



Research School for Operations  
Management and Logistics

**Multimodal Transportation for On-Demand Delivery**

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There were approximately 131 billion packages delivered worldwide in 2020 (Pitneybowes, 2021), which the figure considerably increased about three times in the past six years and is expected to double in the next five years (Statista, 2021). In Indonesia, the parcel shipped is expected to reach 1.6 billion in 2022, which will grow eight times from 200 million in 2017 (Mc Kinsey, 2018). This number will grow for several years, fuelled by the increase of e-commerce which will be predicted to own USD 83 billion gross market value (GMV) (International Trade Administration, 2020). In times of increasing customer, the Logistics Service Provider (LSP) should ensure customer satisfaction level in their business model to grow the company competitiveness, i.e., instant and on-time delivery. Inter-island condition leads to a logistical complexity because it involves multiple transport modes and various stakeholders. Providing same-day delivery within the national border already became a challenge, particularly for the food because the Logistics Service Provider (LSP) should recognize special handling (freezer/chiller) and the travel duration to maintain the food quality. Food sales using the e-commerce platform is the highest share (30.95%); however, the LSP could not meet the customer satisfaction level (i.e. delivery time and product safety), as depicted in the application/company review (2.8 out of 5). The research intends to develop tactical multimodal transport planning by proposing the mathematical model/data-driven/algorithm to optimize the network indicator (cost and service level). The research also will consider several practicalities, such as stochastic demand, heavy congestion in the first/last mile, and transport modal synchronization.