



REVIEW

for awarding the educational and scientific degree “**Doctor**”
in the area of higher education Technical sciences,
professional field General Engineering
the doctoral program: Engineering logistics

Reviewer **Assoc. Prof. Dr. Eng. Stefan Marinov Kazakov**

The title of the Ph.D. dissertation:

**„NETWORK-CENTRIC APPROACH IN MODELING AND
OPTIMIZATION OF CONTEMPORARY TRANSPORT TECHNOLOGIES IN
LOGISTICS“**

The author of the dissertation: **Marian Iliev Rahnev**

1. Description of the dissertation

The dissertation is structured in an introduction, three chapters, a conclusion and references. The volume of the dissertation is 126 pages, including 34 figures and 11 tables. An overview was made of 102 titles (56 in Cyrillic and 46 in Latin) and 34 electronic addresses. Each chapter ends with conclusions, and the final part presents the general conclusions of the scientific research.

2. Actuality of the problem

In the scientific research, the problem determines its relevance by studying the transport logistics systems, application of the system approach in the organization and management of the combined transport technologies and application of the integral approach in optimizing the structure of the logistics supply chains built by logistics systems. In the research, it is noted how in modern conditions, logistics marks a dynamic development, which, with the growing production, the market and the competitive environment, finds an ever-wider expression, both in a geographical and in a sectoral aspect. The basis of this direction is the adoption of the integral approach



and the application of the relevant tools in the management of material flows from the origin, through all phases of movement (supply, production, distribution), to the end user. In this order, achieving a higher degree of implementation in the management of logistics activities at company and inter-company level is one of the important tasks for providing more opportunities for better organization in the actions of individual participants in the supply chain, increases the efficiency of logistical tasks and rationalization in the use of resources.

3. Analytical assessment of the nature and credibility of the material and contributions in the dissertation.

Chapter one describes an analysis of the state of the combined transport logistics systems, as well as of the infrastructure for their implementation on the territory of the Republic of Bulgaria.

The interaction between logistic transport systems is presented, the basis of which is a set of activities aimed at achieving a common goal, through the best use of the characteristics and resources for the relevant types of transport when carrying out transport processes.

The object of the research is an idea for construction, development and implementation in the organization and management of combined transport in the logistics supply chain, which is considered in the context of individual types of transport and at the same time the state of its adjacent infrastructure is monitored.

In the **second chapter**, an approach to the design and management of combined transport systems is presented, proving their economic efficiency. An analysis of the economic cost of a combined transport logistics system was made.



In the **third chapter**, an integral approach is proposed for optimizing the structure of logistics supply chains using mathematical optimization tools, by choosing routes in a transport network. An algorithm of a complex methodology for the design of logistics chains, channels and networks is presented. Through graphs, a section of the international transport network was analyzed in order to determine the shortest paths, as well as to determine optimal routes using the criteria "distance" and "time". The model is an extension of the knowledge of designing such systems, which can be used both for solving immediate tasks and for obtaining new conclusions and lessons from practice. The knowledge obtained from the research allows to make predictions about the future applications of the developed model and to propose ways and specific scientific studies for their implementation.

4. Main Contributions

Based on the analysis and research, the author claims the following scientific and practical contributions:

1. An analysis and summary presentation of the scientific and practical framework for the state of the network for combined transport in the Republic of Bulgaria, as a segment for the functioning of the transport logistics system for combined transport, has been made.

2. A systematic approach is proposed in the management of the combined transport system, as well as models and methods for designing and managing a logistic transport system in order to improve the economic efficiency of this type of transport.

3. The integral approach was applied in the optimization of the structure of the logistics supply chains in a transport logistics system, by using mathematical modeling and optimization. The integral paradigm is applicable only with the consideration of the value chain, as the main complex (integral) characteristic of the material flow.



4. An application of graph theory and linear programming in the optimization of the elements and structure of logistics chains is presented.

Based on the results of the theoretical research conducted in accordance with the purpose and tasks of the dissertation, the author claims that the dissertation research can serve to solve the following problems:

1. Development and updating of the national strategy for the positioning of transport corridors and networks for combined transport activities, by applying specialized algorithms for solving optimization procedures.

2. Development and updating of the national strategy for positioning the network of logistics intermodal terminals, meeting the requirements for modern cargo transport services to ensure better coordination between individual modes of transport in the direction of the development of intermodal services, establishment of reliable and fast railway connections between terminals.

3. Implementation of an active policy for intergovernmental cooperation on regionally important logistics projects concerning combined transport with the aim of developing the Europe-Caucasus-Asia corridor, i.e. prospects for interconnection of the Eurasian and European transport corridors.

5. Abstract

The abstract reflects the content of the dissertation work and the achieved results and contributions of the doctoral student. It is presented according to the requirements of Shumen University "Bishop Konstantin Preslavski".

6. Author's personal contribution and publication activity

The materials developed in the doctoral program were presented and discussed at Scientific Forums in 2020. and 2021, organized by Vasil Levski Higher Secondary



School, as well as in the collections of scientific works of Episcop Konstantin Preslavski Higher Secondary School in 2020.

Part of the results of the theoretical research carried out in the dissertation work have been published in international scientific journals.

According to the above, it is proven that the doctoral student's research on the subject has been approved before scientific forums in a national and foreign format, where the academic community has become familiar with the content of the scientific research and the results achieved by Eng. Marian Rahnev.

7. Critical notes and recommendations on the dissertation and the abstract

- 7.1. To pay attention to the arrangement of titles in English in literary sources.
- 7.2. In the third chapter, it is not necessary to consider graph theory in such detail.

8. Conclusion

I believe that my dissertation work submitted for review, the author's abstract to it, meet the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria and the Rules for its Application, and I propose to the scientific jury to make a decision to award the educational and scientific degree "doctor" to Eng. Mariyan Iliev Rahnev in the field of higher education: 5. "Technical sciences", Professional direction: 5.13. "General Engineering", PhD program: "Engineering Logistics".

5.06.2023 г.

Рецензент:

/доц. д-р инж. Стефан Казаков/