ABSTRACT

Sukanda Djaya *company is a distributor of frozen products from the company Diamond Cold Storage company, which produces frozen items such as fresh milk, yogurt, meat, and others. The distribution of frozen products is carried out to 25 consumer agents using four vehicles with a load capacity of 6.5 tons each vehicle. The issue at hand is that the company divides the distribution routes solely based on geographical categories, lacking a fixed route determination. This results in the return of frozen products from consumer agents to the depot. This problem arises due to the lengthy travel time from the depot to the consumer agents, causing the frozen products to thaw during transit and incurring high transportation costs.*

The distribution of frozen products utilizing refrigerated trucks also impacts the emission of gases, as these refrigerated trucks are employed to maintain product durability at low temperatures during the distribution process. This leads to a 30% higher CO_2 emission compared to regular logistic trucks. Reductions in transportation costs and gas emissions can be achieved by establishing effective and efficient delivery routes. This study aims to devise a proposed distribution route for products from the depot to agents, minimizing total travel distance using the Genetic Algorithm (GA) method.

Due to its iterative nature and the varying delivery schedules at PT. Sukanda Djaya, GA lacks specific criteria found in other heuristic and metaheuristic algorithms for filtering solution quality. Thus, its computational time is relatively shorter, generating several alternative solutions with equal objective values. The obtained outcome is a proposed route with a 57.7% shorter travel distance than the actual condition, resulting in minimized transportation costs and gas emissions.

*Keywords - **Distribution, Frozen Products, Routes, Emissions, CO_2, Genetic Algorithm***