Kresna Social Science and Humanities Research

Proceedings of the International Conference On Ummah:
Digital Innovation, Humanities And Economy (ICU: DIHEc) 2020
https://doi.org/1030874/ksshr.82

Garut Mountain business tourism mapping based on multidimensional scaling

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Abstract. Mountain tourism is potential tourism in Garut Regency. This study aims to design a perception mapping of Garut Mountain tourism based on the preferences of tourists. It applied a quantitative method with survey design and the data were collected through observation, interviews, and questionnaires. The questionnaire was distributed to 100 potential visitors who are interested in mount climbing selected with a purposive sampling method. The data were then processed with multivariate multidimensional scaling (MDS) analysis tools and SPSS software. The result shows that of compared to other four mountain tourism, Mount Papandayan has best attributes including fresh air, unique places, beautiful nature, clean environment, interesting photo spots, correct navigation, complete facilities, water source, trekking activity, family travel, road access, alertness, and transportation. Meanwhile, Mount Cikuray, Mount Guntur, and Mount Talaga Bodas only have a few advantages. This study is expected as a consideration in the management development of mount tourism as a new agenda of the local government.

ISSN 2774-3918 (online), https://ksshr.kresnanusantara.co.id. Published by Kresna Nusantara

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1. Introduction

Mount climbing is an interesting activity to refresh mind and even it becomes a hobby for many people and an achievement to be proud of [1]. Mount climbing activities becomes a more common activity as it is not only performed by nature lovers and explorers, but also by the public in general. People will be satisfied when being able to reach the top of the mountain and witness the beauty of the mountain crater from a relatively close distance.

Garut is one of the regions in Indonesia which has many mountains and four of them are very popular for climbing, namely Mount Papandayan, Mount Guntur, Mount Cikuray, and Mount Talaga Bodas. The mountain tourism had not been set as a priority tourism in this region and it was only considered as interest type tourism up to 2019. However, in early 2020, the local government gave instructions to BUMDes to be a part of the development of village tourism through village funds, and local government funds through the Culture and Tourism Office through one village one tourist attraction program [2].

The challenges of mount tourism for visitors are the required trip time which is around 1 – 2 days and required information to decide which mountain to be visited which suits their perception. Perception comes with expectations and a dynamic perception of tourists [3]. As it always changes, it is important to measure the perception regularly because tourists typically use it as a basis to assess the quality of services provided.

The objective of this study is to design a perception map that can identify the climbers' perceptions of Garut Mountain tourism. Reference [4] suggest that the MDS technique tries to represent the relationship between brands and variables on the spatial model. Therefore, it can be used to determine product position (mountain) and product requirements as a basis for market segmentation (Garut Mountain tourism).

2. Literature Review

2.1. Tourist Perception

In terms of tourist areas, evaluations on tourism quality and tourist satisfaction become a basis for tourist perceptions about their visit experiences [3]. The destination selection is strongly affected by the motives, attitudes, and perceptions of tourists [5]. Reference [6] states that tourist perceptions are affected by some factors such as historical and cultural tourism objects, destination affordability, travel environment, natural attractions, entertainment, and infrastructure. Meanwhile, referring to [7], four dimensions of tourist perceptions of Chinese tourism in Cantonese are local characteristics, captivation, functionality, and dialect understanding.

The emotional attachment of tourists to destinations positively affects their perceptions and reactions to tourism destinations [8]. These value perceptions are essential as they provide a positive effect on tourist satisfaction, environmental commitment, and responsible behavior towards the tourist environment [9].

2.2. Perception Mapping

Perception mapping is a graphical technique used by brand marketers to visually show the perception of customer or potential customers of a product category [10]. Perception mapping is typically used to find broad-minded strategies [11]. Perception mapping manages to bring up tourism clusters [12] which international tourists prefer to visit the cultural and nature-based tourism destinations offered in Indonesia.

2.3 Individual Preferences

In terms of traveling, there are active and passive tourists in determining tourist activities because of sociodemographic conditions and travel arrangements [13]. Knowing tourist preferences in traveling provides high economic benefits. Reference [14] analyze tourist perceptions of beach attractions based on the preferences of beach tourism attributes. In the modern era, tourist preferences are supported by comprehensive and integrated technology called smart tourism [15]. Individual perception and

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preference are closely related to positioning.

2.4 Positioning

Positioning is carried out by marketers in an effort to influence consumer perceptions of brands/ products that are relatively competitive which is determined by the consumer's perspective on quality, attributes, values, prices, and their image / product [16]. In tourism products, positioning can be used to map tourist destinations based on tourist perceptions [17]. Knowing the position of the tourist destination provides an opportunity for regional tourism to compete competitively whose success depends on the condition of competitiveness [18].

3. Methodology

Based on the type and tool, this research belongs to quantitative research with a descriptive explanation level. The MDS approach was used as a data analysis method to generate a visual picture of mount tourism in Garut. MDS directly shows the dimensions of assessment of respondents to closeness visualization patterns about the similarity of popular products in the perceptual mapping term.

In determining the preference attributes, interviews were conducted with 5 types of respondents including general tourists, climber tourists, tourism office officers, tourism academicians, and mount tourism management. Based on the result of interviews, there are 14 preference attributes, namely: fresh air, unique places, beautiful nature, clean environment, interesting photo spots, correct navigation, complete facilities, water source, smartphone signal, affordable price, trekking activity, family travel, camping, road access, alertness, and transportation.

The next attribute becomes the basis for developing the questionnaire. A total of 100 questionnaires were distributed to respondents using non-probability sampling namely, purposive sampling method. The population of this research is national tourists, especially climbers who have visited all objects of research (Mount Papandayan, Mount Guntur, Mount Talaga Bodas, and Mount Cikuray). The four mountains were selected because of their popularity for climbing in Garut Regency. The questionnaire was developed using the conditional rank order in which each stimulus becomes a standard of comparison in turns. Respondents were asked to sort all possible pairs of objects from the most similar to the least similar.

The collected data were analysed using a preference mapping with an internal preference mapping type. This method is based on the Multidimensional Data Preference Analysis (MDPREF) and Principal Component Analysis (PCA) performed on preference data with products in rows (observations) and costumers in columns (variables). The data were rating given by the costumers for each product. Preference mapping is biplot consisting of two dimensions (observations and variables). In MDS, the values of closeness between objects 1 and 2 of the input data are converted to a multidimensional distance of a Euclidean field where the distance between objects was calculated using the Euclidian distance measure.

Table 1 shows the profile of respondents by sex and employment. Data show that respondents are dominated by male students. It is consistent with the mount climbing trend which is mostly done by teenagers. Meanwhile, the female respondents with the entrepreneur status are quite low. It may happen because questionnaires were distributed on weekends in which students and employees enjoy their holidays, but there is a regular holiday for entrepreneurs.

Table 1. Respondent's Profile

	Gender		Total
Types of Job	**Male**	**Female**	
Students	49	12	61
Worker	20	5	25
Entrepreneur	13	1	14
Total	82	18	100

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4. Results and Discussion

To analyse the mapping position to the attribute of a unique place, it used Euclidean distance from the position of each mountain to the position of the unique place. Euclidean distance scores indicate rank, the smaller the value the higher the rank. Euclidean distance for the attributes of Garut Mountain tourism is presented in Table 2. Based on the table, it can be seen that Mount Papandayan dominates the smallest score on each attribute, for example, Fresh air (0.3439), Unique place (0.6445), Beautiful nature (1, 1363), Clean environment (1,0090), Interesting photo spots (0.6444), Correct navigation (0.6444), Complete facilities (1.0120), Water source (1.0120), Trekking activity (1.1897), Family travel (1.1897), Road access (1.0084) and transportation (1,0085).

Based on the coordinates of the points presented in Table 2, the perception mapping obtained is shown in Figure 1. The perception mapping of this study uses two dimensions which show the similarity and dissimilarity between one object and another based on the distance. Dimensions are the relationship between each group of mountain similarities with the mountain attributes based on the perception of the climber respondents.

Table 2. Euclidean distance of Garut Mountain toward attribute.

Attribute	Mt. Papandayan	Mt. Cikuray	Mt. Guntur	Mt. Talaga Bodas
Fresh air	0,3439	1,3465	2,2121	3,9396
Unique place	0,6445	2,8977	2,1448	3,2147
Beautiful nature	1,1363	2,6296	2,5837	3,8571
Clean environment	1,0090	3,8001	1,9979	2,2562
Interesting photo spots	0,6444	2,8978	2,1451	3,2149
Correct navigation	0,6444	2,8978	2,1451	3,2149
Complete facilities	1,0120	3,8016	1,9973	2,2535
Water source	1,0120	3,8016	1,9973	2,2535
Smartphone signal	1,7602	3,3241	1,0428	1,6184
Affordable price	3,7224	2,4673	1,2982	2,7016
Trekking activity	1,1897	4,1056	2,2108	2,2167
Family travel	1,1897	4,1056	2,2108	2,2167
Camping	1,6969	2,4230	0,9345	2,4251
Road access	1,0084	3,7999	1,9982	2,2568
Alertness	1,6966	2,4232	0,9347	2,4251
Transportation	1,0085	3,7992	1,9974	2,2565

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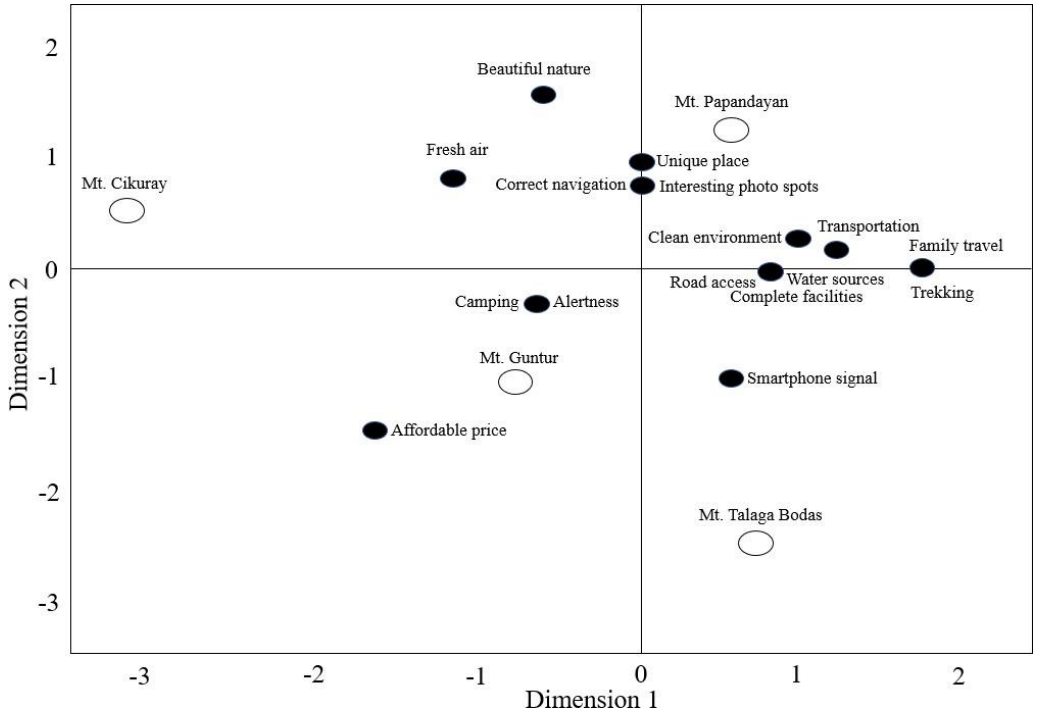

Figure 1. Perceptual map of Garut Mountain.

The analysis was performed using the Euclidean distance position formula of each mountain object towards related attributes. Based on the principle of the closer the Euclidean distance to the related object, the better the mountain object based on that attribute. Based on Figure 1, the position of Mount Papandayan is close to most of the attributes stated earlier. Mount Guntur has a higher position on camping, alertness, and affordable price attributes. Meanwhile, Mount Talaga Bodas and Mount Cikuray do not show a dominant advantage. The general position of the mountain based on the overall attributes can be seen in Table 3.

Table 3. Mount position based on overall attribute.

Attribute	Mt. Papandayan	Mt. Cikuray	Mt. Guntur	Mt. Talaga Bodas
Fresh air	1	2	3	4
Unique place	1	3	2	4
Beautiful nature	1	3	2	4
Clean environment	1	4	2	3
Interesting photo spots	1	3	2	4
Correct navigation	1	3	2	4
Complete facilities	1	4	2	3
Water source	1	4	2	3
Smartphone signal	3	4	1	2
Affordable price	4	2	1	3
Trekking activity	1	4	2	3
Family travel	1	4	2	3
Camping	2	3	1	4
Road access	1	4	2	3
Alertness	2	3	1	4
Transportation	1	4	2	3

Table 3 can be input for mountain tourism management in which they are suggested to pay attention

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and improve the position of mountain tourism which is still considered low compared to the competitors. For the management of Mount Papandayan, prices are considered the weakest. Currently, Mount Papandayan tourism is managed by PT. AIL and tourists often protest this tourism due to its continuous raising price of the ticket as discussed in [19]:

Based on the type and tool, this research belongs to quantitative research with a descriptive explanation level. The MDS approach was used as a data analysis method to generate a visual picture of mount tourism in Garut. MDS directly shows the dimensions of assessment of respondents to closeness visualization patterns about the similarity of popular products in the perceptual mapping term.

"Some climbers cancel their plan to climb Mount Papandayan after knowing the raising price of the tickets on holidays. They prefer to select Mount Cikuray or Mount Guntur which are still relatively affordable. News on the increasing price of the ticket to Mount Papandayan has been discussed for a long time, both among climbers and business actors in Papandayan. Generally, business actors are worried that the increasing price of the ticket to Mount Papandayan will significantly affect the number of visitors. It also burdens the mount climbing service providers in Mount Papandayan, especially those who have set a climbing agenda before the official increase."

Meanwhile, the result of the triangulation of PT. AIL shows that the expensive ticket is in accordance with facilities enjoyed by tourists. The more visitors on holidays, the more waste, thus the waste collection throughout the areas requires higher costs.

Next is Mount Cikuray. Table 3 shows that a clean environment, complete facilities, water sources, hiking activities, family travel, smartphone signals, road access, and transportation are considered inadequate by tourists and need to be considered tourism management. Even though the Google Review score [20] of 4.4 is quite good, there are some negative comments from climbers regarding their experience on Mount Cikuray:

Agustina Hanna account says:

“Beautiful mountain with a beautiful view, unfortunately, some hikers couldn't keep it nice and clean. If you are new to hiking, this mountain will surely challenge your stamina right from the start. "

Dubble Deans account says:

"The track to Mount Cikuray 2821 masl via Pemancar is quite draining because of its continuous climbs. Even, when it rains it will be harder and longer to get to the top ... "

Gun Saputro account says:

"This mountain spoiled our eyes with the beauty of its natural view. However, the cleanliness of the mountain must be maintained in order to preserve nature."

Even though Mount Guntur does not have many advantages to be offered, respondents consider that this mountain does not have prominent weaknesses. Different from Mount Talaga Bodas, out of four mountains, this mountain is officially promoted by the Garut Tourism Office as the top ten leading tourism in this region, but this is different from the respondents’ perception. Taman Talaga Bodas tourism park has low scores for almost all attributes such as fresh air, unique places, beautiful nature, interesting photo spots, correct navigation, camping, and alertness. A review from an [21] about Mount Talaga Bodas can be seen below:

"Hopefully, this place can get more attention from the local government in the future. It's a shame because the location is good, it's well known, but it has poor road access.”

The observation result shows that it is rare for climbers to camp on this mountain due to its safety

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factor as many wild animals roam the camping area at night. In terms of natural beauty, Mount Talaga Bodas has similarities with the White Crater which is more popular and has better road access. Therefore, tourists visiting this mountain probably will compare it with the White Crater. Thus, negative reviews become significant regarding several the attributes mentioned earlier. @ayodolan account wrote a review about it [22]:

"Talaga Bodas is a tourist destination in Garut which has a beautiful view of white-green sulfur craters. This reminds us of White Crater Ciwidey in Bandung which has similar characteristics. Maybe Talaga Bodas and Kawah Putih Ciwidey are twins."

5. Conclusions

Based on the result of data analysis, it can be concluded that Mount Papandayan has the highest attributes compared to others. The detailed positioning map shows that Mount Papandayan has the highest attributes of fresh air, unique places, beautiful nature, clean environment, interesting photo spots, correct navigation, complete facilities, water source, trekking activity, family travel, road access, alertness, and transportation. Meanwhile, the highest attributes of signal, most affordable price, camping, and alertness are possessed by Mount Guntur. Mount Cikuray gets the lowest position in the attributes of a clean environment, complete facilities, water sources, signal, tracking, family tourism, alertness, and transportation. Last, Mount Talaga Bodas gets the lowest position in

the attributes of fresh air, unique place, clean environment, interesting photo spots, correct navigation, camping, and alertness.

6. Recommendation

This research is limited to the type of mountain which is suitable for climbing. Meanwhile, Garut still has many other types of mountains for example based on the interest of tourists in visiting the mountain, such as religious tourist attraction, family tourist attraction, volcano, agricultural mountain, educational tourism mountain, nature reserve, etc.

The weakness of measuring perceptions using MDS or multidimensional analysis is that it is available in many dimensions. However, MDS can only be displayed in two dimensions. Future research can adopt the iconic game technique in interpreting multiple dimensions [23].

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ISSN 2774-3918 (online), https://ksshr.kresnanusantara.co.id. Published by Kresna Nusantara

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