ABSTRACT

Economic development disparity among provinces remains an issue in Indonesia. More than 50% of the national Gross Domestic Product is concentrated on Java Island, while other islands contribute significantly less. Gross Regional Domestic Product (GRDP) at constant prices is one of the indicators that can be used to analyze regional economic dynamics and structures over time. Differences in characteristics and growth patterns of GRDP among provinces require an analytical approach capable of grouping regions based on the similarity of their time series patterns. This study aims to cluster provinces in Indonesia based on the similarity of GRDP time series patterns at constant prices for the period 2010–2024. The method employed is K-Means Dynamic Time Warping Barycenter Averaging (K-DBA), which combines the K-Means algorithm, Dynamic Time Warping (DTW), and Dynamic Time Warping Barycenter Averaging (DBA). K-DBA is advantageous in capturing similarities in time series patterns with temporal misalignments and in generating more stable and representative centroids. The determination of the optimal number of clusters and the evaluation of clustering quality were conducted using the silhouette coefficient. The results show that Indonesian provinces can be grouped into three clusters with distinct GRDP pattern characteristics, namely clusters with low, medium, and high GRDP levels. The average silhouette value for $K = 3$ is 0.796, indicating that the resulting cluster structure has strong clustering quality, and that the clustering results clearly represent differences in provincial economic growth patterns.

Keywords: GDRP (constant price), Clustering, Time Series, K-Means, Dynamic Time Warping, DTW Barycenter Averaging, Silhouette