



## INTISARI

### SISTEM PENDUKUNG KEPUTUSAN UNTUK PEMILIHAN ARMADA MENGUNAKAN AHP, TOPSIS, DAN ELECTRE

Oleh

Dimas Firmansyah

23/528900/PPA/06692

Sektor logistik di Indonesia menghadapi tantangan dalam manajemen armada, terutama pada proses penugasan pengiriman yang masih dilakukan secara manual. Kondisi ini dapat menyebabkan inefisiensi, peningkatan biaya operasional, keputusan yang tidak konsisten, serta risiko *empty backhaul*. Kompleksitas semakin meningkat karena pengambil keputusan perlu mempertimbangkan beberapa kriteria secara bersamaan dalam waktu yang terbatas.

Penelitian ini bertujuan mengembangkan Sistem Pendukung Keputusan (SPK) untuk pemilihan armada pada penugasan *order* baru dengan mempertimbangkan empat kriteria utama, yaitu biaya (*cost*), jarak kosong ke *pickup* (*cost*), kesesuaian armada–muatan (*benefit*), dan potensi *order* selanjutnya (*benefit*). SPK dibangun dengan mengintegrasikan tiga metode Multi-Criteria Decision Making (MCDM), yaitu *Analytic Hierarchy Process* (AHP) untuk menentukan bobot kriteria, *Elimination and Choice Expressing Reality* (ELECTRE) untuk seleksi berbasis relasi *outranking* (eliminasi alternatif yang kalah dominan), serta *Technique for Order of Preference by Similarity to Ideal Solution* (TOPSIS) untuk menghasilkan perankingan akhir berdasarkan kedekatan terhadap solusi ideal. Integrasi metode ini memungkinkan sistem memberikan rekomendasi secara lebih terstruktur dan dapat dijelaskan melalui bobot kriteria, hasil seleksi, serta nilai preferensi akhir.

Hasil pengujian menunjukkan sistem mampu menghasilkan rekomendasi armada dalam bentuk daftar prioritas serta menyediakan informasi pendukung seperti nilai tiap kriteria, nilai preferensi TOPSIS, dan status eliminasi ELECTRE sehingga rekomendasi lebih mudah dipahami dan dipertanggungjawabkan. Evaluasi pengguna melalui kuesioner menunjukkan hasil positif, di mana aspek efisiensi keputusan dan waktu memperoleh nilai 4,33 (Sangat Setuju), aspek akurasi dan akuntabilitas rekomendasi memperoleh nilai 4,20 (Setuju), dan aspek dampak bisnis dan manfaat organisasi memperoleh nilai 4,23 (Setuju). Secara keseluruhan, penelitian ini menunjukkan bahwa integrasi AHP–ELECTRE–TOPSIS efektif untuk mendukung pengambilan keputusan penugasan armada secara lebih objektif, terstruktur, dan berbasis data.

**Kata Kunci:** Dss, Ahp, Electre, Topsis, *Fleet Management*



## ABSTRACT

### DECISION SUPPORT SYSTEM FOR FLEET SELECTION USING *AHP*, *TOPSIS* AND *ELECTRE*

By

Dimas Firmansyah

23/52890/PPA/06692

*Indonesia's logistics sector faces major challenges in fleet management, particularly in shipment assignment processes that are still handled manually. This condition can lead to inefficiencies, higher operating costs, inconsistent decisions, and the risk of empty backhaul. The complexity increases further because decision makers must consider multiple criteria simultaneously within limited time.*

*This study aims to develop a Decision Support System (DSS) for fleet selection when assigning new orders by considering four main criteria: cost (cost), empty distance to pickup (cost), vehicle–cargo suitability (benefit), and potential subsequent orders (benefit). The DSS is built by integrating three Multi-Criteria Decision Making (MCDM) methods: the Analytic Hierarchy Process (AHP) to determine criterion weights, the Elimination and Choice Expressing Reality (ELECTRE) method to perform outranking-based selection (eliminating dominated alternatives), and the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) to produce the final ranking based on closeness to the ideal solution. This integration enables the system to generate recommendations in a more structured manner and provide explainable results through criterion weights, selection outcomes, and final preference scores.*

*The test results show that the system can generate fleet recommendations in the form of a priority list and provide supporting information such as criterion values, TOPSIS preference scores, and ELECTRE elimination status, making the recommendations easier to understand and justify. User evaluation through a questionnaire indicates positive results: decision and time efficiency achieved a score of 4.33 (Strongly Agree), recommendation accuracy and accountability achieved 4.20 (Agree), and business impact and organizational benefits achieved 4.23 (Agree). Overall, the study shows that the integration of AHP–ELECTRE–TOPSIS is effective in supporting fleet assignment decisions in a more objective, structured, and data-driven manner.*

**Keywords:** *Dss, Ahp, Electre, Topsis, Fleet Manageme*