumption of hazardous materials. It also reduced in some level or fairly significantly on environmental accidents frequency.

The economic aspects were identified fairly significantly after the implementation of the green supply chain management. Cost reduction on the purchase of materials, the treatment fee, and discharge of waste as well as reduction of fines for environmental accidents.

Regarding the decrease of energy consumption, it has occurred effect in some level. However, fairly significant effect has occurred on increased operating costs. By the same token, training about environmental practices, as wells as for purchase of Environmentally-Friendly Products has occurred effect considered between relatively significant and significant.

Considering the company's motivation on deploying a green supply chain management, the company affirmed it's important the influence of regulations and laws, which is related to environmental issues imposed by the government.

Enterprise “C”

The company 'C' as regards the internal management practices between very important and extremely important, there is commitment on the part of managers lords with the the supply chain. As for the support given to middle managers, cross-functional cooperation for environmental improvements and compliance to the management with total environmental quality improvement programs, as respondents are of great importance.

It is considered very important and also of some importance that the company has an environmental management system, But it is very important the existence of certifications like ISO 9000, ISO 14000, OHSAS 18000 and AS 8000, and is also a very important eco-labeling of products and a support regulations on the environment.

As for green purchasing practices undertaken by the company, cooperation with suppliers for environmental objectives and the assessment friendly in second-tier suppliers as ace environmental practices among the researched company considers some importance and much important but an internal audit of its suppliers based the ISO 14000 certification is considered of great importance.

Issues related to prevention of pollution, waste generation and prioritization of use of materials in their purchases are thought to be of little importance and much importance to the company. About the certification requirement on their suppliers the company considers very important and is part listed certifications of ISO 9000, ISO 14000, OHSAS 18000 and AS 8000, besides being required to meet NBRs 13230 and 14020, previously mentioned as well as a definition of how to reuse their packaging and maximizing the reuse of components.

Still in their purchases, the company considers to be important to have efficient management if any hazardous waste generation and the existence of an emergency plan for possible environmental accidents.

There is a very important concern for the suppliers have, documented and very well defined, the policy environment, and that this could identify its environmental aspects of its activities a monitoring of indicators regarding the consumption of water, energy, air emissions and waste generation, it is necessary to control for indicators.

The company researches and considers that it's suppliers present their licenses issued by competent agencies people active in environmental impact generating activities, receives appropriate training, whenever necessary for this purpose.

Considering the influence of laws and rules about efficient environmental management for the companies independent of any sphere of government, the researched company, says is important, and hence on their suitability to these norms.

About the influences generated for the implementation of supply green chain management on business performance, was found relatively significant reductions in carbon emissions, effluent, waste, and consumption of hazardous materials.

Some economic aspects it's considered with significant influence on company performance such as: cost reduction in energy consumption, treatment rates and waste discharges, beyond reduction in fines to environmental accidents.

After the implementation of the management for the green supply chain we found performance improvements in other elements such as, cost reduction in purchasing materials significantly. But some relatively significant financial increases occurred as a investment in the implementation for the green purchasing program in training on environmental practices, operational cost.

Results and discussion

For each company, a total of three was investigated two people, and both accountable for strategic sectors in purchases and environmental management of their companies.

With regard to internal environmental management practices realized for companies, only two of the six respondents said that the eco-labeling and the support for regulations on the environment is considered only of some importance, and the others, is, other four responded it is a very important issue. Five them, responded be very important the existence of an Environmental Management System and all consider to be of utmost importance to the existence of certifications with the OHSAS 18000 and AS 8000.

As for ISO 9000 and ISO 14000 half said their existence is very important and others consider to be of utmost importance. Five of the respondents claim to be of much importance as total quality management and environmental improvement programs and four declare that this importance is the same proportion when it comes to commitment by senior managers in achieving environmental goals as the support for the middle managers and the existence of a functional cooperation to achieve the same.

Considering the practices of green purchases for the companies surveyed, Four of the six respondents claim to be very important cooperation with suppliers for environmental objectives and that takes place in these suppliers and second tier suppliers, audits based on ISO 14000 standard certification.

All six respondents consider it very important to have certification AS 8000, five the OHSAS 18000 certification and half them, the ISO 9000 and ISO 14000, and the others, considers it extremely important to answer these last two certifications.

Of the total surveyed, four said to be of some importance to the existence of an Environmental Management System, and five of them said they meet NBRs 13230 and 14020, and, the first deals with the symbology indicative of the label and identification recyclability of plastics and the second deals with environmental labels and declarations, is of great importance. The same is true when it comes to defining the best alternative for reuse of packaging: returnable, reusable or recyclable, and ways to maximize the reuse of components.

As for the optimization of natural resources, recycling and energy recovery; prioritization of materials from renewable resources; pollution prevention, waste generation and other impacts, four respondents claim to be of much importance.

Five of the respondents claim to be much importance to the existence of Installation License / Certificate or Operation Exemption issued by the State Environmental Agency on behalf of its suppliers

Conclusion

This research investigated green management practices in the acquisition of packaging for end products in three companies producing instant coffee. It was observed that there was a great concern to meet environmental requirements in their activities while minimizing their environmental impacts with relative reduction in the generation of their waste and therefore cost on their end. Another observation is that there is a redesign of the internal practices and interference in purchases seeking to meet social appeal and awareness on environmental issues.

This redesign includes shared practices of actions in the production process which provides significant reduction in the use of natural resources and generation of waste. This occurs for two main reasons, the first is due to the need of maintaining consumption-friendly relationship with customers and to meet the ever increasingly strict environmental laws.

Further research is needed with efficient methodological basis, addressing the topic in greater depth and being developed in companies that act in different branches so that one can build a performance model on environmental questions regarding the product packaging. A reorientation of actions inside companies concerning their strategies demand a change in company culture, with new attitudes regarding environmentally sound practices, and this is highly valued by the increasingly demanding society today.

It is of fundamental importance the cooperation in supply chain to achieve 'green' operations, the results indicate there are important and significant advances in the 'green practices' in the acquisition of packaging, there are still major challenges to be overcome with regard to the conducting of the managerial practices of these strategies, especially in the interactions of the actors in the supply chain. Thus, it presupposes a need to increase the level of information regarding the elimination of waste throughout the supply chain, sharing technologies and responsibilities, awareness of recycling, and most importantly, behavioral change in consumption of the whole society.

References

- Björklund, M., U. Martinsen, M. Abrahamsson. 2012. Performance measurements in the greening of supply chains. *Supply Chain Management: An International Journal* 17 (1): 29-39.
- Cervo, A. L., P. A. Bervian. 2002. *Metodologia Científica*. 5. ed. São Paulo: Pearson Prentice Hall.
- Cézar, A. S., C. Mori, M. O. Batalha. 2010. Inovações tecnológicas de embalagens nas indústrias de alimentos: estudo de caso da adoção de embalagem ativa em empresas de torrefação de café. *Revista Brasileira de Inovação*, Rio de Janeiro, 9 (2): 355-378.
- Cuthbertson, R., W. Piotrowicz. 2008. Supply chain best practices – identification and categorisation of measures and benefits. *International Journal of Productivity & Performance Management*, 57 (5): 389-404.
- Gonçalves-Dias, S. L. F. 2006. Há vida após a morte? Um (re)pensar estratégico para o fim da vida das embalagens. *Gestão e Produção*, 13 (3): 463-474.

- Hult, G.T.M., D. J. Ketchen, M. Arrfelt. 2007. Strategic supply chain management: improving performance through a culture of competitiveness and knowledge development. *Strategic Management Journal*, 28 (10): 1035-1052.
- Mestriner, F. 2005. *Design de embalagens*. 2. ed. São Paulo: Prentice Hall.
- Marconi, M. A., E. M. Lakatos. 2002. *Técnicas de Pesquisa*. 5. ed. São Paulo: Atlas.
- Santos, A. S. F., J. A. M. Agnelli, S. Manrich. 2004. Tendências e Desafios da Reciclagem de Embalagens Plásticas. *Polímeros: Ciência e Tecnologia*, 14 (5): 307-312.
- Santos, M. C. L., A. F. Pereira . 1999. Packaging: function, re-function and malfunction. From consumer society to the homeless material culture. EcoDesign'99. 1º International Symposium on Environmentally Conscious Design and Inverse Manufacturing. *Anais... Tokyo*, February: 492-496.
- Vachon, S., R. D. Klassen. 2008. Environmental management and manufacturing performance: the role of collaboration in the supply chain. *International Journal of Production Economics*, 111 (2): 299-315.
- Vasileiou, K., J. Morris. 2006. The sustainability of the supply chain for fresh potatoes in Britain. *Supply Chain Management: An International Journal*, 11 (4).
- Veleva, V. M. Hart, T. Greiner, C. Crumbley. 2003. Indicators for measuring environmental sustainability: a case study of the pharmaceutical industry. *Benchmarking: An International Journal*, 10 (2): 107-119.
- Vermeiren, L., F. Devileghere, M. Vam Beest, N. De krujif, J. Debevere. 1999. Developments in the active packaging of foods. *Trends in Food Science and Technology*, 10 (3): 77-86.
- Zhu, Q., Y. Geng, J. Sarkis, K. Lai. 2008. Confirmation of a measurement model for green supply chain management practices implementation. *International Journal of Production Economics*, 111 (2): 261-273.
- Zsidisin, G. A., S. P. Sifert. 2001. Environmental purchasing: a framework for theory development. *European Journal of Purchasing and Supply Management*, 7 (1): 61-73.
- Yin, Robert. 2005. *Estudo Caso: Planejamento e Métodos*. Tradução Daniel Grassi. 3. ed. Porto Alegre: Bookman.