



From Sunrise Seekers to Village Experience Seekers: A Two Step Clustering Segmentation in Bromo Tengger Semeru National Park

Novita Uki Hutami^{1*}, Faisyal², Reyra Humaera³, Irfanun Nisa Tsalits Hantanty⁴

¹Tourism Study Program, Universitas Terbuka, Indonesia

²Assistant Deputy for Industrial Management, Kementerian Pariwisata, Indonesia

³Postgraduate Management Program, Universitas Pamulang, Indonesia

⁴Shariah Economy, Universitas Terbuka, Indonesia

Email: novita.uki.hutami@ecampus.ut.ac.id^{1*}, ffaisyal14@gmail.com², revrhumaera@gmail.com³, irfanun.nisa@ecampus.ut.ac.id⁴

* Correspondence Author: novita.uki.hutami@ecampus.ut.ac.id

Abstract. This study aims to identify domestic visitor segments in Bromo Tengger Semeru National Park (TNBTS), Indonesia, based on travel characteristics and consumption patterns to support the development of quality tourism in protected areas. Using snowball sampling, 283 domestic visitors was analysed by Two-Step Cluster Analysis in SPSS by integrating length of stay, activity preferences, and expenditure patterns. The results reveal a two-cluster solution as the most optimal segmentation, supported by the highest ratio of distance measures, with cluster quality rated as fair (silhouette = 0.20). Cluster 1 (39.2%) represents short-stay, lower-spending visitors who primarily seek iconic experiences (“Sunrise Seekers”), while Cluster 2 (60.8%) reflects longer-stay, higher-spending visitors who prefer village tourism activities (“Village Experience Seekers”). The strongest differentiating variables across segments are length of stay, activity preference, expenditure style, and age, whereas gender, education level, origin, and travel companions have limited role in segment separation. This study contributes empirical evidence of data-driven visitor segmentation in a conservation-based ecotourism destination within a volcanic national park, extending prior expenditure-focused profiling by integrating length of stay and activity preferences to capture visitor heterogeneity more comprehensively.

Keywords: Ecotourism; Length of Stay; Tourists’ Expenditure; Two-Step Cluster Analysis; Visitor Segmentation.

1. INTRODUCTION

The national parks functioned as ecological conservation areas as well as destinations for nature-based tourism and ecotourism in various countries. Tourism activities in national parks contribute to the social and economic well-being of local communities, but at the same time can put tension on ecosystems if they are not well managed (Hakim & Soemarno, 2017). An increase in the number of tourist visits to conservation areas may able impacted on biodiversity disturbance, habitat degradation, and a decline in environmental quality due to the concentration of tourism activities in certain zones (Armono et al., 2017; Vera et al., 2023).

In Bromo Tengger Semeru National Park, the rise of tourism activities occurs because of the combination of tourist visitation intensity, ecological vulnerability and volcanic activity (Hakim & Soemarno, 2017; Hanifa et al., 2024). Previous study shown that tourism activities and transportation on the main tourist route cause soil compaction and decrease infiltration quality, thereby impacting land quality and environmental support capacity (Saputra et al., 2024). In addition, environmental pressure due to volcanic eruptions and the transformation

of habitat, provoked by the intensity of tourist visitation, threaten the existence flore and faune (Hanifa et al., 2024).

Besides environmental impact, the dependence of local communities in national area as tourism destination trigger vulnerability social, economic and health such as during covid-19 due to closure of tourist area (Rahmi et al., 2024). Although, ecotourism emphasizes local communities, another evidence indicates that limitation capacity, participation, and distribution benefits are still the obstacle of development ecotourism based of communities in national level (Duong et al., 2024; Mensah, 2017). This condition compounded of limited infrastructur supporting sustainable tourism such as waste management, disaster mitigation, transportation, information system and digital communication affected tourism activities to be concentrated only on iconic attraction so that increasing risk of crowding and degradation of the tourists' experiences (Huda et al., 2023; Koswara et al., 2024; Santoso et al., 2023). The numer of tourist arrival being one of the challenge of ecotourism management in the national park, thereby requiring understanding of tourist characteristics, consumption patterns, and visit duration to prevent the pressure on carrying capacity of the destination (Armono et al., 2017; Soto Miranda et al., 2019). In case of Bromo Tengger Semeru National Park, the number of domestic tourist significantly increase from 2020 to 2024 as seen the following chart:



Figure 1. Graphic of the number of tourist visiting Bromo Tengger Semeru National Park.

Source: Balai Besar Taman Nasional Bromo Tengger Semeru, (2024)

By this optimistic data, although domestic tourism has little attention in tourism studies, domestic tourists can consider as the main pillar supporting the tourism industry. The fact that the number of domestic tourists contribute the most stable contributor of tourism recovery, while international tourist growth faster after pandemic, but remain more volatile and lower in number.

The understanding of tourists' heterogeneity can be captured by segmentation approach in order to identify tourists' group based on their difference of behaviour and travel characteristic in supporting the aim of conservation destination (Villanthenkodath et al., 2025). Despite of growing studies, tourist segmentation approach is merely limited to the expenditure patterns to reveal tourists' consumption. (Zopiatis & Pericleous, 2021). Meanwhile, this approach based on the combination of travel characteristic, including length of stay, expenditure, and activity ecotourism preferences determinate relevant because of these variables reflect the level of tourists' participation, economic contribution, as well as the potential impacts of conservation area, (Atsız et al., 2022; Barros & Machado, 2010; Thrane & Farstad, 2011). Furthermore, segmentation is important to identify tourists that tourism is not only for recreational and searching for fun, but also motivated to do an observation and respect the nature and culture including environmental education and social interaction with same interest (Sánchez-Torres et al., 2025).

The qualified tourist tends to have awareness of environmental conservation and culture during their travel in a conservation area and is willing to spend extra budget to receive the quality of service and experience. On the other hand, some previous studies still focus on the correlation between service quality, satisfaction, loyalty, expectation, and tourists' behaviour, without considering tourist as heterogenic (Cheunkamon et al., 2022; SHARIF ALI et al., 2025).

Regarding this gap, this study examine visitor segmentation by applying data driven in a conservation based ecotourism destination, focusing in Bromo Tengger Semeru National Park while prior studies often rely on behavioural dimensions such as personal behaviour, travel and destination characteristic as well as expenditure based segmentation that are mostly studies conducted in small island destination (Zopiatis & Pericleous, 2021; Zubir & Abas, 2025) with the findings are not relevant in the context of volcanic mountain and geological sites. This research integrates length of stay, activity preferences, and expenditure patterns to provide more comprehensive representation of tourists' heterogeneity. The finding segments contribute empirical insights into identifying potential quality tourists and understanding traveller patterns that align with conservation destination management.

Consequently, this research aims to identify the potential of tourist segmentation in supporting development quality tourism in conservation area, particularly Bromo Tengger Semeru National Park, based on motivation, expenditure, and length of stay using two-step clustering approach to identifying quality tourist. To answer this objective, this study purposes the question as following: What is tourist segments created in TNBTS based on length of stay,

tourism activity preferences, and expenditure patterns? And how are the differences of travel characteristic and tourists' consumption all across segments?

2. LITERATURE REVIEW

Ecotourism-based conservation

Ecotourism is a part of the sustainable tourism approach associated tightly with the conservation ecology activities. The objective of ecotourism does not merely offer the landscape beauty of nature but at the same time the contribution towards sustainable environment and the protection of rights having safe and clean environment (Castellanos-Verdugo et al., 2016; Uyar et al., 2025). Previous study shown that ecotourism provide the income may allocate to manage the forest and the additional revenue for communities in the conservation area, so that reduce the dependence of natural exploitation. (Tangban et al., 2025; Wardle et al., 2021). The role of ecotourism in supporting the conservation through environmental awareness and financial conservation can be effectively managed by carrying capacity and environmental mitigation (Maidullah et al., 2024; Wardle et al., 2021). Community participation is crucial including decision makers and managerial support so that ecotourism operate effectively can enhance the positive behaviour towards natural and cultural conservation in protected area (Alam & Nayak, 2025).

Beyond the community involvement, ecotourism activities offer nature-based tourism experiences and environmental education, as well as engage tourists to be mindful and responsible towards nature (Castellanos-Verdugo et al., 2016; Salman et al., 2020). This study confirmed by other empirical studies that the ecotourism experiences can increase the tourist understanding of ecological values and environmental conservation issues, along with the intention to pro-environmental behaviour (Dutha et al., 2023; Xiaoqin & Zhanhong, 2025). Ecotourism experiences through social interaction and economic benefits with local communities can boost ecotourist's more appreciative to source of income for the community and conservation efforts (Petrovska et al., 2009; Tiwari et al., 2024). Ecotourism participation is reflected by educative participation, satisfaction, and environmentally responsible behaviour that is driven by interpretation service as well as compliance between tourists' willingness to pay and income acceptance of the local community (Huynh et al., 2025; Jauro et al., 2019; Lindsey et al., 2007; Pangemanan et al., 2021). In this regard, the successful ecotourism based on conservation is highly determined by local community participation actively and ecotourism as spear of conservation management (Landra et al., 2018; Zhang & Lei, 2012).

Tourism Segmentation

The usage of segmentation theory in tourism market study and practice comprehended as strategic approach may be able reveal heterogeneities needs, preferences, travel behaviour (Dolnicar, 2007; Ramukumba et al., 2018). Segmentation combined with targeting and clear positioning is effective for marketing tourism outcomes to ensure the correlation between destination attributes with tourists' needs and preferences, thus the destination can enhance its competitive advantage and grab the right tourists (Badilla, 2021; Pyo, 2015).

The process of segmentation can be done using two approaches which are a priori segmentation (based on prior knowledge) and a posteriori (data-driven) (Dolničar, 2004). In the a priori approach, data are collected after the perception, and the characteristic of tourist are accepted. Meanwhile, data driven or a posteriori approach consists of the identifying segmentation based on empirical pattern after collecting data. Second approach assessed more superior to capture the complexity of tourists' market trends (Bigné et al., 2007; Dolničar, 2004; Vigolo, 2017). Studies of segmentation increasingly develop and adopt analytical technique like two-step clustering (Yotsawat & Srivihok, 2014), bagged clustering (Brida et al., 2014), bi-clustering (Dolnicar et al., 2012), and algorithm engine (Hayamin & Srivihok, 2018) for testing mix data and high dimension to be accurate and stable. Tourists' segmentation theory are used on ecotourism study (Samdin & Aziz, 2015), small hotel (Smith & Haughton, 2018), and urban tourism (Carvache-Franco et al., 2023).

In the tourist industry, generally segmentation of the market is determined by geographical area, socioeconomic condition, demography (age, gender, education, revenue) psychographic (life style, interest, value) and tourists' behaviour (travel frequency, spending pattern and travel motivation) (Bigné et al., 2007; Oyewole, 2010; Samdin & Aziz, 2015; Srihadi et al., 2016). Therefore, other evidence focused on motivation as a fundamental part of tourists' segmentation (Carvache-Franco et al., 2019). In the context of ecotourist, travel motivation can compile creating personal relationship and social interaction, self-improvement, escape from routine, natural explore, searching for fun and also self-esteem (Carrascosa-López et al., 2021; Carvache-Franco et al., 2021, 2024).

Push-Pull Tourist Motivation in Ecotourism

Tourist motivation can be explained by using push and pull approaches that can reveal the tourists' decision background, visitation, and the choice of activities (Said & Maryono, 2018). Push factor is closely related to internal motivation that impacted psychology of willingness (Zubir & Abas, 2025), social status (Said & Maryono, 2018), self-improvement needs or self-actualisation (Yousefi & Marzuki, 2015). While, pull factor comes from external

motivation that influenced by destination attributes (Zubir & Abas, 2025). Both push and pull factors influence each other. Length of stay, willingness to pay, revisit intention, and satisfaction are demand variables driven by interrelation between push and pull factors (Mehmetoglu, 2011; Nieves-Pavón et al., 2025; Osiako et al., 2022). In the case of ecotourists, the interplay between push and pull factors leads to mutual reinforcement such as desire for nature appreciation needs, the natural environment, and eco-friendly accommodation (Mehmetoglu, 2011; Sukrana et al., 2025), emotional relation affecting destination choices and travel motivation (Madeira et al., 2025), and behavioural response such as satisfaction, loyalty, and environmentally responsible behaviour (Choi, 2025; Obradović, 2024; Suhartanto et al., 2025). Some previous researchers examined tourists' push and pull factors in nature-based tourism in the national park and protected area (see Table 1).

Table 1. Prior studies finding push and pull factors.

Push Motives	Pull Motives	Researchers
escape from routine urban life	scenic beauty and natural landscape	(Hassell et al., 2015; Kim Lian Chan & Baum, 2007; Mutanga et al., 2017; Mzimela et al., 2025)
Nature appreciation and connection with nature	Wildlife viewing opportunities	(Choi, 2025; Hassell et al., 2015; Mzimela et al., 2025)
Relaxation and stress relief	Trails and recreational facilities	(Reihanian et al., 2015; Slabbert & Viviers, 2012)
Adventure and excitement seeking	Accessibility and infrastructure	(Biga, 2014; Dancausa et al., 2023; Hsu, Li-Chun; Chao, n.d.; Reihanian et al., 2015; Slabbert & Viviers, 2012)
Health and wellness motivations	Park management and services	(Kim et al., 2003; Mzimela et al., 2025; Suhartanto et al., 2025)
Family bonding and social interaction	Unique natural attractions and biodiversity	(Biga, 2014; Choi, 2025; Hassell et al., 2015; Mutanga et al., 2017; Reihanian et al., 2015; Said & Maryono, 2018)
Learning about nature and ecology	Educational programs and interpretation	(Mzimela et al., 2025; ŠAMBRONSKÁ et al., 2024; Sinsup & Phumsathan, 2025)
Spiritual and contemplative experiences	Park reputation and image	(Kim et al., 2003; Mutanga et al., 2017; Reihanian et al., 2015)

Tourist Expenditure and Length of Stay Determinants

The length of stay of tourists can determine how much their spending. Different studies find that the two factors depend on geography, variables, and methodology usage (BAM, 2023). Another tourism research conducted in the Canary Island, Barcelona and China shows that the length of stay can increase expenses which is strengthened by socio-demography, travel motivation and previous visit (Alba et al., 2016; Gómez-Déniz & Pérez-Rodríguez, 2021; Nicolau et al., 2018; Yang et al., 2011). However, the length of stay is not directly proportional to expenses caused by tiredness (Wang et al., 2018) and decrease quality of tourist (Thrane & Farstad, 2011), so that treated understanding against characteristic of travel as like travel group size, accommodation type and nationalities (Gedecho et al., 2023; Thrane & Farstad, 2012; Vetitnev, 2015). The relationship of length of stay and expenses is significantly influenced by factor of socio-demography such as age, revenue, education, gender, origin, visit frequency and destination attributes (BAM, 2023; Ferrer-Rosell et al., 2014; Thrane & Farstad, 2012).

Previous research conducted in the Canary Island and Nepal show that the senior tourist with high revenue and origin from faraway and spending more money during the travel due to retirement period (BAM, 2023; Thrane & Farstad, 2012; Yang et al., 2011). Meanwhile, the tourists under 15 years old tend to travel for transformation and satisfaction. (Sahoo et al., 2022). Female tourist visiting is longer than male tourist (Adongo et al., 2017; Barros & Machado, 2010; Salmasi et al., 2012). But, this finding is contradicted with the other research from (Hateftabar & Chapuis, 2020; Santos et al., 2015; Thrane, 2015). The longer visit the more the expenses increase influenced by level education due to the financial steady and higher appreciation towards tourism experiences (BAM, 2023; Gokovali et al., 2007; Neuts et al., 2013). Revisit intention and routine that is reinforced by new adventure can push expenses during the travel. (Nicolau et al., 2018; Wong & Zhao, 2016). The role of destination attributes include tourism activities such as tranquillity, landscape, weather, natural attraction and culture contribute length duration of visit and rising daily spending in the same time (Boto-García et al., 2019; Gedecho et al., 2023). So that, the conceptual understanding about various factors that impacted length of stay and tourist expenses need to identified tourist segmentation which qualified to support the development sustainable tourism (Barros & Machado, 2010; Rafiei Darani et al., 2025).

Table 2. Respondents' Demographic Characteristics.

Variable	Category	Frequency	Percentage (%)
Gender	Male	45	45.0
	Female	55	55.0
Age	20–25	40	40.0
	26–30	60	60.0

Source: Data Proceed, 2026

3. METHODS

Study Area

Bromo Tengger Semeru National Park located in East Java, is well known as volcanic landscape, unique cultural of the Tenggerese, as well as a conservation area and geological sites in Indonesia, highlighting a 10 km² sea of sand (Huda et al., 2023; Saputra et al., 2024). This park offers diverse activities, including horse riding and jeep tour, exploring the beauty of white sand (Hutahayan & Fernandes, 2024), hiking for nature appreciation and spiritual emotion, camping and sunrise viewing in Ranu Kumbolo Lake, green meadows (Prasetyaningrum, 2025). Another attraction for tourists are Entrance Wonokitri, Whispering Sand, Parking Temple, Teletubbies Hills, and Entrance Bromo Stairs (Saputra et al., 2024), bird watching in Resort Darungan as conservation for 67 species of bird (Herdiawan et al., 2020).

The park was selected for this study due to its status as super priority destination and strategic role in biodiversity conservation, cultural preservation, tourism, and local community. Studying ecotourist segmentation will contribute to improve quality of tourism in supporting the role of this park.

Research Sample

This study used a structured questionnaire, designed using Google Forms, consists of demographic details, motivation, length of stay, and expenditure guided by the push and pull model. The instrument was adapted from existing literature to improve the accuracy of measurement about ecological value in protected areas.

Data Collection

Data collection was conducted by online survey targeting domestic tourists to the Bromo Tengger Semeru National Park. Data were gathered about five weeks using snowball sampling, starting from initial respondent and expanding gradually because the access to tourist in field was limited (Nurdiani, 2014).

Data Analysis

This study used two step clustering methods that particularly applied in tourism market segmentation based on various travel motivation, demographics, and preferences (Brida et al., 2014; Yotsawat & Srivihok, 2014) due to large datasets and its flexibility of categorical data (McKim et al., 2017). Data were analysed using Two Step Clustering in two main stages. The process include pre-clustering and clustering (Nurjannah et al., 2019).

4. RESULTS AND DISCUSSION

Demographics

The finding demonstrates that from 283 domestic tourists were relatively balanced with male tourist counting 55,12% and female tourist for 44,88%. The majority of tourist is 29-44 years old counting 74,91%, and dominated by educated tourists for 75,27% (Table 3).

Table 3. Tourists Demographics.

Characteristic	n	%
Gender		
Male	156	55,12
Female	127	44,88
Age		
11 - 28 y.o	53	18,73
29 - 44 y.o	212	74,91
45 - 60 y.o	16	5,65
above 60 y.o	2	0,71
Education		
High School	29	10,25
Diploma	2	0,71
Bachelor's	213	75,27
Master	35	12,37
Doctorate	4	1,41
Total	283	100,00

Source: Data Proceed, 2025

Table 4. Tourist Motivation.

Motivation	N	%
Length of Stay		
1- 3 days	102	36,04
3 - 7 days	74	26,15
more than 7 days	107	37,81
Expenditure		
Rp 50.000 - Rp. 1.000.000	51	18,02
Rp 1.000.000 - Rp 3.000.000	90	31,80
Rp 3.000.000 - Rp. 5.000.000	99	34,98
Above Rp 5.000.000	43	15,19
The purpose of Expenditure		
Public Transportation	41	14,49
Local Food and Beverage	15	5,30
Homestay	209	73,85
Attractions	12	4,24
Hotel	3	1,06
Local Souvenir	3	1,06
Ecotourism Activities		
Horse riding	3	1,06
Camping	14	4,95
Hiking and Trekking	53	18,73
Jeep Tour	31	10,95
Sunrise Viewing	48	16,96
Ritual ceremony	1	0,35
Village tourism	129	45,58
Bird Watching	1	0,35
Tree planting	3	1,06
Travel Companion		
Solo traveler	7	2,47
Family	156	55,12
Friends	61	21,55
Colleagues	59	20,85
Total	283	100,00

Source: Data Proceed, 2025

Table 4 shows that 37,81 percentage tourist like the travel with the time frame more than 7 days and 34,98 percentage spending money as many as 3- 5 million rupiah. Majority of tourist spending more money to pay home stay amount 73,85 percentages. The majority of tourist activity is visiting the tourist village does by 45,58 percentage tourist. In the other hand, tourist most frequently travel with the family is 55,12 percentages.

Tourist Segmentation

Data was analysed with two step clustering methods by using SPSS version 24. This method consists of analysis group objects based on two stages as follows:

Pre Clustering

This phase was conducted to collect data from nine relevant variables in this study. Following automatic clustering with the Akaike's Information Criterion (AIC), the best

solution was two clusters due to the highest ratio of distance measures in two cluster levels, indicating the clearest separation between groups (Table 5).

Table 5. *Automatic Clustering dengan Akaike's Information Criterion (AIC).*

Number of Clusters	Akaike's Information Criterion (AIC)	AIC Change ^a	Ratio of AIC Changes ^b	Ratio of Distance Measures ^c
1	6125,669			
2	5466,540	-659,129	1,000	3,256
3	5334,812	-131,728	0,200	1,095
4	5223,424	-111,389	0,169	1,002
5	5112,412	-111,011	0,168	1,376
6	5059,577	-52,836	0,080	1,146
7	5026,499	-33,077	0,050	1,046
8	4999,360	-27,140	0,041	1,029
9	4975,909	-23,451	0,036	1,095
10	4963,364	-12,544	0,019	1,048
11	4956,050	-7,314	0,011	1,062
12	4955,166	-0,885	0,001	1,056
13	4959,725	4,559	-0,007	1,018
14	4965,993	6,268	-0,010	1,122
15	4982,667	16,674	-0,025	1,042

Source: Data Proceed, 2025

Hierarchical Cluster of Sub cluster

This second phase, the standard hierarchical clustering algorithm was used to examine a range of solution with the distinct numbers of clusters.

Table 6. Cluster Distribution.

	N	% of Combined	% of Total
Cluster 1	111	39,2%	39,2%
2	172	60,8%	60,8%
Combined	283	100,0%	100,0%
Total	283		100,0%

Source: Data Proceed, 2025

Based on table 6, cluster 1 counts for 39.2% of the sample, while cluster 2 show 60.8%. The clustering quality was considered as fair, with a value of 0.20 of the silhouette measure of cohesion and separation, indicates accurate and meaningful clusters, even some overlap may still exist, with certain cases falling between two clusters.

In terms of segmentation, the tourists were mainly differentiated by length of stay, tourism activities, travel expenditure, and age. On the other hand, the purpose of expenditure, origin, gender, education level, and travel companions contributed less to distinguishing the segments. Therefore, the most influential predictors in this study are likely to define the dominant characteristics of each cluster and reflect meaningful data for interpreting tourists' segmentation as mentioned in Table 7.

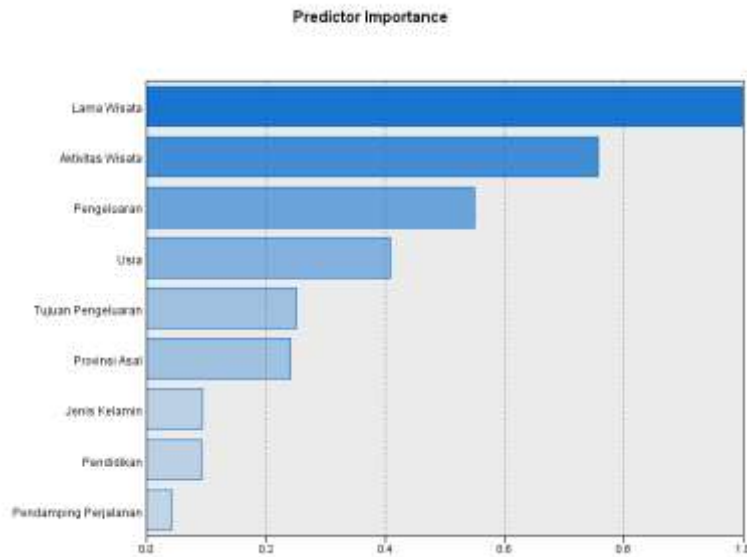


Figure 2. The results of the strongest differentiating variables.

Source: Primary Data, (2025)

Table 7. Visitor Segmentation.

Characteristic	Cluster	
	1	2
Length of Stay	1 - 3 Hari = 85,6% 3 - 7 Hari = 14,4% > 7 Hari = 0,0%	> 7 Hari = 62,2% 3 - 7 Hari = 33,7% 1 - 3 Hari = 4,1%
Tourism Activities*	Sunrise Viewing = 43,2% Jeep Tour = 27,0% Hiking dan Trekking = 12,6%	Visiting Tourism Village = 68,6% Hiking dan Trekking = 22,7% Camping = 5,2%
Expenditure*	IDR 50.000 - IDR1.000.000 = 45,9% IDR 1.000.000 - IDR 3.000.000 = 35,1% IDR 3.000.000 - IDR 5.000.000 = 15,3%	IDR 3.000.000 - IDR 5.000.000 = 47,7% IDR 1.000.000 - IDR 3.000.000 = 29,7% Diatas IDR 5.000.000 = 22,7%
Age*	29 - 44 y.o = 45,0% 11 - 28 y.o = 41,4% 45 - 60 y.o = 11,7%	29 - 44 y.o = 94,2% 11 - 28 y.o = 4,1% 45 - 60 y.o = 1,7%
The purpose of expenditure*	Home Stay = 49,5% Public Transportation = 25,2%	Home Stay = 89,5% Public Transportation = 7,6% Entertainment/natural attractions = 2,3%
Origin*	Local food and beverage = 12,6% DKI Jakarta = 38,7% Jawa Barat = 18,9% Jawa Timur = 13,5%	DKI Jakarta = 13,4% Jawa Timur = 11,6% DIY = 11,6%
Gender	Female = 59,5% Male = 40,5%	Male = 64,5% Female = 35,5%
Education*	Bachelor's = 61,3% Master = 17,1% High School = 16,2%	Bachelor's = 84,3% Master = 9,3% High School = 6,4%
Travel Companion*	Family = 54,1% Friend = 29,7% Colleagues = 13,5%	Family = 55,8% Colleagues = 25,6% Friend = 16,3%

*only the top three were selected

Source: Data Proceed, 2025

Tourists' segmentation in cluster 1 include traveler who prefer stay for 1-3 days, with their most favorite activities being sunrise viewing. They spend the costs start from IDR 50,000 – IDR 1,000,000 and the majority is 29-44 years old. Most of their expenditure is allocated to homestay as accommodation. They mainly originated from DKI Jakarta, dominated by females and have Bachelor's Degree and travel with their families. Thus, cluster 1, we labelled budget seekers. Meanwhile, cluster 2 shows tourists who prefer to stay more than 7 days for visiting village tourism as the most preferred activity. They spend about IDR 3,000,000 to IDR 5,000,000 dominated by the age of 29-44 years old. Their largest expense is homestay, mostly

come from DKI Jakarta, are predominantly male, have Bachelor's level education, and generally travel with family.

5. CONCLUSION

This research demonstrates that tourists' to Bromo Tengger Semeru National Park (TNBTS) are heterogeneously segmented into two clustering using a data-driven approach. The Two-Step Cluster analysis investigated a two-cluster solution, supported by the highest ratio of distance measures at two-cluster levels while silhouette coefficient is a fair cluster quality (0.20). Thus, the segmentation remains interpretable and relevant for tourists' behaviour, shaped by different travel purposes and conditions such as origination, socio-demographic, psychographic, and behaviour. This finding reinforces prior studies grounded by this approach, that segmentation can capture heterogeneous needs, preferences, and travel motivation (Dolnicar, 2007; Ramukumba, Moeketsi and Maseru, 2018). Another empirical finding emphasizes tourism segmentation literature is that the domestic travel pattern of the national park is shaped by trip duration, spending style, and activity preference, especially for balancing tourism with ecological protection.

Cluster 1 (n= 111; 39.2%) which we labelled "sunrise seekers" due to the pull factor such as iconic landscape, unique biodiversity, and destination image. This cluster is dominated by well-educated female travelers who have below-average spending (IDR 50.000 – IDR 1.000.000) due to the short visit, indicating their push motivations are quick getaways of hustle and bustle with budget-consciousness. Their travel characteristics can be categorised as psychocentric travellers (Soeroso, 2022). This type of tourist may generate pressure on the sunrise spot, particularly during peak hours, so carrying capacity management, visitor flow regulation, and congestion control are needed. Although a short visit, their high-volume presence may still cause crowding, transport emissions, and waste accumulation during brief, fast-paced visits. To encourage environmentally responsible practices, destination managers suggested involving public influencers to get the attention of sunrise seekers with a quick environmental campaign and comprehensive pro-environmental nudge (e.g leave no trace, waste separation points, etc.)

Cluster 2 (n= 172; 60.8%) labelling "Village Experience Seekers", they are influenced by the combination of the push-pull motivation factors. The push motivation is driven by adventurous seekers, nature appreciation, social interaction, and relaxation, while the pull motivations are recreational activities and the uniqueness of natural and cultural attributes. This type of tourist is predominantly well-educated male travellers who prefer long trips and spend

more money (IDR 3.000.000 – IDR 5.000.000) in the local community by visiting village tourism. Based on the Plog's Theory, their travel characteristics can be classified as allocentric or wanderers (Soeroso, 2022). Due to their activity preferences, length of stay, and high expenditure, they can consider as quality tourist targeted by developing village-based packages, structured environmental education programs, and locally guided thematic trails that in line with their extended presence with preservation outcomes.

Suggestion

As a tourism destination and conservation area, this segmentation gives valuable perspective, the destination managers can target the quality tourists in supporting the sustainability of the ecological landscape by regarding the clustering. These findings reveal that mostly tourists are well educated and represent the urban generation Y who are family-oriented and prefer homestays as their accommodation. This segment suggests that destination can offers tourism activities and quality of service family-friendly as well as kid-friendly. This segment suggests that environmental awareness and education can be learned by interesting experience with nature, wildlife, and conservation while spending quality time together. At the same time, both male and female travellers prefer to stay at homestay which is align with ecotourism and community based-tourism services in Bromo Tengger Semeru National Park.

On the other hand, notable differences emerge by gender, length of stay, tourism activities, and expenditure style. Table 5 show that male tourist spends more and trips longer than female counterparts which are contrary to previous studies by Adongo et al., (2017), Barros & Machado, (2010) dan Salmasi et al., (2012). However, these findings reinforce prior studies that the visit duration and length of stay are influenced not only by destination attributes but also by financial strength as well as extend the tourist segmentation literature, indicating men have more control over financial resources and are more willing to allocate to travel expenditures and product (Sahoo, Nayak and Mahalik, 2022).

This study also has managerial implications. First, destination managers should design an effective marketing campaign to grab quality tourists considering their travel characteristics and activity preferences as well as work in collaboration with travel agents and local communities to create a sustainable program in tourism packages. Second, homestay managers may develop additional products, facilities, and services aligned with family needs include elderly members and small children by fully involving local cultural values.

Policy makers should pay attention to the positioning of the destination in order to strengthen the competitive advantage of the destination, support the innovation of policy to

facilitate ecotourism industries to develop products according to the travel characteristic at national park.

REFERENCES

- Adongo, C. A., Badu-Baiden, F., & Boakye, K. A. A. (2017). The tourism experience-led length of stay hypothesis. *Journal of Outdoor Recreation and Tourism*, 18, 65–74. <https://doi.org/10.1016/j.jort.2017.02.003>
- Alam, R., & Nayak, D. (2025). Developing local support for wildlife conservation through community-based ecotourism: A study of Jim Corbett Tiger Reserve, India. *Tourism Planning & Development*, 22(2), 182–206.
- Alba, J. M. de, Prats, L., & Coromina, L. (2016). The effect of tourism expenditure on the behaviour of tourists in Barcelona. *International Journal of Business and Globalisation*, 17(3), 445. <https://doi.org/10.1504/IJBG.2016.078845>
- Armono, H. D., Rosyid, D. M., & Nuzula, N. I. (2017). Carrying capacity model applied to coastal ecotourism of Baluran National Park, Indonesia. In *IOP Conference Series: Earth and Environmental Science* (p. 012004). IOP Publishing.
- Atsız, O., Öğretmenoğlu, M., & Akova, O. (2022). A bibliometric analysis of length of stay studies in tourism. *European Journal of Tourism Research*, 31, 3101.
- Badilla, M. C. G. (2021). New approaches to market segmentation, targeting and positioning: The case of Maribojoc, Bohol, Philippines. In *Marketing tourist destinations in emerging economies* (pp. 189–210). Springer.
- BAM, N. (2023). Analysis of tourists' length of stay in Pokhara, Nepal. *Advances in Hospitality and Tourism Research*, 11(1), 28–44. <https://doi.org/10.30519/ahtr.1073732>
- Barros, C. P., & Machado, L. P. (2010). The length of stay in tourism. *Annals of Tourism Research*, 37(3), 692–706.
- Bigné, E., Gnoth, J., & Andreu, L. (2007). Advanced topics in tourism market segmentation. In *Tourism management: Analysis, behaviour, and strategy*.
- Boto-García, D., Baños-Pino, J. F., & Álvarez, A. (2019). Determinants of tourists' length of stay: A hurdle count data approach. *Journal of Travel Research*, 58(6), 977–994. <https://doi.org/10.1177/0047287518793041>
- Brida, J. G., Disegna, M., & Scuderi, R. (2014). Segmenting visitors of cultural events: The case of Christmas market. *Expert Systems with Applications*, 41(10), 4542–4553. <https://doi.org/10.1016/j.eswa.2014.01.019>
- Carrascosa-López, C., et al. (2021). Understanding motivations and segmentation in ecotourism destinations: Application to natural parks in Spanish Mediterranean area. *Sustainability*, 13(9), 4802. <https://doi.org/10.3390/su13094802>

- Carvache-Franco, M., et al. (2023). Market segmentation in urban tourism: A study in Latin America. *PLOS ONE*, 18(5), e0285138. <https://doi.org/10.1371/journal.pone.0285138>
- Carvache-Franco, M., Segarra-Oña, M., & Carrascosa-López, C. (2019). Segmentation by motivation in ecotourism: Application to protected areas in Guayas, Ecuador. *Sustainability*, 11(1), 240. <https://doi.org/10.3390/su11010240>
- Cheunkamon, E., Jomnonkwao, S., & Ratanavaraha, V. (2022). Impacts of tourist loyalty on service providers. *Journal of Quality Assurance in Hospitality & Tourism*, 23(6), 1397–1429. <https://doi.org/10.1080/1528008X.2021.1995564>
- Choi, J. (2025). From desire to action: Unpacking push–pull motivations to reveal how travel sparks eco-intentions and actions. *Behavioral Sciences*, 15(12), 1651. <https://doi.org/10.3390/bs15121651>
- Dolnicar, S. (2004). Beyond “commonsense segmentation”: A systematics of segmentation approaches in tourism. *Journal of Travel Research*, 42(3), 244–250. <https://doi.org/10.1177/0047287503258830>
- Duong, M. P. T., et al. (2024). Community-based ecotourism and the challenges of local participation. *Journal of Environmental Planning and Management*, 1–27.
- Ferrer-Rosell, B., Martínez-García, E., & Coenders, G. (2014). Package and no-frills air carriers as moderators of length of stay. *Tourism Management*, 42, 114–122. <https://doi.org/10.1016/j.tourman.2013.11.002>
- Gokovali, U., Bahar, O., & Kozak, M. (2007). Determinants of length of stay. *Tourism Management*, 28(3), 736–746. <https://doi.org/10.1016/j.tourman.2006.05.004>
- Gómez-Déniz, E., & Pérez-Rodríguez, J. V. (2021). Spending and length of stay by tourists flying to the Canary Islands. *Applied Spatial Analysis and Policy*, 14(3), 631–658. <https://doi.org/10.1007/s12061-020-09370-3>
- Kim, S. S., Lee, C. K., & Klenosky, D. B. (2003). The influence of push and pull factors at Korean national parks. *Tourism Management*, 24(2), 169–180. [https://doi.org/10.1016/S0261-5177\(02\)00059-6](https://doi.org/10.1016/S0261-5177(02)00059-6)
- Mensah, I. (2017). Benefits and challenges of community-based ecotourism. *Tourism Review International*, 21(1), 81–98.
- Mutanga, C. N., et al. (2017). Travel motivation and tourist satisfaction with wildlife tourism experiences. *Journal of Outdoor Recreation and Tourism*, 20, 1–18. <https://doi.org/10.1016/j.jort.2017.08.001>
- Nicolau, J. L., Zach, F. J., & Tussyadiah, I. P. (2018). Effects of distance and first-time visitation on tourists’ length of stay. *Journal of Hospitality & Tourism Research*, 42(7), 1023–1038. <https://doi.org/10.1177/1096348016654972>
- Obradović, S. (2024). Drivers of environmentally responsible behavior in sustainable tourism. *GeoJournal*, 89(4), 124. <https://doi.org/10.1007/s10708-024-11139-x>

- Sahoo, B. K., Nayak, R., & Mahalik, M. K. (2022). Factors affecting domestic tourism spending in India. *Annals of Tourism Research Empirical Insights*, 3(2), 100050. <https://doi.org/10.1016/j.annale.2022.100050>
- Salman, A., Jaafar, M., & Mohamad, D. (2020). A comprehensive review of ecotourism in sustainable tourism development. *e-Review of Tourism Research*, 18(2), 215–233.
- Thrane, C. (2015). Determinants of tourists' length of stay. *Tourism Economics*, 21(5), 1087–1093. <https://doi.org/10.5367/te.2014.0385>
- Wang, L., et al. (2018). Length of stay: Its determinants and outcomes. *Journal of Travel Research*, 57(4), 472–482. <https://doi.org/10.1177/0047287517700315>
- Wardle, C., et al. (2021). Ecotourism's contributions to conservation. *Journal of Ecotourism*, 20(2), 99–129.
- Yang, Y., Wong, K. K. F., & Zhang, J. (2011). Determinants of length of stay for domestic tourists. *Asia Pacific Journal of Tourism Research*, 16(6), 619–633. <https://doi.org/10.1080/10941665.2011.610144>
- Zhang, H., & Lei, S. L. (2012). A structural model of residents' intention to participate in ecotourism. *Tourism Management*, 33(4), 916–925.
- Zopiatis, A., & Pericleous, K. (2021). Profiling the package traveler. *Journal of Destination Marketing & Management*, 21, 100636.