ABSTRACT

Transportation plays a crucial role in the supply chain system, particularly in the last mile delivery stage, which often represents the highest cost component. One of PT XYZ's outlets located in Baktisegara, Buleleng, has experienced a surge in transportation costs, exceeding the company's budget of Rp14,450,000 over the past three months due to the absence of standardized delivery routes. This study aims to design a more efficient routing system to reduce transportation costs. The problem is classified as a Vehicle Routing Problem (VRP) with a Multiple Trips type and is solved using a heuristic Nearest Neighbor approach implemented in Google Spreadsheet. Additionally, a Greedy-Based Load Balancing strategy is applied to ensure proportional workload distribution among vehicles. The results indicate that the proposed routing system is capable of reducing travel distance by up to 38.27% and lowering transportation costs by 9%, or approximately Rp1,333,321.43. These findings demonstrate that implementing VRP methods using heuristic approaches can effectively minimize transportation costs in last mile delivery operations.

Keywords: Vehicle Routing Problem, last mile delivery, Nearest Neighbor, load balancing, transportation