Management of sustainable innovation and risk in global supply chain

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The paper analyses the role of innovations in the implementation of sustainability concept in terms of logistics and supply chain management. The use of sustainability concept fosters the companies to review the key business processes, including logistics, and to find the ways in cost optimization. The innovation is established as crucial part of sustainable logistics. The tools and methods of sustainable logistics including reconfiguration and the reverse logistics are presented from the point of innovation process. In the conclusion the paper investigates the risk factors influence of the success of sustainable logistics implementation.

Keywords: sustainability, logistics, supply chain management, risk, innovation.

Introduction

Globalization and outsourcing have significantly influenced the development of modern supply chain management. Sustainable development becomes one of the most important aspects of international logistics and supply chain management (SCM). Born in the framework of environment protection, today the concept of sustainable development includes the economic component, causing the possibility of companies to act with a minimum negative impact on the next generation. There is no doubt the role of supply chain management in the maintenance of sustainable development is significant that led to the allocation of a special direction — green logistics or sustainable logistics.

Support for the concept from the leading organizations such as the UN and UNICEF placed the principles of sustainability in a wide range of global projects [1]. In 1993, there was set a special Commission on Sustainable Development. The aim of the Commission was to assist in the execution of the agreements, announced at the summit in Rio de Janeiro. To keep the environment safe has been put in line with such important issues as the fight against poverty, hunger and social inequality. It tended to force the national governments to reconsider approaches on environmental issues. The signing of the Kyoto Protocol, involving reduction of carbon dioxide emissions by 60% before 2050, became a landmark for the concept of sustainable development [2].

It is important to also note that contemporary concept of sustainability (fig. 1) covers several areas. It includes ecology, economy and social sphere. Concern about the problem of inefficient use of resources has become the basis of the concept of sustainability on a global scale. The correlation between the decisions in each area determines the integrated development of

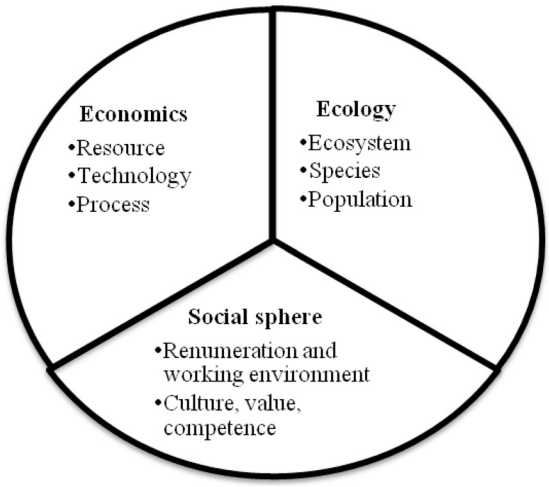

Fig. 1. The area of sustainable development concept

sustainability. Innovation is designed to give an answer for the question «whether the activity conducted by the company so as not to harm the development of future generations»? In sustainable management it is necessary to make an analysis of the business activities today in order to protect the future.

Nowadays, sustainability report is an important task for social responsible company. It plays an extremely significant role in creating the image of social responsible company. Moreover, the use of sustainability concept fosters the companies to review the key business processes, including logistics, and to find the ways in cost optimization.

Review of business process among the social responsibility may improve a competitive advantage. Taking it into account, we have noticed several benefits of sustainable development. However, success of its realization lies upon the scrutinized analysis of business activities. The risk of improper realization brings damage not only to the image of company but also to the promotion of the concept.

Definition of sustainable logistics

The role of logistics and supply chain management in sustainable development increases. The growth of international trade provides an increase in the demand for logistics services and its volume. In the framework of sustainable development, logistics is committed to minimizing the negative effects on the environment and society that may occur during its implementation. As evidence practitioners provide the example of reverse logistics methods for products that have expired or for the defective goods. In addition, a set of factors that determine consumer preference now includes such factor as «environmental friendliness». For example, this factor may play a key role in the consumer's choice in favor of a supplier takes care of the environmental issues of production and delivery. In this regard, the international company that operates in markets with high demands for environmentally friendly production and which operates according to the principles of sustainable development, receives an additional advantage.

Sustainable logistics or eco logistics means reducing the environmental and other damages associated with the movement of goods [3]. Supply Chain Management in sustainable development involves finding ways to improve the process in order to avoid "inefficient" and unnecessary movements. Speaking about the correlation of growth of international trade volume and demand for logistics services, first of all, we are talking about an increase in demand for transport services. Within the concept of sustainable development, economic growth does not imply commensurate increase in the volume of transport services in view of increasing the damage caused. For example, in the UK between 1997 and 2004, there is marked the GDP growth while the dynamics of the freight volume transported remained stable. One way to minimize the damage can be reconfiguration of the supply chain. The optimal arrangement of warehouses and distribution centers can reduce the load-use vehicles.

Innovation as a crucial part of sustainable logistics

Legislation is essential in implementation of sustainable principles which should be taken into account by the international company. For example, in Germany as well as in the Netherlands, there had been adopted amendments to the legislation in order to encourage the producers for developing recycling and utilization technology. Significance of sustainability legislation makes companies to innovate. It not an obligation but it is a "pushing" tool on the way of sustainability.

Generally speaking, the innovation is one of the most effective instruments for implementation principles of sustainability. In order to minimize a negative impact from business activity, a company tries to find an optimal method. The goal might be achieved by minimizing the use of the resource or thinking about to do things in another way. Such investigation leads company to innovate [4].

Innovation is a complex concept, consequently it is difficult to form one definition of this term. It can be defined as a result or a process. On the one hand, the innovation is a change in technology or structure in order to create a new product or method. On the other hand, every creative process is depicted as innovation. In this study innovation is considered as a process due to the fact of sustainable logistics being a continuous task for the company.

From this point such well-established methods of sustainable logistics like reconfiguration of the supply chain and reverse logistics methods are bright examples of innovations. An example of a reconfiguration may be found in crowding out small suppliers by self-service centers. So, DHL is among the first companies launched the project of automatic release of the goods by a special device, which may be located in airports, railway stations and shopping centers. DHL PACKSTATION project allows a consumer to pick up the goods at any time to obtain using the password sent in the e-mail message.

In frames of sustainable logistics there are innovations to ensure the maximum possible load of the vehicle without violating the rules of goods carriage. Thus, some companies are faced with the fact that the geometric dimensions of the transported goods loading vehicle is provided only by 50%. Optimization of packaging, innovation in placement designed to increase the load, which ultimately minimizes the likelihood of unnecessary traffic. It is worth noting that improved logistics stages can be also illustrated in the examples by warehousing innovations. The use of energy-saving technologies in lighting and air-conditioning storage facilities illustrate the implementation of the concept of sustainable development.

Many experts point out reverse logistics as one of the most effective methods in implementing the principles of sustainability. While traditional logistics focuses on the movement of goods from the production site to the place of consumption, reverse logistics focuses on the delivery from the place of consumption to the point of manufacture. Despite the existence of different approaches to the definition of reverse logistics, we can identify the common features of these definitions. According to these definitions, the reverse logistics integrates the planning and control of material flow processes associated with the return of

finished products or components. The desire to reduce unsustainable consumption of resources and the processing of goods already unsuitable for the intended use can be summed up in the slogan «Reduce. Reuse. Recycle».

It is assumed that the manufacturer is willing to take on a permanent basis before the goods produced, and its component parts, which have been in customer use for the following purposes: reuse, recycling, remanufacturing, utilization.

Reuse suggests that the product is applied used again for purposes similar to the original purpose. This approach is often used by manufacturers as an alternative to the use of new resources. Examples of items to be reused are bottles, containers, packages and packing materials.

The process of recycling is divided into two components: the collection of used products and materials division of production, i.e., plastic, metal, wood, etc. Traditional stocks wastepaper collection represents this process [5]. From the standpoint of increasing the value-added processing is one of the least effective methods, as it does not involve preserving the functionality of the used products. Despite the controversial economic viability, it increases the processing volumes, along with the tightening of legal regulation in the sphere of environmental protection and awareness of corporate social responsibility.

Based on the level of producer involvement in the recycling process, it is possible to allocate reverse logistics an open and reverse logistics limited type. Open type reverse logistics involves the optional use of materials processing in the manufacturing process, although the manufacturer can arrange the process of searching and collecting. Closed type implies that the manufacturer is responsible for all stages of reverse logistics: from research to treatment and does not allow the latter to other counterparties.

Another method of reverse logistics is remanufacturing. It can be defined as the use of components for similar purposes. The repair of cars and copying tools by using parts that were obtained as a result of the dismantling of already released products is an example of remanufacturing. These parts may be in good condition or recovered. Nevertheless, the quality of the product, assembled from such parts must meet requirements as well as the original product. Furthermore, in some cases the quality of such product is superior to the original due to the fact that parts were improved in reassembly. Reverse Logistics in this case consists of three stages:

- dismantling (analysis of products for the components);
- preparation (examination of the parts quality, making the required modifications);
- reassembly (collection of new products from prepared parts).

The implementation of these steps allows the end user to obtain products that meet the standards of quality at a price lower than the price of primary products assembly. The increase in value added in the process of disassembling makes remanufacturing a very attractive type for entrepreneurs, demonstrating the economic profitability among with minimizing environmental damage.

Risk factors in sustainable logistics implementation

Public interest for the implementation of sustainability concept in the supply chain management and logistics is increasing. Nevertheless, the experience of successful implementation in the long term counts for a small number of countries. There are can be highlighted several factors of the risk. The main factors stimulating the introduction of the concept can be grouped into two groups: external and internal (table 1).

Implementation of reverse logistics causes additional costs, for example, on purchase equipment used for the modification of the goods or for the effective utilization. So the need of additional investment implies the risk of many companies to implement the concept. However, such costs might be planned and controlled. Companies involved in the process of reverse logistics, with the successful return on investment obtained a number of direct benefits (new components, resources, reducing the cost of manufacturing) as well as indirect (compliance with the requirements of legislation, the strengthening of the market position, and attractive image of a responsible company).

Increasing consumer demand for «ecological products» shifts the focus of manufacturers towards the recycling of used products and environmentally friendly production. The shareholders of many companies put the safety factor for the environment as a priority in taking important decisions. It is noteworthy that the demand for «ecological products» shifted the perception not only of manufacturers, but also of the rest of the supply chain. Companies seek to coordinate efforts in order to find efficient ways of recycle and reuse. The quality of the goods returned substantially affects the process of reverse logistics. Good quality of the products returned requires fewer processing steps.

Conclusion

To be sustainable is not so simple as it seems. In terms of logistics and supply chain management it means a continuous innovative process. In order to minimize the

Table 1

Internal and external factors of sustainable logistics implementation

Internal factors	External factors
Environmental protection The requirement to take into account the potential negative impact on the environment (according to the international quality standards)	Legislation Legal acts that favored the principles of sustainability
Cost optimization Return on investment (new components, resources, reducing the cost of manufacturing)	Demand The presence of demand for eco-friendly products
Quality of returned products Sufficient quality of product returned requires smaller number of processing steps.	

negative impact of freight movement a company has to think of the way how to rearrange the logistics process.

Implementation of sustainable logistics brings some benefits as well as risks to be considered by the producers and other participants of the supply chain. Reconfiguration and implementation of reverse logistics are presented as the possible way of sustainable development. The success of the reverse logistics process largely depends on the efficient management of available resources. It includes production facilities, personnel, recycling capabilities. The use of existing resources for reverse logistics depends on the compatibility of the reduced product and the company's overall strategy of positioning. The role of integration and communication determines the efficiency of reverse logistics. Since the speed of return and reuse of the product affects the process financial performance. Coherence of the departments responsible for the transportation of goods and information security enable the company to create the most cost-effective process of reverse logistics.

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Инновации и риски внедрения концепции устойчивого развития в управлении цепями поставок

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Предметом данной статьи является изучение роли инноваций в процессе внедрения концепции устойчивого развития в логистике и управлении цепями поставок. Реализация принципов устойчивого развития стимулирует компании пересмотреть ключевые бизнес-процессы, включая логистику, и найти пути оптимизации затрат. Инновации представлены как неотъемлемая часть устойчивого развития логистики. Инструменты и методы устойчивой логистики, включая реконфигурацию цепи поставок и реверсивную логистику, рассмотрены с точки зрения инновационного процесса. Также в статье представлены ключевые факторы риска, влияющие на успех реализации концепции устойчивого развития в логистике.

Ключевые слова: устойчивое развитие, логистика, управление цепями поставок, риск, инновация.