

Analysis of Lodging and Competition on the Island of Bali during Covid-19 with Big Data

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ABSTRACT

Purpose: This study aims to count the number of lodgings, map lodging density and its supporting facilities, and rank the county, as well as the lodgings available on the island of Bali during covid-19.

Research methods: This study uses data related to lodging and its supporting facilities such as tourist attractions, gas stations, malls, and marts. The data were collected using the web scrapping method utilizing big data sourced from hotel.com and booking.com. The data were collected during the Covid-19 period is from August to September 2021. Spatial analysis is employed using Geographic Information Systems. Also, it uses the scoring of lodgings, their supporting facilities, and consumer reviews.

Results and Discussions: The results showed that the number of lodgings on Bali Island during the Covid-19 period was 5,389 properties in a high-density area in South Bali. By taking into account the tourist supporting facilities of Badung, it has the highest level of competition.

Implication: The property with high competition is the Sol House Bali Legian hotel by Melia Hotels International.

Keywords: Big data, Covid-19, lodging, dispersion, competition.

INTRODUCTION

Bali is a province in Indonesia that is well known for its tourism. The large number of tourists who come to Bali has caused the rapid growth of the number of hotels on the island of Bali, it can even be said that the hotel industry is one of the key supporters of tourism. Hotels are not only resting places for tourists, but they can also serve as tourist attractions that provide food and beverage services and other recreational facilities. Hotels in Bali during the Covid-19 period are estimated to have decreased due to the large number of hotels that have stopped operating. Before Covid-19 period, there were several counties on Bali island that had a high level of density between adjacent hotels. This will trigger high competition between hotels. However, the decrease in hotel density does not mean that the competition is not high. In the period before Covid-19, hotel density continued to grow, especially in tourist-dense areas such as southern Bali, so competition between hotels was already fierce. Competition is getting tougher with the growth

of other types of lodging besides hotels. Other types of lodging can offer cheaper prices, such that homestays.

Competition is getting tougher with the decline in the number of tourists during the Covid-19 period, for example in March, April, and May 2020 as many as 156,876, down to 327, and reaching only 36 tourists. Meanwhile, in the period before the pandemic, for example, in December 2019 and from January to February 2020, the number of tourists still increased, up to 552,403, to 528,883, and to 363,937 (BPS Bali, 2021). Supporting facilities are important for the lodging industry, which includes tourist attractions, gas stations, malls, and marts. So that its existence is a factor that is taken into account in the hotel competition. Another thing that can be taken into account in hotel competition is the tourists' assessment/review of staying at the hotel.

During the Covid-19 period, lodging industries typically use online transactions, so the existing data are lodgings that operated during the Covid-19 period. Online transactions are common when the use of the internet has become a lifestyle during the Covid-19 period. Lodgings use the internet in their marketing so they provide lodging data, supporting facilities as well as tourist reviews obtained from various sources.

The formulation of the problem in this study is what is the number of lodgings and their distribution? How is the data and distribution of the lodging supporting facilities, and how are the reviews of consumers who use lodging during Covid-19? Understanding how a county or a hotel could win the competition during the Covid-19 period is needed for developing a strategic action.

This paper aims to find out the number of lodgings on the island of Bali. The second is to get an overview of lodging density and lodging supporting facilities. The third is to get a ranking of lodging at the county level, and the fourth is to get a ranking of lodging during the Covid-19 period.

RESEARCH METHODS

This research was conducted using a descriptive quantitative approach. Descriptive research aims to describe the characteristics of certain groups (Sugiyono, 1999). The research location is the coverage of the area on which the research is based. This research was conducted on Bali island which is determined intentionally (purposive). The data are collected online through web crawling and scraping techniques (Hanifah, 2014).

The population in this study is all lodging businesses in the Island of Bali area obtained from online data extraction by utilizing big data. The data, collected from hotel.com and booking.com, was taken during the Covid-19 period, namely from August to September 2021. The extracted data are data on lodging, tourist attractions, gas stations, malls and marts, and consumer review data.

Hotels can be defined as an accommodation that is managed commercially and professionally and provided for everyone to get lodging services, food and beverage services, and other services (Bagyono, 2014). A hotel is a building that is used for commercial purposes and provides professional services for guests including the provision of food and beverages and other commercially managed facilities (Tarmoezi and Manarung, 2000). From the two definitions, it can be concluded that a hotel is an accommodation that is managed professionally and commercially.

The dispersion of hotels includes other types of accommodation (e.g., homestay, guesthouse, etc.) that have grown before the Covid-19 period. Bali has lodgings that spread across nine counties namely Badung, Bangli, Buleleng, Gianyar, Jembrana, Karang Asem, Klungkung, Denpasar City and Tabanan. The rapid development of hotel development in Bali began in 2019 (Salain, 2015). The construction of the hotel is dominated in a big city because it is considered closer to travel anywhere.

Some of the conveniences of tourists are supported by the existence of tourist attractions, gas stations, malls, and marts. The supporting facilities can determine the competition for the lodging industry. From the results of the study, it was found that the location of the hotel close to the airport is one of the strengths of the hotel in developing its strategy (Krestanto, 2019). This also means that the location of the hotel adjacent to its supporting facilities is important in the competition.

Taylor, et al (2013) stated that many people refer to the opinions of others before choosing a product so that they will get the best results. Utami, et al (2015) also states that in hotel selection tourists tend to look for information from online reviews on the Internet hotel guests. It was found that the content of consumer reviews is the most important factor for consumers in choosing a hotel.

Previous research stated that the use of digital marketing has a positive impact on the Grand Asrilia Hotel during the Covid-19 pandemic (Kristiutami, 2021). This means that the use of Information Technology (IT) during the Covid-19 pandemic in hotel marketing is a must. Another study stated that the opportunity obtained from external conditions is that the use of online travel agents can increase the occupancy of the Mutiara Malioboro hotel (Hendriyati, 2019). Consumers decide on the hotel chosen by looking at the promotion on the internet. The importance of using the internet for entrepreneurs and hotel consumers has caused the use of the internet for lodging marketing to increase during the Covid-19 pandemic. All transaction data that uses the internet accumulates into big data.

The data in this study include data related to lodging which also includes tourist attractions, gas stations, malls, marts, and consumer reviews. The data available on the internet can be used by hotels to develop intelligence competitions and strategies (Lau et al., 2016). However, analysis of hotel competition using big data is still rarely done, although the cost and time required are less. This paper will provide a description of lodging competition on the island of Bali based on the dispersion of tourist supporting facilities and consumer reviews with big data.

Data analysis in this study uses spatial analysis, Geographic Information Systems. This technique will result in the distance between the lodgings, the distance of the lodgings to the tourist attraction, the distance from the lodgings to the gas station, the distance from the lodging to the Mall, and the distance from the lodgings to the Mart. Another result is the spread of lodgings and their supporting facilities within a certain radius. The ranking of lodgings and their supporting facilities in each county are weighted and ranked, which take into

account the supporting facilities of tourism, namely the number of lodgings, tourist attractions, gas stations, malls, and marts.

Lodging ranking is carried out by weighting and its supporting facilities. Furthermore, the weighting of consumer reviews with the highest value was given a score of 1. The weighting taken from consumer reviews resulted in the ranking of each hotel. Reviews from consumers at each lodging cover seven dimensions, namely: staff, comfort, free Wi-Fi, facilities, the price, cleanliness, and location. Then, the assessment of these seven criteria and then a score of each hotel are generated (Table 1).

Table 1. Consumer Review Score

Consumer reviews	Score	
	Min	Max
No rating	0	0
Poor	.1	5.9
Fair	6	6.9
Average	7	7.9
Good	8	8,5
Very Good	8.6	8.9
Extremely Good	9	9.4
Excellent	9.5	10

[Source: Booking.com]

RESULTS AND DISCUSSION

There are 17 types of lodging including boat accommodation, chalets, farm houses, guest houses, holiday parks, homestays, hostels, hotel capsules, hotels, inns, motels, campgrounds, resorts, entertainment houses, village houses, glamping tents, and villas. The type and number of lodgings are based on county level county-level of Bali. The type and number of lodgings by counties on the island of Bali can be seen in Table 2.

Table 2. Types and number of lodgings by County on the Island of Bali

No	Type of lodging	Badung	Bangle	Buleleng	Gianyar	Jembrana	Karang Asem	Klungkung	Denpasar	Tabanan	Total
1	Boat			1							1
2	Chalet			1			1				2
3	Farmhouse			2	1					1	4
4	Guest House	453	31	83	381	12	95	156	107	20	1338
5	Holiday Park	52	1	29	58	1	53	185	11	9	399
6	Homestay	126	7	34	132	2	42	48	46	21	458
7	Hostel	9			3			4	1		17
8	Hotel	621	18	61	194	15	54	79	199	19	1260
9	Capsule								1		1
10	Inn	4	3	2	16		7	7		6	45
11	Motel					1			1		2
12	Camp	1	10	1	4		1	1		1	19
13	Resort	124	1	34	133	5	22	19	18	13	369
14	Entertain House	16	2	4	16	1	7	2	5	6	59
15	Village house	1	1	3	1		2	2		2	12
16	Glamping	1	7	1	4		1	2		5	21
17	Villa	735	7	79	372	7	47	28	79	28	1382
	Total	2143	88	335	1315	44	332	533	468	131	5389

[Source: Hotels.com, Booking.com, Google Maps]

Table 2 shows that there were 5,389 lodgings on the island of Bali during the Covid-19 period. From the data obtained, it is known that there are 17 types of lodging on the island of Bali, one of which is a hotel. The type of lodging with the most number is villas with a total of 1,382 properties, hotels rank third with a total of 1,260 properties. The second place is guest houses with a total of 1,338 properties.

The highest number of lodgings is found in Badung, which has about 2,143 properties, followed by Gianyar with 1,315 properties. Denpasar City ranks fourth with 468 properties. The results of Sari and Dewi's research (2018) show that the higher the number of hotels, the higher the income of the county or city.

The tightness shows whether or not the competition for lodging on the island of Bali is strong. The tighter between lodgings in a county, the higher the competition is. The density of lodging on the island of Bali within a radius of 3 km can be seen in Figure 1.

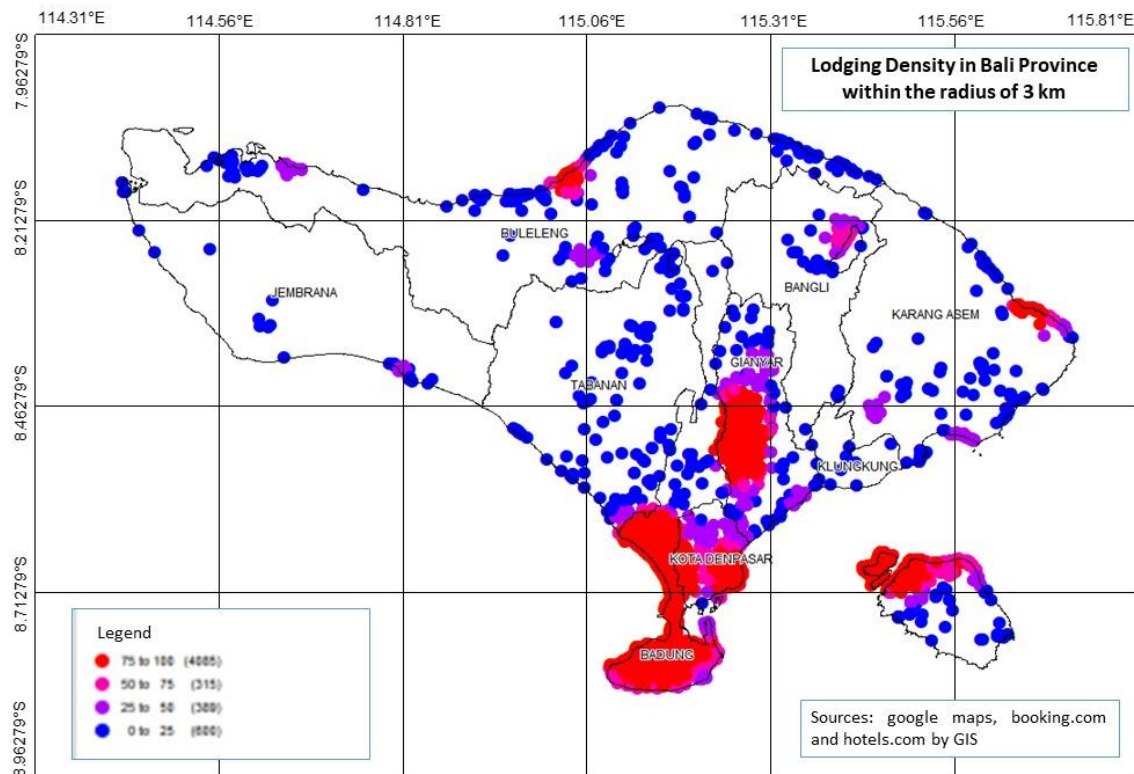


Figure 1. The Density of Bali island’s Lodgings within a Radius of 3 km
 [Source: Booking.com, Hotels.com, Google Maps]

Figure 1 shows that the distribution of lodging properties is found in every county (blue color), but lodgings with a high level of density are found in southern Bali. The high competition between lodgings is caused by the high density. These regencies include most of Badung, Denpasar, and Gianyar. The third is the district has 4,085 properties which have a distance to other properties of less than 3 km. Each property is surrounded by 75-100 other lodging properties.

According to the statement from Supriyatama and Wesnawa (2019) that the tourism industry on the island of Bali is still centered in South Bali such as in Badung, Denpasar City, and Gianyar. It is also stated that the development of tourism in the three counties includes having complete facilities, including lodgings.

While the blue part shows the lower lodging density, 600 properties on the island of Bali, each surrounded by other properties with as many as 0-25 lodgings within a radius of 3 km. This is mostly the case in all counties.

Likewise with pink and purple colors. The pink color indicates that there are 315 properties within a radius of 3 km on the island of Bali. Each property is surrounded by 50-75 other properties. The purple color indicates that there are 389 lodgings within a radius of 3 km. More foreigners are surrounded by other lodgings of 25-50 properties.

The tourism supporting facilities available in big data are lodgings, tourist attractions, gas stations, malls, and marts as determinants of competition for lodging in each county and the lodging itself. The number of each tourist supporting facility per county can be seen in Table 3.

Table 3. The Number of Tourist Supporting Facilities per County

County	Total Lodging	Total Tourist Object	Total Gas Station	Total Mall	Total Mart
Badung	2143	62	44	20	235
Bangli	88	11	10	0	16
Buleleng	335	47	14	0	100
Gianyar	1315	51	51	0	85
Jembrana	51	3	10	0	7
Karang Asem	332	4	10	0	11
Klungkung	533	2	12	0	5
Denpasar	468	5	5	10	73
Tabanan	131	9	9	0	96
Total	5396	194	165	30	628

[Source: Booking.com, Hotels.com, Google Maps]

Table 3 shows that there are lodgings in each regency accompanied by the supporting facilities, namely the presence of tourist attractions, gas stations, malls, and marts. While the Mall is only owned by Badung and Denpasar. For example, in Badung, there are 2,143 properties, 62 tourist attractions, 44 gas stations, 20 malls, and 235 marts.

Most tourist motorcycle taxis are found in Badung, which has about 235 vehicles, the second place in Gianyar, which has about 51 vehicles, then the third place is Buleleng, which has 47 vehicles. The results showed that the greater the number of tourist attractions in a county, the more it will increase the income of the county (Sari and Dewi, 2018). Meanwhile, research by Alyani and Siwi (2020) shows that the number of tourist attractions and the number of hotels together affect the original regional income in West Sumatra Province. This means that both of them support each other's presence of tourists in an area.

Table 3 also shows the number of tourist objects, the total number of tourist attractions identified is 194 objects. Each of them is a temple, beach, and swimming pool. The beach is the most common tourist attraction encountered when on the island of Bali. The county with the most tourist objects is Badung with 62 objects, then Gianyar with 51 objects and Buleleng with 47 objects. The distance to the tourist objects is one of the reasons for choosing the lodgings. This means that lodgings sought after are the ones that are close to the tourist objects. Besides that, there are other factors in the choice of lodgings. The data that can be identified are gas stations, malls, and marts. The density of tourist objects from the lodgings within a radius of 5 km can be seen in Figure 2.

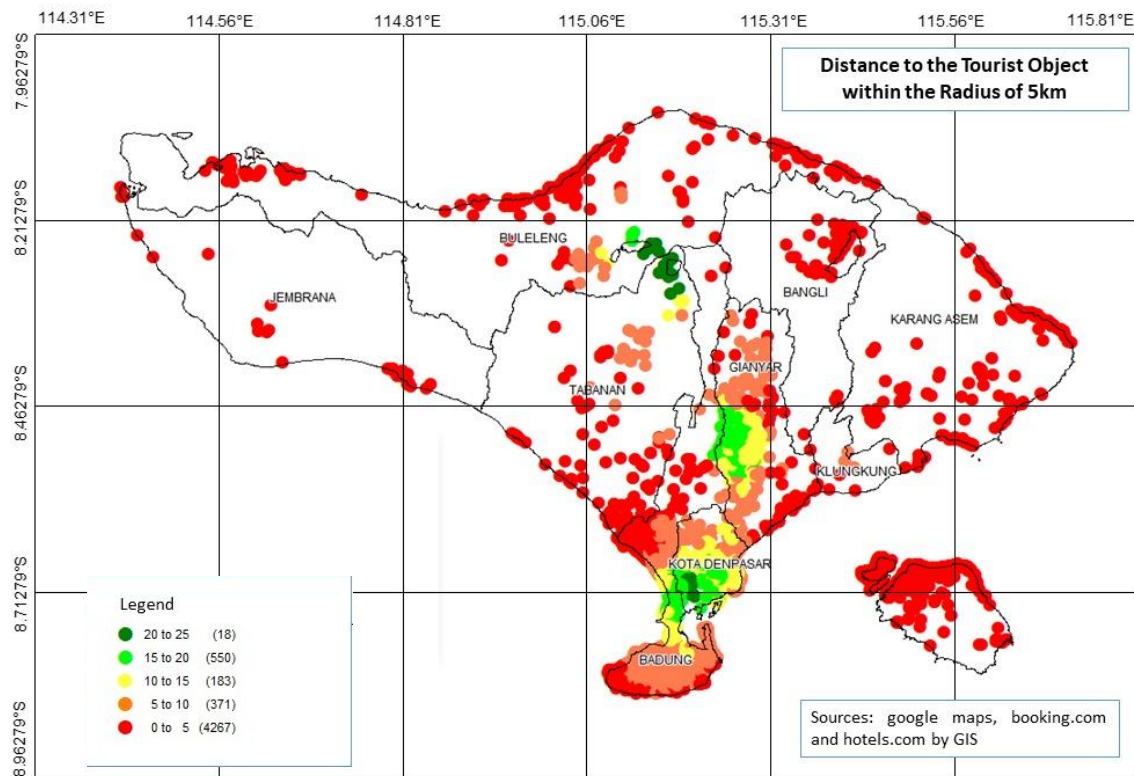


Figure 2. The Tourist Object Density of the Lodgings within a Radius of 5 km
 [Source: Booking.com, Hotels.com, Google Maps]

Figure 2 shows that the tourist objects' distance is highest towards some lodgings in green. There are 28 properties surrounded by tourist objects of less than a 5 km radius. Each property can be surrounded by 28-35 tourist objects. This partly happened in Denpasar City, Buleleng, and Tabanan. The lowest density is that there are 2,044 properties that have a distance to the object of less than 5 km. Each property is only surrounded by 0-7 attractions. This is the case in almost all counties. Meanwhile, a gas station from the properties at a radius of 3 km can be seen in Figure 3.

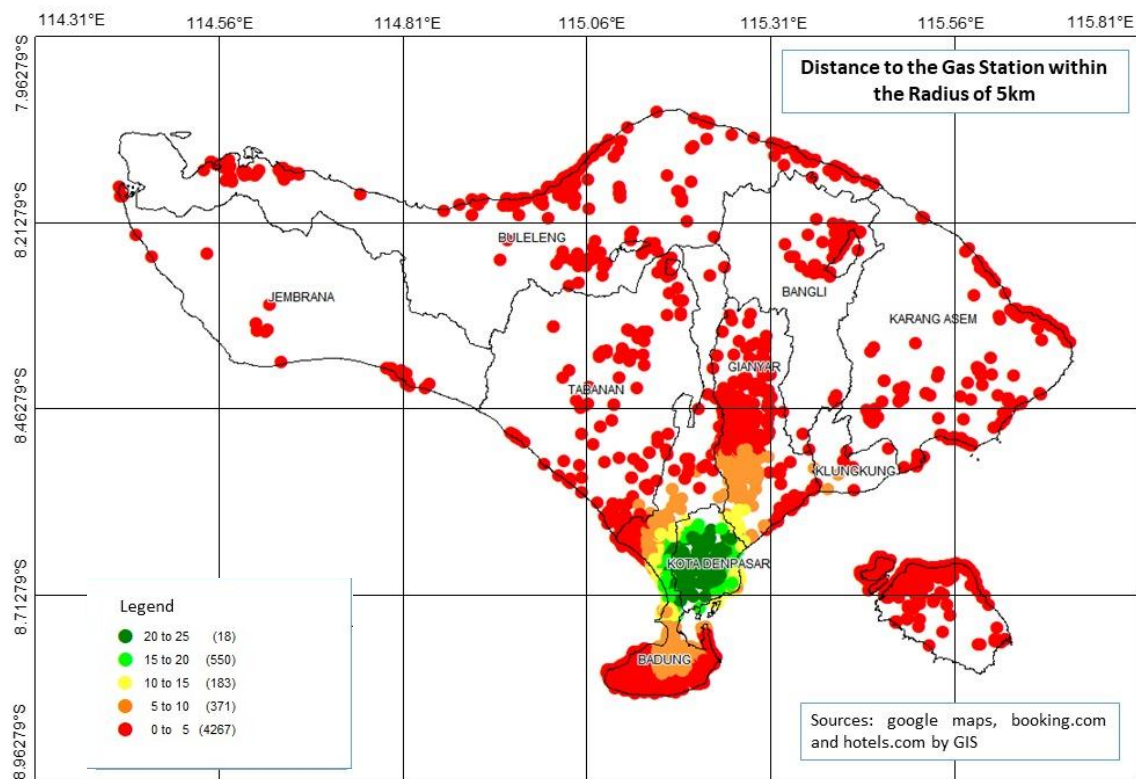


Figure 3. Distance to the Gas station in a Radius of 5 km
 [Source: Booking.com, Hotels.com, Google Maps]

Figure 3 shows that there is a high density of gas stations around Denpasar City. There are 304 lodgings that have a distance to gas stations of less than 5 km. Each lodging property can be surrounded by 40-50 gas stations. The lowest density of gas stations, namely 3184 lodgings, has a distance from the gas station of less than 5 km. Each of them is surrounded by 0 – 10 gas stations. Gas stations support the transportation for travel. Research by Supraptini and Supriyadi (2020) states that transportation facilities and accommodation together have a positive effect on tourist satisfaction. Gas stations are one of the transportation-related facilities while accommodation is a means of lodging including hotels. This is almost the case in all counties. The distance of mall from the lodging property at a radius of 5 km can be seen in Figure 4.

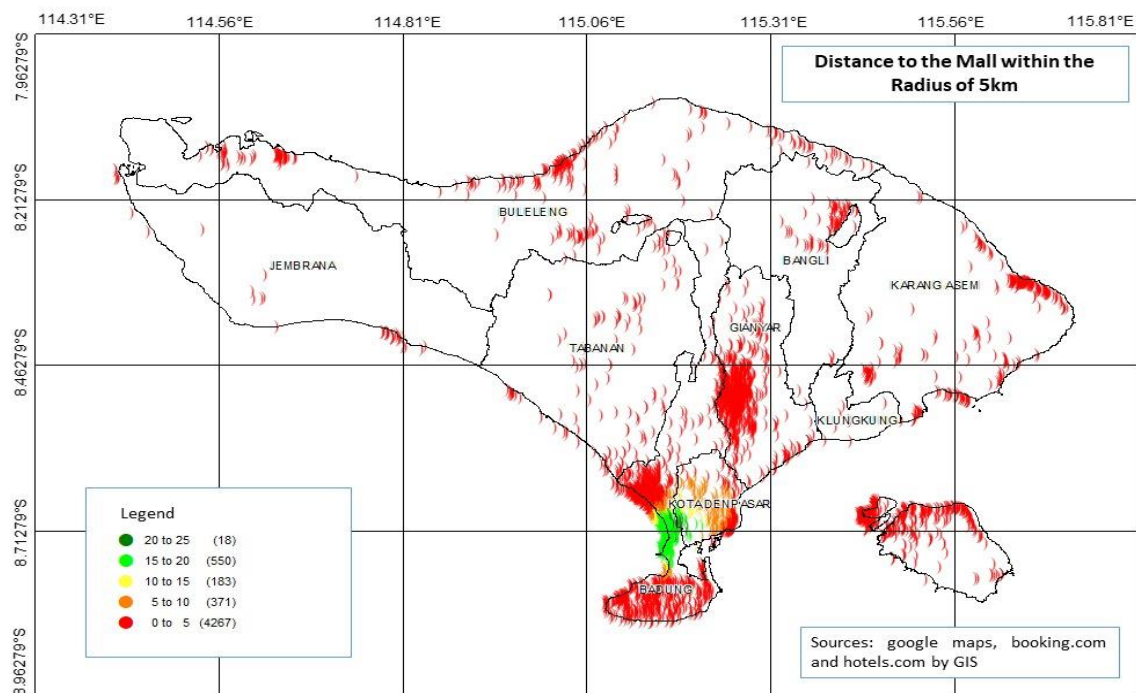


Figure 4. Mall Density from Lodging at a Radius of 5 km
 [Source: Booking.com, Hotels.com, Google Maps]

Figure 4 shows that there are 18 lodging properties that have a distance to the mall of less than 5 km. Each property can be surrounded by 20-25 malls. This happens in Denpasar City. The condition of low density is that there are 4,267 properties having a distance to the mall of less than 5 km. Each lodging can be surrounded by 0 –5 malls. This happened in Buleleng. Meanwhile, the mart density from the properties within a radius of 5 km can be seen in Figure 5.

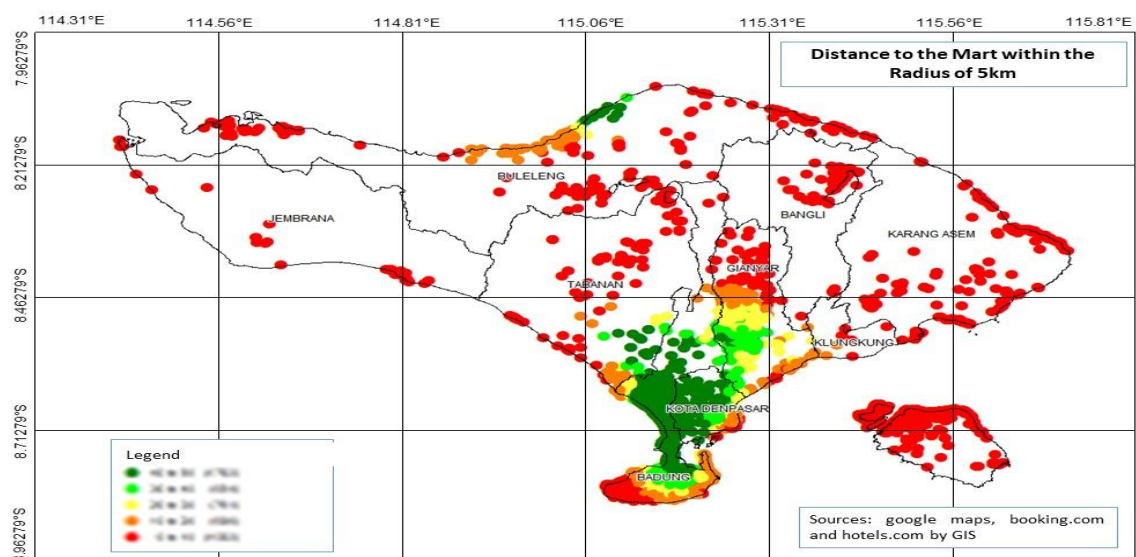


Figure 5. The Density of Marts in a Radius of 5 km
 [Source: Booking.com, Hotels.com, Google Maps]

Figure 5 shows that there are 1,783 lodgings that have a distance to the marts of less than 5 km. Each inn can be surrounded by 40-50 Marts. This happened, among others, in Badung, Denpasar, and Buleleng. Another condition with low density there are 1,563 lodgings that have a distance to the mart of less than 5 km. Each mart can be surrounded by 0 – 10 marts. This happens in all counties.

Lodging competition based on weighting (score) and ranking of lodgings, tourist attractions, gas stations, malls, and marts can be carried out. For this reason, scoring is carried out to get the county with the highest level of competition. The scoring for lodgings, tourist objects, gas stations, malls, and marts in each district can be seen in Table 4.

Table 4. Scoring for Lodging, Tourist Objects, Gas Stations, Malls, and Marts in Each County

County	Lodging score	Tourist object score	Gas station score	Mall score	Mart score	Total score	Ranking
Badung	9	8	8	20	9	42	1
Bangli	2	3	1	0	4	10	8
Buleleng	5	6	5	0	8	24	5
Gianyar	8	7	7	0	6	28	3
Jembrana	1	1	2	0	2	6	9
Karang Asem	4	4	3	0	3	14	6
Klungkung	7	3	4	0	1	15	7
Denpasar	6	5	9	9	5	34	2
Tabanan	3	9	6	0	7	25	4

[Source: Authors]

Table 4 shows that from the scores of lodging, tourist objects, gas stations, malls and marts in each county, it shows that the highest-ranking is owned by Badung, which is the highest score of 42. Badung has 2,143 lodgings, 8 tourist objects, 44 gas stations, 20 malls, and 235 marts. From the density map at a radius of 3 km between lodgings, it is found that among them Badung has 4,085 of lodgings that have a distance to other lodgings of less than 3 km. Each lodging property can be surrounded by 75-100 other lodgings. Badung contributed 1,783 lodging that has a distance to the mart of less than 5 km. Each lodging property is surrounded by 40-50 Marts.

The results of the consumer review per county can be seen in Table 5. In the results of the review, there are only 6 assessments, namely, staff, comfort, free Wi-Fi, facilities, the price is worth it, cleanliness and location. The results of the consumer review per county can be seen in Table 5.

Table 5. Results of Consumer Reviews per-County

County	No rating	Poor	Fair	Average	Good	Very Good	Extremely Good	Excellent	Total
Badung	506	16	45	261	413	342	390	170	2143
Bangli	26		3	6	11	8	20	14	88
Buleleng	56		5	22	52	57	96	47	335
Gianyar	244	2	7	57	171	251	400	183	1315
Jembrana	6		4	6	5	7	9	7	44
Karang Asem	57		3	15	61	71	84	41	332
Klungkung	60	2	2	38	92	99	156	84	533
Denpasar	124	11	27	87	80	53	66	20	468
Tabanan	45	1	3	9	18	17	24	14	131

[Source: Booking.com]

Table 5 shows that consumers give the highest special value to lodgings in Gianyar, which is 183 lodging properties. The second place with special value is Badung with 170 lodging properties, and the third place in Klungkung is 84 properties. On the contrary, the scores of no rating, namely in Badung with 522 lodgings, second place in Gianyar, which was 246 lodging properties and third place was Denpasar City with 135 lodging properties. Then the data in the form of an assessment score is used to determine the ranking of lodging on the island of Bali (Table 6).

Out of the 5,389 lodgings on the island of Bali, the 10 highest ranks were obtained with the supporting of tourist attractions, gas stations, malls and marts. On this weighting and ranking consumer reviews are also taken into account (Table 6).

Table 6. Lodging with the Highest Ranking Based on Other Lodgings, Tourist Objects, Gas Stations, Malls, Marts and Consumer Reviews

Rank	Name	County	Score					Total Score
			50% Review	Tourist object	Gas station	Mall	Mart	
1	Sol House Bali Legian****	Badung	.9100	.7272	.7800	1.0000	1.0000	.8057
2	Sleepwell Seminyak**	Badung	.9300	.6744	.7000	1.0000	1.0000	.8024
3	The Magani Hotel and Spa****	Badung	.9200	.7427	.6400	1.0000	1.0000	.7983
4	B Hotel & Spa****	Denpasar	.8500	.6642	1.0000	1.0000	1.0000	.7914

5	The Kana Kuta Hotel****	Badung	.8800	.7132	.8000	1.0000	1.0000	.7913
6	Juada Garden Villa****	Badung	.8900	.7134	.70000	1.0000	1.0000	.7863
7	Double Six Luxury Hotel Seminyak*****	Badung	.9200	.7380	.5200	1.0000	1.0000	.7858
8	Grand La Walon Hotel Seminyak*****	Badung	.8800	.7711	.6800	1.0000	1.0000	.7851
9	Yan's House Hotel***	Badung	.9100	.7904	.5000	1.0000	1.0000	.7840
10	Beach Hut Hostel***	Badung	.9400	.7440	.3800	1.0000	1.0000	.7824

[Source: Authors}

Table 6 shows that from the weighting with its supporting facilities of each lodging property found that the Sol House Bali Legian by Melia Hotels International Hotel has the highest ranking with a weight of .8079. Followed by The Hotel Magani Hotel and Spa with a weight of .9038. The third place is occupied by the Sleepwell Hotel Seminyak with a weight of .8024. Ten lodgings with the highest ranking out of 5,389 lodgings all in Badung. The type of lodging is dominated by 'hotel'. From the theory, it is found that the types of hotels are managed commercially and professionally (Bagyono (2014) and Tarmoezi and Manarung (2000)).

It should also be remembered that consumer reviews were taken during the Covid-19 pandemic with the condition that almost all hotels were closed, except they could survive by laying off employees permanently or temporarily, limiting the use of hotel facilities, the efficiency of managing expenses, sales of non-room products online, bookings by changing the visit schedule (Nuruddin *et al.* 2020). Even during the Covid-19 period, the hotel must still provide good service. The commitment of lodging to provide service must be improved, considering in previous research there is a relationship between service orientation and organizational commitment (Bhudiharty, 2018).

CONCLUSION

Research shows that there are 5,389 lodgings on the island of Bali. The lodging density map, among others, occurs in Badung Regency, Denpasar City and Gianyar occupying the highest density. Taking into account its supporting facilities, Badung has the highest level of competition with the number of lodgings 2,143 lodging properties, 8 tourist objects, 44 gas stations, 20 malls, and 235 mart. The lodging has high competition taking into account consumer reviews is Hotel Sol House Bali Legian by Melia Hotels International.

The Bali Provincial Government should consider the licensing of new hotel establishments in areas with high lodging density, for example, South Bali, especially Badung Regency, Denpasar City and Gianyar. For the hotel during the Covid-19 period, hotels should do what the Sol House Bali Legian by Melia Hotels International Hotel does, namely implementing CHSE certification (Cleanliness,

Health, Safety and Cleanliness, and Environment Sustainability) instructed by the Indonesian Ministry of Tourism.

Further research to determine the highest score can be done by inviting experts and stakeholders to determine what factors affect the level of competition for lodging/hotels during the Covid-19 period.

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