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Analysis of hotel ratings and price range in labuan bajo, Indonesia

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ABSTRACT

This research aimed to analyze the ratings and reviews of hotels in Labuan Bajo, Indonesia to understand the quality of hotels in Labuan Bajo. Data was collected from a popular online travel booking platform and pre-processed to exclude hotels with less than 10 reviews. K-means clustering was used to identify the optimum number of clusters, which was found to be 3, based on the elbow method. Cronbach alpha analysis was also performed with a value of 0.92, indicating a high level of reliability in the data. Correlation analysis was then performed on each cluster, revealing positive correlations between cleanliness, location, and facilities with overall satisfaction in cluster 0, and negative correlations between cleanliness, service, and value for money with overall satisfaction in cluster 1. The findings from this study imply that further improvement is necessary to meet the expectations of travelers in terms of service, value for money, and cleanliness in hotels located in Labuan Bajo.

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1. INTRODUCTION

The tourism industry in Labuan Bajo, a small town in Indonesia, has been growing rapidly in recent years, making it an increasingly popular travel destination. As the number of hotels and other accommodations in the area continues to grow, it becomes increasingly important for hotel owners and operators to understand the preferences and needs of travelers in order to improve the quality of their hotels and better meet the demands of the market. Moreover, the Indonesian government has also recognized Labuan Bajo as a "super-premium destination", which further boosts the interest of travelers to visit the area. It is important for stakeholders in the tourism industry in Labuan Bajo to understand and be well-prepared for the potential impact of this growth to ensure that the area can continue to thrive as a popular travel destination.

The importance of online reviews and ratings in the hotel industry has been well-documented in the literature. The reason why customer satisfaction has been of interest to researchers is primarily because of its impact on consumers' intentions to take certain actions. According to Sheeran (2002), behavioral intention refers to a person's motivation to engage in a specific behavior. These intentions can include willingness to pay a higher

price, the likelihood of doing business with other companies, the likelihood of repurchasing, and the likelihood of recommending a company to others. This has been supported by other studies conducted by Lai et al. (2011), Suh et al. (2015), Lehto et al. (2015), and Casidy & Wymer (2016). Qi and Qiang (2013) argue that star rating has a similar effect on pricing as electronic word-of-mouth, as both are indicators of quality and measurements of the level of facilities and service standards. In addition to the impact of online reviews and ratings on traveler satisfaction and loyalty, research has also examined the relationship between hotel prices and ratings. Some studies have found a moderate correlation between hotel prices and ratings, suggesting that higher-priced hotels tend to have higher ratings (El-Said, 2020). The research also found that rating reviews through online booking can increase by more than 5 percent (Zhao et al., 2015). Another research has also shown that travelers tend to prioritize location over cleanliness, atmosphere, and price when choosing a hotel (Pertiwi & Sulistyawati, 2020). Other studies have found a negative correlation, indicating that lower-priced hotels tend to have higher ratings (Abrate et al., 2021). Hotels with higher star ratings tend to be more expensive, and guests must weight the costs and benefits of these accommodations. Additionally, there are hotels with lower star ratings that have good reputations and brand recognition. Moreover, Qi and Qiang suggest that electronic word-of-mouth is more influential for hotels with lower star ratings, as guests have less information about them. They also argue that customers expect hotels with high star ratings to have higher quality, and thus do not necessarily need to rely on other's feedback (Qi and Qiang, 2013).

Furthermore, Customers who are satisfied with the services they receive are less likely to look for a new provider, as the current one is already meeting their needs and they tend to remain loyal to the company. This is according to Liat & Chiau (2015). On the other hand, customers who are unhappy with the services tend to explore market alternatives and switch suppliers if possible (Suh et al., 2015). However, it is worth noting that unhappy customers do not always leave a company. There are other factors that come into play when making this decision such as customer inertia (Lai et al., 2011) and perceived switching costs or barriers (Lehto et al., 2015). However, little is known about how these characteristics vary across different price ranges in Labuan Bajo, and how they are related to customer satisfaction and revisit intention (Berezina et al., 2012). Despite the existing research on online reviews and ratings in the hotel industry, little is known about how these factors vary across different price ranges in Labuan Bajo, and how they are related to the overall satisfaction of travelers. To address this gap in the literature, our study aims to analyze the ratings and reviews of hotels in Labuan Bajo from Agoda, a popular online travel booking platform, and to understand the relationship between the ratings and the price range of these hotels. By using k-means clustering and correlation analysis, we aim to identify trends and patterns in the data to help stakeholder improve their quality based on travelers rating.

In conclusion, our study provides valuable information for stakeholders in the tourism sector, such as hotel owners and operators, as well as for travelers. understanding the preferences and needs of travelers in Labuan Bajo, hotel owners and operators can improve the quality of their hotels and better meet the demands of the market. By understanding the needs and preferences of travelers, hotels in Labuan Bajo can offer a better experience for their guests, and in turn increase their satisfaction and loyalty, which will lead to a sustainable owth of the tourism industry in the area.

2. RESEARCH METHOD

To collect the data for our study, we manually accessed the ratings and reviews of hotels in Labuan Bajo from Agoda, a popular online travel booking platform. We collected data on the ratings of cleanliness, value for money, location, service, and facilities, as well as

the price range of each hotel. We classified the price range of each hotel into three categories shown in Table 1.

Table 1. The price range class

Price Range	Class
0-<500.000	1
≥50.0000-<1.000.000	2
≥1.000.000	3

Before conducting the analysis, we preprocessed the data to ensure that it was in a suitable format. We removed any hotels with less than 10 reviews from the dataset using RapidMiner's "Filter Example". After that, we used Cronbach's alpha to determine the internal consistency of the ratings in each category. Cronbach's alpha is a statistical measure that is widely used to assess the internal consistency and reliability of a set of items (Tavakol & Dennick, 2011). It is calculated by averaging the correlations between all pairs of items within a scale, with higher values indicating greater reliability. To calculate Cronbach's alpha formula 1 is applied.

$$\alpha = \left(\frac{k}{k-1}\right)\left(1 - \frac{\sum_{i=1}^{k} \sigma_{y_i}^2}{\sigma_x^2}\right) \quad (1)$$

Where,
α : The computed Cronbach's alpha
k : The number of items
$\sigma_{y_i}^2$: the variance of every item
σ_x^2 : the variance of the total scale

Then, we employed k-means clustering to group the hotels into clusters based on their ratings in the different categories. K-means clustering is a popular unsupervised machine learning algorithm that involves partitioning the data into a specified number that has meaningful set (Singh & Mohan, 2016).

```
Choose k as the number of clusters
Randomly choose k datapoints as centroids

repeat
for each centroid do
        reassign each point to its closest centroid
        recalculate centroid as mean over all points assigned
end for
```

Figure 1. K-Means clustering psudocode

To determine the number of clusters, we used the elbow method. The elbow method involves analyzing the within-cluster sum of squared errors (WCSS) is calculated using formula 2. for different numbers of clusters and selecting the number of clusters. We then plotted the WCSS for different numbers of clusters and selected the number of clusters where the WCSS decreases significantly.

$$WCSS = \sum_{C_k}^{C_n} \left(\sum_{d_i \; in \; C_i}^{d_m} distance(d_i, C_k)^2 \right) \quad (2)$$

Where,
C is the cluster centroids and d is the data point in each Cluster.

After that, Pearson's correlation analysis is applied to understand the relationship between the ratings and the price range within each cluster. Pearson's correlation can be calculated through formula 3.

$$r = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum(x_i - \bar{x})^2 \sum(y_i - \bar{y})^2}} \quad (3)$$

Where,
r : Pearson's correlation coefficient
x_i : x variable samples
y_i : y variable samples
$\bar{x}$: mean of values in x variable
$\bar{y}$: mean of values in y variable

Pearson's coefficient is a measure of the strength and direction of the linear relationship between two continuous variables (Schober & Schwarte, 2018). A positive correlation indicates that an increase in one variable is associated with an increase in the other variable, while a negative correlation indicates that an increase in one variable is associated with a decrease in the other variable. Pearson's correlation coefficient ranges from -1 to 1, with values closer to 1 indicating a strong positive correlation and values closer to -1 indicating a strong negative correlation (Schober & Schwarte, 2018). In this study, we used Pearson's correlation coefficient to determine the relationship between the ratings and the price range within each cluster. To be more precise overall process can be seen through Figure 2.

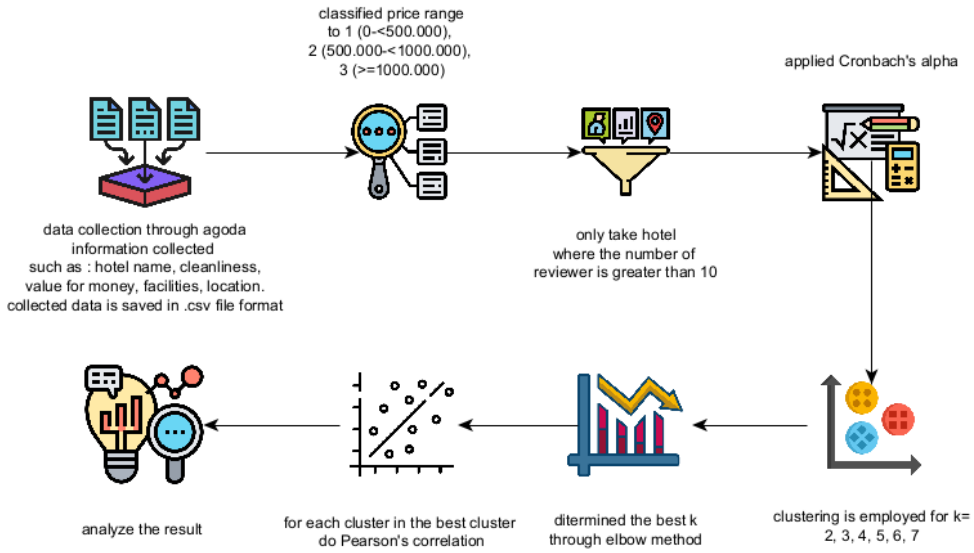

Figure 2. Research method flow

3. RESULTS AND DISCUSSIONS

The results of our study are based on the ratings and reviews of 63 hotels in Labuan Bajo from Agoda. The data was preprocessed to remove any hotels with less than 10 reviews. According to data from the Indonesian Central Agency of Statistic, there were only 98 hotels in Labuan Bajo in 2018. Thus, our sample size of 63 hotels represents a significant portion of the total number of hotels in the area. First, we used Cronchbreach alpha to evaluate the quality of the data. The Cronchbreach alpha value obtained was 0.92, which indicates a high consistency in the data. This means that the ratings and reviews provided by the guests are reliable and valid for analysis.Next, we used k-means clustering to group the hotels into different clusters. The number of clusters (k) was set between 2 to 7 and the optimal number of clusters was determined using the elbow method and average within-centroid distance. The elbow chart shows the explained variance as a function of the number of clusters, and the optimal number of clusters is chosen as the value of k where the explained variance stops increasing at a fast pace. The average within-centroid distance is a measure of how similar the data points within each cluster are to each other. The lower the average within-centroid distance, the more similar the data points within a cluster are to each other. Table 2 shows the number of hotels in each cluster for different values of k.

Table 2. Number of cluster based on K

K	C-0	C-1	C-2	C-3	C-4	C-5	C-6
2	39	24	-	-	-	-	-
3	27	32	4	-	-	-	-
4	15	4	19	25	-	-	-
5	20	10	12	19	2	-	-
6	12	4	14	19	2	12	-
7	11	3	1	10	16	11	11

As can be seen from the table, the number of hotels in each cluster varies depending on the number of clusters.

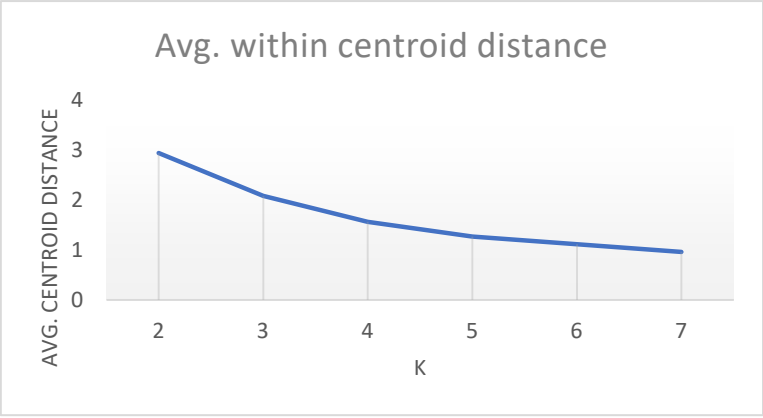

Figure 3. Avg within centroid distance

The elbow chart in Figure 3 and average within-centroid distance indicate that the optimal number of clusters is 3.

Table 3. Pearson's correlation result

C	Cleanliness	Service	Value for Money	Location	Facilities
0	0.423	-0.246	-0.246	0.619	0.529
1	-0.132	-0.461	-0.333	0.191	0.097
2	0	0	0	0	0

As demonstrated by Table 3, it can be inferred that in cluster 0, the characteristics of cleanliness, location, and facilities demonstrate a positive correlation with the overall satisfaction of travelers, while service and value for money exhibit a negative correlation. On the other hand, in cluster 1, the characteristics of cleanliness, service, and value for money demonstrate a negative correlation with the overall satisfaction of travelers. Furthermore, an analysis of cluster 2 reveals that no correlation was established between the characteristics and price.

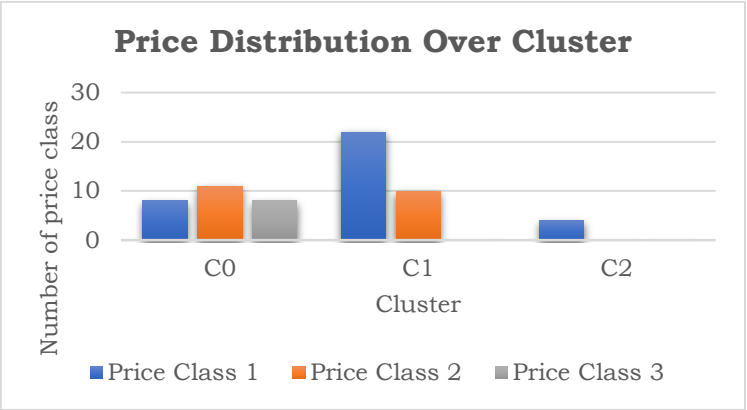

Figure 4. Price distribution over cluster

As evidenced by Figure 4, it is observed that hotels belonging to price classes 1, 2, and 3 possess a similar distribution of size when compared to those in cluster 0. Furthermore, an analysis of travelers' ratings reveals that a proportion of 8 out of 34 hotels in price class 1 and 11 out of 21 hotels in price class 2 exhibit comparable characteristics to those in price class 3, which implies that the expectations of travelers can be satisfied regardless of the cost incurred. However, upon analyzing the distribution of hotel prices in cluster 1, it can be inferred that a considerable proportion of hotels belonging to price class 2 exhibit similar characteristics to 26 hotels in price class 1. This implies that a significant number of hotels in Labuan Bajo are inadequate in meeting the expectations of travelers. This observation is further supported by the correlation coefficients which indicate that ratings for cleanliness, value for money, and service in cluster 1 possess a low negative correlation, while other characteristics such as facilities exhibit weak correlation with the prices paid by travelers.

The result of this research highlights the importance of considering multiple factors when evaluating the overall satisfaction of travelers in Labuan Bajo. Hotel owners and operators should not focus solely on price, but should also consider factors such as cleanliness, service, value for money, location, and facilities to increase overall satisfaction among travelers. Furthermore, our study also shows that hotel in Labuan Bajo should improve their cleanliness, service, and value for money if they want to increase overall satisfaction among travelers, especially for hotels in cluster 0 and 1.

Our study also provides a comparison of the findings with previous research on the preferences and needs of travelers in other regions. For example, previous research has shown that travelers tend to prioritize location when choosing a hotel (Pertiwi &

Sulistyawati, 2020). This is consistent with our findings, which showed that location are positively correlated with price paid among travelers in Labuan Bajo. Overall, our study provides a more comprehensive understanding of the preferences and needs of travelers in Labuan Bajo by considering multiple factors, and highlights the importance of considering different characteristics of hotel when evaluating overall satisfaction among travelers.

4. CONCLUSION

In conclusion, this research found that hotels with lower price can compete with hotel that has greater price. This can be seen from cluster analysis result based on factors such as cleanliness, service, value for money, location, and facilities. Those things play an important role in determining the overall satisfaction of travelers. Additionally, The findings from this study imply that further improvement is necessary to meet the expectations of travelers in terms of service, value for money, and cleanliness in hotels located in Labuan Bajo. These results should be taken into consideration by stakeholders in the tourism industry to enhance the overall quality of hotels in the area. Future research should consider additional factors such as the potential influence of subjective expectations on the evaluation of hotels with higher prices when assessing ratings.

REFERENCES

Abrate, G., Quinton, S., & Pera, R. (2021). The relationship between price paid and hotel review ratings: Expectancy-disconfirmation or placebo effect?. Tourism Management, 85. https://doi.org/10.1016/j.tourman.2021.104314

Amirrudin, M., Nasution, K., & Supahar, S. (2020). Effect of Variability on Cronbach Alpha Reliability in Research Practice. Jurnal Matematika, Statistika Dan Komputasi, 17(2), 223–230. https://doi.org/10.20956/jmsk.v17i2.11655

Berezina, K., Cobanoglu, C., Miller, B. L., & Kwansa, F. A. (2012). The impact of information security breach on hotel guest perception of service quality, satisfaction, revisit intentions and word-of-mouth. International Journal of Contemporary Hospitality Management, 24(7), 991–1010. https://doi.org/10.1108/09596111211258883

BPS Indonesia. (n.d.). Statistic of hotel in Indonesia. https://manggaraibaratkab.bps.go.id/indicator/16/87/1/perkembangan-akomodasi-hotel.html (accessed at 14 January 2023)

Casidy, R., & Wymer, W. (2016). A risk worth taking: Perceived risk as moderator of satisfaction, loyalty, and willingness-to-pay premium price. Journal of Retailing and Consumer Services, 32, p. 189-197. DOI: https://doi.org/10.1016/j.jretconser.2016.06.014

El-Said, O. A. (2020). Impact of online reviews on hotel booking intention: The moderating role of brand image, star category, and price. Tourism Management Perspectives, 33(October 2019), 100604. https://doi.org/10.1016/j.tmp.2019.100604

Lai, L. H., Liu, C. T., & Lin, J. T. (2011). The moderating effects of switching costs and inertia on the customer satisfaction-retention link: auto liability insurance service in Taiwan. Insurance markets and companies: analyses and actuarial computations, 2(1), p. 69-78.

Lehto, X. Y., Park, O. J., & Gordon, S. E. (2015). Migrating to new hotels: A comparison of antecedents of business and leisure travelers' hotel switching intentions. Journal of Quality Assurance in Hospitality & Tourism, 16(3), p. 235-258. DOI: https://doi.org/10.1080/1528008X.2014.925787

Nainggolan, R., Perangin-Angin, R., Simarmata, E., & Tarigan, A. F. (2019). Improved the Performance of the K-Means Cluster Using the Sum of Squared Error (SSE) optimized by using the Elbow Method. Journal of Physics: Conference Series, 1361(1). https://doi.org/10.1088/1742-6596/1361/1/012015

Pearson, K. (1895) Notes on Regression and Inheritance in the Case of Two Parents Proceedings of the Royal Society of London, 58, 240-242. https://doi.org/10.1098/rspl.1895.0041

Pertiwi, P. R., & Sulistyawati, A. S. (2020). Factors of Influence in Choosing Accommodation: a Study With Reference To Mas Village, an Artistic Heritage Village in Ubud - Bali. Journal of Business on Hospitality and Tourism, 6(1), 27. https://doi.org/10.22334/jbhost.v6i1.183

Qi, Lu., & Qiang, Ye. (2013). How hotel star rating moderates online word-of-mouth effect: A difference-in-difference approach. Management Science and Engineering (ICMSE), 2013 International Conference on. http://dx.doi.org/10.1109/ICMSE.2013.6586254

Schober, P., & Schwarte, L. A. (2018). Correlation coefficients: Appropriate use and interpretation. Anesthesia and Analgesia, 126(5), 1763–1768. https://doi.org/10.1213/ANE.0000000000002864

Sheeran, P. (2002) Intention—Behavior Relations: A Conceptual and Empirical Review. European Review of Social Psychology, 12, 1-36. http://dx.doi.org/10.1080/14792772143000003

Shi, C., Wei, B., Wei, S., Wang, W., Liu, H., & Liu, J. (2021). A quantitative discriminant method of elbow point for the optimal number of clusters in clustering algorithm. Eurasip Journal on Wireless Communications and Networking, 2021(1). https://doi.org/10.1186/s13638-021-01910-w

Singh, Y., & Mohan, A. (2016). A Survey on Unsupervised Clustering Algorithm based on K-Means Clustering. International Journal of Computer Applications, 156(8), 6–9. https://doi.org/10.5120/ijca2016912481

Suh, M., Moon, H., Han, H., & Ham, S. (2015). Invisible and intangible, but undeniable: Role of ambient conditions in building hotel guests' loyalty. Journal of Hospitality Marketing & Management, 24(7), p. 727-753. DOI: https://doi.org/10.1080/19368623.2014.945223

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. International Journal of Medical Education, 2, 53–55. https://doi.org/10.5116/ijme.4dfb.8dfd

The Minister of Public Affairs Indonesia. (n.d.). Labuan Bajo, Surga tersembunyi di Indonesia bagian timur. https://kemlu.go.id/copenhagen/id/read/labuan-bajo-surga-tersembunyi-di-indonesia-bagian-timur/700/information-sheet (accessed at 14 January 2023)

Amirrudin, M., Nasution, K., & Supahar, S. (2020). Effect of Variability on Cronbach Alpha Reliability in Research Practice. Jurnal Matematika, Statistika Dan Komputasi, 17(2), 223–230. https://doi.org/10.20956/jmsk.v17i2.11655

Berezina, K., Cobanoglu, C., Miller, B. L., & Kwansa, F. A. (2012). The impact of information security breach on hotel guest perception of service quality, satisfaction, revisit intentions and word-of-mouth. International Journal of Contemporary Hospitality Management, 24(7), 991–1010. https://doi.org/10.1108/09596111211258883

El-Said, O. A. (2020). Impact of online reviews on hotel booking intention: The moderating role of brand image, star category, and price. Tourism Management Perspectives, 33(October 2019), 100604. https://doi.org/10.1016/j.tmp.2019.100604

Nainggolan, R., Perangin-Angin, R., Simarmata, E., & Tarigan, A. F. (2019). Improved the Performance of the K-Means Cluster Using the Sum of Squared Error (SSE) optimized by using the Elbow Method. Journal of Physics: Conference Series, 1361(1). https://doi.org/10.1088/1742-6596/1361/1/012015

Pertiwi, P. R., & Sulistyawati, A. S. (2020). Factors of Influence in Choosing Accommodation: a Study With Reference To Mas Village, an Artistic Heritage Village in Ubud - Bali. Journal of Business on Hospitality and Tourism, 6(1), 27. https://doi.org/10.22334/jbhost.v6i1.183

Schober, P., & Schwarte, L. A. (2018). Correlation coefficients: Appropriate use and interpretation. Anesthesia and Analgesia, 126(5), 1763–1768. https://doi.org/10.1213/ANE.0000000000002864

Shi, C., Wei, B., Wei, S., Wang, W., Liu, H., & Liu, J. (2021). A quantitative discriminant method of elbow point for the optimal number of clusters in clustering algorithm. Eurasip Journal on Wireless Communications and Networking, 2021(1). https://doi.org/10.1186/s13638-021-01910-w

Singh, Y., & Mohan, A. (2016). A Survey on Unsupervised Clustering Algorithm based on K-Means Clustering. International Journal of Computer Applications, 156(8), 6–9. https://doi.org/10.5120/ijca2016912481

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. International Journal of Medical Education, 2, 53–55. https://doi.org/10.5116/ijme.4dfb.8dfd

Zhao, X. (Roy), Wang, L., Guo, X., & Law, R. (2015). The influence of online reviews to online hotel booking intentions. International Journal of Contemporary Hospitality Management, 27(6), 1343–1364. https://doi.org/10.1108/IJCHM-12-2013-0542