Visitor perspectives and satisfaction index towards ecotourism potential in the Leang-Leang Prehistoric Park, Bantimurung Bulusaraung National Park

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Abstract. The Leang-Leang prehistoric park is one of four leading destinations in Bantimurung Bulusaraung National Park, however, the evaluation of visitor perspectives and satisfaction index in this site were still limited. This study aimed to analyze the importance-performance analysis based on visitor perspectives and to assess visitor satisfaction index in the Leang-Leang destination. Fifty people selected through convenience sampling method were involved as respondents. Consumer perspective assessment was focused on 33 ecotourism potential subcomponents and the scoring method referred to Likert scale, prior to group into the IPA matrix/Cartesian diagram. The visitor satisfaction assessment was calculated based on the formula of customer satisfaction index. The result showed that there were 7 ecotourism potential subcomponents that need to be prioritized by managerial team, i.e local cultural arts, guide and interpreter, public lavatory, garbage dump, rest area, security facility (tourist police) and shopping facility. Flora attraction, panorama, specific attraction, historical heritage, hospitality of local people, the easiness access to locations, the easiness access to get information about the distance from the nearest city, brochures, maps or other directions, clean water availability, service, care and skill of human resource had been already in the good condition, so keep up the good work. Fauna attraction, local traditions and customs, festival, carvings and crafts, local food, homestay, hotel, camping ground, the easiness access to get transportation, telephone, faximile or internet and health facility were included in low priority subcomponents. Moreover, cultural landscape, local people daily life and transportation costs were categorized as possible overkill subcomponent. The score of visitor satisfaction index was 55.57 and categorized as a moderate satisfaction level.

1. Introduction
The increase of a healthy lifestyle in our society increases the preference of ecotourism rather than other tourism industry [1]. Ecotourism contributed up to 11.4% of all current society spending [2]. Compared to other tourism industry, ecotourism is the tourism industry with fastest growth rates in worldwide level [3], especially in Asia-Pacific region [4]. National park is one of popular ecotourism in Indonesia [5]. National park is the most developed protected area in Indonesia compared to other categories of protected area such as nature reserve, wildlife sanctuary, nature recreation park, grand forest park, and hunting park [6]. One of favorite national park in Indonesia is Bantimurung Bulusaraung National Park (BBNP). Based on the number of visitors, BBNP is selected as the top five
national park in Indonesia [5]. There are various ecotourism destinations in BBNP offering beautiful landscape of karst ecosystem, such as Bantimurung, Leang-Leang, Helena sky bridge, Pattunuang Asue, Goa Kalibbong Aloa, Karaenta and Bulusaraung.

In addition to the karst ecosystem, the Leang-Leang was one of ecotourism sites that offer the prehistoric tourist experience. The name of Leang was derived from the local tongue with the meaning of the cave. There are two caves promoted in the Leang-Leang prehistoric park, i.e Leang Petta Kere and Leang Pettae that located near each other. The Leang-Leang is managed by three institutions, namely the BBNP Team, Maros Tourism and Culture Office (MTCO), South Sulawesi Cultural Heritage Preservation Center (SSCHPC). The BBNP Team, MTCO, SSCHPC are responsible for monitoring the conservation area sustainability, the visitor management, and the prehistoric site management, respectively. All of these managerial team should formulate several actions in order to achieve the harmony between natural conservation and economical profits for the sustainability of ecotourism business [7].

The major component of ecotourism management is visitor [8]. Visitor is not only determine economical income of ecotourism business, but also influence the environmental sustainability of ecotourism site. If there is no management strategy, the high number of visitors potentially damage the natural resources in ecotourism site.

The managerial team should pay attention to the visitor perspectives and satisfaction index. The visitor perspectives can be used to map the importance, performance and their gap in ecotourism attributes. It is important during the formulation of development strategies. In addition, the visitor satisfaction index is also useful instrument to quantify the satisfaction level of customer to the entire package of ecotourism. Previous study related to the visitor perspective have been conducted worldwide, i.e in Bako national park of Malaysia [9] and Madhav national park of India [10]. However, there is still lack of report related to the similar research at domestic level, especially in the Leang-Leang prehistoric park. Therefore, this study was aimed to evaluate the importance-performance analysis based on visitor perspectives and also to assess visitor satisfaction index in Leang-Leang prehistoric park.

2. Method

2.1 Research and Study site

This study site was the Leang-Leang prehistoric park of BBNP (Figure 1) located in Maros District (50 km away from Hasanuddin International Airport or 60 minutes of drive away by the private car), South Sulawesi Province, Indonesia. The number of visitors in the Leang-Leang prehistoric park was around 8% compared to the entire destinations in the BBNP.

Survey method was used to collect the data from selected respondents during September 2018. The respondent was directly interviewed on the spot and there was a questionnaire used for reference. A number of selected respondents were 50 people. Respondent was the representative of the visitor population who went to this destination. The population of respondents was selected through non-probability sampling from the actual visitors who were found during survey time, so that it was also called as convenience sampling [11-12].
2.2 Data collection
Visitor perspectives collected in present experiment referred to previous study by [13] that comprised of 7 components, i.e. natural attraction, cultural attraction, accommodation, accessibility and transportation, tourism information, public facility and human resource. Natural attraction (A) component was consisted of flora attraction (A1), fauna attraction (A2), panorama (A3), and specific attraction (A4) subcomponents. Cultural attraction (B) was consisted of local cultural arts (B1), local traditions and customs (B2), festival (B3), historical heritage (B4), carvings and crafts (B5), cultural landscape (B6), local food (B7), local people daily life (B8), and local hospitality (B9) subcomponents. Accommodation (C) component was comprised of several subcomponents, i.e homestay (C1), hotel (C2), and camping ground (C3). For accessibility and transportation (D) components, there were several subcomponents such as the easiness access to location (D1), the easiness access to get transportation (D2), the easiness access to get information about the distance from the nearest city (D3) and transportation cost (D4). The subcomponents of tourism information (E) were guide and interpreter (E1), and brochures, maps or other directions (E2). Public facility (F) component was comprised of 8 subcomponents, i.e public lavatory (F1), garbage dump (F2), rest area (F3), telephone, faximile or internet (F4), health facility (F5), security facility (F6), shopping facility (F7) and clean water availability (F8). The last component was human resource (G) that consisted of several subcomponents such as service (G1), care (G2) and skill (G3).

Respondents were asked to determine their assessment on a performance or importance of each subcomponent. The scoring for each subcomponent was followed the Likert scale. This scale was invented by Rensis Likert and it can be used to scale the response in survey research. This scale was comprised of 5 responses, such as 1 point for very bad, 2 points for bad, 3 points for moderate, 4 points for good and 5 points for very good response [14].

2.2 Data analysis
The obtained score was tabulated and then further processed by the importance-performance analysis (IPA), as showed below [15-16].
1. To calculate the mean value of importance and performance rate for every component using following formula:

\[
\overline{X_i} = \frac{\sum_{i=1}^{k} X_i}{n}
\]

\[
\overline{Y_i} = \frac{\sum_{i=1}^{k} Y_i}{n}
\]

Notes:

\(\overline{X_i}\) = The mean value of performance rate of the -i

\(\overline{Y_i}\) = The mean value of importance rate of the -i,

n = The number of respondents

2. To calculate the mean value of importance and performance rate for the entire component using following formula:

\[
\overline{X_i} = \frac{\sum_{i=1}^{k} \overline{X_i}}{n}
\]

\[
\overline{Y_i} = \frac{\sum_{i=1}^{k} \overline{Y_i}}{n}
\]

Notes:

\(\overline{X_i}\) = The mean value of performance rate of the -i

\(\overline{Y_i}\) = The mean value of importance rate of the -i

n = The number of components

The IPA result was plotted into the Cartesian diagram or IPA matrix (Figure 2) that consisted of four quadrants in order to show the difference of management strategy need [15]. Any observed subcomponents with a high importance rate but a low performance rate was plotted in the first quadrant with a management concept of ‘concentrate here’. Subcomponent with a high importance and performance rate were grouped in the second quadrant with a proper management concept of ‘keep up the good work’. In opposite, subcomponent with a low rate of both importance and performance were plotted in the third quadrant with a proper management concept of ‘low priority’. Any subcomponent with a high performance rate but a low importance rate were grouped the fourth quadrant with a proper management concept of ‘possible overkill’.
The second applied data analysis method was Customer Satisfaction Index (CSI) that calculated by several steps as below [17].

1. To calculate the Mean Importance Score (MIS) that originated from the average of importance value from every customer by using following formula

\[ MIS = \frac{\sum_{i=1}^{n} Y_i}{n} \]

Notes:
- \( n \) = the number of customer
- \( Y_i \) = The importance value of \( Y \) subcomponent of the-i

2. To calculate Weight Factors (WF) that originated from the percentage of MIS by using following formula.

\[ WF = \frac{MIS_i}{\sum_{i=1}^{p} MIS_i} \times 100\% \]

Notes:
- \( p \) = the number of importance rate of the-p
- \( MIS_i \) = The mean importance score of the-i

3. To calculate Weight Score (WS) that originated from the percentage of WF times to the average of X (Mean Satisfaction Score = MSS) by using following formula.

\[ WSi = WF_i \times MSS \]

4. To calculate CSI by using following formula.

\[ CSI = \frac{\sum_{i=1}^{p} WSi}{HS} \times 100\% \]

Notes:
- \( p \) = the number of importance rate of the-p
- \( HS \) = The highest scale of the-p

The interpretation of the obtained CSI value referred to previous study by [18] in Cangkuang tourism object (West Java), as showed in Table 1.
Table 1 The classification of Customer Satisfaction Index (CSI) [18]

| The range of CSI value | CSI Level   |
|------------------------|------------|
| 0.81-1.00              | Very good  |
| 0.66-0.80              | Good       |
| 0.51-0.65              | Moderate   |
| 0.35-0.50              | Bad        |
| 0.00-0.34              | Very bad   |

3. Results and Discussion

3.1 Characteristics of respondent
A number of visitors selected to be respondents in this study. The characteristic of respondents in the Leang-Leang prehistoric park of BBNP was showed in Figure 3. Among 50 respondents, there were 52% male and 48% female. Respondents in this ecotourism were dominated by young people, i.e. under 17 years old for about 4%, in range of 18-28 years old for about 54%, in range of 29-39 years old for about 26%, in range of 40-50 for about 12%, and > 50 years old for about 4%. Based on the domicile, respondents originated from Makassar was the highest number (36%) and followed by out of Makassar (26%), out of Sulawesi (24%), Maros (8%) and overseas (6%). In term of visiting number, there were 58% respondents that claimed to have no experience before, 16% respondents with 2 visiting experiences, 10% respondent with 3 visiting experiences, 4% respondents with 4 visiting experiences and the rest for about 12% with more than 4 visiting experiences. Most of the respondents who went to this ecotourism claimed to have main purpose (70%) rather than just only transit purpose (30%).
3.2 Characteristics of the Leang-Leang prehistoric park as tourism area

The main tourist attractions in the Leang-Leang was a prehistoric cave. The characteristics of the Leang-Leang prehistoric caves referred to previous report by the managerial team of Bantimurung Bulusaraung National Park that had been measured and assessed the potential of the cave for the need of site design [19]. There were two kind of caves namely Leang Pettae and Leang Pettakere. Leang Pettae was the type of fossil cave, with a narrow cave ceiling and a lack of travertine processes inside the cave cavity. This is west facing cave with a door measuring up to 8 meters in height and 12 meters in width. The archaeological potential of this cave was the presence of a painting of a jumping deer pig and 3 palms in various positions, either upright or tilted (Figure 4a). The painting was located in the central ceiling. In addition to paintings, there was also stone artifacts (microlites) scattered in the courtyard of the cave and kitchen waste disposal in the form of shells deposited on the side of the cave door.

Leang Pettakere was located in 300 meters east of Leang Pettae. In this cave, there was a wall painting depicted a deer pig and 28 palms made from unknown red coloured substance. The palms scattered on the cave ceiling, i.e 4 palms in an upright position, 8 palms in tilted position and 16 palms in collapsed position (Figure 4b). Other findings in this cave are microlite stone tools including arrowheads with jagged sides and kitchen waste in the form of shells. Stone tools and shell are scattered in the field under the court of the cave. Another finding in this site was the skull without the body skeleton. This finding was obtained in 1978 when the Makassar Archaeological Heritage Conservation Center carried out an excavation activity during the development of iron made staircase leading to the cave door.

In addition to cave observations, another interesting attraction was the pedestrian among the karst rocks that formed a stunning landscape (Figure 5). In addition, tourists were also treated with spectacular views of karst forests and karst cliffs. This pedestrian line was up to ± 500 m long and connected the northern area of Leang Pettae and Leang Pettakere. The pedestrian path was 1 m in width. The path as made from the concrete cement. There was a river that crossed in the middle of the path. In addition, there were also several shelters, information boards, interpretation boards, and warning boards along the path. This destination was also equipped with the main gates, ticketing box office, parking areas and information houses.
3.3 The assessment of ecotourism potential subcomponent

The average value of performance and importance of all observed ecotourism potential subcomponent based on Likert scale were showed in Table 2. In term of natural attraction component, the average value of performance and importance from 4 subcomponents was 3.28 (moderate performance) and 4.47 (good importance), respectively. For cultural attraction, the performance was generally bad (2.5) while the importance was good (4.13). Similar visitor perspectives were found in term of accommodation, i.e bad performance (1.86) and good importance (3.76). Visitor perspective on accessibility and transportation in Leang-Leang prehistoric park was categorized as moderate performance (3.47) while the importance was good (4.45) based on Likert scale. The performance of tourism information component was moderate (2.77), and this component was assessed as very good importance (4.55) by visitor. In term of public facility, the performance was still bad (2.21) while this component was categorized as good importance (4.49). In term of human resource, the average value of performance and importance from 3 subcomponents was 3.59 (good performance) and 4.59 (very good importance), respectively.

Table 2

| No | Ecotourism potential subcomponent                        | The average value of performance | The average value of importance |
|----|----------------------------------------------------------|----------------------------------|--------------------------------|
| (A)| Natural attraction                                      |                                  |                                |
| (A1)| Flora attraction                                        | 3.70                            | 4.56                           |
| (A2)| Fauna attraction                                        | 2.30                            | 4.12                           |
| (A3)| Panorama                                                | 3.82                            | 4.66                           |
| (A4)| Specific attraction                                     | 3.30                            | 4.54                           |
| (B)| Cultural attraction                                     |                                  |                                |
| (B1)| Local cultural arts                                     | 1.50                            | 4.34                           |
| (B2)| Local traditions and customs                            | 1.54                            | 3.64                           |
| (B3)| Festival                                                | 1.32                            | 3.50                           |
| (B4)| Historical heritage                                    | 4.40                            | 4.70                           |
| (B5)| Carvings and crafts                                     | 2.38                            | 3.78                           |
All obtained Likert score from Table 2 were used to form IPA matrix or Cartesian diagram. All ecotourism potential subcomponents were placed into IPA matrix. To divide the IPA matrix to be four quadrants, there were 2 center lines, i.e. center line for performance value (2.73) and importance ones (4.33). The final result with scattered subcomponents were showed in Figure 6.
The first quadrant was consisted of several subcomponent such as local cultural arts, guide and interpreter, public lavatory, garbage dump, rest area, security facility (tourist police) and shopping facility. Any subcomponent in the first quadrant should be managed by a suitable management concept, i.e ‘concentrate here’. The high concentration should be paid by managerial team, since these subcomponents assessed as a good importance but the present performance was still low.

There were several ecotourism potential subcomponent that plotted in the second quadrant such as flora attraction, panorama, specific attraction (waterfall, bathing, cave railing, etc), historical heritage, hospitality of local people, the easiness access to locations, the easiness access to get information about the distance from the nearest city, brochures, maps or other directions, clean water availability, service, care and skill of human resource. All of subcomponent in this quadrant had not only a good importance but also good performance also, so this good work should be maintained (keep up the good work).

Ecotourism potential subcomponent that plotted in third quadrant were fauna attraction, local traditions and customs, festival, carvings and crafts, local food, homestay, hotel, camping ground, the easiness access to get transportation, telephone, faximile or internet and health facility (the easiness access to intensive care unit). Based on visitor perspectives, all subcomponents in this quadrant was categorized as a low importance and a low performance, so the suitable management concept was a ‘low priority’ concept.

There were 3 ecotourism potential subcomponents that placed in the fourth quadrant, i.e cultural landscape, local people daily life and transportation costs. All subcomponents in this quadrant indicated that their importance was low, however the performance was good. The managerial team should not to develop more these subcomponents because off ‘possible overkill’ management concept.

3.4 Customer satisfaction index
The score of CSI based on the visitor perspective found in the Leang-Leang prehistoric park was 55.57%. Based on [18], this result was categorized as ‘moderate’ level within range 0.51-0.65. The managerial team of the Leang-Leang should be improved the performance of the ecotourism potential subcomponent in order to satisfy the visitors. Similar study conducted in Pasirmukti Tourism Park also showed the moderate CSI score, i.e 65.38% [20].
4. Conclusion
The Leang-Leang prehistoric park was one of leading destination in Bantimurung Bal ASAung National Park. There were two caves namely Leang Pettae and Leang Pettakere contained a prehistoric painting depicted deer-pigs and palms either in ceiling or wall. Other attractive objects were microlite stone, shell, skull and pedestrian path crossing the karst forests and karst cliffs. Based on the visitor perspectives, there were 7 ecotourism potential subcomponents that need to be prioritized by the managerial team, i.e. local cultural arts, guide and interpreter, public lavatory, garbage dump, rest area, security facility (tourist police) and shopping facility. The score of customer satisfaction index was 55.57 or moderate level of satisfaction.

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