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Green Logistics as a Sustainable Development Concept of Logistics Systems in a Circular Economy

Henryk DZWIGOL

Faculty of Organization and Management, Silesian University of Technology, Zabrze, Poland
henryk.dzwigol@poczta.fm

Nataliia TRUSHKINA

Department of Regulatory Policy and Entrepreneurship Development,
Institute of Industrial Economics of the National Academy of Sciences of Ukraine, Kyiv, Ukraine
nata_tru@ukr.net

Aleksy KWILINSKI

The London Academy of Science and Business, London, United Kingdom
a.kwilinski@london-asb.co.uk

Abstract

The article presents the results of expert surveys and the opinions of scientists about the need for a "green" transformation of logistics systems in the world. A statistical analysis of the development of logistics systems was carried out, taking into account the environmental component. The article identifies the barriers hindering the development of logistics systems from the point of view of greening. The evolution and preconditions of formation, challenges and factors of development of the circular economy are studied. The existing scientific approaches to the definition of the concept of "circular economy" are systematized. The theoretical approaches of different scientific schools to the definition of the concept of "green logistics" are analyzed and generalized. The author's formulation of the term "green logistics" is proposed as an instrument of the circular economy; component of corporate social responsibility of business; type of economic activity aimed at reducing the negative impact on the ecosystem and the environment. It has been established that for the effective implementation of the concept of green logistics, it is advisable to develop an organizational and economic mechanism, which is considered as a set of principles, tools, functions, methods and means aimed at reducing the level of greenhouse gas emissions and the cost of organizing logistics activities and various logistics services (transport, warehouse, marketing, etc.). A structural diagram of the formation of an organizational and economic mechanism for the implementation of the concept of green logistics is proposed. The key principles of green logistics are the use of an integrated approach to managing logistics flows; rational use of resources (production, financial, energy, information); minimal use of raw materials and packaging that are not recyclable; economically sound and environmentally friendly transportation and storage of material resources; maximum use of production waste, containers and packaging as secondary raw materials or their environmentally friendly disposal; optimization of costs for organizing logistics activities; minimization of risks in the operation of transport and logistics systems; increasing the level of environmental education and personnel responsibility; introduction of innovative technologies to reduce the environmental burden on the environment; application of information systems and digital technologies in the field of environmental protection.

Keywords: Logistics System, Circular Economy, Green Logistics, Conceptual Approach, Sustainable Development

Introduction

Ensuring sustainable development of logistics systems requires the introduction of organizational, managerial and environmental technologies adequate to transformational transformations, as well as innovative models to reduce the negative impact of transport on the environment. This is in line with the green growth concept proposed by the Organization for Economic Cooperation and Development. As international experience shows, improving the efficiency of the transport sector and organizing logistics activities can be achieved through the implementation of conceptually new management tools based on the principles of logistics, namely, systematic, process approaches, concepts of "lean" production, "just in time," sustainable development (Abazov 2021; Dalevska et al. 2019; Dyduch 2019; Dzwigol 2019; 2020a; 2020b; Dzwigol & Dźwigoł-Barosz 2018; 2020; Dzwigol et al. 2019a; 2019b; 2020a; 2020b; Kharazishvili et al. 2020; Lyulyov et al. 2021).

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friendly technologies; component of the green economy; type of logistics; economic activity; scientific and practical activities; type of activity related to the eco-efficient management of the movement of logistics product flows; a tool for ensuring the ecological safety of the ecosystem; a set of logistic approaches to optimizing waste and resource flows; environmentally friendly transport distribution system; coordination of logistics activities to achieve sustainable development.

At the same time, most scientists identify the concepts of "green" and "ecological logistics", which is understood as a scientific direction that involves the use of modern innovative logistics technologies; a set of actions aimed at minimizing the environmental consequences of logistics activities; integrated management of logistic processes (production, storage, waste transportation); a subsystem for managing product flows from supplier to consumer with minimal impact on the environment.

As a result of the study, it was proposed to consider the term "green logistics" from four scientific positions: as a concept of sustainable development of logistics systems of different levels; circular economy tool; component of corporate social responsibility of business; type of walking activity.

The main principles of green logistics should be the application of an integrated approach to managing logistics flows; rational use of resources (production, financial, energy, information); minimal use of raw materials and packaging that are not recyclable; economically sound and environmentally friendly transportation and storage of material resources; maximum use of production waste, containers and packaging as secondary raw materials or their environmentally friendly disposal; optimization of costs for organizing logistics activities; minimization of risks in the operation of transport and logistics systems; increasing the level of environmental education and personnel responsibility; introduction of innovative technologies to reduce the environmental burden on the environment; application of information systems and digital technologies in the field of environmental protection.

The implementation of the green logistics mechanism helps to minimize the costs of managing the movement of logistics flows while maintaining the required level of environmental safety, which is one of the important requirements for the implementation of the concept of corporate social responsibility of business in a circular economy.

In further scientific research, it is planned to give the author's approach to the definition of the concepts of "green investment" and "green financing of infrastructure projects"; to conduct a SWOT analysis of the development of logistics systems, taking into account the environmental component on the example of different countries of the world; analyze and summarize international experience of "green" transformation of logistics systems in a circular economy.

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