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Analysis of Decision Support Systems Using the Analytical Hierarchy Process (AHP) Method to Determine Socioeconomic Inequality Priorities (Case Study: Pelabuhanratu District)

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Abstract*: The development of tourism in the UNESCO Global Geopark Ciletuh-Palabuhanratu area has contributed to regional economic growth; However, the benefits have not been equally distributed, resulting in socioeconomic disparities among local communities. This study aims to analyze socioeconomic inequality and determine the priority weight of its influencing indicators using the Analytical Hierarchy Process (AHP) method. A quantitative approach was employed by integrating questionnaire data and online sentiment analysis converted into a Likert scale. Six indicators were used as the evaluation criteria, namely social conflict, land ownership, economic inequality, economic capital ownership, digitalization, and infrastructure. The AHP method was applied to determine the priority weight of each criterion through pairwise comparison and consistency testing. The results show that the Consistency Ratio (CR) is less than 0.10, indicating that the pairwise comparison matrix is consistent and reliable. The weighting results identify the indicators with the greatest influence on socioeconomic inequality in Palabuhanratu District and provide an objective basis for supporting regional development policy decisions. Therefore, the implementation of the AHP method is considered effective in assisting decision-makers in determining development priorities based on socioeconomic inequality indicators.*

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Introduction

Tourism is a strategic sector that plays a role in driving economic growth, improving community welfare, and regional development.(Octivaningsih et al., 2025);(Muhamad et al., 2025). The development of tourist destinations not only has an economic impact by increasing regional income and creating jobs, but also influences the social conditions of the communities

surrounding the tourist areas.(Iskandar et al., 2025);(Imran & Irwan, 2025)Therefore, evaluation of socio-economic impacts is an important aspect in realizing sustainable tourism development.(Ilhami et al., 2021)One of the tourist areas that plays an important role in the development of sustainable tourism in Indonesia is the UNESCO Global Geopark Ciletuh-Palabuhanratu.(Maulana & Adiputra, 2023).

This area has been recognized as a UNESCO Global Geopark due to its unique geology, biodiversity, and valuable cultural heritage. This recognition has encouraged increased tourism, infrastructure development, and economic activity in the surrounding community. The UNESCO Global Geopark's presence has boosted local economic activity, strengthened community-based businesses, and increased tourist visits through sustainable geotourism development.(Lee & Jayakumar, 2021)

The tourism sector in Palabuhanratu District currently shows a tendency towards enclave tourism, characterized by significant inequality in the ownership of tourism economic assets. Based on analysis of capital ownership proxy data, approximately 77.5% of the formal tourism sector, such as star-rated hotels, beach resorts, modern restaurants, and various artificial tourist attractions, is controlled by large investors from outside the region, primarily from Jakarta and Bandung. Meanwhile, the local community of Palabuhanratu only controls approximately 22.5% of the business share, which is generally in the informal micro-scale economic sector with a relatively high level of vulnerability, such as semi-permanent tent stalls, tire rental services, and budget-class accommodation.

This inequality in capital ownership has significant social and economic consequences forpublicThe coast of Palabuhanratu. The dominance of investment from outside the region has led to a leakage effect, where most of the profits generated from tourism activities do not circulate locally, but instead flow back to the investors' home regions (capital flight), thus limiting the economic benefits received by local communities (Sukabumi Regency Tourism Office, 2024). This condition has resulted in coastal tourism areas developing into centers of modern economic activity that are relatively separate from the surrounding community, while local communities in the buffer zone still face limited welfare and have not received proportional benefits from the development of the tourism sector in their own region.(Zalianti & Rahma, 2026).

Socioeconomic inequality analysis faces methodological challenges due to the differences in characteristics between online and offline data.(Pratama et al., 2026), such as social media activities and reviews on digital platforms, have the advantage of providing fast and real-time information, but are vulnerable to representation bias due to the digital divide, which causes low-income groups and rural areas to be underrepresented in the digital ecosystem.(Amin et al., 2022). In contrast, offline data such as censuses, socio-economic surveys, and government administrative data are capable of

ThereforeThat, the use of one data source separately has the potential to produce a less than optimal analysis of socioeconomic inequality. To overcome this limitation, this study integrates online and offline data as a basis for analyzing the condition of socioeconomic inequality. Furthermore, the Analytical Hierarchy Process (AHP) method is used to determine the priority weight of each indicator based on its level of importance through a pairwise comparison process. The results of this weighting are expected to provide an overview of the indicators that most influence socioeconomic inequality in Palabuhanratu District, thereby providing a basis for formulating more targeted, objective, and sustainable development policies.(Velasquez & Hester, 2013).

However, integrating online and offline data in socioeconomic inequality analysis still faces several challenges. Differences in data characteristics, the number of indicators used, and the varying levels of importance assigned to each indicator make the decision-making process

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increasingly complex. Furthermore, most previous research has used a single data source, either survey data or digital data, resulting ininformationThe resulting data do not fully represent the overall socio-economic conditions. As a result, determining regional priorities or levels of socio-economic inequality still has the potential to produce less than optimal decisions.(Kitchin, 2014).

This study used the Analytical Hierarchy Process (AHP) method, taking into account various previous studies that demonstrated its ability to handle multi-criteria problems. In the study of internet package selection, the AHP method produced a conformance rate of 84.62% with the user's expected results, higher than the Simple Additive Weighting (SAW) method, which obtained a conformance rate of 76.92%. Furthermore, in the processmatchingIn the ranking of students based on report card grades, the AHP method showed a 100% match rate, while the SAW method only achieved 33.33%. The AHP method has also been successfully applied in various fields, such as selecting mobile phone quality, selecting prospective employees, evaluating suppliers (supplier selection), and determining development priorities based on various criteria. The results of this study indicate that AHP is a method capable of producing systematic, objective, and consistent criteria weighting, making it suitable for use in research involving many indicators.(Hubbard, 2020).

In this study, the Analytical Hierarchy Process (AHP) method was chosen because it is able to determine the level of importance of each indicator of socioeconomic inequality through a pairwise comparison process. This approach allows each indicator to be evaluated based on its contribution to the problem under study, resulting in a justifiable priority weight. Furthermore, the AHP method is complemented by a Consistency Ratio (CR) test to ensure that the weighting results obtained have a good level of consistency. Thus, the AHP method is consideredappropriateused to analyze the priority of socio-economic inequality indicators based on the integration of online and offline data.(Prabaswara et al., 2023)

This research is expected to be able to produce priority weights for socio-economic inequality indicators.based onIntegration of digital sentiment data and questionnaire data so that it can be used as a consideration for local governments and stakeholders in formulating more targeted, equitable, and sustainable development policies.

Research Methods

This study uses a quantitative approach with descriptive methods to analyze socioeconomic inequality in Palabuhanratu District, Sukabumi Regency. The research data consists of primary data in the form of community questionnaires and expert interviews and secondary data in the form of online reviews from Google Maps Review. Online data was obtained through web scraping using Python and the Playwright library at 36 tourist attractions, then through the process of cleaning, tokenization, stopword removal, stemming, and sentiment analysis. Questionnaire data was obtained from the community around the Palabuhanratu Geopark area using a purposive sampling technique with the criteria for respondents being at least 17 years old, having experience in activities in the research area, understanding tourism development, and including local communities, community leaders, small business owners, or tourists. The questionnaire instrument used a five-level Likert scale.

Next, online and offline data were integrated to analyze six indicators of socioeconomic inequality: social conflict, land tenure, economic inequality, capital distribution, digitalization, and infrastructure. The analysis was conducted using the Analytical Hierarchy Process (AHP)

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method through the stages of hierarchical construction, pairwise comparison, matrix normalization, priority weight calculation, and consistency testing using the Consistency Index (CI) and Consistency Ratio (CR). The weighting results were used to determine the priority ranking of socioeconomic inequality indicators. The research was conducted in the UNESCO Global Geopark Ciletuh-Palabuhanratu area using supporting equipment such as laptops/computers, Microsoft Excel, Python, questionnaires, and the internet. The final results of the analysis are expected to form the basis for providing recommendations for more targeted and equitable development policies.

Results and Discussion

Online Sentiment Analysis Results

1. Data Labeling Results

Data labeling is done automatically using a keyword-based labeling approach based on the codebook.hascompiled. A total of 4,115 reviews were successfully labeled into eight predetermined categories and saved in the file hasil_labelling.csv.

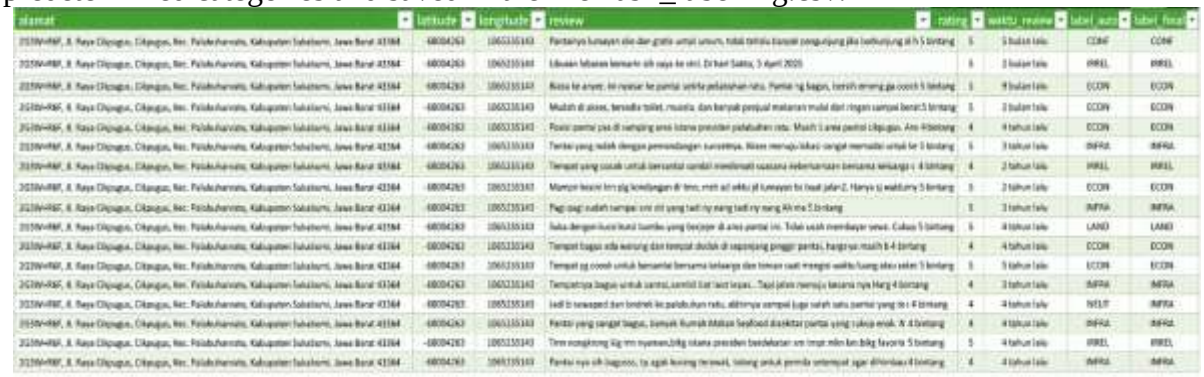


Figure 1. Data Labeling Results

The distribution of automatic labeling result categories on all review data is presented in the following table:

Table 1. Sentiment Labeling Results Data*On line*

No.	Label	Category	Amount	Presentation
1.	IRREL	Irrelevant	2,635	64.04%
2.	NEUT	Neutral/Positive	790	19.20%
3.	INFRA	Infrastructure	348	8.46%
4.	ECON	Economy	285	6.93%
5.	CONF	Social conflict	21	0.51%
6.	LAND	Land/Access	17	0.41%
7.	GEND	Gender Issues	11	0.27%
8.	DIGI	Digitalization	8	0.19%
		Total	4.115	100%

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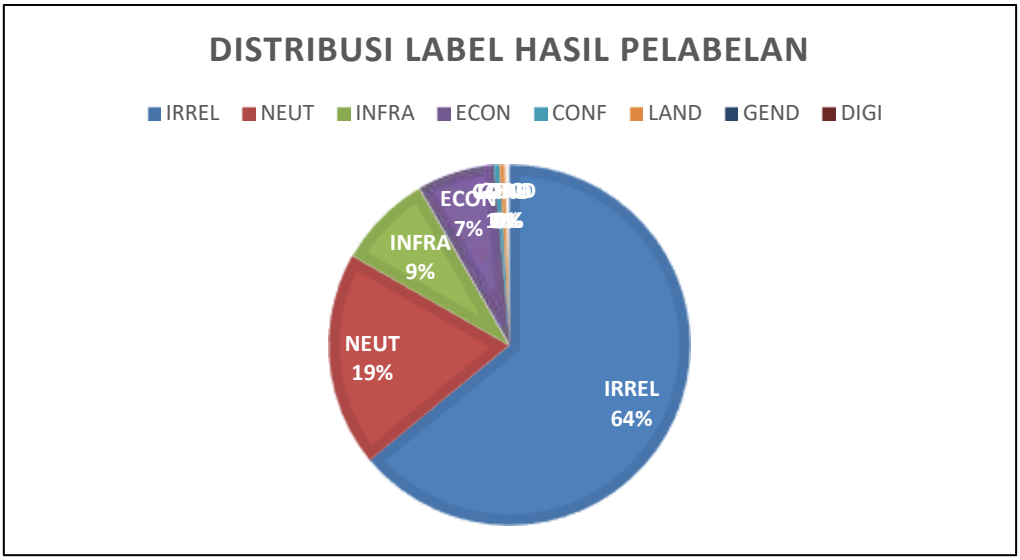


Figure 2. Labeling Results Distribution Diagram

Based on the table above, the IRREL (Irrelevant) category dominates the dataset with 2,635 reviews (64.04%). This indicates that most tourist reviews are general in nature and do not directly address the issue of economic inequality in tourism. The NEUT (Neutral/Positive) category ranks second with 790 reviews (19.20%), indicating that many tourists responded positively to the attractiveness of tourist destinations.

In the tourism economic inequality category, the INFRA (Infrastructure) label was the most dominant category with 348 reviews (8.46%), followed by ECON (Economy) with 285 reviews (6.93%). These findings indicate that infrastructure conditions and cost aspects are the most frequently perceived issues by tourists. Meanwhile, the CONF, LAND, GEND, and DIGI categories had relatively fewer reviews, but can still be used as indicators of potential inequality that need attention.

Next, user identities were anonymized and compiled into an annotator worksheet in Excel format (annotator_worksheet_final.xlsx). The worksheet contained anonymous user identities, place names, review text, labels, and category notes used for documentation and data verification purposes.

No	Timestamp	Nama	Jenis Kelamin	Usia	Domisili	Pekerjaan	Platform	Komentar
1	9 Jun 2025 12.34.56	Rina A	Perempuan	25	Palabuhanratu	Pelajar/Mahasiswa	Google Maps Review	Tempat wisata bagus, tapi harga makanan mahal.
2	9 Jun 2025 12.38.21	Dedi K	Laki-laki	30	Cisolok	Wiraswasta	TikTok	Akses jalan rusak banget ke beberapa spot.
3	9 Jun 2025 12.41.03	Siti M	Perempuan	22	Palabuhanratu	Pelajar/Mahasiswa	Google Maps Review	Pemandangannya indah, cocok buat healing.
4	9 Jun 2025 12.45.18	Andi P	Laki-laki	28	Cikakak	Karyawan Swasta	Instagram	Fasilitas umum masih kurang terawat.
5	9 Jun 2025 12.49.39	Nina S	Perempuan	35	Palabuhanratu	Ibu Rumah Tangga	Google Maps Review	Pantainya bersih dan airnya jernih.
6	9 Jun 2025 12.52.10	Budi H	Laki-laki	40	Cisolok	Petani	TikTok	Kurang promosi, jadi masih sepi pengunjung.
7	9 Jun 2025 12.56.47	Dewi L	Perempuan	27	Palabuhanratu	Karyawan Swasta	Instagram	Sunset di sini luar biasa!
8	9 Jun 2025 12.59.05	Fajar R	Laki-laki	23	Cikakak	Pelajar/Mahasiswa	TikTok	Parkir mahal dan sempit.
9	9 Jun 2025 13.02.33	Lina T	Perempuan	31	Palabuhanratu	Wiraswasta	Google Maps Review	Tempatnya nyaman buat liburan keluarga.
10	9 Jun 2025 13.05.21	Agus S	Laki-laki	36	Cisolok	Karyawan Swasta	TikTok	Banyak sampah di beberapa titik pantai.
11	9 Jun 2025 13.08.44	Rika D	Perempuan	24	Palabuhanratu	Pelajar/Mahasiswa	Instagram	Tempat wisata hidden gem di Sukabumi.
12	9 Jun 2025 13.12.15	Hendra Y	Laki-laki	29	Cikakak	Wiraswasta	Google Maps Review	Toilet umum kurang bersih.
13	9 Jun 2025 13.15.37	Maya W	Perempuan	32	Palabuhanratu	Ibu Rumah Tangga	TikTok	Alamnya masih terjaga, keren!
14	9 Jun 2025 13.18.51	Yoga P	Laki-laki	26	Cisolok	Pelajar/Mahasiswa	Instagram	Sinyal internet lemah di beberapa area.
15	9 Jun 2025 13.21.29	Wulan S	Perempuan	30	Palabuhanratu	Karyawan Swasta	Google Maps Review	Harga tiket masuk terjangkau.

Figure 3. Annotator Worksheet

Each review is then classified into several indicator categories, namely Infrastructure (INFRA), Economy (ECON), Conflict and Access (CONF), Land Inequality (LAND), Gender and Employment Inequality (GEND), Digitalization and Information (DIGI), Neutral (NEUT),

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and Irrelevant (IRREL).

Table 2. Indicator Categories of Sentiment*On line*

Label	Number of Reviews	Percentage
IRREL (Irrelevant)	2,635	64.03
NEUT (Neutral)	790	19.02
INFRA (Infrastructure)	348	8.46
ECON (Economy)	285	6.93
CONF (Conflict and Access)	21	0.51
LAND (Land Inequality)	17	0.41
GEND (Gender and Employment)	11	0.27
DIGI (Digitalization and Information)	8	0.19
Total	**4.115**	**100**

Based on Table 2, the majority of review data falls into the IRREL (Irrelevant) category, with 2,635 reviews, or 64.03% of the total data. This category indicates that the majority of tourists provided comments focused on the general tourism experience, such as natural beauty, location atmosphere, or assessment of tourist attractions, without explicitly discussing aspects of socioeconomic inequality. In addition to the irrelevant category, there were 790 reviews (19.20%) that fell into the NEUT (Neutral) category. Reviews in this category are generally informative and descriptive, for example, explaining the condition of the tourist location, access to the destination, or the visiting experience without indicating any specific socioeconomic issues.

Among the categories relevant to the research, the Infrastructure (INFRA) indicator was the most frequently encountered theme, with 348 reviews (8.46%). This finding indicates that infrastructure aspects are the most frequently highlighted issue by tourists. Comments in this category generally relate to road conditions, public facilities, parking areas, environmental cleanliness, tourism support facilities, and the availability of other basic amenities. The high frequency of infrastructure indicators indicates that facility quality and accessibility are important factors in shaping the tourist experience.

The Economy (ECON) category ranked second with 285 reviews, or 6.93%. Reviews in this category primarily discussed the prices of tourism products and services, entrance fees, local economic activities, and the presence of businesses in the surrounding areas. These results indicate that tourists are not only concerned with recreational aspects but also with the economic activities developing around tourist destinations.

Meanwhile, the Conflict and Access (CONF) indicator was only found in 21 reviews, or 0.51% of the total data. The low number of reviews in this category indicates that issues related to social conflict and restricted access to public spaces have not been widely discussed by tourists in digital reviews. The Land Inequality (LAND) category was found in 17 reviews, or 0.41%. This finding indicates that issues related to land conversion, spatial control, and changes in land use due to tourism activities have not yet emerged widely in tourists' perceptions. This condition may occur because tourists generally focus more on the experience of visiting than observing changes in land ownership or use structures.

Furthermore, the Gender and Employment (GEND) category only appeared in 11 reviews, or 0.27%. The low number of reviews in this category indicates that issues regarding employment opportunities, women's involvement in the tourism sector, and labor equality are not yet primary concerns for tourists when leaving reviews. The category with the fewest reviews was Digitalization and Information (DIGI), with only 8 reviews, or 0.19%. Reviews in

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this category generally relate to the availability of digital information, location directions, internet access, and the ease of obtaining online tourism information.

Questionnaire Results

Primary data collection in this study was carried out by distributing questionnaires to the community in the Ciletuh-Palabuhanratu Geopark area.

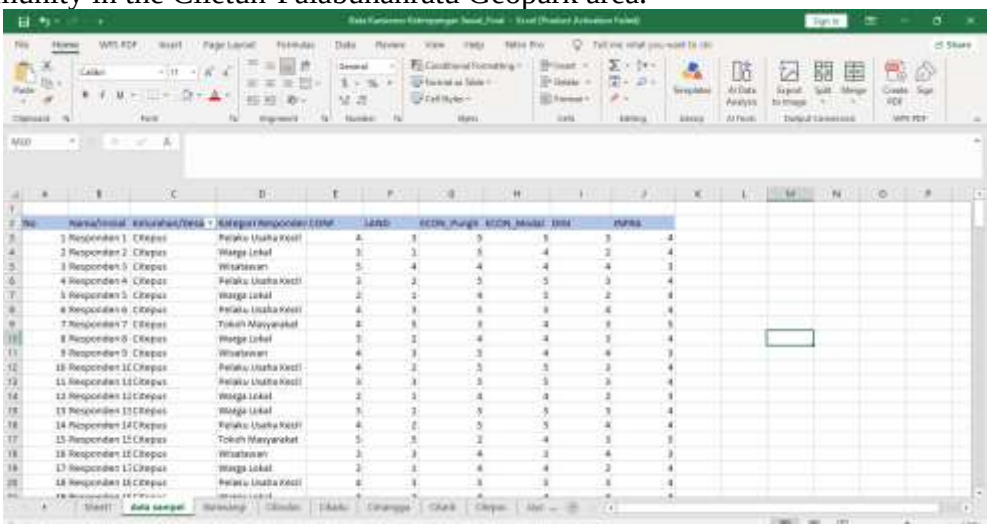


Figure 4. Questionnaire Data Tabulation

Based on the data collection results, 200 respondents were obtained, consisting of local residents, small business owners, tourists, and community leaders. The questionnaire was designed using a Likert scale of 1–5 to measure respondents' perceptions of various socioeconomic indicators that were the focus of the study.

Table 3. Questionnaire Indicator Categories

Variable	Average
ECON (Capital)	4.35
INFRA	4.11
LAND	3.91
ECON (Extortion)	3.90
CONF	3.45
DIGI	3.18

Based on Table 3, the indicator with the highest average value is ECON_Modal, at 4.35. This result indicates that most respondents have a strong perception of the influence of capital and investment on tourism development. The high score for this indicator indicates that the growing economic activity in the Ciletuh-Palabuhanratu Geopark area is considered to have a significant impact on the surrounding community, both in the form of business opportunities and increased local economic activity.

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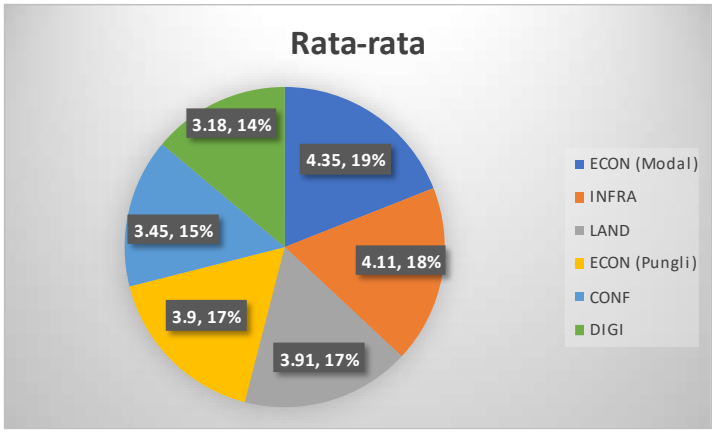


Figure 5. Average Value Diagram on Questionnaire Indicators

The INFRA (Infrastructure) indicator obtained an average score of 4.11, indicating that respondents assessed the condition of infrastructure in the study area as being in the good category. Infrastructure is a crucial aspect in supporting tourism development because it is directly related to accessibility, comfort, and quality of service to tourists. The high score for this indicator indicates that the development of tourism facilities and infrastructure has been felt to be beneficial by both the community and visitors. Furthermore, the LAND (Land Inequality) indicator obtained an average score of 3.91. This value indicates that respondents are quite aware of changes in land use or the dynamics of spatial utilization that occur along with the development of the tourism sector. However, the level of perception is still in the medium to high category, indicating that the issue of land inequality has not become a dominant problem compared to other indicators.

The ECON_Pungli indicator obtained an average score of 3.90. This result indicates that respondents are still concerned about economic practices that have the potential to harm both the community and tourists. Although the average score is quite high, this finding can be used as evaluation material for tourism area managers to improve transparency and improve economic governance. The CONF (Conflict and Access) indicator obtained an average score of 3.45. This value indicates that respondents have a relatively moderate perception of the existence of social conflict and access issues that occur in tourism areas. The low score compared to other indicators indicates that social conflict and access restrictions are not yet a major issue perceived by the majority of respondents.

Meanwhile, the DIGI (Digitalization and Information) indicator received the lowest average score, at 3.18. This result indicates that digitalization still requires further attention. Some respondents considered the availability of digital information, location accuracy on digital platforms, and ease of access to tourism information to be suboptimal.

Respondent Characteristics

Based on the questionnaire results, respondents consisted of several stakeholder groups who were related to tourism activities in the research area.

Table 4. Number and Categories of Respondents

Respondent Category	Amount
Local Residents	86
Small Business Actors	44
Traveler	36
Public figure	34
Total	200

The data shows that the majority of respondents, 86 people, or 43% of the total, were local residents. The predominance of local respondents provides an advantage in this research

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because they directly experience the socio-economic impacts of tourism development in the Ciletuh-Palabuhanratu Geopark area.

AHP Weighting Results

The Analytical Hierarchy Process (AHP) method was used to prioritize socioeconomic indicators based on two data sources: online sentiment analysis and questionnaire results. The use of AHP in this study aimed to determine which indicators were most important in describing the socioeconomic conditions of the UNESCO Palabuhanratu Geopark.

Hierarchical Structure Compilation

The AHP hierarchical structure in this study consists of three levels, namely objectives, criteria, and alternatives.

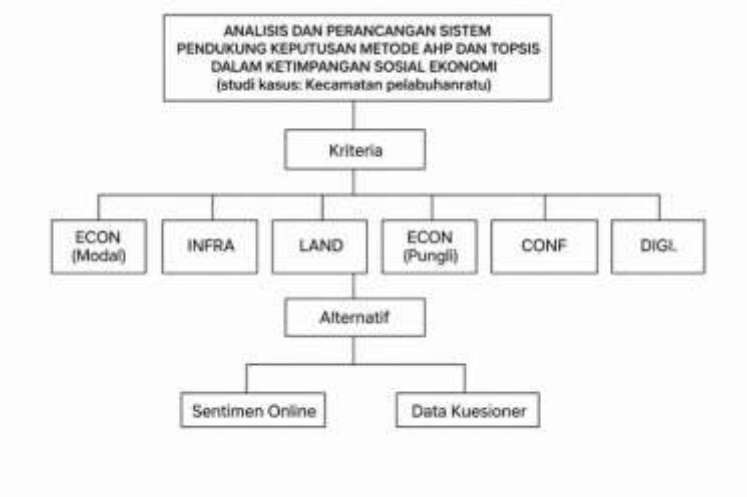


Figure 6. Hierarchical Structure

Online Data Analysis Results

Online data was obtained through a process of identifying and analyzing information related to socioeconomic conditions in Palabuhanratu District. The information obtained was then grouped based on six research indicators to allow for quantitative measurement.

1. Online Data Processing Results

Based on the results of online data collection, values were obtained for each indicator as shown in Table 5.

Table 5. Online Analysis Results Data

No	CONF	LAND	ECON	Capital Distribution	DIGI	INFRA
1	4	4	6	6	4	6
2	4	4	6	6	4	6
3	4	4	6	6	4	6
4	4	4	6	6	4	6
5	4	4	6	6	4	6
6	4	4	6	6	4	6
7	4	4	6	6	4	6
8	4	4	6	6	4	3

Table 5 shows that the Economic Inequality and Capital Distribution indicators scored relatively higher than the other indicators. This indicates that economic issues were the most

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dominant topic of discussion in the online data analyzed.

2. Recapitulation of Average Values of Online Data

The average value of each indicator is calculated to determine the relative importance of each indicator based on online data.

Table 6. Average Online Data

Indicator	Average value
CONF (Conflict and Access)	4,000
LAND (Land Inequality)	4,000
ECON (Economic Inequality)	6,000
Capital Distribution	6,000
DIGI (Digital Inequality)	4,000
INFRA (Physical Infrastructure)	5,625

Based on the average calculation results, the Capital Distribution and Economic Inequality indicators obtained the highest score of 6,000. Meanwhile, the Physical Infrastructure indicator obtained an average score of 5.625, while the Conflict and Access, Land Inequality, and Digital Inequality indicators each obtained an average score of 4,000.

These results indicate that economic issues are more prominent in public discussions on digital media than other indicators. The high level of attention paid to capital distribution and economic inequality indicates that the public places greater emphasis on economic welfare, investment equity, and business opportunities as factors influencing socioeconomic conditions in Palabuhanratu District.

Offline Data Analysis Results

Offline data was obtained by distributing questionnaires to respondents familiar with the socioeconomic conditions in Palabuhanratu District. Data collection was conducted to directly obtain public perceptions of the six socioeconomic inequality indicators that were the focus of the study. All data obtained was then processed to determine the level of importance of each indicator before weighting it using the Analytical Hierarchy Process (AHP) method.

1. Offline Data Processing Results

Based on the results of distributing the questionnaire, the data obtained were as shown in Table 7.

Table 7. Offline Analysis Result Data

No	CONF	LAND	ECON	Capital Distribution	DIGI	INFRA
1	8	10	8	10	6	8
2	10	8	10	10	8	8
3	6	8	6	8	8	10
4	8	10	6	8	6	10
5	8	8	10	10	8	8
6	4	6	6	6	6	8
7	4	6	4	6	8	8
8	6	6	6	8	10	10

Table 7 shows that each respondent gave a different assessment of each indicator. This difference indicates varying public perceptions regarding the factors that most influence socioeconomic inequality in Palabuhanratu District.

2. Summary of Offline Data Average Values

The average value of each indicator is calculated to determine the relative level of importance based on respondents' perceptions.

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Table 8. Average Offline Data

Indicator	Average value
CONF (Conflict and Access)	6,750
LAND (Land Inequality)	7,750
ECON (Economic Inequality)	7,000
Capital Distribution	8,250
DIGI (Digital Inequality)	7,500
INFRA (Physical Infrastructure)	8,750

Based on the average calculation results, the Physical Infrastructure indicator obtained the highest score of 8.750, followed by Capital Distribution at 8.250. Furthermore, the Land Inequality indicator obtained an average score of 7.750, Digital Inequality at 7.500, Economic Inequality at 7.000, and Conflict and Access at 6.750.

These results indicate that, based on respondents' perceptions, infrastructure conditions and capital distribution are the most influential factors affecting socioeconomic inequality in Palabuhanratu District. Adequate infrastructure is considered capable of improving accessibility, economic activity, and the quality of public services, while capital distribution impacts community opportunities to develop businesses and improve welfare.

3. Determining the Degree of Importance of Offline Data

Based on the average results obtained, each indicator is then converted into an ordinal scale of 1–10 as a basis for determining priorities before weighting using the Analytical Hierarchy Process (AHP) method.

Table 9. Degree of Importance of Offline Data

Variables	Average value	Ordinal Scale (1–10)	Priority Classification
INFRA (Physical Infrastructure)	8,750	10	Very Important (Top Priority)
ECON (Capital Distribution)	8,250	9	Very important
LAND (Land Inequality)	7,750	8	Important
DIGI (Digital Inequality)	7,500	7	Important
ECON (Economic Inequality)	7,000	6	Quite Important
CONF (Conflict & Access)	6,750	5	Quite Important

Based on Table 9, the Physical Infrastructure indicator received the highest degree of importance with an ordinal scale of 10, followed by Capital Distribution with a scale of 9. These two indicators are considered the most influential factors on the condition of socioeconomic inequality based on the results of respondents' perceptions. Meanwhile, the Land Inequality indicator received an ordinal scale of 8, while the Digital Inequality received a scale of 7. Both indicators are still considered to have a significant influence on the socioeconomic conditions of the community. The Economic Inequality indicator received a scale of 6, while the Conflict and Access indicator received a scale of 5, so both are in the category of moderate importance.

The differences in results between online and offline data indicate a variation in perception between information circulating in digital media and the conditions directly

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experienced by the public. In the online data, public attention focused more on economic aspects and capital distribution, while in the offline data, respondents assessed that physical infrastructure had a greater influence on socioeconomic inequality. Therefore, both data sources need to be integrated to obtain a more comprehensive assessment basis before the AHP weighting process is carried out.

4. Determining the Degree of Importance of Online Data

Based on the average value obtained, each indicator is then converted to an ordinal scale of 1–10 to indicate its relative priority level before being weighted using the AHP method. The ordinal scale is determined by considering the average value and the level of urgency of each indicator.

Table 10. Degree of Importance of Online Data

Variables	Average value	Ordinal Scale (1–10)	Priority Classification
ECON (Capital Distribution)	6,000	10	Very Important (Top Priority)
ECON (Economic Inequality)	6,000	10	Very Important (Top Priority)
INFRA (Physical Infrastructure)	5,625	8	Important
CONF (Conflict & Access)	4,000	6	Quite Important
LAND (Land Inequality)	4,000	6	Quite Important
DIGI (Digital Inequality)	4,000	4	Less Important

Based on Table 10, the Capital Distribution and Economic Inequality indicators received the highest importance rating, with an ordinal scale of 10, as both indicators had the highest average scores in the online data analysis. This indicates that economic aspects are the primary focus of public discussions on digital media. Furthermore, the Physical Infrastructure indicator received an ordinal scale of 8, as it still has a significant influence on public perception. Meanwhile, the Conflict and Access and Land Inequality indicators each received an ordinal scale of 6, while Digital Inequality received an ordinal scale of 4, as it played a supporting role compared to the other indicators.

Integration of Online and Offline Data Analysis Results

1. Data Integration Results

Based on the results of the average calculation from the two data sources, the integration value is obtained as shown in Table 11.

Table 11. Results of Online and Offline Data Integration

Variables	Online Values	Offline Value	Integration Value
CONF (Conflict and Access)	4,000	6,750	5,375
LAND (Land Inequality)	4,000	7,750	5,875
ECON (Economic Inequality)	6,000	7,000	6,500
ECON (Capital Distribution)	6,000	8,250	7,125
DIGI (Digital Inequality)	4,000	7,500	5,750
INFRA (Physical Infrastructure)	5,625	8,750	7,188

Based on Table 11, the Physical Infrastructure indicator obtained the highest integration score of 7.188, followed by Capital Distribution at 7.125. Next, the Economic Inequality indicator obtained a score of 6.500, Land Inequality at 5.875, Digital Inequality at 5.750, and Conflict and Access at 5.375. These results indicate that after combining perceptions from digital media and the public, physical infrastructure indicators and capital distribution remain

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the most dominant factors in influencing socioeconomic inequality in Palabuhanratu District.

2. Determining the Degree of Importance of Integration Results

The integration values are then converted to an ordinal scale of 1–10 to determine the relative importance of each indicator. The ordinal scale is used as the basis for constructing a pairwise comparison matrix in the AHP method.

Table 12. Degree of Importance of Integration Results

Variables	Integration Value	Ordinal Scale (1–10)	Priority Classification
INFRA (Physical Infrastructure)	7,188	10	Very Important (Top Priority)
ECON (Capital Distribution)	7,125	9	Very important
ECON (Economic Inequality)	6,500	8	Important
LAND (Land Inequality)	5,875	6	Quite Important
DIGI (Digital Inequality)	5,750	5	Quite Important
CONF (Conflict and Access)	5,375	4	Less Important

3. Discussion of Integration Results

The integration results show that there are differences in priorities between online and offline data. In the online data, public attention is more focused on the aspects of Capital Distribution and Economic Inequality, while in the offline data, respondents considered Physical Infrastructure to be the most influential factor in the condition of socioeconomic inequality. After the two data sources were combined, Physical Infrastructure remained in first place with an integration score of 7.188, followed by Capital Distribution at 7.125. This condition shows that in addition to economic aspects, the availability of infrastructure also plays a very important role in supporting equitable development and improving community welfare in Palabuhanratu District.

Meanwhile, Economic Inequality remains a significant indicator, achieving an integration score of 6.500. This indicates that the issue of economic inequality remains a public concern, both in digital media and based on directly experienced conditions. Meanwhile, Land Inequality, Digital Inequality, and Conflict and Access achieved relatively lower scores, but they still contribute to socioeconomic inequality and therefore need to be considered in the decision-making process.

Based on the integration results, an initial priority order of indicators is obtained, which is then used as the basis for compiling a pairwise comparison matrix using the Analytical Hierarchy Process (AHP) method. This stage aims to obtain a more objective priority weight for each indicator through a weighting process and consistency testing.

Pairwise Comparison Matrix

Based on the results of determining the degree of importance of the indicators, a pairwise comparison matrix was prepared using the AHP method. The values in the matrix indicate the relative importance of one indicator to another.

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Table 13. Pairwise Comparison Matrix

Indicator	C1	C2	C3	C4	C5	C6
C1	1.00	1.33	0.80	0.80	2.00	1.33
C2	0.75	1.00	0.60	0.60	1.50	1.00
C3	1.25	1.67	1.00	1.00	2.50	1.67
C4	1.25	1.67	1.00	1.00	2.50	1.67
C5	0.50	0.67	0.40	0.40	1.00	0.67
C6	0.75	0.67	0.60	0.60	1.50	1.00
Amount	**5.50**	**7.00**	**4.40**	**4.40**	**11.00**	**7.33**

Information:
C1 = Conflict and Access
C2 = Land Inequality
C3 = Economic Inequality
C4 = Capital Distribution
C5 = Digital Inequality
C6 = Physical Infrastructure

Table 13 shows the results of pairwise comparisons between research indicators. A value greater than one indicates that the indicator in the row has a higher level of importance than the indicator in the column, while a value less than one indicates a lower level of importance. This matrix serves as the basis for the normalization process to obtain the priority weights for each indicator.

Matrix Normalization and Priority Weights

Once the pairwise comparison matrix is obtained, the next step is to normalize the matrix. The normalization process involves dividing each matrix element by the sum of its columns to obtain the relative importance of each indicator. The average value of each row is then calculated to obtain the priority weights (priority vector).

Table 14. Results of Matrix Normalization and Priority Weights

Indicator	C1	C2	C3	C4	C5	C6	Eigenvectors
C1	0.182	0.190	0.182	0.182	0.182	0.182	0.183
C2	0.136	0.143	0.136	0.136	0.136	0.136	0.137
C3	0.227	0.238	0.227	0.227	0.227	0.227	0.229
C4	0.227	0.238	0.227	0.227	0.227	0.227	0.229
C5	0.091	0.095	0.091	0.091	0.091	0.091	0.092
C6	0.136	0.095	0.136	0.136	0.136	0.136	0.130

Based on the results of the matrix normalization, the priority weight of each indicator is obtained. The weight value indicates the relative importance of each indicator to the research objectives. The greater the weight value, the greater the influence of the indicator in determining the priority of socioeconomic inequality. The calculation results show that the indicators of Economic Inequality (C3) and Capital Distribution (C4) have the highest priority weight, each at 0.229. This is followed by Conflict and Access (C1) at 0.183, Land Inequality (C2) at 0.137, Physical Infrastructure (C6) at 0.130, and Digital Inequality (C5) at 0.092. These findings indicate that the economic aspect is the most dominant factor based on the results of the online data analysis.

Comparison Matrix Consistency Test

After obtaining the priority weights for each indicator, the next step is to test the consistency level of the pairwise comparison matrix. This test aims to ensure that the assessments provided meet the consistency principles of the Analytical Hierarchy Process (AHP) method. The consistency testing stage is carried out by calculating the Weighted Sum

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Vector, Consistency Vector, λmax, Consistency Index (CI), and Consistency Ratio (CR).

a. Weighted Sum Vector

The Weighted Sum Vector is obtained by multiplying the pairwise comparison matrix by the eigenvector obtained in the previous stage.

Table 15. Weighted Sum Vector

Indicator	Mark
C1 (Conflict and Access)	1,096
C2 (Land Inequality)	0.821
C3 (Economic Inequality)	1,373
C4 (Capital Distribution)	1,373
C5 (Digital Inequality)	0.552
C6 (Physical Infrastructure)	0.779

Based on the calculation results, the Weighted Sum Vector value is obtained for each indicator which is then used in the process of calculating the Consistency Vector value.

b. Consistency Vector

The Consistency Vector is obtained by dividing the Weighted Sum Vector value by the eigenvector value of each indicator.

Table 1. Consistency Vector

Indicator	Weighted Sum	Eigenvector	Consistency Vector
C1	1,096	0.183	5.99
C2	0.821	0.137	5.99
C3	1,373	0.229	6.00
C4	1,373	0.229	6.00
C5	0.552	0.092	6.00
C6	0.779	0.130	5.99

The average value of the Consistency Vector produces the value of λmax.

c. λmax value

The λmax value is obtained from the average of all Consistency Vector values.

Table 17. Calculation of λmax

Parameter	Mark
Number of Consistency Vectors	35,962
Number of Criteria	6
λmax	5,994

The λmax value obtained was 5.994, which indicates that the comparison matrix has a very good level of consistency and is close to the number of criteria used.

d. Consistency Index (CI) Calculation

The Consistency Index is calculated using the following equation.

$$\boldsymbol{CI = \frac{\lambda_{max} - n}{n - 1}}$$

With:

λmax = 5.994

n = 6

Then we get:

$$\boldsymbol{CI = \frac{5,994 - 6}{5}}$$

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$$\boldsymbol{CI = -0,0012}$$

Because this value appears as a result of decimal rounding and in theory CI is not negative, the CI value is considered to be equal to 0, which indicates a very good level of consistency.

Table 18. CI Calculation

Parameter	Mark
λmax	5,994
n	6
CI	0,000

e. Consistency Ratio (CR) Calculation

The Random Index (RI) for the number of criteria as many as six is 1.24.
CR calculation is done using the formula:

$$\boldsymbol{CR = \frac{CI}{RI}}$$

So we get:

$$\boldsymbol{CR = \frac{0}{1,24} = 0}$$

Table 19. Consistency Ratio Results

Parameter	Mark
Consistency Index (CI)	0,000
Random Index (RI)	1,240
Consistency Ratio (CR)	0,000

Based on the calculation results, the Consistency Ratio (CR) value was obtained at 0.000. This value is below the tolerance limit of 0.10 as required in the Analytical Hierarchy Process (AHP) method. Thus, the pairwise comparison matrix is declared consistent, so that the resulting priority weights can be used as a basis for determining the priority of socio-economic inequality indicators in Palabuhanratu District.

Conclusion and Recommendation

This study identifies six indicators relevant to socioeconomic inequality in Palabuhanratu District: Conflict and Access, Land Inequality, Economic Inequality, Capital Distribution, Digital Inequality, and Physical Infrastructure. The preliminary ranking based on integrated online and offline scores places Physical Infrastructure first, with a score of 7.188, followed by Capital Distribution at 7.125. However, the final AHP weights reported in Table 14 identify Economic Inequality and Capital Distribution as the highest-ranked indicators, each with a weight of 0.229, followed by Conflict and Access (0.183), Land Inequality (0.137), Physical Infrastructure (0.130), and Digital Inequality (0.092). These differences highlight the importance of distinguishing the initial ranking from the final AHP results. The reported Consistency Ratio (CR) of 0.000 is below the accepted threshold of 0.10, although the pairwise comparison matrix and calculations should be verified before the final priority ranking is established. The results represent the relative priorities derived from online reviews, questionnaire responses, and pairwise comparisons, rather than evidence of the actual causes of socioeconomic inequality.

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Based on these findings, the local government may use the verified priority rankings as an initial reference for assessing policies related to economic inequality, capital distribution, infrastructure, and other identified indicators. Further assessment involving local communities and relevant stakeholders is needed before determining specific interventions or drawing conclusions about how tourism benefits are distributed. This study has several limitations, including purposive sampling, the high proportion of irrelevant online reviews, the geographical focus on the Palabuhanratu area, and the reliance on perception-based indicators. Future research should broaden the geographical coverage, improve the relevance and representativeness of online data, include additional socioeconomic indicators, and compare AHP results with other multi-criteria decision-making methods.

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