TEKNIKA: JURNAL SAINS DAN TEKNOLOGI

Homepage jurnal: http://jurnal.untirta.ac.id/index.php/ju-tek/

# Analysis of tourism carrying capacity at KSPP Tanjung Lesung as part of sustainable marine tourism development

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ARTICLE INFO

*Article history:*
Submitted 7 September 2023
Received 9 September 2023
Received in revised form 10 October 2023
Accepted 12 November 2023
Available online on 30 November 2023

*Keywords:*
Tourism carrying capacity, KSPP Tanjung Lesung, marine tourism, degree of coupling coordination.

*Kata kunci:*
Daya dukung wisata, KSPP Tanjung Lesung, wisata bahari, tingkat hubungan koordinasi.

ABSTRACT

Marine tourism is one of the tourism sectors with significant potential for development in the province of Banten. However, the development of this sector must be carried out with consideration for the principles of sustainable development. In the context of marine tourism, the assessment of tourism carrying capacity becomes crucial as marine tourist attractions are prone to environmental damage and social issues. Tourism carrying capacity assessment (TCCA) is one approach that can be used to evaluate how many tourists visits a destination can handle without harming the environment or reducing the quality of the tourist experience. TCCA analysis is conducted by considering aspects such as economic facilities, socio-cultural, and ecological environment. This research aims to assess the tourism carrying capacity at Tanjung Lesung Tourism Special Economic Zone as part of sustainable marine tourism development, based on which supporting aspects need to be developed and to determine the coupling coordination among these three aspects. The aspect that needs development is the ecological environmental aspect with a performance level of 8.79%. Meanwhile, the lowest degree of coordination relationship among systems that needs improvement is the relationship between socio-cultural and ecological environmental aspects, with a degree value of 0.64899.

ABSTRAK

Pariwisata bahari merupakan salah satu sektor yang memiliki potensi besar yang dapat dikembangkan di Provinsi Banten. Namun, pengembangan sektor ini harus dilakukan dengan memperhatikan prinsip-prinsip pembangunan berkelanjutan. Dalam konteks pariwisata bahari, penilaian kapasitas daya dukung wisata menjadi sangat penting karena objek wisata bahari cenderung rentan terhadap kerusakan lingkungan serta masalah sosial. Penilaian daya dukung wisata (DDW) merupakan salah satu pendekatan yang dapat digunakan mengevaluasi seberapa banyak kunjungan wisata yang dapat ditangani oleh suatu destinasi wisata tanpa merusak lingkungan atau mengurangi kualitas pengalaman wisatawan. Analisis DDW dilakukan dengan mempertimbangkan aspek-aspek seperti fasilitas ekonomi, sosial budaya dan lingkungan ekologi. Penelitian ini bertujuan untuk menilai daya dukung wisata di KSPP Tanjung Lesung sebagai bagian dari pengembangan pariwisata bahari yang berkelanjutan berdasarkan aspek pendukung wisata mana yang perlu dikembangkan serta mengetahui hubungan koordinasi antar ketiga aspek tersebut. Aspek yang perlu dikembangkan adalah aspek ekologi lingkungan dengan performa level sebesar 8,79%. Sedangkan derajat hubungan koordinasi antar sistem paling rendah dan perlu diperbaiki adalah hubungan antara sosial budaya dengan ekologi lingkungan dengan nilai derajatnya sebesar 0,64899.

Available online at http://dx.doi.org/10.36055/tjst.v19i2.21941

## 1. Introduction

The province of Banten is a land area located at the western tip of Java Island surrounded by the Java Sea, Sunda Strait, and the Indian Ocean. The maritime area of Banten province covers 11,500 $km^2$, with a coastline length of 499.62 km. This makes Banten rich in natural resources and tourism potential. The tourism sector is one of the industries with significant potential to boost national and regional income. Therefore, efforts are needed for tourism development in Indonesia [1]. The suboptimal development of tourism is one of the constraints to the advancement of the tourism industry, both in Banten Province and Serang Regency. To stimulate the growth of the tourism industry in Banten Province, the local government has issued Regional Regulation No. 6 of 2019 concerning the Master Plan for Tourism Development in Banten Province for the period 2018–2025, in which one of the strategic development areas is the strategic tourism area [2]. The Banten government is attempting to develop the maritime tourism sector that regulated by the Banten Provincial Regulation No. 6 of 2019 concerning the Master Plan for Tourism Development in Banten Province for the period 2018–2025. One crucial point in this regional regulation is the establishment of the Banten Province Strategic Tourism Area, including KSPP Tanjung Lesung, which is expected to contribute to the tourism sector's contribution to the Regional Gross Domestic Product (PDRB) reaching 3.19% by 2025. This is one of the government's programs to increase the number of tourists, prioritizing tourism development in 10 locations, including tourism in Banten Province [1]. Additionally, the goal of developing KSPP is to attract investors, both domestically and internationally, in efforts to boost the regional economy. The Central Statistics Agency predicts that all economic growth in 2022 will experience an increase [3]. This is based on the evidence that maritime tourism has the potential to drive economic growth through its contribution to national income in various countries [4]. Several analyses required by investors include economic and capital market analysis, industry analysis, and company analysis [5].

In recent years, KSPP Tanjung Lesung has experienced a significant increase in tourist visits and substantial infrastructure development. If not managed properly, this development may lead to complex issues in the future. Excessive tourism development can have negative impacts on the local environment, resources, socio-cultural aspects, and regional resilience. Some social issues, such as overcrowding, environmental degradation, traffic congestion, decreased quality of life, and cultural damage, are currently a serious concern for environmental and tourism observers. These problems are defined as 'over-tourism,' indicating that the level of tourism development exceeds the maximum limits [6]. Tourism is the pinnacle of the environmental and industrial chain and has significant potential to drive economic development in both tourist destinations and the areas hosting these attractions [7]. However, the effects of industrial expansion have generated a range of issues, necessitating an alternative, environmentally friendly, and holistic approach to address the potential social problems arising from these efforts [8].

The assessment of tourism carrying capacity can be a solution in the effort to develop sustainable maritime tourism in KSPP Tanjung Lesung. This is because the assessment of tourism carrying capacity can help in various ways, such as minimizing negative impacts on the environment. By evaluating tourism carrying capacity, the maximum number of visitors that can be tolerated by a tourism destination without harming the environment and natural resources can be determined [9]. Tourism carrying capacity can enhance the quality of the visitor experience by ensuring that the destination is not overly crowded. A positive visitor experience can increase satisfaction and encourage visitors to return to the destination in the future, as well as recommend the destination to others [10]. Knowing the limits of tourism carrying capacity ensures that the destination remains economically sustainable in the long term [11]. Maritime tourism destinations often feature natural beauty as their main attraction [12]. Therefore, the assessment of tourism carrying capacity is crucial to preserve the availability of natural resources needed for long-term tourism development [13]. In this research, tourism carrying capacity focuses on three supporting aspects of tourism: Economic Facilities, Socio-Cultural, and Ecological Environment at KSPP Tanjung Lesung. Thus, the goal of this research is to assess the tourism carrying capacity at KSPP Tanjung Lesung as part of sustainable maritime tourism development based on which supporting aspects need to be developed and to determine the coordination relationships among these three aspects.

Several previous studies have been conducted to analyze tourism carrying capacity. The study [14] titled "Analisis Daya Dukung Kawasan Wisata Pantai Sebanjar Kabupaten Alor dalam Mendukung Pariwisata yang Berkelanjutan" calculated the tourism carrying capacity in the Sebanjar Beach Area of Alor Regency, East Nusa Tenggara Province. The analysis results showed that the Sebanjar Beach Tourism Area has not exceeded its capacity. Another study [15] titled " Analisis Daya Dukung Lingkungan Wisata Alam Coban Talun, Kota Batu" calculated the tourism carrying capacity to increase visitors from 210 to 250 per day. A study [16] titled "Research on Tourism Carrying Capacity and the Coupling Coordination Relationships between Its Influencing Factors: A Case Study of China" calculated tourism carrying capacity based on Economic Facilities, Socio-Cultural, and Environmental Ecology aspects. The analysis revealed a lack of connection between Economic Facilities and Environmental Ecology, indicating a need for development. From various previous studies, there are different models and approaches in assessing tourism carrying capacity that serve as references for developing the concept of tourism carrying capacity assessment. The novelty in this research lies in using a more integrated and holistic method of tourism carrying capacity assessment by combining the method of tourist reception capacity with the analysis of economic facilities, socio-cultural, and environmental ecology in the context of developing sustainable maritime tourism in KSPP Tanjung Lesung, Banten Province.

## 2. Methodology

This research employs a case study method with the Tourism Carrying Capacity (TCC) analysis approach, first developed by WTO/UNEP in 1992 [17], conducted at KSPP Tanjung Lesung in Pandeglang Regency. The research location is focused on three maritime tourist attractions in the area (Tanjung Lesung Beach, Bodur Beach, and Umang Island).

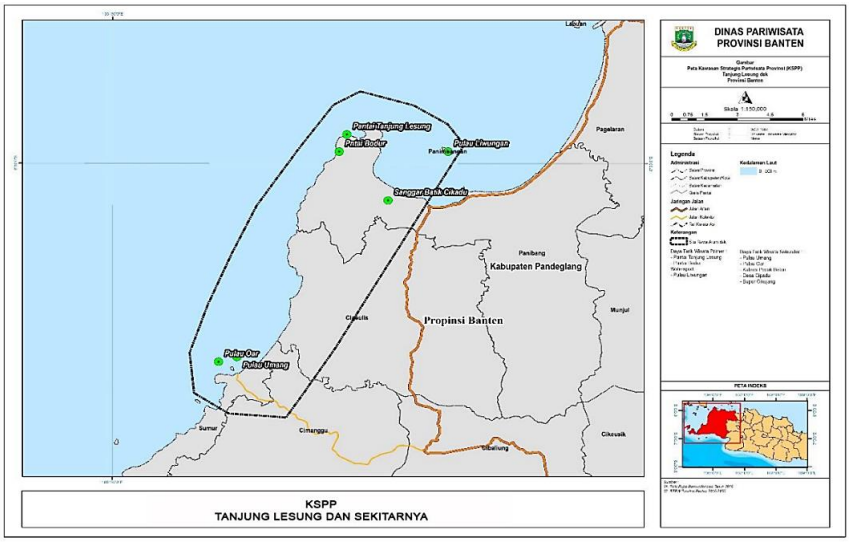


**Figure 1. Research location map.**

### *2.1. Indicator System Design*

TCC is measured from three aspects: economic facilities (EF), socio-cultural (SC), and ecological environment (EE) using indicators modified from previous research [18][19][20], with a total of 23 indicators to construct the TCC indicator system [16]. The three aspects of indicators consist of main indicators, level two indicators, and level three indicators, which are presented in the following table.

**Table 1.** Indicator of Tourism Carrying Capacity

| Indicator | | | Sign |
|---|---|---|---|
| **System** | **Factor** | **Indicator** | |
| Economic Facilities (EF) | Infrastructure | Length of highways (km) | + |
| | | Total number of travel agencies (unit) | + |
| | | Amount of water supply (10.000 M3) | + |
| | | Number of taxis (On/Off 10.000 unit) | + |
| | | Number of road-operating car ownership (10.000 unit) | + |
| | Economic pressure | Water consumption (M3/10 Juta) | - |
| | | Energy consumption (tons of SCE) | - |
| | Social economic development | Tourism revenue as a percentage of PDRB (%) | + |
| | | Foreign exchange earnings from tourism (USD 1 juta) | + |
| | | Natural population growth rate (%) | - |
| Socio-Cultural (SC) | Harmony | Urbanization level (%) | + |
| | | Unemployment rate (%) | - |
| | | Possession of civil motor vehicles (10.000 unit) | + |
| | | Passenger-kilometers (100.000 penumpang/km) | + |
| | | Number of hospital beds (unit) | + |
| | Residents psychological | Ratio of tourists to residents (%) | - |
| | | Resident Engel's coefficient (%) | - |
| | Social cultural atmosphere | Number of students enrolled in universities (Orang) | + |
| | | Number of cultural and art institutions (unit) | + |
| Ecological Environment (EE) | Ecological environment quality | Volume of garbage disposal (10.000 Tons) | + |
| | | Waste water treatment rate (%) | + |
| | State of natural resources | Total amount of water resources (M3) | + |
| | | Green coverage area (Ha) | + |

The data collected from the above indicators consist of both primary and secondary data, both quantitative and qualitative, based on predetermined tourism carrying capacity indicators. The data were obtained through on-site survey results, observations on the determination of tourism space usage [21], interviews with community leaders and members to gather descriptions of the natural and cultural tourism objects in KSPP Tanjung Lesung, and Focus Group Discussions (FGD) with relevant parties involved in the management of Maritime tourism in KSPP Tanjung Lesung. The secondary data, on the other hand, were obtained from the Central Statistics Agency of Banten Province and the Tourism Department of Banten Province.

### *2.2. Analysis of Tourism Carrying Capacity*

#### *2.2.1. Calculation of Normalization Data*

The matrix consists of all observed values from the 23 level-three indicators, where $X = (X_{ij})$ with $i$ representing main system and $j$ representing the indicator. Positive indicators are those whose growth promotes TCC, and negative indicators are those whose growth has a negative impact on TCC. The calculation for data standardization is presented in the following equation.

$$positive\ indicator: \quad s_{ij} = \frac{\left(X_{ij} - \min\left(X_{ij}\right)\right)}{\left(\max\left(X_{ij}\right) - \min\left(X_{ij}\right)\right)} \text{ and} \tag{1}$$

$$negative\ indicator: \quad s_{ij} = \frac{\left(\max\left(X_{ij}\right) - X_{ij}\right)}{\left(\max\left(X_{ij}\right) - \min\left(X_{ij}\right)\right)}, \tag{2}$$

where:

$X_{ij}$ = initial data of indicator
$s_{ij}$ = normalization data

#### *2.2.2. Calculation of the indicator weight with entropy method*

The Economic Facilities, Socio-Cultural, and Ecological Environment Systems each comprise 10 indicators, 9 indicators, and 4 indicators, respectively. The entropy method is utilized to differentiate the indicator weights. The specific entropy weight calculation steps are presented in the following equation:

$$P_{ij} = \frac{s_{ij}}{\sum_{j=1}^{n} s_{ij}}, \tag{3}$$

$$e_i = -\frac{1}{\ln n} \sum_{j=1}^{n} P_{ij} \times \ln P_{ij}, \quad \left(0 \le e \le 1\right) \tag{4}$$

$$w_i = \frac{\left(1 - e_i\right)}{m - \sum_{i=1}^{m} e_i} \tag{5}$$

where:

$P_{ij}$ = The proportion of system $i$ for indicator $j$
$e_i$ = The entropy value of system $i$
$w_i$ = The entropy weight of system $i$
$m$ = Number of main systems
$n$ = Number of indicators

#### *2.2.3. Calculation of performance level*

Performance level calculation is employed to indicate the performance of each main indicator, namely EF, SC, and EE. The calculation is done using the following equation:

$$EF = \sum_{j=1}^{p} w_i^{EF} . s_{ij} \tag{6}$$

$$SC = \sum_{j=1}^{q} w_i^{SC} . s_{ij} \tag{7}$$

$$EE = \sum_{j=1}^{r} w_i^{EE} . s_{ij} \tag{8}$$

where:

$EF$ = represent the performance level of Economic Facilities
$SC$ = represent the performance level of Socio-Cultural
$EE$ = represent the performance level of environmental ecology

#### *2.2.4. Determination of improved contribution coefficients*

Determination of improved contribution coefficients is calculated using the following equation:

$$\alpha = \frac{EF}{\left(EF+SC+EE\right)} \tag{9}$$

$$\beta = \frac{SC}{\left(EF+SC+EE\right)} \tag{10}$$

$$\gamma = \frac{EE}{\left(EF+SC+EE\right)}, \tag{11}$$

where:

$\alpha$ = represent the improved contribution coefficients of Economic Facilities
$\beta$ = represent the improved contribution coefficients of Socio-Cultural
$\gamma$ = represent the improved contribution coefficients of environmental ecology

### *2.2.5. Determination of coupling coordination degree*

Determination of coupling coordination degree is calculated using the following equation:

$$C = \sqrt{\frac{(EF.SC.EE)}{\left(\frac{EF+SC+EE}{u}\right)^u}} \tag{12}$$

$$T = \alpha.EF + \beta.SC + \gamma.EE \tag{13}$$

$$D = \sqrt{C.T} \tag{14}$$

where:

$C$ = represent the coupling degree between the system
$T$ = represent the comprehensive performance index between the system
$D$ = represent the degree of coupling coordination
$u$ = number of coupling

Coupling coordination degree used for classification of relationship between the system. Classification of coupling coordination degree is devided into five class. The basis analyzing used classification from [22][23] that shown in the following table.

**Table 2.** Classification Based on The Degree of Coupling Coordination

| Coupling Level | *D* Value | Coordination | Description |
|---|---|---|---|
| Low Coupling | $0 \leq D \leq 0{,}25$ | Serious imbalance | The nexus between the system is very poor |
| Antagonism stage | $0{,}25 < D \leq 0{,}45$ | Imbalance | The interaction between the system is weak |
| Running-in stage | $0{,}45 < D \leq 0{,}65$ | Basic coordination | The link between the system begins to reinforce |
| Coupling stage | $0{,}65 < D \leq 0{,}75$ | Coordination | The relationship between the system is coordinated |
| Highly coupling | $0{,}75 < D \leq 1$ | Good coordination | The coordination between the system is very good |

## 3. Result and Discussion

The data collected from economic facilities, socio-cultural, and ecological environment indicators for each indicator were obtained from the Central Statistics Agency (BPS) in the Banten in publication of Banten in Number for year 2022 and publications from the management of KSPP Tanjung Lesung, Banten. Indicator analysis begins with the calculation of data normality for each indicator, as presented in the following table.

**Table 3.** Normalization Data of Indicator Tourism Carrying Capacity

| Indicator | | | Sign | Initial Data | Normalization Data |
|---|---|---|---|---|---|
| System | Factor | Indicator | | | |
| Economic Facilities (EF) | Infrastructure | Length of highways (km) | + | 1032,42 | 0,00368 |
| | | Total number of travel agencies (unit) | + | 16,00 | 0,00006 |
| | | Amount of water supply (10.000 M3) | + | 25734,86 | 0,09164 |
| | | Number of taxis (On/Off 10.000 unit) | + | 0,07 | 0,00000 |
| | | Number of road-operating car ownership (10.000 unit) | + | 21,58 | 0,00008 |
| | Economic pressure | Water consumption (M3/10 Juta) | - | 23,86 | 0,99992 |
| | | Energy consumption (tons of SCE) | - | 280811,55 | 0,00000 |
| | Social economic development | Tourism revenue as a percentage of PDRB (%) | + | 5,20 | 0,00002 |
| | | Foreign exchange earnings from tourism (USD 1 juta) | + | 47,56 | 0,00017 |
| | | Natural population growth rate (%) | - | 1,54 | 0,99999 |
| Socio-Cultural (SC) | Harmony | Urbanization level (%) | + | 24,30 | 0,00009 |
| | | Unemployment rate (%) | - | 9,24 | 0,99997 |
| | | Possession of civil motor vehicles (10.000 unit) | + | 21,58 | 0,00008 |
| | | Passenger-kilometers (100.000 penumpang/km) | + | 483,37 | 0,00172 |
| | | Number of hospital beds (unit) | + | 317,00 | 0,00113 |
| | Residents psychological | Ratio of tourists to residents (%) | - | 28025,30 | 0,90020 |
| | | Resident Engel's coefficient (%) | - | 0,22 | 1,00000 |
| | Social cultural atmosphere | Number of students enrolled in universities (Orang) | + | 5434,00 | 0,01935 |
| | | Number of cultural and art institutions (unit) | + | 3,00 | 0,00001 |

| Indicator | | | Sign | Initial Data | Normalization Data |
|---|---|---|---|---|---|
| System | Factor | Indicator | | | |
| Ecological Environment (EE) | Ecological environment quality | Volume of garbage disposal (10.000 Tons) | + | 37,50 | 0,00013 |
| | | Waste water treatment rate (%) | + | 12,76 | 0,00005 |
| | State of natural resources | Total amount of water resources (M3) | + | 12,18 | 0,00004 |
| | | Green coverage area (Ha) | + | 58800,00 | 0,20939 |

Based on the table above, the proportion for each indicator will be calculated to determine the entropy value, which will then be used in finding the weight for each system. The weight for the Economic Facilities system is calculated based on 10 indicators, the Socio-Cultural system is calculated based on 9 indicators, and the Ecological Environment system is calculated based on 4 indicators. The obtained weight for each system is presented in the following table.

**Table 4.** Weight of Tourism Carrying Capacity System

| System | Entropy Value | Weight |
|---|---|---|
| Economic Facilities | 0,30810 | 0,32016 |
| Socio-Cultural | 0,43748 | 0,26029 |
| Environmental Ecology | 0,09330 | 0,41955 |

Based on Table 4, it is evident that the highest weight is for the Environmental Ecology System, which is 0.41955. This can be interpreted as indicating that in the development of tourism carrying capacity in KSPP Tanjung Lesung, Banten, the development of the Environmental Ecology System is considered quite significant. The next highest weight is for the Economic Facilities System with a weight of 0.32016, followed by the weight of the Socio-Cultural System at 0.26029. After obtaining the weights for each system, the performance levels of the Economic Facilities System, the Socio-Cultural system, and the ecological environment system will be calculated using equations (6), (7), and (8). The performance level is used to determine improved contribution coefficients and the coupling coordination degree (D). The results of the performance level and improved contribution coefficients (ICC) are presented in the following table.

**Table 5.** Result of Performance Level each Sytem

| System | Performance Level | ICC |
|---|---|---|
| Economic Facilities | $EF = 0{,}67091$ | $\alpha = 0{,}44151$ |
| Socio-Cultural | $SC = 0{,}76071$ | $\beta = 0{,}50061$ |
| Environmental Ecology | $EE = 0{,}08794$ | $\gamma = 0{,}05787$ |

Table 5 shows that the highest performance level value is for the Socio-Cultural System, which is 76.07%. This means that the development of tourism carrying capacity in KSPP Tanjung Lesung, Banten, in the Socio-Cultural System, has a fairly good performance even though the value is less than 1 but more than 0.5. When illustrated in a graph, the development of this performance level is not too gradual. On the contrary, the performance level value for the Environmental Ecology System is 8.79%. This indicates that the development of this performance level is quite significant. This is evidenced by the earlier calculation of the large weight for the Environmental Ecology System. After obtaining the performance level and improved contribution coefficients, the next step is to calculate the value of the coupling degree between the system and the degree of coupling coordination between the system using equations (12), (13), and (14) as shown in the following table.

**Table 6.** Result of Coupling Degree Between the System

| Coupling Between the System | C Value | T Value |
|---|---|---|
| EF-SC-EE | 0,70161 | 0,68213 |
| EF-SC | 0,99803 | 0,71863 |
| EF-EE | 0,64019 | 0,79699 |
| SC-EE | 0,60956 | 0,69099 |

**Table 7.** Result of Coupling Coordination Degree Between the System

| Coupling Between the System | D Value | Coupling Level | Coordination | Description |
|---|---|---|---|---|
| EF-SC-EE | 0,69180 | Coupling stage | Coordination | The relationship between the system is coordinated |
| EF-SC | 0,84688 | Highly coupling | Good coordination | The coordination between the system is very good |
| EF-EE | 0,71429 | Coupling stage | Coordination | The relationship between the system is coordinated |
| SC-EE | 0,64899 | Running-in stage | Basic coordination | The link between the system begins to reinforce |

Based on Table 7, it can be seen that the degree of coordination merging for the basic classification among the three main systems obtains a degree value is 0.6918. This indicates that the classification of the three systems states a balanced development. It means that the coordination development among the three main systems, namely Economic Facilities, Socio-cultural, and Environmental Ecology, is considered normal.

In addition to assessing the coordination merging of the three main systems, the calculation of the degree of coordination merging for the basic classification between the Economic Facilities system and the Socio-cultural system obtains a degree value is 0.84688. This indicates that the classification of these two main systems indicates development with good coordination. It means that the relationship between the Economic Facilities system and the Socio-Cultural system is quite high. The calculation of the degree of coordination merging for the basic classification between the Economic Facilities system and the Environmental Ecology system obtains a degree value is 0.71429. This indicates that the classification of these two main systems indicates

balanced development. It means that the coordination between the Economic Facilities system and the Environmental Ecology system is considered normal. Finally, the calculation of the degree of coordination merging for the basic classification between the Socio-Cultural system and the Environmental Ecology system obtains a degree value of 0.64899. This means that the classification of these two indicators indicates development that is not quite balanced or requires intervention. This is because the coordination between the Economic Facilities system and the Environmental Ecology system is in the strengthening stage.

## 4. Conclusion

Based on the results of data processing and analysis, several conclusions were drawn, including the highest performance level being the Socio-Cultural system with a performance level value of 0.76071. Meanwhile, the lowest performance level is the Environmental Ecology system with a performance level value of 0.08794. The tourism support aspect in the Environmental Ecology system needs development to increase the tourism carrying capacity at KSPP Tanjung Lesung, both for domestic and international tourists. In addition, the relationship between the three main systems, namely Economic Facilities, Socio-Cultural, and Environmental Ecology at KSPP Tanjung Lesung, is considered balanced. This is also indicated by the relationship between the Economic Facilities system and the Environmental Ecology system, which is also balanced. The relationships between aspects that have a fairly good connection are only the relationship between the Economic Facilities system and Socio-Cultural system. This means that the development of tourism support by the developers of KSPP Tanjung Lesung, Banten, does not overlook the local social and cultural aspects as tourist attractions that can boost the economy in both the tourist area and the surrounding region as an effort to optimize the visitor experience. Tourism support can enhance the quality of the visitor experience by ensuring that the destination is not too crowded. A good visitor experience can increase satisfaction and encourage visitors to return to the destination in the future, as well as recommend the destination to others. This needs to be maintained and, if necessary, improved for economic sustainability. By knowing the limits of tourism carrying capacity, it can be ensured that the destination remains economically sustainable in the long run.

## Acknowledgements

Our sincere thanks go to all parties who have assisted in this research. Central Statistics Agency of Banten Province and the Provincial Tourism Office of Banten who have kindly provided the necessary tourism carrying capacity indicator data. Management of KSPP Tanjung Lesung, PT. Banten West Java, who granted permission for the researchers to conduct field observations and agreed to be interviewed. Figures and residents of Tanjungjaya Village, Panimbang District, Pandeglang Regency, who willingly participated in interviews regarding the conditions of economic, socio-cultural, and environmental aspects around the tourism area of KSPP Tanjung Lesung, Banten. Finally, thank you to the Ministry of Education and Culture for providing the opportunity to conduct funded research in the Beginner Lecturer Research Program (PDP) for the fiscal year of 2023.

## REFERENCES

[1] Laksana, A., Kenedi, K., & Permana, B. R. S. (2022). Digital tourism development strategy as a promotion of creative economy tourism in banten province. *Jurnal Ekonomi*, 11(01), 631-638.

[2] Kenedi, K., Sukmawan, I., & Laksana, A. (2022). Evaluation of the economic potential of coastal tourism strategic area of anyer tourism–cinangka. *Jurnal Ekonomi*, 11(01), 611-618.

[3] Saepulloh, A., & Laksana, A. (2023). Peran serikat pekerja nasional (SPN) di dewan pengupahan dalam pengawalan penetapan upah minimum kabupaten dan kota. *JISIP (Jurnal Ilmu Sosial dan Pendidikan)*, 7(2).

[4] Das, M., & Chatterjee, B. (2015). Ecotourism: A panacea or a predicament?. *Tourism management perspectives*, 14, 3-16.

[5] Valentika, N., Abdullah, S., Chasanah, S. I. U., Nuha, A. R., Huda, M., & Nursyirwan, V. I. (2020, December). Partial modeling of macroeconomic variables in industrial fields. *In IOP Conference Series: Materials Science and Engineering* (Vol. 909, No. 1, p. 012091). IOP Publishing.

[6] Hernández, M. M. G., Leon, C. J., García, C., & Lam-González, Y. E. (2023). Assessing the climate-related risk of marine biodiversity degradation for coastal and marine tourism. *Ocean & Coastal Management*, 232, 106436.

[7] Gonzalez, M. V., Coromina, L., & Gali, N. (2018). Overtourism: residents' perceptions of tourism impact as an indicator of resident social carrying capacity-case study of a Spanish heritage town. *Tourism review*, 73(3), 277-296.

[8] Sharma, R. (2016). Evaluating total carrying capacity of tourism using impact indicators. *Global Journal of Environmental Science and Management*, 2(2), 187-196.

[9] Long, C., Lu, S., Chang, J., Zhu, J., & Chen, L. (2022). Tourism Environmental Carrying Capacity Review, Hotspot, Issue, and Prospect. *International Journal of Environmental Research and Public Health*, 19(24), 16663.

[10] Wang, J., Huang, X., Gong, Z., & Cao, K. (2020). Dynamic assessment of tourism carrying capacity and its impacts on tourism economic growth in urban tourism destinations in China. *Journal of Destination Marketing & Management*, 15, 100383.

[11] Dioko, L. D. A., & So, A. S. (2017). Residents' quality of life and visitors' quality of experience: Revisiting tourism carrying capacity in Macao. *Worldwide Hospitality and Tourism Themes*, 9(3), 349-360.

[12] Fernández-Villarán, A., Espinosa, N., Abad, M., & Goytia, A. (2020). Model for measuring carrying capacity in inhabited tourism destinations. *Portuguese Economic Journal*, 19, 213-241.

[13] Adrianto, L., Kurniawan, F., Romadhon, A., Bengen, D. G., Sjafrie, N. D. M., Damar, A., & Kleinertz, S. (2021). Assessing social-ecological system carrying capacity for urban small island tourism: The case of Tidung Islands, Jakarta Capital Province, Indonesia. *Ocean & Coastal Management*, 212, 105844

[14] Akliyah, L., & Umar, M. Z. (2013). Analisis daya dukung kawasan Wisata Pantai Sebanjar Kabupaten Alor dalam mendukung pariwisata yang berkelanjutan. *Jurnal Perencanaan Wilayah dan Kota*, *13*(2).

[15] Hamdani, A. F., & Wardani, N. R. (2018). Analisis Daya Dukung Lingkungan Wisata Alam Coban Talun, Kota Batu. *Ethos (Jurnal Penelit. dan Pengabdi. Masyarakat)*, *6*, 291-296

[16] Dong, X., Gao, S., Xu, A., Luo, Z., & Hu, B. (2022). Research on Tourism Carrying Capacity and the Coupling Coordination Relationships between Its Influencing Factors: A Case Study of China. *Sustainability*, *14*(22), 15124.

[17] Leka, A., Lagarias, A., Panagiotopoulou, M., & Stratigea, A. (2022). Development of a Tourism Carrying Capacity Index (TCCI) for sustainable management of coastal areas in Mediterranean islands–Case study Naxos, Greece. *Ocean & coastal management*, *216*, 105978.

[18] Ye, F., Park, J., Wang, F., & Hu, X. (2020). Analysis of early warning spatial and temporal differences of tourism carrying capacity in China's island cities. *Sustainability*, *12*(4), 1328.

[19] Wang, Y., Li, J., & Zhang, M. (2020). Evaluation of tourism environmental carrying capacity in Diaoshuihu national forest park. *International Journal of Sustainable Development and Planning*, *15*(5), 761-766

[20] Wang, Z., & Chen, Q. (2022). Comprehensive partitions and optimisation strategies based on tourism urbanisation and resources environment carrying capacity in the Yellow River Basin, China. *Environmental Science and Pollution Research*, 29(16), 23180-23193.

[21] Maryono, M., Effendi, H., & Krisanti, M. (2019). Tourism carrying capacity to support beach management at Tanjung Bira, Indonesia. *Jurnal Segara*, *15*(2), 119-126.

[22] Liu, H. C., You, J. X., You, X. Y., & Shan, M. M. (2015). A novel approach for failure mode and effects analysis using combination weighting and fuzzy VIKOR method. *Applied soft computing*, *28*, 579-588.

[23] He, H., Shen, L., Du, X., & Liu, Y. (2023). Analysis of temporal and spatial evolution of tourism resource carrying capacity performance in China. *Ecological Indicators*, 147, 109951.