



Váš list číslo/zo dňa

Naše číslo

Vybavuje/linka

Košice

VEC: Review of the doctoral thesis „Multi-Criteria Decision-Making Methods in Last-Mile Delivery“

In this dissertation the author investigates Last-Mile Delivery (LMD) using a Multi-Criteria Decision-Making (MCDM) approach and proposes a new method for more reliable and comprehensive performance assessment. Building on concepts from city logistics, delivery systems, mathematics, and operational research, the study identifies limitations of existing MCDM techniques. Established methods (TOPSIS, ARAS, WASPAS, and MARCOS) are used as benchmarks to inform the development of a novel MCDM framework with adaptive normalization and a new final-ranking formulation. The method is validated through a real-world case study in Novi Sad, Serbia, evaluating twelve delivery areas based on key operational criteria, with results confirming its robustness, practicality, and managerial value.

Theoretical Parts of the Dissertation

Chapter 1 presents the theoretical background relevant to the dissertation. It begins by introducing the basic terms and key concepts of city logistics and last-mile delivery, followed by an overview of different last-mile delivery modes, including light commercial vehicles, cargo bikes, and autonomous vehicles. The chapter then outlines the theoretical foundations of Multi-Criteria Decision-Making (MCDM) methods and concludes with a review of existing MCDM approaches applied in the literature. By thoroughly reading and assessing the theoretical chapter, the dissertation establishes a strong and more than enough background of the proposed topic.

Chapter 2 analyzes the current state of research and practice in the field of last-mile delivery. It discusses the main challenges and problems associated with last-mile delivery operations and



examines how Multi-Criteria Decision-Making (MCDM) methods have been applied to address these issues. The chapter ends with an evaluation of the current-state analysis, highlighting key findings and identified research gaps. In conclusion, this chapter highlights the complexity of last-mile delivery and emphasizes the value of MCDM methods as effective tools for addressing related challenges. The analysis provides a strong foundation for further research and supports the development of improved decision-making approaches in this field.

Dissertation Objective

The dissertation objective (to propose a new MCDM technique for assessing last-mile delivery in urban areas) is clear and very well-defined by the author. By defining the objective in such a clear and understandable way, this dissertation successfully advances the field by proposing a novel MCDM technique that offers a robust, systematic, and practical framework for assessing last-mile delivery performance in urban environments.

Methodological Part

The author proposes a rigorous and completely new methodological framework (AROMAN) based on similar principles of the existing MCDM methods, including TOPSIS, ARAS, WASPAS, and MARCOS. These methods are appropriately selected for handling complex decision-making problems characterized by multiple and conflicting criteria. The framework is supported by a comprehensive literature review, systematic data analysis, and expert judgment, ensuring methodological robustness.

Dissertation Contribution

The application of the proposed AROMAN approach to real-world case study of Novi Sad, Serbia, confirms its practical relevance and academic contribution. Nevertheless, the newly AROMAN method is original in the scientific literature which adds more value to the MCDM theory. The author thoroughly emphasizes the differences between the novel AROMAN method and the existing MCDM methods which I see as a huge advantage of this dissertation. Moreover, the newly proposed method is highly accepted by the scientific community around the globe in a short period of time, which is appreciative.

Formal Aspects of the Dissertation

The dissertation is readable and understandable from the beginning to the end. The chapters are logically followed. In addition, the author uses figures, tables and visual effects to clarify her thoughts, words, and results. From my point of view, it is on a satisfactory level. When it comes to the referencing and formatting, it meets academic standards. The used literary sources are properly cited.

Question

1. How easily can AROMAN be applied to real-world last-mile delivery problems in other cities or contexts?
2. Are there types of decision-making problems where AROMAN might not be suitable?
3. Does the method accommodate dynamic operational conditions, such as fluctuating parcel volumes or delivery failures?

Conclusion

The dissertation proposal “Multi-Criteria Decision-Making Methods in Last-Mile Delivery” makes a significant contribution to city logistics and sustainability. It addresses the optimization of last-mile delivery by applying advanced MCDM technique to assess last-mile delivery in urban areas. Grounded in challenges from urbanization and the e-commerce growth, the study offers a rigorous and easy-to-use framework with practical applicability. Real-world case study and validation further demonstrate its relevance, making it a valuable decision-making tool for researchers, policymakers, and practitioners.

From my point of view, I consider the presented phases of the research and the realized analysis in the thesis to be prepared in detail and, at the same time, valuable precisely through the interpretation of the thesis solution.

The doctoral thesis meets all formal and scientific requirements. The language solution is on a good level. The graphic presentation of the thesis results appropriately complements the work's textual part. It is possible to state that the thesis's contributions are valuable because they create prerequisites for future research on the issue. Based on the detailed analysis of this thesis,

I recommend that this thesis be accepted and awarded the academic degree "Philosophiae doctor (PhD.)"

Košice 10.02.2026

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