Towards Sustainable Transport: A Strategic Decision Support System for Urban Logistics Operations

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Abstract. *Global urbanization for decades has led to unprecedented levels and growing demands for urban logistics. Thus, problems such as congestion, environmental noise, and urban sprawl are growing. As a result, many cities face problems of optimal decision-making regarding green and sustainable smart transportation systems and infrastructures. However, various possible measures and logistics concepts are available to improve urban logistics, while effects are unclear and difficult to predict. To meet the growing need for future-oriented decisions by city authorities, we developed a decision support system prototype that allows a strategic simulation-based evaluation of different logistics concepts regarding defined targets, e.g., pollutant emissions, traffic flow, space requirements, or economic efficiency on a city district level. An expert system for the strategic evaluation of logistics concepts on a city district level is integrated to achieve transferability and scalability.*

Keywords: Urban Logistics, Liveable City, Data-Driven Government, Decision Support System, Expert System

1   Introduction

The world's urban population is growing rapidly and already accounts for 55% of the total population, a share that the UN expects to rise to 68% by 2050 [1]. Together with the continuous growth of e-commerce, urbanization is leading to a rising transport demand in cities. The ongoing digital transformation and emerging digital business models in urban food, beverage, and parcel delivery are causing an increasingly dynamic transport demand characterized by time-critical services. The recent global COVID-19 pandemic has further changed the logistics industry's landscape and strongly intensified this already growing parcel delivery demand [2-3]. As a result, many cities face growing challenges to their transport systems and infrastructure that affect the urban population's health and quality of life, such as congestion, environmental noise, CO2 emissions, accidents, and urban sprawl. The future transport system, the cityscape, and the cities' quality of life will depend on city authorities' actions regarding the urban transport landscape.