SMATIKA : STIKI Informatika Jurnal
Accredited Sinta 4 Ministry of Higher Education, Science and Technology Republic of Indonesia SK No. 79/E/KPT/2023
E-ISSN: 2580-6939 || P-ISSN: 2087-0256

Segmentation Analysis of Tourist Visits Using K-Means Algorithm at the Kutai Kartanegara Tourism Office

Rully Wijaya Saputra[1*], Nursobah[2], Ahmad Abul Khair[3]

[1,2,3] *STMIK Widya Cipta Dharma, Informatics Engineering, M. Yamin Street No. 25, Gn. Kelua, Samarinda Ulu District, Samarinda City, East Kalimantan 75123, Indonesia*

Keyword

Clustering; Data Mining; Kutai Kartanegara; K-Means; Tourism

Corresponding Author:
2243051@wicida.ac.id

Abstract

Kutai Kartanegara Regency possesses abundant and diverse tourism potential that can contribute significantly to regional economic development. Nevertheless, tourism visitation data has generally been utilized only for administrative documentation and reporting purposes, limiting its role in supporting strategic decision-making. Therefore, a data-driven approach is required to identify the characteristics and performance of tourism destinations more effectively. This study aims to analyze and segment tourism destinations in Kutai Kartanegara Regency using the K-Means Clustering algorithm. The research employed secondary data obtained from the Kutai Kartanegara Tourism Office covering the period from 2023 to 2025. Three variables were used in the clustering process, namely total domestic tourist visits (Wisnus), total international tourist visits (Wisman), and seasonal visitation fluctuations. Prior to clustering, the data underwent preprocessing and normalization to improve clustering performance. The Elbow Method was applied to determine an appropriate number of clusters, resulting in a three-cluster solution representing high-, medium-, and low-visitation categories. The clustering process successfully grouped 56 tourism destinations into 28 destinations in the medium-visitation cluster, 12 destinations in the high-visitation cluster, and 16 destinations in the low-visitation cluster. Furthermore, model evaluation using the Silhouette Score produced a value of 0.4288, indicating a moderate and acceptable level of cluster quality. The findings provide a comprehensive overview of tourism destination performance and can support policymakers in prioritizing destination development, improving resource allocation, and formulating more targeted tourism promotion strategies to enhance regional tourism competitiveness.

1. Introduction

The tourism sector plays an important role in supporting regional economic growth and increasing Local Genuine Revenue (PAD) in Kutai Kartanegara Regency [1],[2]. As a region that possesses a wide variety of natural, cultural, and artificial tourism attractions, effective tourism management requires reliable data and information to support planning and policy formulation [1],[3].The Kutai Kartanegara Tourism Office routinely collects tourism visitation data from various destinations each year [1]. However, these data are generally utilized only for administrative reporting purposes and have not been fully explored to generate strategic insights regarding tourism destination performance and visitor distribution patterns [4],[5].

Cite: R. W. Saputra., et al., (2026). Segmentation Analysis of Tourist Visits Using K-Means Algorithm at the Kutai Kartanegara Tourism Office. SMATIKA : STIKI Informatika Jurnal,16(2). doi: https://doi.org/10.32664/smatika.v16i02.2324

This condition creates challenges for policymakers in identifying which destinations have high visitation performance and which destinations require greater development attention[6],[7],[2].Without an objective classification mechanism, tourism promotion programs, infrastructure investments, and resource allocation may not be implemented effectively [8]. Therefore, transforming tourism visitation data into meaningful information through data mining techniques is essential to support evidence-based tourism planning and development [9],[5],[8].

To address this issue, this study applies the K-Means Clustering algorithm to segment tourism destinations in Kutai Kartanegara Regency based on visitation characteristics. The analysis utilizes tourism visitation data for the period 2023–2025 obtained from the Kutai Kartanegara Tourism Office [1]. Three variables were used in the clustering process, namely domestic tourist visits (Wisnus), international tourist visits (Wisman), and seasonal visitation fluctuations. The Elbow Method was employed to determine the optimal number of clusters, while cluster quality was evaluated using the Silhouette Score [10],[11].

The clustering results provide a clearer representation of tourism destination characteristics by grouping destinations into high-, medium-, and low-visitation categories. This segmentation enables the identification of destinations with strong tourism performance as well as destinations that require further development and promotion efforts. Consequently, the results of this study can serve as a reference for the Kutai Kartanegara Tourism Office in formulating targeted tourism policies, improving resource allocation efficiency, and enhancing regional tourism competitiveness [12],[2],[8] .

2. Research Method

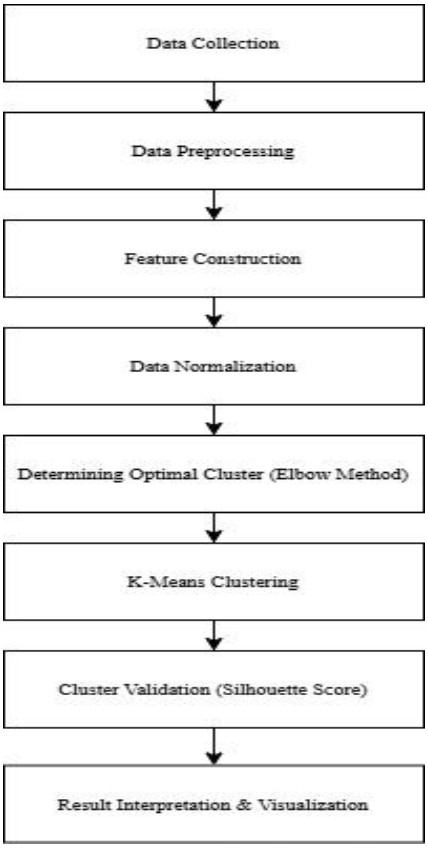

Figure 1. Research Methodology for Tourism Destination Clustering Analysis

This study employed a quantitative data mining approach to analyze tourism destination segmentation using visitation data obtained from the Kutai Kartanegara Tourism Office for the period 2023–2025. The dataset consisted of tourism destinations recorded in official visitation reports and included information on domestic

tourist visits (Wisnus) and international tourist visits (Wisman). Prior to clustering, the data underwent preprocessing stages, including data cleaning, transformation, integration, and normalization. During the cleaning process, records that did not represent actual tourism destinations, such as tourism events, festival activities, ticketing records, and other administrative entries, were removed to improve data quality and ensure analytical consistency. After preprocessing, a total of 56 tourism destinations were retained for further analysis.

During data preprocessing, several missing or incomplete values were identified in the raw tourism visitation reports. These missing values mainly originated from empty cells and unavailable visitation records. To preserve all tourism destinations in the analysis, missing values were replaced with zero values during preprocessing. This approach was considered appropriate because missing entries generally represented periods with no recorded tourist visits rather than data collection errors. After preprocessing, the final dataset contained no missing values and was subsequently used for clustering analysis.

The clustering process was performed using three numerical variables: total domestic tourist visits, total international tourist visits, and seasonal visitation fluctuation. To minimize differences in variable scales and improve clustering performance, all variables were standardized using the StandardScaler (Z-Score) method. The K-Means algorithm was selected because of its effectiveness in grouping tourism destinations with similar visitation characteristics and its widespread application in tourism data analysis studies [10],[11],[13]. The optimal number of clusters was determined using the Elbow Method by evaluating the Within-Cluster Sum of Squares (WCSS) values for different cluster configurations.

K-Means was selected because the dataset consists of numerical variables and the objective of this study is to identify homogeneous groups of tourism destinations based on visitation characteristics. Compared with K-Medoids, K-Means offers lower computational complexity and faster processing for numerical datasets. Hierarchical Clustering provides a dendrogram structure but becomes less efficient as the dataset size increases, while DBSCAN is more suitable for identifying clusters with irregular shapes and noise. Since the tourism visitation data exhibit relatively compact numerical patterns and the research objective focuses on segmentation rather than anomaly detection, K-Means was considered the most appropriate clustering technique.

Data preparation and preliminary processing were conducted using Microsoft Excel, while clustering analysis, visualization, and model evaluation were performed using Python in the Google Colab environment. The resulting clusters were subsequently evaluated using the Silhouette Score to assess cluster cohesion and separation. The evaluation produced a Silhouette Score of 0.4288, indicating a moderate level of clustering quality and supporting the reliability of the segmentation results [14],[15],[16].

3. Result and Discussions

3.1 Analysis of Optimal Cluster Determination

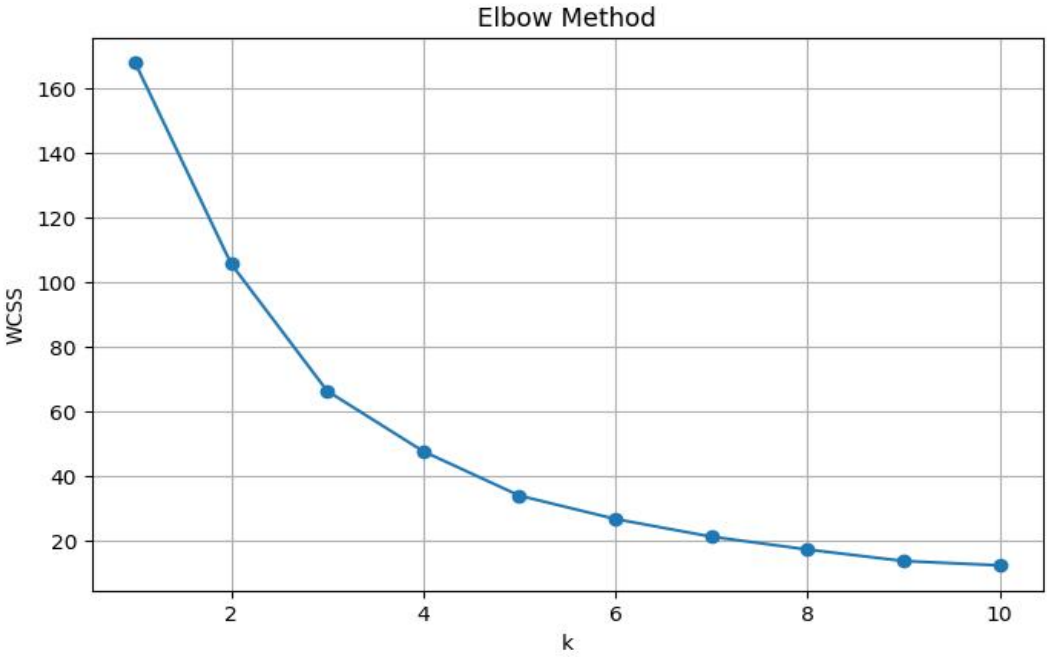

Figure 2. Elbow Method Analysis for Optimal Cluster Selection

The research procedure employed in this study is illustrated in Figure 1, which presents the overall workflow from data collection and preprocessing to clustering and evaluation. Following this framework, the K-Means clustering algorithm was applied to identify patterns among tourism destinations in Kutai Kartanegara Regency. Prior to clustering, the optimal number of clusters was determined using the Elbow Method.

As shown in Figure 2, the Elbow Method analysis indicates a noticeable decrease in the Within-Cluster Sum of Squares (WCSS) value as the number of clusters increases. The curve begins to flatten after k = 3, suggesting that additional clusters contribute only marginal improvements in reducing cluster variance [11],[16].Therefore, three clusters were initially identified as a suitable configuration because they provide a reasonable balance between clustering performance and model simplicity [17],[18],[11]. To further assess clustering quality, Silhouette Scores were calculated for several cluster configurations. The comparison results are presented in Table 1.

Table 1. Comparison of Silhouette Scores for Different Cluster Configurations

Number of Clusters (k)	Silhouette Score
2	0.3933
3	0.4288
4	0.4652

The results indicate that the Silhouette Score increased from 0.3933 for k = 2 to 0.4652 for k = 4. The four-cluster configuration achieved the highest Silhouette Score, suggesting slightly stronger cluster cohesion and separation compared with the two- and three-cluster solutions. However, the Elbow Method identified k = 3 as the point where the reduction in Within-Cluster Sum of Squares (WCSS) began to diminish substantially. This indicates that adding more clusters beyond three provides only limited improvement in explaining data variability.

Furthermore, the three-cluster configuration offers a more practical and interpretable segmentation framework by categorizing tourism destinations into high-, medium-, and low-visitation groups. This

classification aligns with the objectives of tourism planning and destination management, enabling policymakers to formulate targeted development strategies based on distinct visitation characteristics. Therefore, despite the slightly higher Silhouette Score obtained by the four-cluster configuration, the three-cluster solution was retained as the final clustering model due to its interpretability, practical relevance, and consistency with the Elbow Method results [12],[11].

From a practical perspective, the resulting segmentation successfully groups tourism destinations into high-, medium-, and low-visitation categories. This classification provides a clearer understanding of destination performance and facilitates the identification of destinations requiring different development strategies. Furthermore, the clustering results can support the Kutai Kartanegara Tourism Office in improving policy formulation, prioritizing development programs, and allocating tourism resources more effectively according to the characteristics of each destination group [1],[2],[8].

3.2 Interpretation and Visualization of Tourism Segments

Table 2. Summary of Tourism Destination Segmentation Results

Cluster	Cluster Category	Number of Destinations	Average Wisnus	Average Wisman
0	Medium Visitation	28	32.433,16	0,38
1	High Visitation	12	105.167,94	410,79
2	Low Visitation	16	6.762,36	4,80
Total	-	56	-	-

Table 2 summarizes the tourism destination segmentation results obtained through the K-Means clustering algorithm. Based on the analysis, 56 tourism destinations in Kutai Kartanegara Regency were classified into three clusters according to their visitation characteristics, including domestic tourist visits (Wisnus), international tourist visits (Wisman), and seasonal visitation fluctuations. The use of K-Means clustering allows destinations with comparable visitation patterns to be grouped into similar segments, providing valuable information for tourism management and strategic planning activities [10],[11],[19].

Cluster 1 was categorized as the High Visitation group, consisting of 12 tourism destinations that recorded the highest average domestic tourist visits (105,167.94) and international tourist visits (410.79). The concentration of visitor flows suggests that these destinations play a strategic role as the principal tourism assets of Kutai Kartanegara Regency. Similar patterns have been reported in previous studies, where destinations with higher visitation intensity were found to function as regional tourism anchors [20]. However, the present study extends previous findings by incorporating seasonal visitation fluctuations as an additional clustering variable, allowing a more comprehensive assessment of tourism destination performance over time. Consequently, maintaining infrastructure quality, accessibility, visitor services, and destination attractiveness is essential to preserve their competitiveness and long-term sustainability [2],[20] .

Cluster 0 represented the Medium Visitation group and contained 28 tourism destinations. This cluster achieved an average of 32,433.16 domestic tourist visits and 0.38 international tourist visits. The findings of the present study are comparable to previous research that identified tourism segments with moderate market performance and growth potential [12], indicating that the proposed segmentation approach produces results consistent with established market characteristics. In the context of Kutai Kartanegara Regency, destinations within this category demonstrate relatively stable tourism performance and possess opportunities for further growth through targeted promotional programs, tourism events, and improvements in supporting facilities and services. These findings suggest that medium-performing destinations can serve as strategic targets for tourism development initiatives aimed at increasing visitation levels and regional tourism competitiveness.

Cluster 2 was identified as the Low Visitation group, consisting of 16 tourism destinations with the lowest average domestic tourist visits (6,762.36) and international tourist visits (4.80). The relatively low number of

visitors indicates that these destinations have considerable development potential but may require targeted interventions to improve accessibility, supporting facilities, and tourism attractiveness. Similar patterns have been reported in previous studies on tourism destination development [8]. The findings of the present study reinforce this perspective within the context of Kutai Kartanegara Regency. Although visitor numbers remain comparatively low, these destinations still possess development potential through enhanced promotional efforts, infrastructure improvement, and diversification of tourism products tailored to local characteristics[2],[20].

Overall, the clustering results reveal clear differences in visitation intensity among tourism destinations in Kutai Kartanegara Regency. The resulting segmentation can assist policymakers in determining development priorities, allocating resources more efficiently, and implementing tourism strategies that are aligned with the characteristics and needs of each destination group [12],[8].

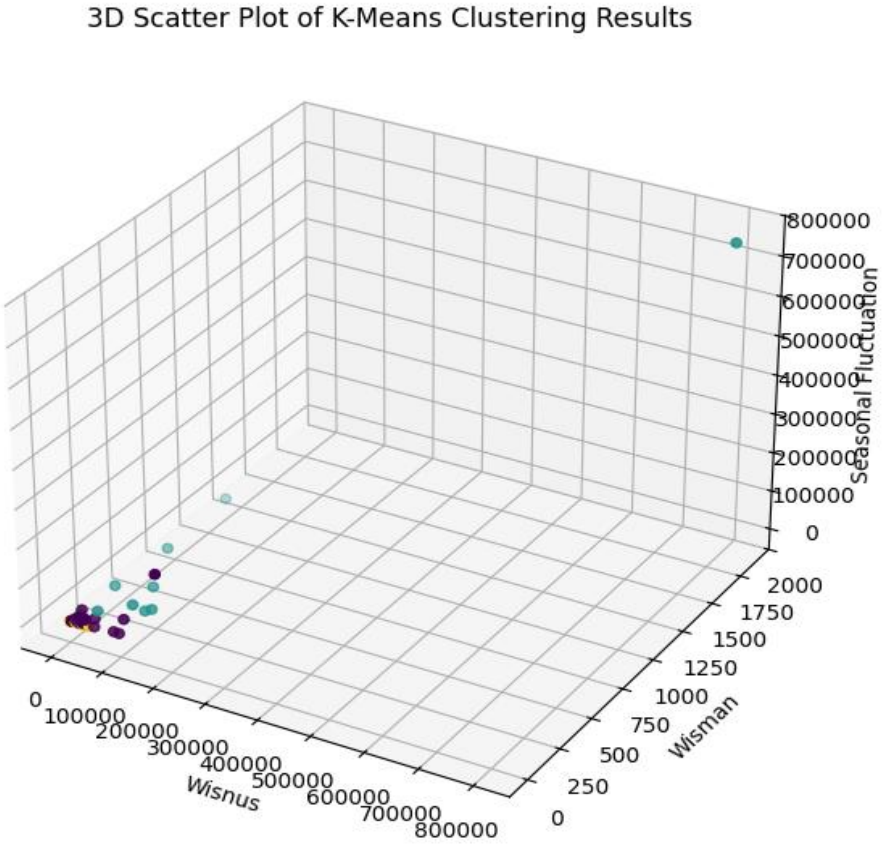

Figure 3. Three-Dimensional Visualization of Tourism Destination Clusters.

To facilitate the interpretation of clustering results, the segmented tourism destinations were visualized using a three-dimensional scatter plot, as presented in Figure 3 [3]. In this visualization, each point represents a tourism destination positioned according to three analytical variables derived from the 2023–2025 dataset. The X-axis corresponds to total domestic tourist visits (Wisnus), the Y-axis represents total international tourist visits (Wisman), and the Z-axis illustrates seasonal visitation fluctuations. Different colors indicate the cluster membership assigned by the K-Means algorithm.

The visualization demonstrates that tourism destinations are distributed into three distinct groups according to their visitation characteristics. Although some overlap is naturally present, the clusters exhibit observable separation, indicating that the selected variables are capable of differentiating destination performance levels. This finding is consistent with the Silhouette Score value of 0.4288, which indicates a moderate level of cluster cohesion and separation [11].

Based on the clustering results, the three clusters can be interpreted as follows:

1. Cluster 1 (High Visitation) consists of tourism destinations with the highest visitation levels, characterized by large numbers of domestic and international tourist arrivals. These destinations represent the primary tourism attractions in Kutai Kartanegara Regency and contribute significantly to regional tourism activities [2],[20].
2. Cluster 0 (Medium Visitation) includes tourism destinations with moderate visitation levels. Destinations within this cluster demonstrate stable tourism performance and possess opportunities for growth through targeted promotion, infrastructure enhancement, and tourism event development [12],[2].
3. Cluster 2 (Low Visitation) contains tourism destinations with relatively low visitation levels compared to other clusters. Despite lower visitor numbers, these destinations maintain development potential and may benefit from strategic marketing initiatives, accessibility improvements, and diversification of tourism products [2],[8].

Overall, the three-dimensional visualization provides a clearer understanding of tourism destination distribution patterns and supports the interpretation of the K-Means clustering results. The identified clusters can serve as a valuable reference for tourism planning, resource allocation, and destination development strategies within Kutai Kartanegara Regency [12],[8].

3.3 Analysis of Visitation Patterns

Figure 4. Tourism Visit Density Heatmap (2023–2025)

Figure 4 presents the tourism visitation density heatmap for selected tourism destinations in Kutai Kartanegara Regency during the 2023–2025 period. The visualization illustrates variations in visitation intensity across destinations and years, where darker color gradients indicate higher visitor volumes. The heatmap reveals that several destinations, such as Event Erau, Pantai Pangempang, and Makam Raja Kutai, consistently recorded high visitation levels throughout the observation period, while destinations such as BOSF Samboja exhibited relatively lower visitation intensity.

In addition, the heatmap indicates a general increase in visitor numbers across most destinations from 2023 to 2025. These patterns suggest differences in destination attractiveness and visitation performance, supporting the inclusion of visitation volume and seasonal variation variables in the clustering analysis. The visualization provides an initial overview of tourism visitation patterns prior to the segmentation process.

The observed concentration of visitor activity in several major destinations is consistent with previous tourism studies, which reported that a limited number of destinations often function as primary tourism hubs and attract a substantial proportion of regional visitors [2],[20]. The increasing visitation trend identified across multiple destinations also suggests opportunities for tourism growth and supports the need for destination-specific development strategies.

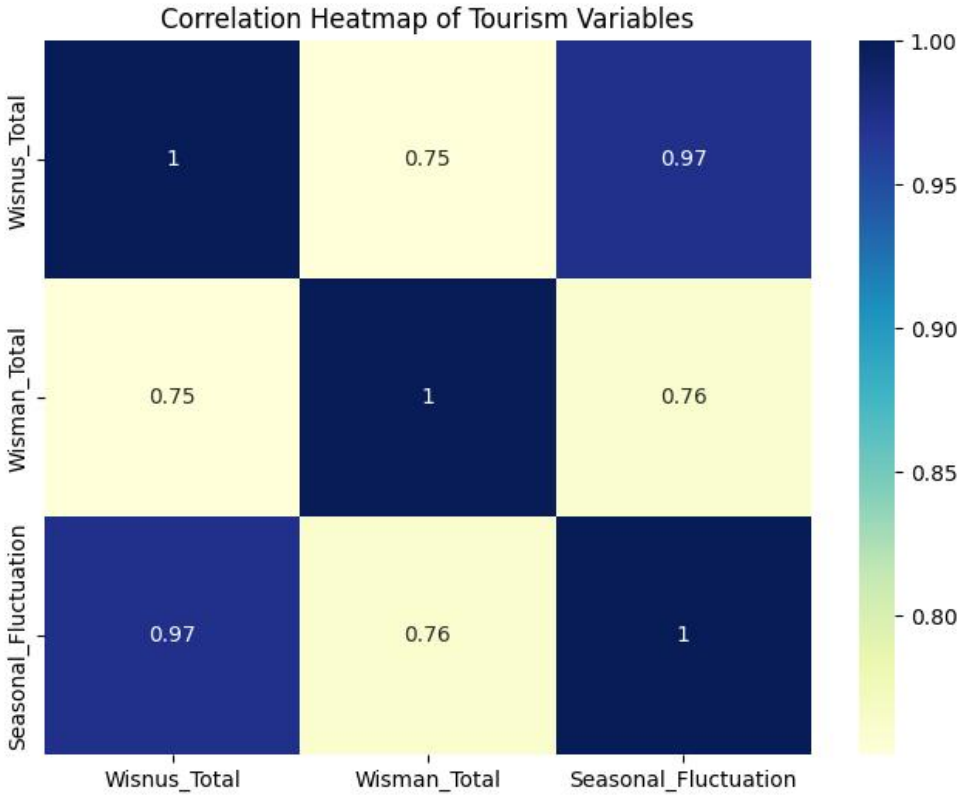

Figure 5. Correlation Analysis of Tourism Variables Using a Heatmap

Following the data reprocessing stage, a correlation heatmap was additionally generated to examine the relationships among the variables used in the clustering model. While the visitation density heatmap provides an overview of destination-level visitation patterns, the correlation heatmap offers complementary information regarding the degree of association among domestic tourist visits (Wisnus), international tourist visits (Wisman), and seasonal visitation fluctuations. This analysis supports the interpretation of cluster formation and validates the suitability of the selected variables for tourism destination segmentation.

The relationships among the variables used in the clustering process are further illustrated through the correlation heatmap presented in Figure 5 [3]. This visualization provides a comprehensive overview of the degree of association between domestic tourist visits (Wisnus), international tourist visits (Wisman), and seasonal visitation fluctuations. By representing correlation values through color intensity, the heatmap facilitates the identification of patterns and interactions among the selected variables.

The heatmap indicates that each variable contributes differently to the clustering process. Domestic tourist visits constitute the dominant component in describing tourism destination performance, while international

tourist visits and seasonal fluctuations provide complementary information that helps distinguish destinations with different visitation characteristics. The variation in correlation values suggests that the selected variables capture multiple dimensions of tourism activity rather than representing identical information [10],[11].

Furthermore, the correlation analysis supports the suitability of the chosen variables for K-Means clustering because they provide sufficient variation for destination segmentation. The combination of visitation volume and seasonal fluctuation enables the clustering model to identify destinations with high-, medium-, and low-visitation characteristics more effectively. Consequently, the heatmap serves as an additional analytical tool for validating the relevance of the variables used in the segmentation process and strengthening the interpretation of the clustering results [12],[3],[8].

Overall, the correlation heatmap complements the clustering analysis by providing insights into the relationships among tourism variables. These findings contribute to a better understanding of tourism destination characteristics and support evidence-based decision-making for tourism planning and development in Kutai Kartanegara Regency [2],[8].

4. Conclusions and Future Works

4.1 Conclusions

Based on the analysis of tourism visitation data from 2023 to 2025, this study successfully applied the K-Means clustering algorithm to segment tourism destinations in Kutai Kartanegara Regency into three distinct groups. Using domestic tourist visits (Wisnus), international tourist visits (Wisman), and seasonal visitation fluctuations as clustering variables, the analysis classified 56 tourism destinations into three categories: High Visitation, Medium Visitation, and Low Visitation. The three-cluster solution was selected based on the Elbow Method and further evaluated using the Silhouette Score, which yielded a value of 0.4288, indicating a moderate level of cluster cohesion and separation.

The clustering results demonstrate that tourism destinations in Kutai Kartanegara Regency exhibit different visitation characteristics and performance levels. Destinations classified in the High Visitation cluster represent major tourism attractions with the highest visitor intensity, while destinations in the Medium Visitation cluster show stable performance and potential for further growth. Meanwhile, destinations in the Low Visitation cluster require additional attention through promotion, infrastructure improvement, and tourism product development to increase their attractiveness and competitiveness.

From a practical perspective, the resulting segmentation can support the Kutai Kartanegara Tourism Office in identifying development priorities, allocating resources more effectively, and designing tourism promotion strategies tailored to the characteristics of each destination group. The findings also provide an evidence-based framework for tourism planning and policy formulation aimed at improving regional tourism performance.

This study is limited to historical visitation data and focuses primarily on quantitative visitation indicators. Future research may incorporate additional variables, such as visitor satisfaction, tourism preferences, social media sentiment, accessibility indicators, environmental factors, or Geographic Information Systems (GIS), to provide a more comprehensive understanding of tourism destination performance and visitor behavior. Further studies may also compare alternative clustering techniques, such as Hierarchical Clustering, DBSCAN, or K-Medoids, to evaluate the robustness of tourism destination segmentation results.

5. References

[1] Dinas Pariwisata Kabupaten Kutai Kartanegara, *Data Kunjungan Wisatawan ke Kutai Kartanegara Tahun 2025*. Kutai Kartanegara: Pejabat Pengelola Informasi dan Dokumentasi (PPID), 2025.

[2] A. S. Putra, "Strategi Pengembangan Objek Wisata pada Dinas Pariwisata Kabupaten Kutai Kartanegara," *J. Adm. Bisnis*, vol. 9, no. 3, pp. 154–162, 2021, doi: 10.35797/jab.v9i3.34567.

[3] A. Wulandari and B. Saputra, "Visualisasi Data Spasial Kunjungan Wisatawan Kutai Kartanegara Menggunakan Scatter Plot 3D dan Heatmap," *J. Sains dan Teknol.*, vol. 13, no. 1, pp. 18–27, 2025, doi: 10.35580/sainstek.v13i1.22104.

[4] E. Mulyadi, "Analisis Kinerja Algoritma K-Means dalam Pengelompokan Data Kunjungan Wisatawan Berdasarkan Variabel Demografi," *J. Ris. Komput.*, vol. 12, no. 2, pp. 201–209, 2025, doi: 10.30865/jurikom.v12i2.9103.

[5] M. R. Sanjaya, "Data Mining untuk Klasifikasi Tingkat Kunjungan Objek Wisata Alam di Kabupaten Kutai Kartanegara," *J. Tek. Inform. dan Sist. Inf.*, vol. 11, no. 2, pp. 310–321, 2024, doi: 10.35957/jatisi.v11i2.5432.

[6] P. Handoko and S. Fitriani, "Implementasi Algoritma K-Means untuk Pemetaan Potensi Wisata Budaya di Wilayah Kutai Kartanegara," *J. Teknol. Inf. dan Multimed.*, vol. 5, no. 3, pp. 112–120, 2024, doi: 10.35746/jtim.v5i3.452.

[7] P. Lestari and T. Wahyudi, "Segmentasi Pasar Pariwisata Provinsi Jawa Barat Menggunakan K-Means Berdasarkan Jumlah Kunjungan, Hotel, dan Restoran," *J. JITEK (Jurnal Ilm. Teknosains)*, vol. 11, no. 1, pp. 22–30, 2025, doi: 10.26877/jitek.v11i1.15672.

[8] M. Yusuf and F. Amin, "Implementasi Algoritma Clustering untuk Strategi Pengembangan Pariwisata Berbasis Evidence-Based Policy di Kalimantan Timur," *J. Kebijak. Publik dan Pemerintah.*, vol. 7, no. 1, pp. 89–98, 2026, doi: 10.24832/jkpp.v7i1.765.

[9] H. Nasution, *Implementasi Data Mining dengan Algoritma K-Means untuk Pemetaan Potensi Daerah*. Yogyakarta: Deepublish, 2024.

[10] R. Hidayat and A. Saputra, "Penerapan Algoritma K-Means untuk Mengelompokkan Kunjungan Wisatawan pada Dua Puluh Tempat Wisata di Jakarta," *Technol. J. Ilm.*, vol. 16, no. 1, pp. 45–52, 2025, doi: 10.31602/tji.v16i1.16959.

[11] S. Purnama and T. Rahayu, "Clustering Destinasi Wisata di Kalimantan menggunakan Metode Elbow dan Silhouette Coefficient pada Algoritma K-Means," *J. Inform. Mulawarman*, vol. 20, no. 1, pp. 45–53, 2025, doi: 10.30872/jim.v20i1.11542.

[12] Y. Irawan and D. Safitri, "Application of K-Means Clustering for Tourism Market Segmentation Based on Travel Motivation and Behavior," *Int. J. Data Sci. Anal.*, vol. 8, no. 1, pp. 55–64, 2026, doi: 10.1007/s41060-025-00621-x.

[13] K. P. Sinaga and M. S. Yang, "Unsupervised K-Means Clustering Algorithm," *IEEE Access*, vol. 8, pp. 80716–80727, 2020, doi: 10.1109/ACCESS.2020.2988796.

[14] M. R. Pratama and N. Sari, "Implementasi Metode K-Means Pada Website Pengelompokan Kunjungan Wisatawan Dengan Rekomendasi Planning Otomatis," *J. Janitra Inform. dan Sist. Inf.*, vol. 6, no. 1, pp. 12–21, 2026, doi: 10.59395/rth4pa36.

[15] R. Aulia and D. Hartama, "Analisis K-Means Clustering pada Data Kunjungan Wisatawan Mancanegara ke Indonesia berdasarkan Pintu Masuk," *J. Sist. Komput. dan Inform.*, vol. 6, no. 2, pp. 145–152, 2025, doi: 10.30865/json.v6i2.8821.

[16] H. Zulfikar, "Analisis Perbandingan Algoritma K-Means dan K-Medoids dalam Segmentasi Pengunjung Objek Wisata Berbasis Konsumsi," *J. RESTI (Rekayasa Sist. dan Teknol. Informasi)*, vol. 8, no. 4, pp. 621–628, 2024, doi: 10.29207/resti.v8i4.5812.

[17] A. Fahmi and I. Kurniawan, "Optimasi Penentuan Centroid K-Means untuk Segmentasi Objek Wisata Unggulan di Wilayah Kalimantan Timur," *J. Ilm. Inform. dan Ilmu Komput.*, vol. 4, no. 1, pp. 33–41, 2025, doi: 10.58602/jima-ik.v4i1.124.

[18] D. Kurniawan, "Penerapan K-Means Clustering Pada Pariwisata Kabupaten Bojonegoro Untuk Mendukung Keputusan Strategi Pemasaran," *J. Nas. Teknol. dan Sist. Inf.*, vol. 9, no. 2, pp. 110–118, 2023, doi: 10.25077/TEKNOSI.v9i2.2023.141-149.

[19] M. Carvache-Franco, O. Regalado-Pezúa, G. Sirkis, O. Carvache-Franco, and W. Carvache-Franco, "Market Segmentation in Urban Tourism: A Study in Latin America," *PLoS One*, vol. 18, no. 5, p. e0285138, 2023, doi: 10.1371/journal.pone.0285138.

[20] F. Ramadhan and I. Zulkarnain, "Analisis Preferensi Wisatawan terhadap Objek Wisata di Kalimantan Menggunakan Clustering," *Dir. Student Journals*, vol. 4, no. 2, pp. 88–95, 2025, doi: 10.20527/jrkt.v4i2.1123.