

PhD in BusinessEconomics: Business Engineering

The Perception of Autonomous Delivery Robots as a Future Delivery Solution

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Abstract

As technology advances and digitalization becomes integral to daily life, the growing global population alongside emission and traffic restriction regulations intensifies urban challenges, particularly in the mobility and transport sector. Road transport, a major contributor to greenhouse gas emissions, is particularly constrained by inefficiencies in last-mile logistics, which is further compounded by the rapid expansion of e-commerce.

Autonomous Delivery Robots (ADR), which are understood as pedestrian-sized robots that deliver items to customers without human intervention, present a promising solution for last-mile logistics. ADR can enhance efficiency, reduce environmental impacts, and provide contactless delivery options. Despite the technological advancements, real-life experiences with ADR are scarce, posing a challenge in understanding their potential impacts. This research aims to bridge this gap by providing real-life experiences with ADR to various stakeholders in the logistics supply chain.

The thesis explores the perceptions of different actors, including Logistics Service Providers, private end-receivers, the public, and a unified group of stakeholders, towards ADR. The research is grounded in technology acceptance theories and employs both quantitative and qualitative methods to provide a comprehensive understanding. The findings highlight the importance of stakeholder involvement in the successful deployment of ADR, addressing concerns related to safety, privacy, and employment impacts, and fostering collaboration. The study underscores key factors for the future of last-mile logistics and ADR integration, revealing significant constructs influencing the intention to use ADR. Key themes include human-robot interaction, ADR design, and traffic integration, providing valuable insights for manufacturers, policymakers, and planners. Additionally, the study recommends combining theoretical and qualitative methods to address specific needs and preferences across different regions and stakeholder groups. Emphasizing high shipment volumes and diverse goods is crucial for successful ADR deployment.

The research contributes to the field by offering insights into the practical implications and challenges of integrating ADR into existing logistics processes, aiming to achieve a more sustainable and efficient lastmile delivery system. The thesis is structured into four chapters, each focusing on a different stakeholder group regarding their perception of ADR, followed by a conclusion chapter that synthesizes the findings and suggests future research directions.