

RINGKASAN

Distribusi produk memegang peran penting dalam menjamin ketersediaan barang di pasar secara tepat waktu dan efisien. PT Perkebunan Nusantara IV Regional 4 sebagai produsen teh memiliki peran strategis dalam kelancaran rantai pasok dari gudang hingga konsumen. Namun, praktik distribusi saat ini masih dilakukan secara subjektif oleh sales tanpa standar optimasi, sehingga berpotensi menimbulkan jarak tempuh lebih jauh, konsumsi bahan bakar tidak efisien, dan keterlambatan pengiriman. Penelitian ini bertujuan menentukan rute distribusi teh kemasan yang optimal menggunakan pendekatan *Travelling Salesman Problem* (TSP) dengan algoritma *Steepest Ascent Hill Climbing* dan *Branch and Bound*.

Pada penelitian ini terdapat 53 verteks yang digunakan. Lokasi pendistribusian dibagi menjadi 4 wilayah. Wilayah 1 meliputi MM Glory, Bang Jack, AC Andoenk, MM Rezeki, Oleh-oleh Pak DJ, RM Sumatra, MM Surya, KEKO, MM Mulia, Wiraviona, dan Adila Snack. Wilayah 2 meliputi Hotel Amanah, Grand Hotel, Motokoffie, Swissbell, Luminor, Aston, Elmondo, RSUD Raden Mataher, Barokah Mart, MM Buana, WTC Batanghari, Mandala Swalayan, dan Hotel Pundi Rezeki. Wilayah 3 meliputi MM Favorite 88, MM Garuda, Gudang Pempek Selamat, Mandala Mart, MM Putra, Tropi Mart Talang Bakung, Tropi Mart Pasir Putih, Hotel Cosmo, Transmart, Tropi Mart Selincih, Fresh, Meranti Swalayan, Lippo Plaza, MM J88, The Difan Hotel, dan Tropi Sijenjang. Wilayah 4 meliputi PT Sumber Alfaria Trijaya Tbk, MM Favorite, Indogrosir, Jkov, MM Namura, MM Central Mayang, MM Family 16, MM Angkasa, MM Win-Win, SJ Mart, Green Mart, dan Tropi Mart Mendalo. Rute terpendek masing-masing wilayah akan ditemukan menggunakan algoritma *Steepest Ascent Hill Climbing* dan *Branch and Bound*. Algoritma *Steepest Ascent Hill Climbing* memungkinkan pencarian solusi terbaik dengan memulai dari suatu solusi awal dan secara bertahap melakukan perbaikan hingga tidak ada perbaikan yang lebih baik lagi. Sementara itu *Branch and Bound* bekerja dengan membangun pohon pencarian dan memangkas cabang-cabang yang tidak memungkinkan menghasilkan solusi lebih baik dari solusi yang sudah ditemukan.

Hasil penelitian menunjukkan bahwa untuk keempat wilayah, rute terpendek yang diperoleh dengan kedua algoritma adalah sama. Pada wilayah 1 diperoleh rute A – B – D – G – C – E – F – H – I – K – L – J – A atau Kantor PTPN – MM Glory – RM Aroma Cempaka – RM Sumatra – Seafood Bang Jack – MM Rezeki – Oleh-oleh Pak DJ – MM Surya – KEKO – Wiraviona – Adila Snack – MM Mulia – Kantor PTPN dengan total jarak tempuh 28,6 KM. Pada wilayah 2 diperoleh rute A – B – C – J – I – H – D – E – F – G – K – L – N – Mm – A atau Kantor PTPN – Hotel Amanah – Grand Hotel – Barokah Mart – RSUD Raden Mataher – Elmondo – Motokoffie – Swissbell – Luminor – Hotel Aston – MM Buana – WTC Batanghari – Hotel Pundi Rezeki – Mandala Swalayan – Kantor PTPN dengan total jarak tempuh 37,5 KM. Pada wilayah 3 diperoleh rute A – B – C – I – H – G – F – D – E – O – L – K – Q – P – N – Mm – J – A atau Kantor PTPN – MM Favorite 88 – MM Garuda – Hotel Cosmo – Tropi Mart Pasir Putih – Tropi Mart Talang Bakung – MM Putra – Gudang Pempek Selamat – Mandala Mart – MM J88 – Fresh – Tropi Mart Selincih – Tropi Mart Sijenjang – The Difan Hotel – Lippo Plaza – Meranti Swalayan – Transmart – Kantor PTPN dengan total jarak tempuh sebesar 52,2 KM. Pada wilayah 4 diperoleh rute A – F – Mm – L – K – J – I – H – G – E – D – B – C – A atau Kantor PTPN – MM Namura – Tropi Mart Mendalo – Green Mart – SJ Mart – MM Win-Win – MM Angkasa – MM Family 16 – MM Central Mayang – Jkov – Indogrosir – PT Sumber Alfaria Trijaya Tbk. – MM Favorite – Kantor PTPN dengan total jarak tempuh sebesar 51,07 KM.

SUMMARY

Product distribution plays a crucial role in ensuring that goods are available in the market in a timely and efficient manner. PT Perkebunan Nusantara IV Regional 4, as a tea producer, has a strategic role in maintaining the smooth flow of the supply chain from the warehouse to the consumer. However, current distribution practices are still carried out subjectively by sales personnel without optimization standards, which can potentially lead to longer travel distances, inefficient fuel consumption, and delivery delays. This study aims to determine the optimal distribution routes for packaged tea using the Travelling Salesman Problem (TSP) approach with the Steepest Ascent Hill Climbing and Branch and Bound algorithms.

In this study, there are 53 vertices used. The distribution locations are divided into four regions. Region 1 includes MM Glory, Bang Jack, AC Andoenk, MM Rezeki, Oleh-oleh Pak DJ, RM Sumatra, MM Surya, KEKO, MM Mulia, Wiraviona, and Adila Snack. Region 2 includes Hotel Amanah, Grand Hotel, Motokoffie, Swissbell, Luminor, Aston, Elmondo, RSUD Raden Mataher, Barokah Mart, MM Buana, WTC Batanghari, Mandala Swalayan, and Hotel Pundi Rezeki. Region 3 includes MM Favorite 88, MM Garuda, Gudang Pempek Selamat, Mandala Mart, MM Putra, Tropi Mart Talang Bakung, Tropi Mart Pasir Putih, Hotel Cosmo, Transmart, Tropi Mart Selincih, Fresh, Meranti Swalayan, Lippo Plaza, MM J88, The Difan Hotel, and Tropi Sijenjang. Region 4 includes PT Sumber Alfaria Trijaya Tbk, MM Favorite, Indogrosir, Jkov, MM Namura, MM Central Mayang, MM Family 16, MM Angkasa, MM Win-Win, SJ Mart, Green Mart, and Tropi Mart Mendalo. The shortest route for each region is determined using the Steepest Ascent Hill Climbing and Branch and Bound algorithms. The Steepest Ascent Hill Climbing algorithm searches for the best solution by starting from an initial solution and gradually improving it until no better solution can be found. Meanwhile, Branch and Bound works by constructing a search tree and pruning branches that cannot produce a better solution than the one already found.

The results show that for all four regions, the shortest routes obtained by both algorithms are identical. In Region 1, the route obtained is A-B-D-G-C-E-F-H-I-K-L-J-A or PTPN Office – MM Glory – RM Aroma Cempaka – RM Sumatra – Seafood Bang Jack – MM Rezeki – Oleh-oleh Pak DJ – MM Surya – KEKO – Wiraviona – Adila Snack – MM Mulia – PTPN Office, with a total travel distance of 28.6 KM. In Region 2, the route is A-B-C-J-I-H-D-E-F-G-K-L-N-Mm-A or PTPN Office – Hotel Amanah – Grand Hotel – Barokah Mart – RSUD Raden Mataher – Elmondo – Motokoffie – Swissbell – Luminor – Hotel Aston – MM Buana – WTC Batanghari – Hotel Pundi Rezeki – Mandala Swalayan – PTPN Office, with a total distance of 37.5 KM. In Region 3, the route is A-B-C-I-H-G-F-D-E-O-L-K-Q-P-N-Mm-J-A or PTPN Office – MM Favorite 88 – MM Garuda – Hotel Cosmo – Tropi Mart Pasir Putih – Tropi Mart Talang Bakung – MM Putra – Gudang Pempek Selamat – Mandala Mart – MM J88 – Fresh – Tropi Mart Selincih – Tropi Mart Sijenjang – The Difan Hotel – Lippo Plaza – Meranti Swalayan – Transmart – PTPN Office, with a total distance of 52.2 KM. In Region 4, the route is A-F-Mm-L-K-J-I-H-G-E-D-B-C-A or PTPN Office – MM Namura – Tropi Mart Mendalo – Green Mart – SJ Mart – MM Win-Win – MM Angkasa – MM Family 16 – MM Central Mayang – Jkov – Indogrosir – PT Sumber Alfaria Trijaya Tbk – MM Favorite – PTPN Office, with a total distance of 51.07 KM.