Article

Enhancing Tourist Satisfaction on Komodo Island: A Data-Driven Analysis of Online Reviews

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Abstract: This study examines the role of Komodo Island in boosting Indonesia's status as a leading global tourism destination, emphasizing the importance of balancing environmental preservation with visitor satisfaction for sustainable growth. By conducting a comprehensive analysis of online reviews from Google Travel, this study identifies key factors that shape tourists' experiences on Komodo Island. Specifically, the objectives are to uncover the primary drivers of visitor satisfaction and offer practical recommendations for tourism operators and policymakers. Using text mining and semantic network analysis through RStudio and UCINET 6.0 to analyze word associations, alongside exploratory factor analysis and linear regression in SPSS 29, this study focuses on aspects such as "Value for Money" and "Service Quality". The results show that natural attractions greatly enhance visitor satisfaction, whereas high expenses and inconsistent service quality are sources of dissatisfaction. These insights highlight the importance of revisiting pricing approaches and enhancing training for frontline staff. The study's recommendations for sustainable tourism on Komodo Island center on recalibrating pricing and improving service quality, fostering a memorable experience for visitors.

Keywords: Komodo Island tourism; online review; big data analytics; customer satisfaction

1. Introduction

The Komodo dragons have shown a notable surge in popularity, particularly following the designation as one of the seven new of nature in 2011 and the international promotional event "Sail Komodo" in 2013 (Oktadiana, 2021). The increasing popularity of the lizards has resulted in a significant increase in visitors to Komodo National Park (KNP) (Oktadiana, 2021). Due to this escalating trend, the Indonesian government made Labuan Bajo, the main gateway to Komodo Island, a top-10 priority for national tourism (Lasso & Dahles, 2018). As a prominent tourist destination, Komodo Island ought to develop a significant competitive strategy to create added value through an efficient value chain (Laiskodat et al., 2017). Sustainable tourism on Indonesia's Komodo Island has progressed by combining conservation initiatives with enhancements to visitor experiences, focusing on ecological harmony through community participation, environmentally conscious infrastructure, and management strategies adapted to its distinctive environmental conditions (Sianipar et al., 2024).

The tourism industry has faced heightened competition in recent years, leading to a shift in heritage tourism research ranging from product-focused approaches to those centered on the visitor experience (Ballantyne et al., 2014). This new approach explores the experiences of tourists at heritage sites, particularly within the context of the intensified

competition. Research has focused significantly on sustainability, exploring economic, social, and cultural strategies to support the developing heritage destinations over the long term (Weiler & Kim, 2011) while emphasizing the importance of community involvement in preserving heritage sites through local participation aimed at maintaining destination authenticity and sustainability (Silverman, 2015).

In the context of tourism, eWOM (electronic word-of-mouth) refers to the distribution of purchased experiences with products and services following use or interaction (Riswanto & Kim, 2023). As such, if marketers, policymakers, and tourism planners focus on improving tourist experiences (Riswanto et al., 2023), it could enhance the likelihood of tourists sharing their experiences through eWOM, a vital tool for attracting and retaining clients in the modern era (Litvin et al., 2008).

Prior research on natural heritage sites has thoroughly explored the relationship between environmental conservation and visitor satisfaction, focusing on sustainable development practices that improve the visitor experience while safeguarding natural and cultural assets. However, much of this research relies on qualitative analysis or examines impacts at a local level, often without employing large-scale, data-driven methods to gauge visitor satisfaction. This study builds on previous work by applying big data analytics to assess extensive online reviews, offering a quantitative perspective on customer satisfaction in areas like "Nature", "Value for Money", "Service", and "Experience". Distinct from earlier studies, this research uses advanced text mining and semantic network analysis, presenting a robust, data-driven understanding of how visitor satisfaction is influenced by both natural attractions and service aspects. This approach uncovers new insights into the intricate balance between satisfaction and sustainability on Komodo Island.

This research investigates tourist experiences on Komodo Island, Indonesia, with a particular emphasis on customer satisfaction derived from online reviews. By analyzing specific heritage tourism terminology based on patterns of word co-occurrence, this study aims to:

1. Identify the content and impact of online reviews pertaining to Komodo Island, concentrating on frequently used terms.
2. Assess customer satisfaction levels during visits to Komodo Island.
3. Offer practical implications to assist companies in enhancing their public reputation by identifying key terms that contribute to higher review ratings.

Using exploratory factor analysis (EFA), word clusters will be identified as well as the relationship between guests' feedback and their level of satisfaction.

2. Literature Review

Tourism is essential for economic growth, job generation, attracting investment, and increasing income within communities (Fatina et al., 2023). Indonesian tourism development began in the 1960s and has seen significant growth since the 1980s (Hampton & Jeyacheya, 2015). Indonesia's tourism industry is rapidly advancing, serving as a key driver of economic growth by creating local jobs, improving infrastructure, and fostering cultural understanding (Sokhanvar et al., 2018). The primary goal of tourism development is to increase local income, which in turn can enhance local well-being and contribute to the growth of the Indonesian economy (Kinseng et al., 2018). Effective tourism management is essential to achieving optimal sustainability and meeting tourism objectives (KC et al., 2021). Additionally, sustainable tourism practices are progressively being incorporated into the industry to ensure that the economic advantages are enduring and will not result in environmental or cultural harm (Khan et al., 2020).

Labuan Bajo is a significant entry point for tourism in eastern Indonesia, primarily because it is home to Komodo National Park (Kinseng et al., 2018). A study conducted by

Muchtar et al. (2023) assessed the dependence of islands near Labuan Bajo on mainland water resources by analyzing spatial factors and water-carrying capacity. In contrast, Cole's (2017) study applied the ethnographic method, highlighting the competition for water between tourists and local communities, which has a particular impact on women. In the social context, study by Sianipar et al. (2022) employed the human ecosystem method, pinpointing challenges in managing Komodo National Park, including the conservation and management of Komodo dragon populations, economic disparities with international investors, and a diminishing quality of kinship relationships between the lizards and the indigenous tribal community. These studies highlight the need for sustainable strategies on Komodo Island to ensure the balance between tourism, resource management, and the preservation of both cultural heritage and the natural environment.

Due to the intangibility of tourism services, customers are heavily dependent on the opinions of other tourists when making purchase decisions (Riswanto & Kim, 2023). Social Influence Theory suggests that consumers frequently depend on others' experiences to lessen perceived risks and uncertainties in their decision-making, particularly in tourism, where services cannot be directly assessed before purchase (Tanford & Montgomery, 2014). A study by Riswanto et al. (2023) shows that using big data analysis of eWOM in heritage tourism helps identify key factors that impact customer satisfaction in cultural destinations, highlighting the role of online reviews in shaping tourist perceptions and choices. In marketing, electronic word-of-mouth (eWOM) allows consumers to share their opinions, beliefs, and experiences about products or services online, facilitating consumer-to-consumer engagement and influence (Ahuja et al., 2007). However, fake reviews can threaten tourism entities, and the lack of sufficient information and context in some online reviews may lead to misunderstandings (Wu et al., 2020). Additionally, the excessive repetition of information in reviews may cause consumer confusion during the decision-making process (Wang et al., 2023). An overabundance of positive reviews may also contribute to overcrowding at popular destinations (Xu et al., 2021). Furthermore, this study builds on existing eWOM and tourism literature by examining how these factors are reflected in the heritage tourism experience on Komodo Island.

As implied by the term "Big Data Analytics", the procedures involve the analysis of large quantities of unstructured as well as structured data available on the Internet (Xu et al., 2021). In recent years, sentiment analysis has employed big data analytics to gauge user opinions on business offerings from vast online databases, enabling researchers to extract valuable insights from unstructured online data (Gandomi & Haider, 2015). In semantic network analysis, to determine how information is structured, word frequencies and sequential placement are examined without assigning specific meaning to the words (Pereira et al., 2022). While Freeman's centrality is based on the number of direct linkages between nodes, eigenvector centrality takes into account both the quantity and the importance of connectivity (Freeman, 1978; Kenett, 2018). CONCOR analysis was performed in order to identify the most prominent words and discover the key features that define customer satisfaction (Handani et al., 2022). The CONCOR analysis utilizes a co-occurrence matrix to discover hidden subgroups and their linkages, while exploratory factor analysis and linear regression analysis on semantic networks help identify key terms that define various aspects of the customer experience. Based on these results, this study proposes hypotheses such as:

Hypothesis 1 (H1). *Nature positively influences customer satisfaction at Komodo Island.*

Hypothesis 2 (H2). *Value for money positively influences customer satisfaction at Komodo Island.*

Hypothesis 3 (H3). *Service quality positively influences customer satisfaction at Komodo Island.*

Hypothesis 4 (H4). *Visitor experience positively influences customer satisfaction at Komodo Island.*

3. Methodology

Customer satisfaction research has traditionally focused on using surveys and questionnaires as the main approaches (Brandtner et al., 2021). In this study, quantitative and qualitative methods are employed as part of a mixed-methods approach. Text mining, utilizing Outscraper and RStudio (Figure 1), was conducted in order to analyze frequently used words. Researchers have employed a range of methods for sentiment analysis, including the use of the R programming language alongside RStudio, an integrated development environment crafted specifically for statistical computing (Handani et al., 2022). These matrices underwent analysis using Freeman's degree and eigenvector analyses to identify the most influential words within the dataset. Subsequently, UCINET was employed to assess the significance of words, and CONCOR discerned the relationship between words.
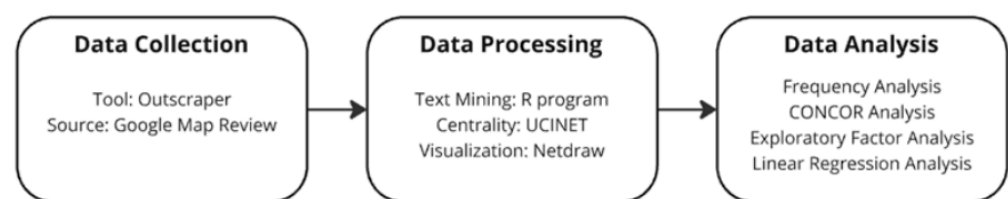
Figure 1. Research flow.

Following this, an analysis of semantic networks was conducted in order to identify the most relevant words (Riswanto et al., 2024). In order to analyze the relationship between words and their significance, UCINET was used to conduct a CONCOR analysis. UCINET was selected for its sophisticated network analysis features, which are particularly effective in uncovering patterns of influence and connections within semantic networks (Ellahi et al., 2023). Moreover, UCINET is frequently used in social science research for network analysis and is commonly applied in the hospitality industry for sentiment analysis. Statistical tests, such as the Kaiser–Meyer–Olkin (KMO) and Bartlett tests, along with exploratory factor analysis, were performed to confirm the scale's validity and reliability, verifying that factors exceeding 0.5 are consistently structured (Riswanto et al., 2024).

The primary aim of this study was to explore the factors that influence customer satisfaction in the context of Komodo Island. Data sourced from Google Travel includes 6200 reviews, with an average satisfaction rating of 4.7. To maintain data quality, only reviews that contained both textual comments and numerical ratings were included, while reviews lacking written comments were excluded. This approach led to the creation of a final dataset, comprising (the number of reviews).

Customer reviews of Komodo Island were gathered and analyzed using a text mining process. To improve data quality, the analysis included only reviews with both written comments and numerical ratings, excluding empty reviews to reduce the risk of low-quality or potentially fake feedback. This study utilized Google Travel as data sources due to their widespread recognition and frequent use as platforms for sharing travel experiences, offering a wealth of diverse user-generated content that provides meaningful insights into tourist perceptions (Baka, 2016; Ramadhani et al., 2024). The dataset gathered from Google Travel may contain sample biases due to the platform's unique audience. The use of online reviews introduces potential biases, as they primarily reflect the opinions of motivated tourists who choose to share their experiences, often skewing toward very positive or negative sentiments, which may limit the generalizability of the findings to the broader tourist population. A study by Wu et al. (2020) highlights that emotions

often drive individuals to post extreme reviews, whether highly positive or negative, thereby contributing to potential biases in online review analysis and emphasizing the need for careful interpretation of such data in tourism research. However, compared to survey data, it is less biased as it reflects feedback from a diverse and anonymous pool of respondents over an extended period, rather than targeted individuals responding within a short timeframe. This limitation is considered in discussions of generalizability, with data handling fully aligned with Google's copyright and privacy policies. Customer satisfaction levels were assessed based on numerical ratings, which ranged from 1 to 5. The results indicated an overall satisfaction rating of 4.7 stars, demonstrating high levels of customer satisfaction.

4. Result

4.1. Frequency Analysis

The word significance was determined by ranking them according to the frequency of their appearance within the valid comments (Doerfel & Moore, 2016). Table 1 displays the top 60 customer experience-related words. This selection of words was guided by their relevance to the research topic (Bayrakdar et al., 2020). In this study, each word is assigned a proportional frequency, calculated based on its overall occurrence in the comments, allowing them to be ranked according to their frequency.

Table 1. Frequency analysis results.

Rank	Words	Freq	Rank	Words	Freq
1	komodo	2097	31	far	354
2	island	1673	32	walk	345
3	experience	1478	33	unique	292
4	scenery	1175	34	fun	289
5	wonderful	1170	35	excited	286
6	beautiful	1064	36	fun	285
7	labuan-bajo	1045	37	natural	278
8	guide	1013	38	time	276
9	boat	952	39	row	275
10	trip	794	40	dry	274
11	visit	774	41	stone	271
12	nature	751	42	quiet	270
13	visit	710	43	inside	268
14	tour	679	44	bay	267
15	place	645	45	group	266
16	worth	621	46	fascinating	265
17	route	578	47	crowd	264
18	good	544	48	view	263
19	animal	506	49	price	260
20	indonesia	462	50	pay	258
21	recommend	457	51	trash	257
22	interesting	447	52	safe	255
23	safe	430	53	friendly	254
24	amazing	414	54	ranger	253
25	tourist	406	55	crowd	252
26	great	387	56	ticket	251
27	cost	380	57	majestic	249
28	local	374	58	fee	247
29	service	365	59	hike	245
30	habitat	362	60	mountain	243

Semantic network analysis links concepts, offering significant insight into textual data and enabling a deeper level of comprehension and relationships between words (Schubert et al., 1979). Research in this field has utilized metrics like Freeman's degree centrality and eigenvector centrality to determine the distribution of words according to their closeness to central nodes within the network (Gisela M. von Dran, 2001). The results are displayed in Table 2.

Table 2. Comparison of word frequency and centrality.

Factor	Frequency		Degree		Eigenvector		Factor	Frequency		Degree		Eigenvector	
Word	Freq	Rank	Coef.	Rank	Coef.	Rank	Word	Freq	Rank	Coef.	Rank	Coef.	Rank
komodo	2097	1	20.8317	1	20.8227	1	far	354	31	2.9296	31	2.9415	31
island	1673	2	16.1489	2	16.1399	2	walk	345	32	2.9347	30	2.9466	30
experience	1478	3	15.7939	3	15.7849	3	unique	292	33	2.9545	29	2.9664	29
scenery	1175	4	15.4131	4	15.4041	4	fun	289	34	2.9187	33	2.9306	33
wonderful	1170	5	11.9018	5	11.8928	5	excited	286	35	2.5108	36	2.5227	36
beautiful	1064	6	10.7328	6	10.7238	6	fun	285	36	2.9216	32	2.9335	32
labuan-bajo	1045	7	8.8749	9	8.8729	8	natural	278	37	2.7367	35	2.7486	35
guide	1013	8	8.2372	11	8.8659	9	time	276	38	2.4823	37	2.4942	37
boat	952	9	7.9635	12	9.1859	7	row	275	39	2.1461	38	2.158	38
trip	794	10	9.1949	7	8.3828	10	dry	274	40	2.0961	40	2.1079	40
visit	774	11	8.8819	8	8.2282	11	stone	271	41	2.0657	41	2.0776	41
nature	751	12	6.3335	16	7.3517	13	quiet	270	42	1.9671	43	1.979	43
visit	710	13	7.3607	13	7.9545	12	inside	268	43	1.7259	45	1.7378	45
tour	679	14	6.3772	15	6.7126	14	bay	267	44	1.9831	42	1.9951	42
place	645	15	8.3918	10	6.3682	15	group	266	45	1.6396	46	1.6515	46
worth	621	16	6.7216	14	5.0948	18	fascinating	265	46	1.9631	44	1.9751	44
route	578	17	5.8717	17	6.3245	16	crowd	264	47	1.6067	47	1.6186	47
good	544	18	3.9905	23	5.8627	17	view	263	48	1.5804	48	1.5923	48
animal	506	19	5.1038	18	4.3168	20	price	260	49	1.5395	50	1.5514	50
indonesia	462	20	4.1058	21	4.5069	19	pay	258	50	1.5468	49	1.5587	49
recommend	457	21	4.0809	22	3.9815	23	trash	257	51	1.4715	52	1.4834	52
interesting	447	22	4.5159	19	3.8474	24	safe	255	52	1.3802	54	1.3921	54
safe	430	23	3.2871	28	4.0968	21	friendly	254	53	1.4921	51	1.5039	51
amazing	414	24	4.3258	20	4.0719	22	ranger	253	54	1.1478	56	1.1597	56
tourist	406	25	2.7377	34	3.7465	25	crowd	252	55	1.2822	55	1.2941	55
great	387	26	3.3916	26	3.3826	27	ticket	251	56	1.4518	53	1.4647	53
cost	380	27	3.7306	25	3.7216	26	majestic	249	57	1.1302	57	1.1431	57
local	374	28	3.2964	27	3.2874	28	fee	247	58	0.9314	59	1.0751	58
service	365	29	3.7555	24	3.2781	29	hike	245	59	1.0631	58	0.9433	59
habitat	362	30	2.0978	39	3.0953	30	mountain	243	60	0.8422	60	0.8541	60

Figure 2 demonstrates the interconnectedness of these words by displaying a network of the most frequently used terms.
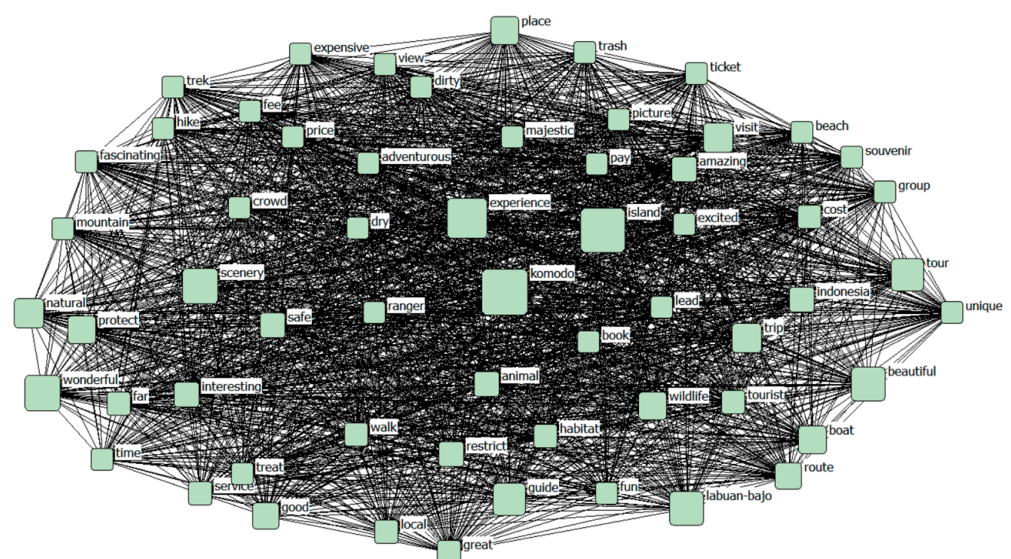

Figure 2. The visibility of top-frequency words in the network.

4.2. CONCOR Analysis

CONCOR, short for "CONvergence of iterated Correlation", is a technique used to evaluate keyword relatedness based on repeated analyses of correlation. This method analyzes the correlation coefficients of the metric values of related keywords to identify clusters of nodes, leading to groups of keywords that are similar to each other (Schwartz, 1977). Figure 3 shows the top 60 words extracted and grouped into four clusters through CONCOR analysis.
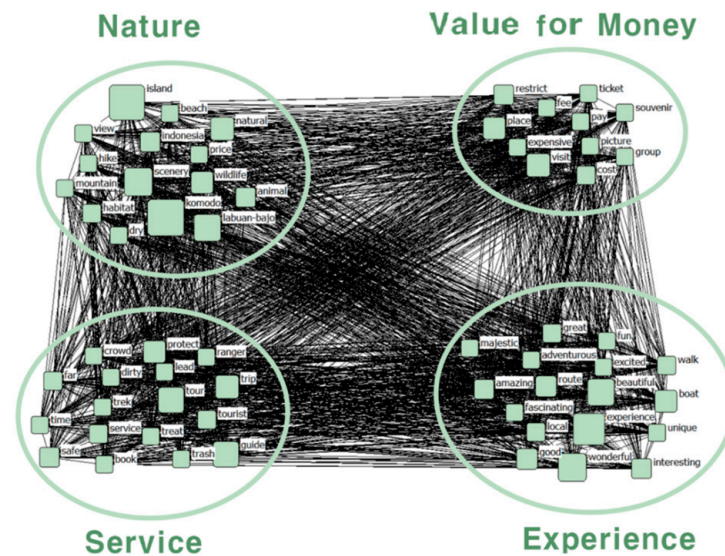
Figure 3. CONCOR analysis visualization.

4.3. Exploratory Factor Analysis and Linear Regression Analysis

Fifteen keywords formed four factors, as seen in Table 3, explaining 93.440% of variance. These factors, treated as independent variables, identified key elements influencing customer satisfaction. The KMO index was 0.825, and Bartlett's sphericity test confirmed factor analysis suitability (χ^2 = 1225.832, p = 0.001).

Table 3. Exploratory factor analysis results.

Factor	Words	Factor Loading	Eigen Value	Variance (%)
Nature	Natural	0.857	3.321	34.020
	Komodo	0.808		
	Habitat	0.838		
	Wildlife	0.851		
Value for Money	Expensive	0.871	1.602	24.650
	Ticket	0.791		
	Cost	0.821		
	Pay	0.864		
Service	Ranger	0.863	0.1890	17.340
	Tour	0.765		
	Guide	0.786		
	Trek	0.843		
Experience	Interesting	0.781	0.865	17.430
	Unique	0.781		
	Majestic	0.822		
KMO (Kaiser–Meyer–Olkin) = 0.825				
Bartlett chi-square (p) = 1225.832 (p < 0.001)				

Four independent variables are involved in the linear regression analysis (Table 4), labeled as "Nature", "Value for Money", "Service", and "Experience". "Nature" ($ß = 0.862$, $p < 0.05$) and variables have a positive significant impact on customer satisfaction. Meanwhile, "Value for Money" ($ß = -0.048$, $p < 0.05$) and "Service" ($ß = -0.32$, $p < 0.001$) have a negative impact on user satisfaction, as highlighted in reviews: "Komodo Island was too expensive, with high ticket costs that made the experience feel overpriced and disappointing" and "The tour guide on our trek seemed indifferent, and it was upsetting to see the Komodo dragons not being cared for properly by the rangers".

Table 4. Linear regression analysis results.

Model	Unstandardized Coefficients		Standardized Coefficients	t
	B	Std. Error	Beta	
(Constant)	4.480	0.021		200.862
Nature	0.04	0.021	0.862	14.240 *
Value for Money	−0.038	0.021	−0.048	4.880 *
Service	−0.026	0.021	−0.32	3.421 *
Experience	0.027	0.021	0.004	0.453

Notes: $R^2 = 0.07$, adjusted $R^2 = 0.041$, $F = 8.429$, * $p < 0.05$. Dependent variable: customer satisfaction (CS).

The study's findings on tourist satisfaction at Komodo Island are consistent with prior research on ecotourism destinations like the Galapagos Islands and Yellowstone National Park, where natural beauty and unique wildlife are key drivers of visitor contentment (Carvache-Franco et al., 2021; Kelley et al., 2019; Yonk & Lofthouse, 2020). However, unlike these destinations, where service quality often enhances the visitor experience, tourists at Komodo Island reported dissatisfaction, particularly regarding the behavior of tour guides and rangers. This points to a gap between visitor expectations and service quality, emphasizing the need for staff training programs to meet international standards (Mikołajczyk, 2022). Additionally, while the high cost of visiting Komodo Island aligns with trends seen in similar ecotourism locations, tourists here appeared especially sensitive to ticket and service prices, highlighting an opportunity to review pricing strategies to improve perceived value. The frequent mentions of words like "Komodo" and "Experience" in reviews underscore the island's appeal, as tourists are highly engaged with its wildlife and scenic beauty. However, the recurring negative sentiment around terms like "Cost" and "Service" suggests a disconnect between the prices charged and the quality of service, underscoring the need to better align service quality with premium pricing to meet tourist expectations. Notably, the study's use of reviews from Google Travel carries the risk of sample bias due to the specific user demographics of these platforms. However, this approach is less prone to bias than survey methods, as it captures spontaneous and organic feedback from a wider and more diverse range of users over a longer time period, without the constraints of targeted sampling or questionnaire design.

5. Discussion

Online customer reviews have gained significant popularity in the hospitality and tourism sectors, thus serving as a vital data source for researchers and professional entities aiming to better understand customers (Schuckert et al., 2015). This study investigated tourists' experiences on Komodo Island through an analysis of online reviews, aiming to identify the primary factors contributing to customer satisfaction. Analyzing online reviews from Google yielded valuable insights into tourists' perceptions and expectations (Borrego & Comalat Navarra, 2021; Garner & Kim, 2022), offering a deeper understanding of the aspects that either enhance or detract from their overall satisfaction. In line with our initial research goal, aimed at examining the content and influence of online reviews related

to tourism on Komodo Island, our frequency analysis reveals prominent themes in visitor feedback, with words such as "Komodo", "Island", "Experience", and "Scenery" appearing frequently. These terms underscore the importance of the island's natural attractions as key drivers of tourist interest, affirming that its unique wildlife and stunning landscapes play a significant role in shaping visitor perceptions. This insight also supports our secondary goal of evaluating satisfaction levels, as these elements are shown to be major contributors to positive experiences on Komodo Island.

The factor "Nature", which includes the natural environment, wildlife, and the unique habitat of Komodo Island, was identified as having a strong positive impact on customer satisfaction. This aligns with the island's reputation for exceptional natural beauty, where tourists are primarily drawn to observing the rare Komodo dragons and exploring the landscape. Implementing targeted strategies like eco-friendly infrastructure, visitor limits during peak seasons, and enhanced conservation education can support sustainable tourism on Komodo Island by balancing tourism growth with ecological preservation. Interestingly, this study also revealed that "Value for Money" and "Service" negatively affected customer satisfaction. These findings suggest a disconnect between the cost of visiting Komodo Island and the level of service provided. To explore this issue further, the Service Quality (SERVQUAL) (1988) model provides relevant insights, particularly its focus on the role of "tangibles" or physical features in creating favorable impressions in natural tourism settings (Parasuraman et al., 1988). This evidence points to a need for better-aligned pricing strategies and service improvements, especially in sustainable tourism, where both the preservation of natural resources and high visitor satisfaction are essential for long-term viability.

A notable finding from this study is the negative impact of "Value for Money" on tourist satisfaction, reflecting dissatisfaction with the island's pricing strategies. Both Galapagos National Park in Ecuador and Komodo Island in East Nusa Tenggara, Indonesia, are recognized for their high costs due to sustainable development efforts (Perdana et al., 2021). Visitors to Komodo Island often expressed concerns about the steep prices, noting that entrance fees and service charges seemed excessive in comparison to the services received, despite the island's natural beauty. This suggests a disconnect between tourist expectations and their actual experience, pointing to a need for better alignment between pricing strategies and the perceived value of the services provided. Adjusting the pricing structure may enhance tourists' perception of the destination (Mejía & Brandt, 2017). Furthermore, customer satisfaction theories, such as the Disconfirmation of Expectations model, clarify how perceived discrepancies between costs and service standards can foster dissatisfaction. Previous research in tourism similarly suggests that tourists often prefer low-cost destinations (Demolingo et al., 2021).

Previous studies have demonstrated that customers are particularly sensitive to pricing, typically preferring more budget-friendly options (Suk et al., 2021). However, many researchers have also highlighted that customers tend to have higher expectations for service quality, a finding that aligns with the results of this study. The research by Shin et al. (2024) identifies cleanliness, staff behavior, and convenience as significant service features that strongly influence customer satisfaction. This conclusion is in line with the findings of Lai and Chong (2020), who stress that service quality is essential for ensuring customer satisfaction and loyalty, focusing on dimensions like reliability, responsiveness, and assurance. Based on these insights, this study suggests that to further enhance customer satisfaction, particular attention should be given to improving the quality of services such as the tour guide (or ranger) and the trekking experience. These improvements would better align with customer expectations and enhance their overall experience.

The findings underscore the substantial positive influence of natural attractions on tourist satisfaction while also highlighting critical areas for improvement related to pricing and service quality. Tourists frequently expressed dissatisfaction with high ticket costs and a perceived mismatch between price and value, alongside concerns about the professionalism and behavior of tour guides and rangers. These issues point to the necessity of aligning service quality with the costs borne by visitors. Aligning with previous research, such as Mejía and Brandt (2017), which illustrates how effective pricing strategies can enhance perceived value and support conservation efforts, this suggests a dual opportunity to revisit pricing models and invest in staff training to elevate visitor satisfaction and create a more balanced tourism experience.

The influence of "Experience" in the model was relatively minor, indicating that while activities on Komodo Island are unique and memorable, they alone are not enough to drive high satisfaction when service quality and cost-related issues exist. This finding underscores the complexity of tourism satisfaction, where multiple elements—such as natural beauty, service quality, and pricing—work together to shape the overall visitor experience. For tourism operators on Komodo Island, it is essential to balance these factors effectively. Research by Sumanapala et al. (2023) highlights the essential role of tour guides in elevating the quality of visitor experiences within nature-based tourism. Accordingly, enhancing experience-driven activities, especially guided tours, to better match the costs tourists incur can improve their perceived value.

These results have important implications for managing Komodo Island as a global tourism destination. The strong connection between nature and customer satisfaction emphasizes the need to continually invest in conservation efforts. The island's natural environment, particularly the Komodo dragons and their habitat, is its most valuable asset. As tourism grows, preserving these natural features is crucial for both ecological sustainability and maintaining the island's appeal. At the same time, a strategic approach to pricing is necessary. Dissatisfaction with value for money suggests a need to adjust pricing structures to better align with service quality and expectations (Saut & Bie, 2024). Flexible pricing options, such as discounts for longer stays or tourism packages, could enhance the perceived value (Pan et al., 2022). Additionally, improving service, particularly through well-trained rangers and guides who are knowledgeable about the island's ecosystem, could boost satisfaction while supporting conservation efforts.

6. Conclusions

This study offers a comprehensive analysis of how different factors influence customer satisfaction at Komodo Island, using big data analytics to reveal the dynamics between natural beauty, pricing, and service quality. The research highlights that while the island's unique natural environment remains the main driver of tourist satisfaction, the high costs associated with visiting and subpar service experiences pose significant challenges to maintaining high levels of visitor satisfaction.

This study employed both quantitative and qualitative methods to examine the factors influencing customer satisfaction in Komodo Island tourism. Through a mixed-methods approach, text mining tools, including Outscraper and RStudio, were used to analyze frequently used words from customer reviews sourced from Google Travel. A semantic network analysis was conducted to identify the relationships and significance of key words within the dataset. Freeman's degree and eigenvector analyses were utilized to determine the most influential terms, while UCINET and CONCOR analyses were employed to group these terms into relevant clusters. The findings of this study revealed several important insights. First, 60 customer experience-related words were ranked by frequency, and their significance was further analyzed through centrality measures. The CONCOR analysis

categorized these words into four distinct clusters: "Nature", "Value for Money", "Service", and "Experience". Exploratory factor analysis confirmed the reliability and validity of these categories, and linear regression analysis was used to assess the impact of these factors on customer satisfaction.

The results demonstrated that "Nature" had a positive and significant influence on customer satisfaction, highlighting the importance of natural beauty and wildlife experiences on Komodo Island. On the contrary, "Value for Money" and "Service" were found to negatively impact satisfaction. Many reviewers expressed dissatisfaction with high ticket prices and inadequate service, particularly concerning the behavior of tour guides and the perceived lack of care for the Komodo dragons. These findings suggest that management of Komodo Island tourism should focus on improving service quality and offering better value for money to enhance overall customer satisfaction. Addressing issues such as the cost of tickets and improving the quality of service provided by tour guides and rangers could lead to a more positive tourist experience. Beyond general service quality concerns, specific issues like inadequate ranger trainings were identified as factors that could further impact visitor satisfaction. Some reviewers highlighted service shortcomings, such as one who noted, "The rangers did not treat the lizards respectfully", underscoring the need for improved ranger training and visitor relations. Additionally, many visitors expressed dissatisfaction with high ticket prices, with remarks like, "The experience on Komodo Island was overpriced for the quality of services provided", suggesting a disconnect between cost and perceived value.

Addressing these issues may be key to enhancing the tourist experience and aligning service quality more closely with visitor expectations on Komodo Island. Implementing tailored service training programs for local staff could significantly enhance their professionalism and improve visitor interactions, addressing concerns about inadequate service quality. Additionally, adopting targeted pricing strategies, such as tiered pricing based on service levels or discounts for extended stays, could boost tourists' perceived value while ensuring economic sustainability. As highlighted by Pan et al. (2022), perceived value is a crucial determinant of tourists' overall satisfaction and loyalty, underscoring the importance of aligning pricing structures with service quality. These practical initiatives would not only address critical areas of dissatisfaction but also promote a more balanced and fulfilling tourism experience on Komodo Island.

Ensuring Komodo Island's continued success as a premier ecotourism destination requires thoughtful strategies that balance environmental conservation with high levels of visitor satisfaction. Future efforts might include introducing adaptable pricing structures to appeal to a wide range of tourists and enhancing training for tour guides and rangers to improve service quality. These steps would not only boost tourist satisfaction but also support responsible tourism practices that align with conservation objectives.

However, this study has certain limitations. This study's analysis primarily relies on online reviews, which could introduce sample bias, as it reflects the perspectives of those who choose to share their experiences online. However, compared to survey methods, this approach reduces potential biases by drawing from a larger, more diverse, and organically generated dataset. Additionally, while insights derived from Google Travel may carry platform-specific biases, they still capture a broad spectrum of user feedback over an extended period, offering a more comprehensive view than traditional survey data.

In conclusion, while Komodo Island enjoys high levels of customer satisfaction due to its unique natural appeal, there are clear opportunities to improve in terms of pricing and service quality. By addressing these key areas, Komodo Island can solidify its position as a top global tourism destination, offering an enriching and sustainable experience for visitors. The study's findings provide important insights for policymakers, tourism operators, and

conservationists, all of whom play a critical role in ensuring that Komodo Island continues to thrive as a world-class destination for tourism.

This research emphasizes the crucial impact of Komodo Island in elevating Indonesia's status as a leading global tourism hotspot, stressing the need to balance environmental preservation with visitor satisfaction to achieve sustainable tourism growth. Management should evaluate the current pricing strategy to ensure that it reflects the quality of services provided while also focusing on enhancing staff training and performance, especially for those interacting directly with tourists. Although this study's application of semantic and keyword analysis offered important insights into the primary themes within visitor feedback, this method may overlook the deeper qualitative subtleties of visitor expectations and emotional reactions. Longitudinal studies would also be beneficial for monitoring changes in satisfaction over time and evaluating the influence of new policies or service enhancements. Additionally, examining the effects of pricing strategies and improved guide training on visitor satisfaction could further aid sustainable tourism efforts on Komodo Island.

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