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BASIC TOOLS OF TRANSPORT SYSTEMS DESIGN BY THE HELP OF PRINCIPLES OF GREEN LOGISTICS

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Abstract:

Logistics is currently recording boom not only in the integration to the enterprise activities, processes, management of chains of material, informational flows, but also in the area of environment. The need of environment protection has its place at the state level in the form of legislation for environment, but also at the level of process control, at the same time processes of transport. Selection of transport system with an emphasis on the environment protection brings cost savings (accordance with legislative provisions), but also environmental consciousness. The area of logistics which emphasizes the need of environmental protection also in connection with transport, is eco-logistics, and in the significant level green logistics, as a subsystem of eco-logistics. The paper presents the short analysis of eco-logistics, green logistics and its tools which are necessary for the need of suitable selection of transport systems.

Key words:

Logistics, eco-logistics, green logistics, transport

INTRODUCTION

Logistics is by the current understanding, application of principles, divided into several application areas. Logistics and its application areas always placed emphasis on the way of management of activities with the minimal negative impact on the environment and as a result of this fact, it is formed a new application area of logistics, namely eco-logistics.

Eco-logistics can be defined as an application area of logistics that studies and minimizes the impact of logistics on the environment. It is essentially protection and creation of the environment. Its main object of interest is control, provision and realization of logistical

activities with the main criterion protection and creation of the environment, i.e. care for the environment. Basic measures of eco-logistics are environmental impact assessment, integrated prevention and pollution control, raw materials and energy control, determination of conditions of activities realization, realization of monitoring for potential and existing sources of environmental pollution, determination of the best available technologies, realization of control activities, effective information system for collection, processing and evaluation of data, elimination of impacts of environment damage, effective system of waste management, advertising of information about environmental impacts.

Eco-logistics can also be characterized as a sustainable ecological orientation with the importance of principles of sustainable development. Eco-logistics can be modified with the acceptance of principles of logistics to the form of targeted, long-term, continuous, complex and synergistic approach that influences the conditions of life at all levels of management with the direction of activities for creation of a functional model that respects basic needs and interests and at the same time it eliminates and significantly limits various forms of damage and pollution of the environment.

1 DEFINITION OF GREEN LOGISTICS AND ITS AREAS

For effective application of eco-logistics, by the present theoretical knowledge of application areas of logistics, the green logistics is very important. Green logistics presents a successful tool for managing of logistical activities in the direction of protection and creation of the environment, respectively environmental care.

At the same time, the effective solution of the problem areas of the environment with the respect of sustainable development should be based on accountability and suitably chosen approach to the analysis, assessment of the current state of problem areas of the environment and consequent way of adequately chosen solution of problems with the planning and application of preventive measures.

In connection with the above said facts, it is possible to apply for green logistics this approach – green logistics is the subsystem of eco-logistics as an application part of logistics with the main focus on monitoring, evaluating, reducing of the negative impacts of various logistical activities on the environment and the individual parts of the environment [1].

Green logistics presents an important tool of eco-logistics, as an application area of logistics. However, for the need of an ecological understanding of logistics, it is important to analyse ecological approaches or positions of logistics. These are possible to select into three basic areas:

1. Selection of an adequate locality for the realization of logistical activities with reference to environment protection,
2. Acceptance of legislative measures concerning to areas and parts of environment (raw materials management, air and water pollution, waste management),
3. Additional environmental value (in the direction of its own regulatory measures in the context of logistical activities in the sense of reactive strategy of organization in the protection of nature, environment).

Based on the above said ideas, it is possible to apply the following approach to eco-logistics: Eco-logistics is an application area of logistics whose main subject of interest is managing and realization of logistical activities with the main criterion of protection and creation of environment, i.e. care of the environment. Eco-logistics has two main parts, reverse

logistics and green logistics. Green logistics allows to increase effectiveness of processes of environmental impact assessment and eliminate creation of damages to the environment [2].

2 TOOLS OF GREEN LOGISTICS

Tools of green logistics are created by a broad spectrum. On the base of the study of several scientific publications [for example 3, 4] it is possible by determination of the tools of green logistics to copy the trend of tools that integrates the knowledge of ecology and environmentalism. Among these tools is possible to include two basic groups of tools, namely tools oriented to products and tools oriented to processes. With an emphasis on the transport systems, for the need of green logistics are important tools oriented on the processes, including:

- eco-balance,
- environmental management systems for transport enterprises and processes,
- Environmentally oriented audit for transport enterprises and processes,
- assessment of environmental profile for the transport system and also for the transport process,
- cleaner production and also cleaner transport devices,
- environmentally oriented monitoring and simulation.

2.1 Integration of the tools of green logistics into transport systems and processes

Significant pressures in organizations in the direction of production costs reduction, delivery times shortening, and increasingly tightening environmental legislation are developing in search of new organizational structures, new management systems and new methods for utilizing of human and material potential [5].

Therefore very important is right management of transport processes which is based on principally the same elements with these characteristics:

- strategy,
- planning,
- effective communication at all levels of management,
- evaluation of changes,
- staff and work organization.

The idea of the effective development of an integrated system of management for transport processes and systems from the beginning or more appropriate way is an orientation on only one from aspects and then adding other elaborated aspects to the developed management system or the idea about the approach to integrated tools of green logistics.

2.2 Similarities and differences of selected green logistics tools

The similarity of above-said tools of green logistics is possible to include into the following partial conclusions [6, 7]:

- historical development, i.e. from the input process through management of processes to the integrated management, research of the present state of transport process,
- orientation to the organizational solutions, above all application of transport devices and systems and at the same time responsibility of the control sphere,
- necessary cooperation of all parts of the production chain, of all parts of transport process,

- different aims of each system, but the management of the transport process is the subject of the system,
- the need of motivation for the development of transport systems also with external influences, not only with internal,
- the existence of identical systemic elements and tools, for example, measurement, strategy, etc.

Differences of the above-said tools of green logistics are presented by:

- the orientation of transport systems to the various aims and subjects, also with an emphasize to the transport devices,
- demands of partners,
- different level for evaluation of the importance,
- different level for costs,
- different level and emphasize to the continuous improvement.

2.3 Integrated transport system by the tools of green logistics

Based on a common process of implementation of the tools of green logistics, it is created the possibility of the creation of the integrated system of transport by the help of exclusion of duplicities and also full interconnection of management and follow-up activities, such as methods, procedures, technology, information, etc.

It is possible to realize a project with the aim to create a conception for integration of common elements of the transport systems. This is created by these elements: strategy and planning, information, improvement, evaluation, simulation.

Strategy and planning include parts: analysis of the field of interest, connection with the current systems, selection of the strategy and aims, preparation of the plan, assignment of costs. Information includes these parts: analysis of information demands, measuring of parameters, a collection of information, documentation, and communication.

The improvement includes determination and realization of plans for improvement, check of possibilities of improvement.

Evaluation is presented by comparison of demands and information, feedback of results, beginning of remedial measures.

Simulation is a very important part of the integration. By the help of simulation and simulation software, it is possible to analyze the present state and determine bottlenecks [7].

2.4 Opportunities for improving the integration of green logistics in transport systems selection

Opportunities for improving the integration of green logistics in transport systems selection need to be considered at several levels, on the basis of the fact, what creates immediate needs for the transport system and at the same time, the character and complexity of the transport systems. The levels of improving the integration of the transport systems in green logistics include [7]:

- measures,
- integration of perspectives in strategies, guidelines, procedures,
- integration of manuals, documentation,
- integration of management systems.

In the practice area, the most commonly applied ways include:

- creation of an integrated system of transport process from the beginning, above all in the cases, when there are not created systems of transport systems, but this fact presents a complication for development,
- creation of transport systems for every aspect separately and at the same time to integrated them after effective and successful implementation,
- the gradual addition of other aspects in the first applied systems, this presents the use of experiences from the primary system of integration.

Basic factors of integration include:

- objectives - it is important to emphasize that if individual objectives do not contradict each other, the integration is easier. In this case, of contradictory objectives are considered, environmental protection may represent a constraint on the quality of the product.
- subject – the integration is greatly influenced by the priority of subjects within different systems.
- status – it is necessary to emphasize that the level of system development can be different and therefore it is preferable to realize the ending of implementation of one system and then to begin with the integration of another system.

For understanding of integration of green logistics in transport systems selection the suitable way is presentation of paradoxes of green logistics by its dimensions and the following consequences. This is presented by the Fig. 1.

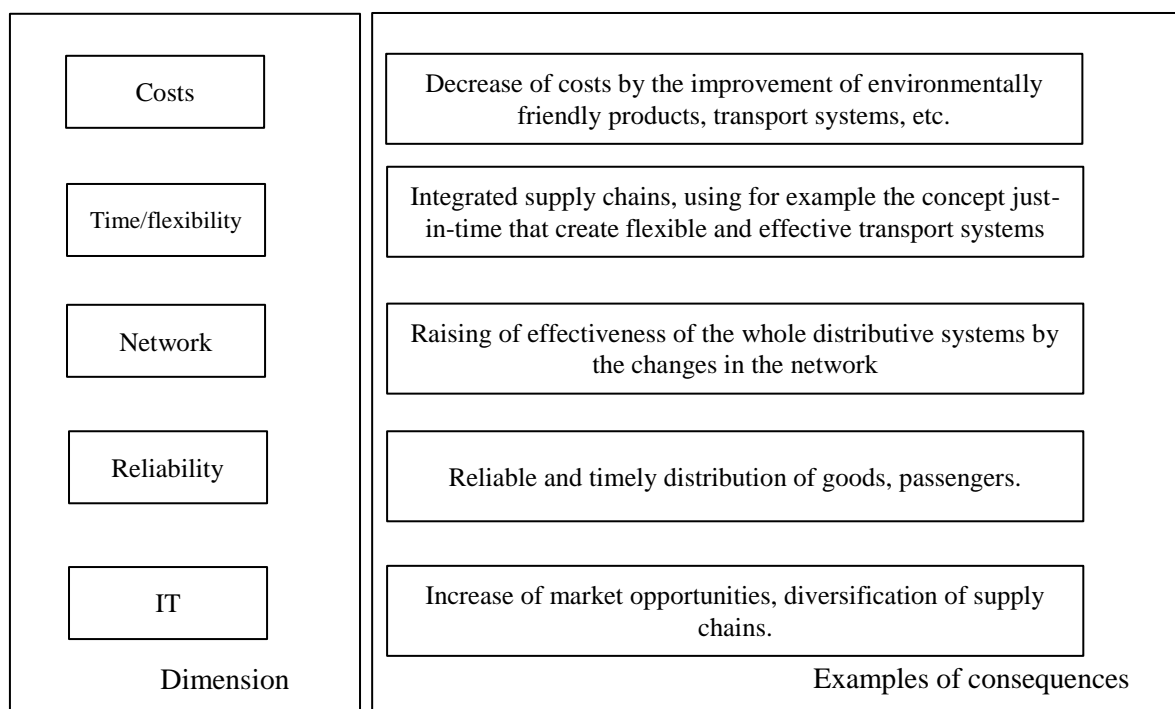


Fig. 1 Dimensions and consequences of integration of green logistics in transport systems selections

3 CONCLUSIONS

The presented paper has a theoretical character and it explains the base of a very important part of logistics, namely eco-logistics and its significant subsystem green logistics and its tools. The importance of these facts is for an understanding of the necessity of managing of logistical activities at the direction of environment protection and care. This is also an important fact for selection of suitable transport system and process because due to tighter specifications and legislative rules for the area of environment, the research of suitable, effective and environmentally friendly transport systems and processes is an inseparable part of the current transport and transport enterprise. Acceptance and implementation of the principles of green logistics, its main idea and also the tools of green logistics may save costs and also be in accordance with legislative in the area of the environment.

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