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Comparison of different variants of logistics chain with the use of air transport using the software application

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Abstract

To ensure sustainable system of freight transport is necessary to provide efficient transport services with significant focus on level of customer service. The air transport system is very often the part of logistics chain in intermodal freight transport by using the air containers. Because of this it is necessary to identify and calculate the level of possible constraints that may have the negative impact on the efficiencies of realised logistics chain. This evaluation should be realised by the software application that provides to logistics operators, freight forwarders, carriers and other entities the user friendly interface. Based on the research realised at University of Žilina, Department of Railway transport, there was created Microsoft Excel application that evaluates the level of constraints by setting weights to selected criteria. These criteria represent the possible constraints in proposed logistics chain. Based on these criteria this application evaluates the weights of these criteria by using the multi-criteria analysis method (Saaty method) and compare two different variants of proposed logistics chain with using the air transport system. The result of the software evaluation helps easily to choose the better variant of realisation of logistics chain by the comparison of constraints in two different variants of proposed logistics chains.

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1. Introduction

The solution of the sustainable freight transport system seems to be using the intermodal transport system for realisation of the logistics chain. The air transport system with using the air containers is a part of the intermodal transport. This system has to provide the transport services on required level focused on the customer´s expectations. Because of this it is necessary to identify and calculate the level of possible constraints that may have the negative impact on the efficiencies of realised logistics chain. As Chen says, appropriate performance measurement system is an important requirement for the efficient management of a supply chain Chen, Y, Liang, L., Yang, F. (2006). It is necessary to say that in the sense of efficiency evaluation, the constraints are not only elements with low capacity or performance, but also elements with disproportionately high performance or capacity. The disproportionately high performance or capacity of element compared to other logistics system elements is inefficient and significantly increase the costs of realisation. As Cibulka says, the final efficiency of passing the distance and efficiency of time indicators are analysed in the process of achieving of logistics goals to ensure that customer requirements for goods and services (logistics efficiency) are met Chen, Y, Liang, L., Yang, F. (2006)

The research realised at Žilina University, Department of Railway transport has shown, that the evaluation should be realised by the software application that provides to logistics operators, freight forwarders, carriers and other entities the user friendly interface. Based on the research, there was created Microsoft excel application for evaluation of constraints and comparison of two different variants of logistics chain.

2. Comparison of different variants of logistics chain

The comparison of different variants of logistics chain with using the excel application created at Department of Railway transport at University of Žilina is realised in the following three steps:

- Setting the criteria that represents possible constraints in logistics chain
- Software comparison and calculation of weights of criteria
- Software comparison of levels of these criteria in two different variants of logistics chain

2.1. Setting of the criteria

The first step of software comparison is setting the criteria. Based on research realised at Žilina University, Department of Railway transport, there was selected the following criteria for comparison of two different variants of logistics chain with using the air transport system:

- Total costs of transport
- Terms of payment
- Total time
- Safety
- Level of information
- Usability of the container

For better understanding are these criteria described in details in the following rows.