

ABSTRAK

Usaha Mikro, Kecil, dan Menengah (UMKM) batik tulis di Kabupaten Bangkalan memiliki peran penting dalam perekonomian daerah, namun masih menghadapi kendala dalam pengembangan usaha, khususnya terkait legalitas, akses permodalan, dan kemitraan. Penelitian ini bertujuan untuk mengelompokkan UMKM batik tulis berdasarkan karakteristik usaha serta membandingkan metode *Agglomerative Hierarchical Clustering* (AHC) dan *Fuzzy C-Means* (FCM). Variabel yang digunakan meliputi lama usaha, jumlah tenaga kerja, aset, omzet per bulan, kemitraan, dan kepemilikan surat izin usaha. Pembobotan fitur dilakukan menggunakan *Entropy Weighting Method* (EWM). Evaluasi hasil klasterisasi dilakukan menggunakan *Silhouette Coefficient* dan *Davies–Bouldin Index* (DBI). Hasil penelitian menunjukkan bahwa metode FCM dengan jumlah klaster $k = 3$ dengan nilai 0,8582 menghasilkan kualitas klaster terbaik, ditunjukkan oleh nilai *Silhouette Coefficient* tertinggi dan nilai DBI terendah yaitu 0,2540 dengan $k = 2$ dibandingkan nilai DBI metode AHC. Klaster yang terbentuk dapat menjadi dasar penyusunan strategi pembinaan dan pengembangan UMKM batik secara lebih tepat sasaran.

Kata Kunci: *Agglomerative Hierarchical Clustering, Fuzzy C-Means, Entropy Weighting, Silhouette Coefficient, UMKM batik.*

ABSTRACT

Micro, Small, and Medium Enterprises (MSMEs) producing hand-drawn batik in Bangkalan Regency play an important role in the regional economy; however, they still face challenges in business development, particularly related to legal compliance, access to capital, and partnerships. This study aims to cluster hand-drawn batik MSMEs based on their business characteristics and to compare the Agglomerative Hierarchical Clustering (AHC) and Fuzzy C-Means (FCM) methods. The variables used include business duration, number of employees, assets, monthly turnover, partnerships, and ownership of business licenses. Feature weighting was performed using the Entropy Weighting Method (EWM). The clustering results were evaluated using the Silhouette Coefficient and the Davies–Bouldin Index (DBI). The results indicate that the FCM method with $k = 3$ clusters achieved the best clustering quality, with a value of 0.8582, as indicated by the highest Silhouette Coefficient, while the lowest DBI value was 0.2540 at $k = 2$, which was lower than the DBI values obtained using the AHC method. The resulting clusters can serve as a basis for formulating more targeted strategies for the development and empowerment of batik MSMEs.

Keywords: *Fuzzy C-Means, Agglomerative Hierarchical Clustering, Entropy Weighting, Silhouette Coefficient, Batik MSMEs.*

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