

Sistem Pendukung Keputusan Penentuan Penerima Bantuan Sosial UMKM Di Kota Lhokseumawe Menggunakan Metode *Analytic Network Process (ANP)* Dan *Technique For Order Preference By Similarity To Ideal Solution (TOPSIS)*

ABSTRAK

Penentuan kelayakan penerima program bantuan sosial bagi Usaha Mikro, Kecil, dan Menengah (UMKM) pada instansi Dinas Perindustrian, Perdagangan, dan Koperasi Kota Lhokseumawe saat ini ternyata masih mengandalkan proses seleksi manual yang sangat rentan terhadap bias subjektivitas. Situasi administratif tersebut sangat menegaskan tingginya urgensi pengembangan sebuah sistem pendukung keputusan yang terkomputerisasi secara transparan dan terukur, guna memastikan penyaluran dana bantuan modal usaha pemerintah benar-benar dialokasikan secara adil kepada pelaku usaha yang paling membutuhkan. Untuk mengatasi permasalahan krusial itu, penelitian ini merancang sistem komputasi presisi berlandaskan kerangka kerja *Multi-Criteria Decision Making (MCDM)* dengan mengintegrasikan berbagai parameter kritis seperti omzet bulanan, nilai aset, lama operasional, beban tanggungan, status SKTM, serta riwayat bantuan. Pendekatan analitik gabungan menggunakan *Analytic Network Process (ANP)* dan *Step-wise Weight Assessment Ratio Analysis (SWARA)* diimplementasikan secara komparatif untuk mengekstraksi bobot prioritas kriteria berdasarkan tingkat ketergantungan antar-elemen maupun penilaian preferensi langsung dari pakar terkait. Sebagai tahapan perankingan akhir, algoritma *Technique for Order Preference by Similarity to Ideal Solution (TOPSIS)* diterapkan untuk mengevaluasi data kandidat dengan mengukur kedekatan geometris melalui jarak terpendek menuju solusi ideal positif dan jarak terjauh dari solusi negatif. Hasil pengujian fungsionalitas sistem secara komprehensif akhirnya membuktikan bahwa integrasi model algoritma hibrida tersebut mampu beroperasi secara optimal dalam memproses variabel kompleks serta konsisten menghasilkan urutan rekomendasi kelayakan kandidat penerima tanpa adanya celah anomali matematis. Berdasarkan hasil perhitungan perankingan akhir pada kedua skenario pembobotan tersebut, maka alternatif A2 (Riski Fotokopi) sukses mendominasi perolehan nilai preferensi tertinggi, sehingga secara ilmiah direkomendasikan sebagai kandidat penerima bantuan sosial UMKM yang paling layak dipertimbangkan.

Kata Kunci: Bantuan Sosial, Sistem Pendukung Keputusan, UMKM, ANP, SWARA, TOPSIS.

Decision Support System for Determining MSMEs Social Assistance Recipients in Lhokseumawe City Using the Analytic Network Process (ANP) and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) Methods

ABSTRACT

Determining the eligibility of social assistance beneficiaries for Micro, Small, and Medium Enterprises (MSMEs) in Lhokseumawe City currently still relies on a manual selection process that is highly vulnerable to subjectivity bias. This administrative situation strongly emphasizes the high urgency of developing a transparent and measurable computerized decision support system to ensure government business capital assistance is truly allocated fairly to the most deserving business actors. To overcome this crucial problem, this research designs a precision computational system based on the Multi-Criteria Decision Making (MCDM) framework by integrating critical parameters including monthly turnover, asset value, operational duration, dependents, and assistance history. A combined analytical approach using Analytic Network Process (ANP) and Step-wise Weight Assessment Ratio Analysis (SWARA) is comparatively implemented to extract priority weights based on inter-element dependencies and direct preference assessments from related experts. As the final ranking stage, the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) algorithm is applied to evaluate candidates by measuring geometric closeness through the shortest distance to the positive ideal solution. The comprehensive system functionality testing results finally prove that this integrated hybrid algorithm model operates optimally in processing complex variables and consistently generating candidate eligibility recommendations without any mathematical anomaly loopholes. Based on the final ranking calculations in both weighting scenarios, alternative A2 (Riski Fotokopi) successfully dominates the highest preference value, thus being scientifically recommended as the most eligible MSME social assistance candidate to consider.

Keywords: Social Assistance, Decision Support System, MSMEs, ANP, SWARA, TOPSIS.