

Optimasi Rute Distribusi Restoran Cepat Saji Menggunakan Model Capacitated Vehicle Routing Problem with Time Windows (CVRPTW) = Optimization of Fast-Food Restaurant Distribution Routes Using Capacitated Vehicle Routing Problem with Time Windows (CVRPTW)

Sibarani, Stefanus Jacob, author

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Abstrak

Biaya logistik memiliki dampak yang signifikan terhadap daya saing perusahaan. Bagi perusahaan, biaya logistik memiliki pengaruh langsung terhadap penetapan harga jual produk akhir. Semakin efisien biaya logistik dalam proses rantai pasok, maka harga produk akhir akan semakin kompetitif. Penentuan rute merupakan salah satu faktor penting yang dapat mempengaruhi biaya logistik. Pada industri makanan cepat saji, terdapat jumlah cabang restoran yang banyak, permintaan yang tinggi, serta dibutuhkan dalam waktu yang singkat sehingga diperlukan metode penentuan rute yang optimal. Penelitian ini dilakukan pada perusahaan logistik yang mendistribusikan produk bahan makanan restoran cepat saji di Indonesia. Perusahaan ini masih menggunakan sistem penentuan rute pengiriman secara manual atau belum menggunakan model optimasi. Selain itu, perusahaan juga mengalami kendala seperti waktu pendistribusian yang terbatas serta lokasi pelanggan yang banyak dan berjauhan sehingga terkadang menyebabkan kendaraan terlambat untuk melayani pelanggan maupun kembali ke pusat distribusi. Pada penelitian ini, peneliti menggunakan pendekatan Capacitated Vehicle Routing Problem with Time Windows (CVRPTW) dengan tujuan menghasilkan rute yang memiliki total jarak perjalanan terpendek dalam memenuhi permintaan pelanggan sesuai batasan waktu dan kapasitas kendaraan, sehingga dapat meminimalkan biaya distribusi dan meningkatkan kualitas pelayanan kepada pelanggan dari segi ketepatan waktu. Perubahan yang dihasilkan dari perhitungan optimasi dapat menurunkan jarak tempuh kendaraan hingga 12,16% dan menghasilkan total penghematan hingga Rp10,266,891 dalam 40 jadwal pengiriman.

.....Logistics costs are a crucial factor that significantly influences a company's competitiveness. For companies, logistics costs directly impact the selling price of the final product. Logistics costs include all components of expenses involved in the movement of goods throughout the supply chain process. The more efficient the logistics costs within the supply chain process, the more competitive the price of the final product becomes. Vehicle routing is one of the critical components that can affect logistics costs. In the fast-food industry, with numerous restaurant branches, high demand, and the need for prompt delivery, an optimal route determination method is essential. This research was conducted at a logistic company that distributes products to fast-food restaurant in Indonesia. The company currently uses a manual vehicle routing system and has not yet implemented an optimization model. The company faces challenges such as limited distribution time and numerous distant customer locations, resulting in occasional delays in serving customers or returning to the distribution center. In this research, the researcher adopts the Capacitated Vehicle Routing Problem with Time Windows (CVRPTW) approach with the aim of generating routes with the shortest total travel distance while meeting customer demands within time constraints and vehicle capacity. This approach aims to minimize distribution costs and improve service quality to customers in terms of timeliness. The optimization calculations produced significant

changes, reducing vehicle travel distances by up to 12,16% and resulting in total savings of up to Rp10,266,891 across the 40 delivery schedules.