ABSTRACT

Disparities in development characteristics among regencies and cities in Central Java Province highlight the need for regional mapping that objectively illustrates similarities and differences in development levels. This study aims to segment the regencies and cities in Central Java Province in 2024 based on four regional development indicators: population density (demographic), land area (geographic), Human Development Index/HDI (social), and Gross Regional Domestic Product/GRDP (economic). The clustering process was conducted using the K-Medoids and Density-Based Spatial Clustering of Applications with Noise (DBSCAN) algorithms because they are more robust in handling outliers and utilize Euclidean distance calculations. The K-Medoids algorithm groups objects based on the nearest distance to the medoids as cluster centers, while the DBSCAN algorithm clusters objects based on data density. The clustering results were validated using the Silhouette Coefficient, where a higher value indicates better clustering performance. The results show that the K-Medoids algorithm produces two optimal clusters with a Silhouette Coefficient value of 0.6179, while the DBSCAN algorithm forms three clusters and 25 noise with a Silhouette Coefficient value of 0.6532. Therefore, the best clustering result for regencies and cities in Central Java Province based on regional development indicators in 2024 is obtained using the DBSCAN algorithm, which produces three clusters and 25 noise.

Keywords: clustering, K-Medoids, DBSCAN, regional development, Central Java.