

## SELECTED PROBLEMS OF SUSTAINABLE LOGISTICS

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**Abstract:** The “sustainable development” term is listed in almost every aspect of life. The wide perspective of sustainable development and its three dimensions: ecology, economy and society, allows for its frequent use in relation to any actions taken by people or companies. At the beginning this term was often used and understood only in ecological aspect, but today, all its dimensions are taken into account. It was a matter of time when the sustainable development concept will be connected with the logistics area – it is also a very wide field, in which, sustainable development might be found very useful. This article presents the essence of the sustainable development conception in connection with the logistics. After the introduction, the assumptions of sustainable development in logistics are presented and then the most common problems and issues are listed.

**Keywords:** sustainable development, logistics, ecologistics, management, supply chain, transport

### 1. Introduction

Due to the increased interest in issues of sustainability, it takes a particular significance. It is a multi-layered phenomenon, encompassing such research planes as ecology, philosophy, culture, society, politics, technology and economics. The main goal of sustainable development is the introduction of an integrated governance, which pays special attention to the corporate merger of environmental sustainability, socio-economic, spatial and institutional and political. This concept is realized by carrying out environmental, socio-economic and spatial category policy, with an emphasis on sustainable development in the political sense as well as in the field of management.

The principles of sustainable development in the economy, concern including the organic matter, so far unprecedented in the economic history, in the area. This reorientation of the world economy, gives rise to questions concerning the major determinants of determining the possibility of developing the concept of philosophical and practical solutions, applied, for example, by the companies [1].



Figure 1. The levels of sustainable development.

The main objective of sustainable development, is to protect the natural capital as a few important rules. This concept is important to reproduction of renewable resources, the integrity of the natural environment, the greening of the economy and its development-environment cannot be in conflict with the interests of the economy. The last principle refers to the economization or policy in a way that minimizes the social cost.

## 2. Assumptions of Sustainable development in the field of logistics

Until recently, the costs and speed were the main criteria for evaluation of logistics operations. This situation has now changed, with the result that the process of making key decisions logistics, has been extended to the third dimension: sustainable development. [2]

The concept of sustainable development is, more often, being used in logistics, due to the fact, that logistics is a human activity, that naturally generates many benefits but also poses risks to the environment. Logistics impacts on the environment through transport, storage and packaging management processes.

Sustainable development began to play an important role in the logistics business. Even a separate field of logistics – Ecologistics developed, thus "realization of optimal solutions for the collection, storage, disposal and utilization and non-harmful for environment and society disposal of various types of waste" [3]. Her main goal is to solve environmental problems in the areas of logistics, which can be understood by eliminating or minimizing any negative impact of logistics on the environment. These activities include designing sustainable packaging, and reuse of, recycling waste, reducing energy and the pollution caused by transport [4].



Figure 2. Waste hierarchy.

With ecologistics are related concepts such as logistics disposal, recycling logistics, reverse logistics, and downcycling. Reverse logistics is a very important area of logistics management in individual companies and supply chains. Reverse logistics is so called. waste management. It is arousing growing interest among companies, which was caused due to stringent regulations for environmental protection.

Reverse logistics - "is the process of planning, implementing and controlling the efficient and cost-effective flow of raw materials, semi-finished and finished products, together with the related information flows, from the point of consumption to the point of origin, in order to recover the value or proper management" [5].

Disposal logistics - "the application of the concept of logistics for the residue, to induce their efficient, economically and ecologically, movements, while the space-time transformation, including changes in the amount and type of" [6].

Recirculation logistics - "suggests that product or packaging, is circulated repeatedly in a closed loop supply chain" [7].

Downcycling - "process of waste or useless products transformation into new materials or products, having a lower quality and functionality [7].

Looking at these definitions, it seems necessary to explain how they are defined from the point of view of logistics and recycling waste. Wastes "are all solid and liquid substances (except water), as a result of economic activity or human life, that are in accordance with the decision of the trustee useless in a place and time in which they arise" [8]. However, recycling is "dispose the waste in the recycling process" [8].

Another term associated with sustainable logistics is called. Green logistics. This management approach is aimed at minimizing the negative impact on the ecosystem of logistics flows. This term, from some time is significantly increased in importance. The problems of excessive environmental degradation concern on companies, operating in each market sector. In particular, however, apply to freight forwarders and carriers. The concept of green logistics associated with the strategy, consists in the use of their resources in the most efficient and environmentally friendly way. It is a trend, that stems from the need to care for the global environment.

The implementation of sustainable development strategies in logistics functions, should play an important role in the company. An interesting example is the logistics of the chemical industry in Europe. The managers of these companies have introduced fully utilized assets, the products were sent in smaller parties, but always at full load, which

contributed to the cost-effectiveness, as well as the reduction and elimination of waste. These activities, as well as greater integration of the different components of the supply chain, compliance with social systems and a better environment and quality of work, contributed to sustainable logistics and helped the company reduce carbon emissions. However, the sustainable management of tangible assets has been identified as the highest priority in the supply chain managers, as it can affect the minimization or elimination of energy-intensive storage, reduce travel time and increase cargo trucks.

### **3. Problems of sustainability in the main logistics' fields**

Logistics includes "efforts to acquire materials and finished products distribution to the right place, at the right time and in the right amount" [9]. Typical elements of the logistics system are: customer service, demand forecasting, distribution communications, inventory control, warehousing, procurement processes, parts and service support, site selection magazine, shopping, packing, handling complaints, waste management, transport and storage. This process can extend from the source of raw materials, through the manufacturing and distribution, to the point of consumption and the associated reverse logistics. Companies collaborate with business partners (suppliers, shippers, distributors, customers) in order to improve their logistics operations, thus considerably improving business performance and reduce logistics costs.

The literature on logistics and supply chain, also highlights the importance of sustainability and energy efficiency. Abukhader and Johnson conducted a thorough literature review in the field of environmental protection in logistics, and observed weak ties in knowledge concerning the implementation of discipline between logistics and environmental protection [10]. Also Halldo'rsson and Kova'cs, in the survey of CEOs of large outsourcing companies, tried to identify the five most important reasons, that affect the determination of sustainable programs of their companies, they were as follows: the desire to make a "good deeds ", pressure from customers, the desire to improve the image company, the desire to attract the so-called "green consumers" and to achieve a competitive position in the market.

#### **3. 1. Sustainability in the supply chain management**

The supply chain is a network, in which the raw material is a complement to semi- and finished products, that are not sent to the client, and the flow of information and funds is delayed. The complexity of the structure and management of these networks have been documented in the literature. Supply chain management is synonymous with the network supply, gas supply management, value chain and value stream.

Supply chain management is the management of all the processes, functions, activities and relationships, in which the products, services, information and monetary transactions move among enterprises. Supply chain management is a very challenging task [11], in particular, the flow of supplies from sources of supply to end users [11].

In recent years, the concept of sustainable development was introduced in the areas of management, technology and supply chain. The introduction of environmental strategy will create new opportunities for the organization [12]. Social responsibility of business Has been replaced by the provisions of the business environment of the organization. Nowadays, companies have established various environmental strategies to improve their operations, and business environment. Environmental Strategy, which are used in

organizations is the management of the supply chain. Sustainable Supply Chain Management (SSCM) is an important strategy, that helps organizations achieve competitive advantage and improve overall performance. Effects of SSCM strategy are unclear and may lead to positive or negative economic results  
 SSCM activities that have been discussed in the literature review are shown in figure 3. A brief overview of each type of action associated with the concept of sustainable development.



Figure 3. Actions of Sustainable Supply Chain Management

Sustainable design - the first action in the implementation of SSCM is developing a strategy for the sustainable design of the product and its presentation. This also includes the design of products, in a way that will allow them to recycling or refurbishing. It is believed that „it will optimize the important factors in addition to the design features, quality, and cost of the development cycle” [13].

Sustainable Production - is second, after the project, a very important function in the development of SSCM. Environment production can be achieved through clean production methods, the use of new technologies and reducing the use of raw materials and resources to achieve low input, high efficiency and low pollution [13].

Sustainable Marketing - is a very important function in the development and implementation of SSCM. To achieve sustainable marketing, organizations „should maintain biological balance and pay more attention to environmental protection”[14]. Waste management in sustainable marketing, can lead to cost savings and increased competitiveness. In addition, it helps companies improve their relationships with customers, suppliers and other partners [15].

Sustainable transport - another important element of SSCM effective development. Many factors, including renewable energy, modes of transport, infrastructure and operational management practices, should be considered in the development of environmentally friendly transport systems. These factors and dynamics associated with them, determine the environmental impact generated in the phase of transport logistics supply chain [16].

Sustainable Purchase - SSCM development requires the implementation of a sustainable purchasing strategy, that leads to a reduction in the amount of waste and hazardous materials with organic materials [17]. In addition, sustainable purchasing plays a significant role in SSCM, as helps organizations reduce the sources of pollution and waste by using strategies such as recycling and disposal, dumping, sorting and using biodegradable packaging.

### 3. 2. Sustainability in the competitiveness

Competitiveness, from the point of view of the company, can be defined as the ability to provide products and services in the same, or a more efficient way, than competitors do. The competitiveness of companies is, of course influenced by many factors, until recently,

it was mainly the quality and price of goods or services. For some time, often appear another important factor for consumer, when choosing goods, it is the ratio of the principles of sustainable development.

One of the main goals of sustainable development and corporate social responsibility, while creating a marketing strategy, is to take into account not only the needs of the organization, but also a group of entities, that operate in its environment (ie, shareholders, borrowers, local community). In the name of these principles, business organization target should be to maximize the company's value, however, with a balance in meeting the needs of all stakeholders. This requires integrated actions of economic, social and ecological.

According to the idea of corporate social responsibility, company in its business operations, developed strategies and everyday decisions, should take into account the environmental, ethical and social aspects. It is about the social responsibility of enterprises for the consequences of its actions, which have a direct or indirect impact on the environment (co-workers, local communities and the environment). In a broader approach to this problem, you can even Take, that actually are all the stakeholders of the company, as at present, in a globalized world interconnections are getting stronger [18]. Therefore, all stakeholders have expectations for the company, which it tries to meet, what's more, the behavior and decisions of these groups have an impact on the achievement of the objectives set by the company.

Sustainability in business is often treated as a source of constraints, that are introduced by environmental and social regulations. They are treated as obstacles, because their performance adds to the cost and inconvenience of doing business. In this perspective, only by worsening business performance, environment can be improved. On the other hand the "cost of adaptation to environmental regulations can be minimized or even eliminated, through innovation, that generate other competitive advantages" [19]. This is not only a theory. There are many companies creating innovation, eliminating the harmful technologies. A good example is Germany, in the case of the early adopters of the standards of recycling, the company has given many chances to get ahead of noduleas already developed products with fewer pack. That kind of products are manufactured at a lower cost and the demand for them is growing

Poland has also faced these challenges, because the regulations and standards in the field of sustainable development are becoming increasingly common. More and more companies are also introducing integrated reporting on sustainable development and corporate social responsibility. Undoubtedly it has an impact on consumer pressure, but it 's starting to see benefits of this business. More and more companies are promoting so 'green economy', and try to adapt new standards of operations, in accordance with the principles of sustainable development.

### **3. 3. Sustainability in the transport**

Addressing the concept of sustainable development into transport, was associated with a rapid and, increasingly aggravating environment, development, and the lack of balance in this area of human activity. The increasing number of vehicles and their exploitation contributes to the reduction of natural resources such as oil and emissions. It is therefore important to introduce to this field the concept of sustainable development.

Ecologistics's inherent element and the concept of green logistics, is the pursuit of sustainable transport . Because, as mentioned earlier, in recent years, there has been growing interest in the issues of sustainable development and its references to planning the

transport system [20]. Transportation because it is a factor entailing consequences, both in the economy and to society and the environment, thus determining in this way all elements of the balance. Among the features of sustainable transport, deserve attention, two of them, namely the mobility category and availability category.

Sustainable development emphasizes the integrated nature of human action and, therefore, the need for coordinated planning, across different sectors, groups and jurisdictions. It develops all purposes, their effects and the possibilities included in the planning process. As a result, short-term individual decisions are consistent with long-term strategic objectives. The sustainable transport planning, transport decisions affect people in different ways, so the planning process should take into account the objectives and results.

Interest in sustainable development and transport continues to increase. Published many works, such as reports and books, dealing with issues of sustainable development and communities involved in the projects of sustainable planning. Studies on the nature and extent of these issues, and their implications for transport planning and Policy, have been recently launched. Several factors contribute to participate in these matters. The concern for sustainable development makes that public is aware of the impact of human activities on the environment, the results of which, can be seen in the economic, social and environmental costs. Global air pollution, the impact of producing toxins, degradation of natural resources such as fresh water and fisheries, and the cross-border nature of many environmental problems, highlight the need for the perception of the human impact on the environment from a wide perspective.

#### **4. Conclusion**

As was mentioned above, logistics is a very wide concept and covers many actions performed by the companies. This wide range allows to, first introduce, and then use many tools, solutions or actions proposed by sustainable development conception. It led to creation of new term which is Sustainable Logistics Management. In a nutshell – these are all processes, which belong to logistics field, with additional tools or actions or ways of perform, which are characteristics for sustainable development or are the pillars of this conception. Now, it can be said, that a lot of was done – sustainable development is visible almost in every aspect of logistics, but still remain a lot to do. The present situation on the markets, both, local and global, allows for introduction of sustainable development assumptions into logistics. But, fast changing reality and conditions, will require another actions among sustainable development.

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