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INNOVATIVE SOLUTIONS IN REVERSE LOGISTICS

A b s t r a c t: Reverse logistics is a dynamically developing field, which is based on the flow of goods in the opposite direction to the traditional (from consumer to producer). The main purpose of this article is to introduce the concept of reverse logistics and to characterize specific solutions used in its aspect, as well as to present the advantages of using this type of logistics. To illustrate the theoretical considerations were used some reverse logistics processes in enterprises and the benefits that have been achieved as a result of them.

K e y w o r d s: reverse logistics, innovations in logistics, reverse logistics benefits.

J E L C o d e: O30, L90

INTRODUCTION

Reverse Logistics is a process of planning, implementing and controlling of an efficient and economically effective materials flow, semi-finished and finished goods with the information linked with these flows from the place of its expenditure to the place of its origin in order to regain its value or manage it properly.

Fleischmann's interpretation is the most complete definitions, the determine the essence of Recovery Logistics. Recovery Logistics is responsible for handling returning goods related to being damaged, being traded back, balancing the goods in the warehouses or taking care of waste management.

We can also come across the others definitions of Reverse Logistics. For example we can describe Reverse Logistics as a flow of goods from the customers to the producers in the trading channel, or as a part of Logistics handling recycled goods and managing of dangerous goods (like ones mentioned in the Dangerous Goods Declaration).

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Reverse Logistics is also referred to as a process planning, resolving and supervising the efficient and economically effective flow of materials within the supply chain, and information related to that flow in the differing direction to flows in the normal (traditional) supply chain for the purpose of recovering its value or proper managing of goods [Rogers, Tibben-Lembke, 1998].^[6]

In 1993 the Council of Logistics Management stated that: Reverse Logistics is a broad term referring to logistics management of product and packaging skills and activities (both dangerous and secure). It contains the inverse distribution that causes flows of goods and information in the opposite direction to normal Logistics activities [Fajczak-Kowalska, 2014].^[3]

1. EXAMPLES OF REVERSE LOGISTICS APPLICATION

The recovery process (including recycling) within the supply chain network contain:

- products (damaged or undamaged),
- packaging (returnable and disposable).

Reverse logistics system is influenced with not only economic reasons or more less environmental feelings of the company owner but also with the legislation. Henrique Luiz Corrêa and Lucia Helena Xavier consider the establishment of legal environment-related limits such as maximum emissions for certain modes of transportation in the United States in the 90s as a milestone in the logistics – environment interaction. The same way the public policy in many countries can influence through the rules included in the law the regulation of reverse logistics. However, some modern companies build their corporate brand directly on their relationship to the environment [Antonyová et al. 2016].^[1]

That is why some of the modern companies rely on the recycling. The term of recycling was spread wildly in the near end of twentieth century, the definition of recycling in polish legislation is: „such recovery, which consists of repeating the processing of substances or materials contained in waste in the manufacturing process for obtaining a substance or material of its original purpose or other purpose including organic recycling, excluding energy recovery”

It is not only good for the environment, but also makes the company looks good in the eyes of the society.

For example, in the Polish joint venture of the Farm Frites International BV and Aviko BV, the Farm Frites Poland, the term of recycling is meant by processing the production wastes, that are meant to be recycled in order to produce a biogas, which is later used to create the electricity and to heat up a process water.

Other kind of reusable goods, that can be used are routable spare parts of any kind of electronic devices such as TV's, mobile phones etc. In this kind of goods Reverse Logistics can work well with both damaged and undamaged goods.

For example, companies can use damaged parts of TV's to maintain high quality of its products by researching what causes the damage or by replacing damaged parts with highly working ones, or using the parts from the damaged goods for future replacing.

The other category of the recovered goods are consumer goods such as copiers, washing machines or dryers. Producers almost every time provide a warranty on such expensive goods, which results in them picking faulty and replacing them with functioning ones. Meanwhile the damaged ones are being transported to the warehouse, where engineers can decide if any of their parts are suitable to be replaced, just like they do with the spare parts of any other devices.

Picture 1. The wheel of the Reverse Logistics.



Source: *Global Trend of Reverse Logistics Market | Trends To Watch Out In* by Lisa Smith (2019).

The best example of Reverse Logistics application is returnable packaging. In the common understanding returnable packaging are ones that are suitable for re-use in the production and distribution process, and their issue is usually followed by a deposit, which is returned when the packaging is returned. In the everyday life we can encounter this kind of Reverse Logistics, for example when we go shopping, and we buy a specific kind of bottles or we buy some goods on pallets, which are also a reusable packaging.

While in the large factories reverse logistics system is a direct part of the production process, in small and medium sized enterprises logistics channels are self-built, often not directly dependent on the manufacturing process [Antonyová et al. 2016].^[1]

Nowadays many big companies like PSP Lębork (which handle the palettes and packaging for Farm Frites Poland), DHL or Amazon are obligated to be using Reverse Logistics. For example, they re-use the pallets or boxes, they shred the packaging in special shredders to later form a new package with them.

2. ASPECTS OF IMPLEMENTATION AND IMPACT OF REVERSE LOGISTICS SOLUTIONS

To achieve the desired benefits of implementing reverse logistics, cooperation of all links in the supply chain is required (suppliers, manufacturers, retailers). Factors such as:

- incorrect flow of information,
- lack of trust,
- failure to fulfill duties,

contribute to the creation of difficulties in building a reverse supply chain and, above all, reducing its efficiency.

To measure the effectiveness of processes, quantitative indicator methods can be used, which are based on the use of synthetic or partial indicators or measures enabling the identification, measurement and evaluation of economic and/or non-economic effects. The effectiveness of logistics processes (including reverse logistics processes) can be assessed from different perspectives. When choosing measurement indicators, it should be remembered that they reflect actual changes in processes resulting from the flow of raw materials, materials, semi-finished products, finished products or information. It is also important to choose the right parameters to supervise and modify the process. Logistic indicators can be expressed in the form of:

- factual, e.g. material consumption per product,
- valuable, e.g. costs related to the production of one product.

The creation of logistic indicators is based on the selection of the evaluation criterion, which may relate to:

- shortening the time of raw material flows or implementation of activities,
- minimizing the costs associated with the implementation of processes,
- capacity utilization,
- the amount of processed materials, raw materials,
- service quality and products delivered [Dorozińska, et al., 2017].^[2]

One of the most important elements of reverse logistics used in enterprises is recovery. In order to be able to analyze the logistic possibilities of correctly organizing flows in the scope of packaging waste recovery, one should start

considering the answer to the question at what stage of the functioning of the supply network the waste being the subject of these flows is generated. In the same way as analysis of the product life cycle, you can also track the life cycle of the packaging and thus get the answer to your question. This wording defines the individual stages of a product’s life, from the moment of designing it up to the period when it ceases to meet the clients’ requirements and is removed from the market. By analogy, the packaging’s life cycle is also discussed, which covers the period from obtaining the raw material, through production to distribution, consumption and disposal of residues including cassation. In the current period, there is a strong polemic about the time when waste generated from packaging becomes a recyclable material, i.e. it loses its waste status again. On the one hand, the importance of the topic results from the increasing the value of secondary raw materials, related to the shortage of natural resources, on the other hand, with the conflict of interest of groups involved in flows based on these principles.

The decision-making process limiting the losses of added value from the supply network should take into account many aspects related to the functional characteristics of the packaging and the economic effect that is to be achieved.

The most important tips you need to make a decision include answering the following questions:

- Is it possible to ensure appropriate usage characteristics of given packaging, such as strength, durability, product protection, i.e. using recyclable materials in the production process, i.e. will the packaging still fulfill its protective function?
- Will the use of waste in the production process weaken the logistics function of the packaging?
- Will the marketing function of the packaging be ensured, which is, among other things, its aesthetic appearance?
- Will it be possible to secure the packaging information function by using secondary raw material - i.e. will it be possible to include inscriptions, instructions and instructions on it?
- Is ensuring the ecological function of packaging, i.e. producing it from waste so that it is least harmful to the natural environment, also economically profitable?^[2]

Table 1. Comparison of features of economic models

| Production | Recovery |
|---|---|
| Natural resources | Recyclable materials |
| Production of new products (production) | Replacement, repair, recycling (services) |
| Shortening the life cycle of products | Extending product life cycle |
| Distribution logistics | Recovery Logistics |
| Consumer society | Recycling Society |
| Supply Network | Exchange Network |

| | |
|---|--|
| Technological progress | Development of processing technology |
| Employment in production (and so threatened by computerization and mechanization of production) | Temporary unemployment and premium for product durability and respect for natural resources (positive social aspect) |
| Exploitation of the natural environment | Respect for natural resources |

Source: Michniewska K., (2013), *Logistyka Odzysku w opakowalnictwie*, Difin, Warsaw.

By properly managing returns, companies can reap a number of benefits, among which the most important are:

1. Cost reduction - reuse of materials and management of returnable packaging can provide revenues that stimulate new initiatives and efforts to develop and improve reverse logistics. In some industries, such as the aluminium industry, where valuable raw materials are reimbursed, processing costs are much lower than, e.g., re-production of a bauxite product (the basic raw material of this industry).
2. Impact on the environment - raising awareness about environmental protection is not a temporary trend. This factor causes a long-term reorientation of production and consumption to sustainable development. In this context, logistics can strive to minimize the environmental impact, not just production residue. It is very important to reduce the negative impact of products at every stage of their life cycle.
3. Competitive advantage - one of the ways to gain competitive advantage on the market is to introduce a liberal return policy (strategy to minimize return barriers when exchanging products), which allows loyalty to the customer. In this way, companies that manage return logistics the right way have the opportunity to succeed on the market. What's more, it is easier for them to reach the customer, examine their expectations and on this basis stand out from the competition.
4. Diversification of the company image - many companies use reverse logistics for strategic purposes, positioning themselves as a "citizen company", socially involved and helping disadvantaged people.^[2]

Table 2. Benefits of using reverse logistics

| Area | Interpretation |
|---------------------|--|
| Customer service | Good returns policy gives you an advantage over less liberal competitors. |
| Supplies management | Reverse logistics allows for more efficient use of inventory by quickly replacing old and slow-moving goods in the warehouse with new, more needed ones. |

| | |
|------------------------|---|
| Product value recovery | If the product does not sell quickly, an efficient reverse logistics system will help to effectively remove it from the supply chain, e.g. to sell at auction or to people who buy surplus or unwanted goods from one source for re-sale. |
| Technology security | By recovering all of its products, the company can limit competitors' access to its innovative technologies, which will help it gain a competitive advantage. |

Source: [5]

In order for the reverse logistics system to bring benefits, it is worth perceiving reverse logistics as a tool to improve the level of customer service, increase competitive advantage and change the corporate image. Reverse logistics helps the company focus on social and environmental activities, which allows it to declare itself as a socially responsible organization. What's more, return flow management can be a source of valuable information about customer behaviour and expectations. Improving the company's image is one of the goals assigned to most strategies reverse logistics. A positive image distinguishes the company from its competitors and helps to perceive it as an organization:

- environmentally friendly, i.e. thinking about ecological problems, promoting recycling and its activities reducing the negative impact on the external environment,
- encouraging the enforcement of legal provisions regarding the collection and the subsequent fate of dangerous goods ADR¹,
- socially active, emphasizing activities such as donation, job creation, educational and social support.^[5]

Today, most companies are not aware of the importance of reverse logistics in their business; moreover, these companies are not even interested in it. The main reasons for this state of affairs include:

- lack of integrated computer systems that support management and use by companies, in the best case, of traditional logistics systems to adjust return flows,
- belief that reverse flows only generate costs and are therefore not a priority in the company,
- difficulty measuring the impact of returning goods and materials, and unaware of the need to control them.

Another reason that inhibits the development of reverse logistics is the lack of knowledge about what reverse logistics controls and what returns to the company. In fact, reverse logistics are more about complaints and returns of goods that

¹ ADR - the European Agreement concerning the International Carriage of Dangerous Goods by Road.

the customer does not want or does not need. While logistics and distribution functions are well defined and have their own information systems, reverse logistics due to their specificity, quantity and frequency of returns is treated in the company as something unusual. There is a clear need for specialized systems that integrate distribution and reverse logistics processes, as there are several IT systems capable of mapping processes that also include reverse logistics models.^[5]

SUMMARY

To sum up, reverse logistics is important from the point of view of manufacturing companies, because it enables them to properly manage waste, returns and reusable packaging. The use of reverse logistics brings a positive impact not only to the company itself, but also to the natural environment. Recovery efficiency in manufacturing enterprises is constantly increasing due to the method of identifying waste suitable for recovery.^[4] Therefore, increasing product awareness leads to more effective use of reverse logistics, and thus more efficient waste management, which results in less negative impact on the natural environment, better company image and increased financial benefits.

LITERATURE

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