

A Simulation-Supported Integrated Framework for Safe, Efficient, and Sustainable Motorcycle Food Delivery Operations in Saudi Arabia

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Abstract

Motorcycle-based food delivery is a critical operation in ensuring service efficiency and customer satisfaction within Saudi Arabia's rapidly growing digital economy. However, safety challenges and operational inefficiencies in this sector can lead to increased risk of accidents and service disruptions. This project presents a comprehensive application of integrated IoT technologies to improve the safety and effectiveness of motorcycle delivery operations in desert environments. The study begins with a thorough analysis of the current state of delivery operations, identifying key performance challenges, and pinpointing areas of safety concerns and potential technological enhancement. Utilizing an integrated smart system framework, a structured approach is employed to systematically address the identified issues. Through rigorous environmental analysis and technological integration, root causes of inefficiencies such as extreme temperature exposure, inadequate safety equipment, and inconsistent food quality preservation are addressed. This approach demonstrates a pathway toward safer, more efficient, and customer-oriented motorcycle delivery operations.

Keywords

Integrated Framework, Efficient, Sustainable Motorcycle Food Delivery