1. Introduction

Reverse logistics can bring several benefits for manufacturing companies. On the one hand, its practices contribute to environmental improvement and, on the other hand, it represents a good business opportunity through the recovery of returned products economic value. Moreover, reverse logistics offers a great competitive advantage to companies through improving their brand image, ensuring a greater customer satisfaction, creating new markets by recovering the economic value of returned items, favoring a better organization of stocks, etc.

Most of products’ development processes may have harmful effects on sustainability (i.e., economic, social and environment impacts). In this field, eco-design allows reducing or eliminating environmental impacts in the early stage of product design. It integrates environmental requirements throughout the whole product life cycle.

Besides, resources commitment is the cornerstone of all supply chain processes’ functioning, whether in direct or reverse path. According to Tan et al., (2003), resources commitment should be a priority to develop reverse logistics processes and to improve their related performance. It also aims building strategies for sustainable relationships with stakeholders.

In this context, eco-design and reverse logistics ensure cost and environmental impact reduction initiatives. However, they need the right rate of resources commitment to empower their good functioning. Hence, eco-design, resources commitment and reverse logistics can be considered as practices of green and sustainable supply chain in a circular economy environment. Consequently, eco-design and resources commitment must share a strong and a positive relationship with reverse logistics.

2. Reverse logistics
2.1. Definitions

Hervani et al. (2005) defined reverse logistics as a practice of parts recovery in end-of-life, which is based on three processes: reuse, remanufacturing and recycling. That’s, in order, to integrate these parts again in the supply chain as a
new product. Chung and Wee (2008) showed that the purpose of using reverse logistics' activities is the reuse, refurbishment and recycling, and also reducing environmental impacts. In addition, Riopel et al. (2011) defined reverse logistics as a process of planning, implementing and efficiency monitoring of low-cost inbound flows, stocks and related information to recover value or to treat them properly.

Hence, reverse logistics is a process based on practice of many activities to manage returns of products, parts and associated information, from points-of-sale to the manufacturer with lowest cost. This is in order to reduce environmental impacts and to recover added value by repair, recycling or disposal.

2.2. Return activities

Return activities are considered as trigger for the reverse logistics process. In fact, returned products have many forms and types. Fleischmann (2001) has identified five categories of returns, such as: unused products, unsold products, products under warranty, scrap and products derived from activities and packaging. However, Liao (2018) proposes a general network for multi-echelon reverse logistics that maximizes total profit by handling products returned for repair, remanufacturing, recycling, reuse, or incineration/landfill. Table 1 summarizes different returns types and their sources.

| Table 1 Reverse logistics' sources classification |
|-----------------------------------------------|
| **Sources** | **Returns** |
| Parts     | - Production scrap |
|           | - Command errors |
|           | - Row material waste |
| Marketing | - Obsolete stocks |
| Packaging | - Materials of packaging |
|           | - Labels |
|           | - Polystyrene |
|           | - Palettes |
|           | - Documents |
| Products  | - Commercial returns |
| Marketing | - Dead stocks |
|           | - Control at the reception |
| In production | - Non-compliant products |
| In use | - Return under warranty |
|           | - Information |
|           | - Products to be refurbished |
| End of life | - Products no more usable |

2.3. Reverse logistics activities

Reverse logistics activities are different depending on the type of returned products. Several researchers have represented multiple activities of the reverse chain, such as:

- Collection: an attempt to divert abandoned assets and turn them to a value-added network
- Sorting: the operational step that separates different valuable materials, components, etc. from recovered things
- Storage: gathering in a warehouse of a large number of goods
- Transportation: moving secondary assets along the processing stream
- Reuse: the use of a piece or a component in a environment similar to its first use
- Recycling: material recovery of all or part of the product in the end of its life
- Disassembly: it is the main activity in reverse logistics in the end of the product's life in order to recover
certain valuable components
- Remanufacturing or refurbishing: retouching or repairing activities on products that don't comply with functional or quality requirements in order to extend its life

3. Resources commitment

Resources commitment is defined as the willingness to provide needed materials and support to achieve the stated goals of the firm (Weeks and Mileski, 2013). These two researchers claim that resources commitment to facilities, whether in terms of capital, equipment or technology, is important for the organization operations. Besides, resources commitment requires not only financial resources for facility purchases, but also an investment in training personnel on the new technology and information that will be used at all levels. Likewise, Richey et al. (2005) have showed that investment in staff training to master new technologies and information use methods is the main step into resources commitment. Moreover, Garbout and Zouari (2015) have mentioned that technology and management resources, belong to the resource classification based on knowledge, are considered as know-how of reverse logistics. Consequently, managers need to commit more financial, human and material resources to a process in order to achieve superior profitability performance.

Companies use logistics resources to create and improve value for their customers or to achieve superior financial performance. In several researches (Das and Teng, 2000; Daugherty et al., 2005; Skinner et al., 2008), many types of resources engagement in reverse logistics were mentioned, such as: financial resources; technological resources; managerial resources; human resources; information resources; knowledge and skills; material resources; product data; Etc.

4. Eco-design

4.1. Concept

Several definitions of eco-design were proposed in scientific literature. For example, ISO 14006 (2011) have defined eco-design as the integration of environmental aspects into product design and development with the aim of reducing adverse environmental impacts throughout a product’s life cycle. Likewise, Chou, (2014) has claimed that eco-design is a concept that aims to reduce environmental impact throughout the entire product life cycles through improved product design. Otherwise, eco-design method can be applied to all the product life cycle (Telenko et al., 2008). However, Jeswiet and Hauschild (2005) have indicated that eco-design identifies functional, economic and environmental risks, furthermore than other risks associated; while focusing on product design phase. Thus, eco-design incorporates environmental aspects into designed product to minimize pollution risk during products life cycle phases, mainly production, consumption and disposal (Dangelico and Pontrandolfo, 2010).

4.2. Eco-design approach

Eco-design, requires a large amount of knowledge development, both from the design team and the supporting business functions (marketing, production, purchasing). Indeed, its activities need to extend to the entire value chain and therefore new challenges are associated with external stakeholder collaboration (Dekoninck et al., 2016). Thus, tool integration, including Life Cycle Assessment (LCA); internal communication; internal knowledge dissemination, competences and expertise, are needed for eco-design implementation in companies. In recent research, Tao et al. (2018) have introduced an innovative eco-design approach based on integration of LCA, CAD-CAE and optimization tools. In addition, Rossi et al. (2016) have presented tools and method framework for eco-design, such as: LCA tools, CAD integration method, diagram tools, checklist and guidelines, design for x approaches, methods for supporting the company’s eco-design implementation and generation of eco-innovation, methods for implementing the entire life cycle and user centered design for sustainability and methods for integrating different existing tools.

Standards such as ISO/TR 14062 (2002) and ISO 14006:2011 (2011) have been developed to provide guidance to companies on how to integrate eco-design into existing management systems. Consequently, managers can initiate actions in the eco-design approach, such as:
- Resources allocation.
- Financial responsibilities attribution.
- Definition, support and monitoring of product design programs.
- Financial tasks determination.
- Implementation of product design review programs.
- Organization of environmental product design functions and processes.
- Identification of recruitment needs and programs implementation.
- Definition of environmental vision and policy.

So, to simplify the implementation of eco-design in companies, several researchers have presented strategies that evolved over time from 4 R to 6 R. Loomba and Nakashima (2012) have indicated that eco-design strategies can be conceived taking into account the considerations of 6 R (Rethink, Reduce, Replace, Recycle, Reuse, Repair):

- Rethink: think back to the product utility and its features, for example, how the product can be used more effectively.
- Reduce: reduce energy and material consumption throughout the product life cycle.
- Replace: replace harmful substances with more environment friendly alternatives.
- Recycle: select all materials which can be recycled and build a product in a manner which can be easily disassembled for recycling.
- Reuse: product design can promote the reuse of parts.
- Repair: make the product easy to repair so that the product should not be replaced.

Farhane et al. (2014) have presented an eco-design approach in which they specify the different phases of application as well as actions, output and tools of eco-design, see table 2:

| Phases          | Actions                                                                                           | Output       | Tools                                 |
|-----------------|--------------------------------------------------------------------------------------------------|--------------|---------------------------------------|
| Planning        | - Formulate environmental requirements based on external and internal factors                   | Design ideas | - Survey                              |
|                 | - Choose the appropriate environmental design approaches                                         |              | - Benchmarking                        |
|                 |                                                                                                  |              | - Simplified LCA                      |
| Preliminary     | - Make life cycle oriented analyzes                                                              | Concepts     | - LCA Check-list                      |
| design          | - Formulate measurable targets according to predefined requirements                              |              |                                       |
|                 | - Propose concepts                                                                               |              |                                       |
| Detailed        | - Realize the concepts                                                                            | Design solutions | - Data bases                  |
| design          | - Finalize the product specifications                                                             |              | - Simulation                          |
| Tests / prototype | Verify that all specifications related to environmental impacts throughout the product life cycle are met | Prototype    | - Prototyping tools                    |
|                 |                                                                                                                                               |              | - Simulation                          |
|                 |                                                                                                                                               |              | - LCA Checklist                       |
| Production      | Ensure the environmental optimization of manufacturing and logistics processes                   | Products     | Checklist                             |
| Marketing       | Communicate the product environmental aspects                                                    | Environmental statement | - Environmental report             |
|                 |                                                                                                                                               |              | - Eco-labels                          |
| Use and end of life | Optimize use and end of life                                                                      | Accompanying Feedback | Knowledge Management               |
| Product review  | Capitalize feedback for a possible re-design                                                      | Ideas for improvement | LCA Checklist                        |

Eco-design approach is a set of steps. Those steps lead to solve products problems in a faster way, more efficient manner and with precision in the choice of tools to use.
4.3. Eco-design objectives

Brezet and Van Hemel (1997) have admitted that the main eco-design goal is to achieve a perfect balance between ecological and economic necessities of a product. Furthermore, according to scientific literature, it is deduced that eco-design allows:
- Minimize non-renewable resources use.
- Reduce toxic emissions.
- Reduce waste and energy consumption.
- Reduce products environmental impacts.
- Improve environmental performance.
- Develop environmental honesty.
- Maximize the use of recovered energy and materials.
- Enhance the brand image of the company.
- Minimize transportation throughout the product life cycle.
- Satisfy the user needs.

5. Relationships between eco-design, resources commitment and reverse logistics

5.1. Relationship between eco-design and reverse logistics

Reverse logistics has several basic variables, such as: collection, sorting, reuse, recycling, etc. However, eco-design is mainly reflected in least polluting choice of materials, manufacturing process, packaging, distribution and withdrawal. The integration of the product and its packaging eco-design with reverse logistics is reflected by the constraints illustrated in figure 1.

![Fig. 1 Relationship between eco-design and reverse logistics](image-url)
It can be confirmed that the relationship between eco-design and reverse logistics can be constrained by:
- Product: reuse, disassemble, rebuild, repair, reduce environmental impact and energy consumption
- Components: reuse, reliability, number
- Connections and assemblies: removable, modular, number
- Materials: recycled, recyclable, identification, environmental impact, number
- Actuators: energy consumption, emissions, reuse, repair, number
- Packaging: environmental impact, recycle, reuse, number, size, mass
- DFx: Disassembly, Reliability, Logistics, etc.

5.2. Relationship between eco-design and resources commitment

In their research, Kuo et al. (2001) have cited that eco-design helps to minimize the use of non-renewable resources. Similarly, Gherra (2005) have confirmed that it has a positive impact on the use of renewable resources. Moreover, Richey et al. (2005) have showed that companies that focus on improving quality can reduce the amount of product recovery.

Hence, there is a coherent relationship between resources commitment and eco-design when applying eco-design strategies in the logistics chain. It is noted that if we act with eco-design on resources commitment, this allows to: minimize the use of non-renewable resources; foster the use of renewable resources; reduce the consumption of financial resources; increase product value; reduce product cost; use technology resources with low environmental impact; optimize management resources; capitalize and share product data; etc. Hence, the relationship between eco-design and resources commitment can be represented by figure 2.

![Fig. 2 Relationship between eco-design and resources commitment](image)

5.3. Relationship between reverse logistics and resources commitment

Organizations need to shift from the continued focus on the forward chain to attain larger competitive benefits. That requires the commitment and the use of a greater amount of human, financial and technological resources to
reverse logistics activities carried out by the firm (Mahindroo et al., 2018). Besides, reverse logistics process is been one of the fundamental processes that implement multiple resources and skills. In this context, resources commitment for reverse logistics program increases the likelihood of better service in a company (Daugherty et al., 2002). In this context, Richey et al. (2004) have specified that resources commitment acts as a moderator in the relationship between reverse logistics and performance results.

Specifically, the commitment of reverse logistics resources has a positive impact on the achievement of reverse logistics program goals. It includes environmental regulatory compliance, reducing inventory’s investment, improving profitability and increasing economic performance. Indeed, resources commitment makes reverse logistics programs more efficient and effective. Hence, this commitment is positively associated with economic performance in reverse logistics (Huang et al., 2012).

The results of a mediated model suggest by Morgan et al. (2018) have indicated that resources commitment may be used to develop a sustainable reverse logistics capability and reduce the environmental impact of reverse logistics activities. This study suggests that firm resources committed to sustainable Supply Chain Management (SCM) through reverse logistics create structures within and across the supply chain. This allows improving performance organizational resources commitment which may include dedicated workforce time, define responsibilities and objectives and ensure employee training to support sustainable SCM strategies.

According to Khor and Udin (2013), resources commitment allows company to develop reverse logistics programs that cover its assets. Likewise, Richey et al. (2005) have showed that for all companies, resources commitment has a positive impact on company ability to innovate a reverse logistics program. It may be mentioned that this allows to: increase service; develop reverse logistics programs and innovate reverse logistics program.

Moreover, resources help to make reverse logistics programs more efficient and effective. In this context, it is founded that: resources must be allocated to provide a new approach; financial resources commitment is strongly linked to cost control; resources management has an important influence on reverse logistics; resources commitment has a positive and significant impact on reverse logistics; successful operation of resources commitment in a reverse logistics program can create innovation in the business. Therefore, the relationship between reverse logistics and resources commitment can be represented by figure 3.

![Fig. 3 Relationship between reverse logistics and resources commitment](image-url)
5.4. Proposal of a conceptual model linking the three concepts

Huang et al. (2012) have proved that resources commitment is positively associated with environmental performance in reverse logistics. Furthermore, Khor and Udin (2013) have indicated that design for environment and resources commitment have a slight influence on repair and disposal activities.

Based on literature and following the various binary relationship between the three concepts above, we see that if we act with eco-design on a product, this allows obtaining an eco-designed product. In general, this phenomenon can influence company profitability and also product quality. Indeed, the production of an eco-designed product allows:
- Reduce the financial burden.
- Limit the volume and the weight of packaging.
- Allows the reuse and the recovery of the packaging.
- Optimum resources use.
- Strengthen company competitiveness.
- Reduce environment impact.

It can be deduced that the best position of resources commitment in a reverse logistics chain can be established following the application of an eco-design approach. This approach allowed withdrawing the necessary links between eco-design, reverse logistics and resources commitment. Figure 4 illustrates the binding of these three concepts as follows:

Fig. 4 Relationship between eco-design, resources commitment and reverse logistics

Mahindroo et al. (2018) have proposed an information system-centric framework that emphasis the influence of return frequency and resources commitment, which hold a lot of significance in the reverse logistics context. This technological resource can be adapted to the proposed model to support the integration of eco-design and resources commitment to reverse logistics.
6. Application on canned tomato packaging eco-design

6.1. Overview

Tunisia is among first countries in the world in the consumption of tomato and harissa preserves. Usually, those products are packed in metal box. If the packaging production plants are located in remote areas at the tomato canning plants, so there is a very big loss of transport time and cost, also the increase of greenhouse gas emission related to this activity. In the same way, the covers of the packages which are characterized by an easy opening are imported from abroad, whose final product cost will automatically increase and production break risk will be greater. So “Can the intervention of eco-design concepts and resources commitment give a blow to the decrease in these items noted above?” Therefore, can the replacement of canned tomato metal packaging with another allow to:
- Increase profit margin in all the supply chain.
- Minimize environment impact.
- Improve reverse supply chain.
- Minimize nonrenewable resources use.

6.2. The effect of eco-design on cardboard based packaging

In this case, eco-design objective is packaging quality improvement to reduce environmental impacts throughout its life cycle. An eco-designed and eco-manufactured packaging allows:
- Limit its volume and its mass at least.
- Allow its reuse and its valuation after disposal.
- Reduce harmful or dangerous packaging materials.
- Facilitate recycling.
- Reduce its environmental incidence.

The standard ISO / TR 14062 has provided general principles for taking environmental aspects into account in design activities. It has several objectives:
- Company’s brand image improvement.
- Better knowledge of product.
- Risk reduction.
- Innovation stimulation.
- Promote the adoption of preventive approach vs. pollution.
- Preserve resources.

The advantages shown above are justified for cardboard based packaging. A life cycle assessment realized by Bio Intelligence Service for Tetra Pack Company (see table A1) has shown that, compared to greenhouse gas emissions, bricks food are very efficient compared to steel and glass packaging.

Tetra-Pack product which is constituted by three layers (cardboard, aluminum and plastic) has shown that it is more efficient according to greenhouse gas emission. Thus, to increase this packaging efficiency, it is necessary to decrease the rate of materials Global Warming Potential (GWP). This idea was realized by Pack Alim Company and Combibloc EcoPlus Company who removed aluminum layer.

Also, according to a study on the life cycle assessment, done by Tetra-Pack Company, multiple packaging materials end of life scenarios (Bricks, Flask blows up, Glass, Steel) are given in table A2. According to this table, we noticed that: the recycling of bricks is much less interesting than that of the glass and the steel, only 31% of the waste is recycled; compared to the plastic flask and glass, a good quantity of the food bricks (35%), ends by the incineration; the burial of 34% of waste resulting from bricks stays always a big percentage compared with: plastic bottle, glass and steel.

Moreover, 69% of the food bricks at the end of life are exposed to either incineration or burying. According to LCA data presented above, it is deduced that: food parquets are badly recycled; CO2 emission is much lower than that of traditional packaging; Incineration and burying are unfortunately the more adapted solution for food packaging disposal. Hence, to reduce these rates and promote recycling, a good household waste management is needed through selective sorting, user awareness, etc.
6.3. Resources commitment for cardboard based packaging

6.3.1. Raw material

Several packaging materials can replace the tomato preserves metal packaging such as glass, plastic and cardboard based packaging. Table 3 illustrates some advantages and disadvantage for those packaging materials.

According to table 3, the study will be centered on cardboard based packaging because it has more advantageous. Cardboard based packaging production for canned tomatoes requires: wood-based cardboard, plastic layer, water-based ink and glue. However, metal box requires: tinplate, varnish, joined (import from abroad), polyethylene powder coating, inks and copper wire. It is noticed that there is less number of raw materials for cardboard based bricks. In addition, most of used products are either renewable or recyclable.

Table 3 Comparative presentation of possible packaging materials

| Materials          | Advantages                                         | Disadvantages                                      |
|--------------------|----------------------------------------------------|----------------------------------------------------|
| Glass packaging    | - Effective protection for food products           | - CO2 emission during the production.              |
|                    | - The lid can be either plastic or metal           | - Use of nonrenewable resources                    |
|                    | - Recyclable to the infinity                       | - Weight in excess compared with the other         |
|                    | - Etc.                                             | packaging.                                         |
|                    |                                                    | - Big risk of breakage.                           |
|                    |                                                    | - Etc.                                             |
| Plastic packaging  | - lighter weight                                   | - Use of nonrenewable resources                    |
|                    | - lower price                                      | - Risk of carcinogenic diseases                    |
|                    | - Recyclable                                       | - High CO2 emissions during production             |
|                    | - Etc.                                             | - High environmental impact during if not         |
|                    |                                                    | recycled or if incinerated                         |
|                    |                                                    | - Etc.                                             |
| Cardboard based    | - Usually used for food packaging                  | - Use of many materials (paper, aluminum, plastic)|
| packaging           | - Low price                                        | - CO2 emission during the production.              |
|                    | - Light weight                                     | - Use of some nonrenewable resources (oil         |
|                    | - Low volume                                       | and bauxite)                                      |
|                    | - Recyclable                                       | - Etc.                                             |
|                    | - Non-exhaustible main raw material                |                                                    |
|                    | - Etc.                                             |                                                    |

6.3.2. Financial resources

The use of cardboard based packaging allows increasing the profit margin. Financial profitability in the distribution and transport links is very interesting. In addition, the weight of a one litter Tetra Pack package is 26 grams; however, metal box weighs 66 grams. Consequently, the transportation of cardboard spool to manufacture 946 000 of one litter Tetra Brick packaging requires only one truck of 25 ton. However, to transport the same quantity of metallic boxes 4/4, need 16 trucks. This allows decreasing transportation cost, material resource use and indirect costs.

6.4. Reverse logistics of cardboard based packaging

The recycling of cardboard packaging is very simple despite the difficulty of separating layers. The approach to be followed for the recycling this packaging type is:

- Collection of used packaging bricks.
- Food bricks packaging are crushed, plunged and mixed in big tanks filled with water:
  - The plastic will be separated by centrifugation.
  - The pulp is then going to pass in a thickener to form a paper pulp.
- Collected residues of polyethylene, as well as new papers are going to be used for the production of multiple products.
- Water maybe recycled and reused in the process.

However, packaging recycling of metal food boxes needs much energy and big factories which require great technological, management and financial resources. Nevertheless, the food brick recycling system is very simple and much cheaper. Hence, for financial resources the attractive relationship between eco-design and resources commitment has allowed to ensure the advantage of cardboard based compared metal packaging. Consequently, eco-design and resources commitment for cardboard based packaging production has a positive effect on reverse logistics.

7. Conclusion

Following the analysis and modeling of the relationship between eco-design, resources commitment and reverse logistics, we conclude that it leads to the development of a new model which is characterized by the flexibility during manipulation between the various processes. Otherwise, the collaboration between these three concepts leads to positive and better results than ancient practice. Furthermore, the successful operation of resources commitment and eco-design leads to mastering reverse logistics practice. However, after comparing and criticizing multiple types of packaging, we mentioned the different advantages of cardboard based packaging, and its correlation with reverse logistics. Consequently, a cardboard based packaging submitted to the requirements of eco-design and to a structured resources commitment has a positive effect on the inverse logistics.

In perspective, we aim to study the development of a strategy for valuing returns through an optimal traceability system in the context of reverse logistics. Furthermore, the research can extended to the study of circular economy impact over the performance of reverse supply chain.

Appendices A

| Packaging       | Stand Up Pouch | Tetra Pack | Steel  | Glass  |
|-----------------|----------------|------------|--------|--------|
| Weight of CO2 emission | 78 g           | 81 g       | 126 g  | 237 g  |

| Scenario of the end of life | bricks | Plastic bottle | Glass | Steel |
|-----------------------------|--------|----------------|-------|-------|
| Recycling                   | 31%    | 51%            | 72%   | 63%   |
| Incineration                | 35%    | 24%            | 14%   | 0%    |
| Burying                     | 34%    | 25%            | 14%   | 37%   |

References

Brezet J.C., Van Hemel C., Ecodesign - A promising approach to sustainable production and consumption, H. Böttcher, & R. Clarke (Eds.), United Nations Environment Program UNEP, (1997), ISBN: 9789280716313
Chou J.R., An Ariz-based life cycle engineering model for eco-design. Journal of Cleaner Production, Vol. 66, (2014), pp. 210-223.
Chung C.J., Wee H.M., Green-component life-cycle value on design and reverse manufacturing in semi-closed supply chain, International Journal of Production Economics, Vol. 113, No. 2 (2008), pp. 528–545.
Dangelico R.M., Pontrandolfo P., From green product definitions and classifications to the Green Option Matrix, Journal of Cleaner Production, Vol. 18, No. 16, (2010), pp. 1608-1628.
Das T.K., Teng B.S., A Resource-Based Theory of Strategic Alliances, Journal of Management, Vol. 26, No. 1, (2000), pp. 31-61.
Daugherty P.J., Myers M.B., Richey R.G., Information support for reverse logistics: the influence of relationship commitment, Journal of Business Logistics, Vol. 23, No. 1, (2002), pp. 85-106.
Daugherty P.J., Richey R.G., Genchev S.E., Chen H., Reverse logistics: superior performance through focused resource commitments to information technology, Transportation Research Part E: Logistics and Transportation Review, Vol. 41, No. 2, (2005), pp. 77-92.
Dekoninck E.A., Domingo L., O’Hare J.A., Pigoso D.C., Reyes T., Troussier N., Defining the challenges for ecodesign
implementation in companies: Development and consolidation of a framework, Journal of Cleaner Production, Vol. 135, (2016), 410-425.

Farhane Y., Thierno D., Amegouz D., Bouras A., Eco-design the key of sustainable development, International Journal of Innovation and Applied Studies, Vol. 8, No. 1, (2014), pp. 131-140 (in French)

Fleischmann M., Reverse logistics network structures and design, ERIM Report series research in management, Erasmus University Rotterdam, (2001), The Netherlands, No ERS-200-1-52-LIS

Garbout M., Zouari A., The effect of eco-design and resource commitment on reverse logistics, First International Conference on Transportation and Logistics (2015), May 13 - 14, 2015, Sousse - Tunisia

Gherra S., Sustainable development, Supply chain management and strategy: case of eco-design, Logistique & Management. Vol. 13, No. 1, (2005), pp. 37-48. (in French)

Hervani A.A., Helms M.M., Sarkis J., Performance measurement for green supply chain management, Benchmarking: An International Journal, Vol. 12, No. 4, (2005), pp. 330–53.

Huang Y., Wu Y.J., Rahman S., The task environment, resource commitment and reverse logistics performance: evidence from the Taiwanese high-tech sector, Production Planning & Control: The Management of Operations, Vol. 23, No. 10-11, (2012), pp. 851-863.

ISO 14006:2011 Environmental Management Systems - Guidelines for integrating eco-design

ISO/TR 14062:2002 Environmental Management - Integrating environmental aspects into product design and development

Jeswiet J., Hauschild M., EcoDesign and future environmental impacts, Materials & Design, Vol. 26, No. 7, (2005), pp. 629-634.

Khor K.S., Udin Z.M., Reverse logistics in Malaysia: Investigating the effect of green product design and resource commitment, Resources, Conservation and Recycling, Vol. 81, (2013), pp. 71-80

Kuo T-C., Huang S.H., Zhang H-C., Design for manufacture and design for X: concepts, applications, and perspectives, Computers & Industrial Engineering, Vol. 41, No. 3, (2001), pp. 241-260.

Liao T-Y., Reverse Logistics Network Design for Product Recovery and Remanufacturing, Applied Mathematical Modelling, Vol. 60, (2018), pp. 145-163.

Loomba A.P., Nakashima K., Sustainable Ecodesign Mapping of End-of-Life Strategies for Improved Products/Processes Management. In: Design for Innovative Value: Towards a Sustainable Society, Matsumoto M., Umeda Y., Masui K., Fukushige S. (Eds). (2012), Springer, Dordrecht, pp. 697-700.

Mahindroo A., Samalia H.V., Verma P., Moderated influence of return frequency and resource commitment on information systems and reverse logistics strategic performance, International Journal of Productivity and Performance Management, Vol. 67, No. 3, (2018), pp. 550-570.

Melquist P., Life cycle assessment of Tetra Pak packaging, (2008), https://www.actualites-news-environnement.com/article.php?id=18216, accessed in 11/04/2018, (in French)

Morgan T.R., Tokman M., Richey R.G., Defee C., Resource commitment and sustainability: a reverse logistics performance process model, International Journal of Physical Distribution & Logistics Management, Vol. 48, No. 2, (2018), pp. 164-182

Richey R.G., Daugherty P.J., Genchev S.E., Autry C.W., Reverse logistics: the impact of timing and resources, Journal of Business Logistics, Vol. 25, No. 2, (2004), pp. 229-250.

Richey R.G., Genchev S.E., Daugherty P.J., The role of resource commitment and innovation in reverse logistics performance, International Journal of Physical Distribution & Logistics Management, Vol. 35, No. 4, (2005), pp. 233-257

Riopel D., Chouinard M., Marcotte S., Ait kadi D., Reverse logistics engineering and management: Towards sustainable networks, (2011), Hermes-science, Lavoisier. (in French)

Rossi M., Germani M., Zamagni A., Review of ecodesign methods and tools: Barriers and strategies for an effective implementation in industrial companies, Journal of Cleaner Production, Vol. 129, (2016), pp. 361-373

Skinner L.R., Bryant P.T., Richey R.G., Examining the impact of reverse logistics disposition strategies, International Journal of Physical Distribution & Logistics Management, Vol. 38, No. 7, (2008), pp. 518-539.

Tan A.W.K., Yu W.S., Arun K., Improving the performance of a computer company in supporting its reverse logistics operations in the Asia-Pacific region, International Journal of Physical Distribution & Logistics Management, Vol. 33, No. 1, (2003), pp. 59-74.
Tao J., Li L., Yu S., An innovative eco-design approach based on integration of LCA, CAD-CAE and optimization tools, and its implementation perspectives, Journal of Cleaner Production, Vol. 187, (2018), pp. 839-851.
Telenko C., Seepersad C.C., Webber M.E., A compilation of design for environment principles and guidelines, In ASME’2008, International Design Engineering Technical Conferences, and Computers and Information Engineering Conference, January (2008), New York, USA, American Society of Mechanical Engineers.
Weeks K., Mileski J., The Impact of Resource Commitment, Product Route Efficiency on Supply Chain Performance and Profitability: An Empirical Case Analysis, Journal of Business and Management Sciences, Vol. 1, No. 5, (2013), pp. 105-111.