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Market Structure, Conduct, and Performance of Star Hotels in North Sumatra, Indonesia

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Abstract: *This study aims to analyse the market structure, conduct, and performance of the star hotel industry in North Sumatra. The study was conducted in 2019 with time series data for the period of 2013 to 2018. The market structure is measured using the methods of concentration ratio, Herfindahl-Hirschman index, and barriers to entry, while descriptive methods are used to analyse the conduct and performance of five-star hotels. The results of the study show that: (i) there is a concentration of three- and four-star hotels, and that the concentration of four- and five-star hotels have an oligopolistic structure; (ii) the market structure of star hotels tends to be monopolistic; (iii) the minimum efficient scale index of star hotels is relatively small, which means that new hotels have a good opportunity to get a larger market share; (iv) the level of service and the level of availability of star hotel facilities are classified as good; and (v) the star hotel market structure influences hotel business behaviour in North Sumatra, which in turn affects hotel business performance.*

Keywords: Market Structure; Conduct; Performance; Market share; Facility; Service.
JEL Classification: M20, M21, M31

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1. Introduction

The market structure of every business, whether involving goods or services, is vital, as it allows for the intensity of competition and the relative size of existing companies in the market to be identified. Carson et al. (2014) state that market structure includes the number and size of companies in a given industry. Market structure consists of market share, concentration, and barriers to entry. These elements describe the size of companies competing in a market. Market structure analysis needs to be conducted for each form of business because it can influence the performance of the industry concerned (Naylah, 2010). It can determine the characteristics of the market, particularly the conduct of producers and consumers when carrying out transactions (Mohammed et al., 2017). More explicitly, Indonesia's Law Number 5 of 1999 concerning Prohibition of Monopolistic Practices and Unfair Business Competition (Fadhilah, 2019) defines market structure as a condition that provides direction on aspects that have a crucial influence on the conduct of business actors and market performance. These aspects cover the number of sellers and buyers, barriers to entry, diversity of products, distribution systems, and control of market share. Harris and Mongiello (2001) argue that market structure shows the competitive environment between sellers and buyers through the process of pricing and the number of products offered in the market.

One of the fastest-growing businesses that are oriented towards market structure is hotels, which are necessary for tourism (Stangl et al., 2016). Hotels are an important facility in the tourism industry to meet the needs of people who travel more than a day. Damardjati (1981), as cited in Tag-Eldeen and El-Said (2011), define a hotel as a company that serves accommodation, food and other facilities to the public, which meet the requirements of comfort, for commercial purposes. According to Hilman and Kaliappen (2014), the availability of hotels is one of the benchmarks in attracting travellers to tourist destinations. Harris and Mongiello (2001) report that comfortable and clean conditions, completeness of accommodation, easy access, and efficient staff are the main attributes of a hotel that can impact the level of effectiveness of service quality and level of customer loyalty (see also Oluwatoyin et al., 2018).

The relationship between the hospitality industry and tourism shows that the higher the number of tourists visiting a place, the more they stay, shop,

visit culinary, use transportation and so on. Hilman and Kaliappen (2014) state that at present in Indonesia, the hotel business is entering a new era because of changes in various fields. These changes include the development of communication technology, the emergence of millennial generation that plays a key role as the driver of economic growth, as well as the need for a new mindset, work patterns, and business models. In North Sumatra, there are an increasing number of hotels. During the period of 2013 to 2017, the number of hotels and other accommodations experienced an average growth of 11.83%, with an increase of 48% from 2016 to 2017. In general, hotels and accommodations are concentrated in the cities of Medan, Karo, Deli Serdang, Samosir, and Langkat, the most popular tourist destinations in the region.

The number of hotels and other accommodations in North Sumatra at the end of 2018 stood at 1,109 units, with 30,174 rooms and 48,571 beds. The average hotel room occupancy rate was 44.21%, with star hotels recording an average of 56.67% and budget hotels with 34.32%. In terms of occupancy rate by class, the highest were four-star hotels, with an average of 76.24%, followed by five-star hotels with 59.72%, three-star hotels with 50.16%, one-star hotels with 38.26%, two-star hotels with 36.01%, and non-star hotels with 34.32%. Overall, in North Sumatra, the average length of stay of guests in 2018 ranged from one to two days. The average length of stay for all hotels was 1.51 days, with 1.69 days for star hotels and 1.35 days for budget hotels. This shows that the average length of stay for star hotels is higher than for budget hotels.

According to the Indonesian Hotel and Restaurant Association (PHRI) of North Sumatra, Medan is the city with the highest investment prospects in the region with 207 hotels. This is followed by Samosir, with 89 hotels and Karo, with 78 hotels. The high growth of hotels in Medan is a result of market demand in recent years, with many events held at hotels. This shows that the hotel business in Medan is very popular. Besides, the government constantly carries out infrastructure renovations to the Lake Toba area, to improve the prospects of hotel investment in Samosir, Tobasa, and Simalungun. The increasing growth of the hotel industry in North Sumatra will lead to tighter business competition to gain higher market shares. Therefore, marketing becomes the spearhead for the future of this hospitality business (Choi & Kim, 2012). Marketing is carried out very aggressively by each hotel, with price competition or hotel tariffs are also used to claim

market share (Abu Kasim & Minai, 2009). This is supported by the fact that information from the majority of hotels in North Sumatra can be accessed easily through online sites, such as Traveloka, Pegi-pegi, Tiket.Com, and so on. Tourism centres in North Sumatra also continue to experience increased activities that can attract more travellers. So, to understand the development of the hospitality industry in North Sumatra, it is first necessary to examine the conditions of the hotel market.

What can be used to determine the market system of an industry is the SCP (structure-conduct-performance) analysis, as popularised by Joe S. Bain in 1956 (Nzioka & Njuguna, 2017). A SCP approach can explain market structure, conduct, and performance to decide which policies to carry out (Emeksiz et al., 2006). The structure, conduct, and performance of industries are interconnected, and these three aspects will influence each other (Sitorus, 2012). According to Kim et al. (2013), the SCP approach is carried out to oversee competition among producers in a market. In the market structure, there are three main elements—market share, market concentration, and barriers to entry. The conduct of industry analyses behaviour and the application of strategies used by companies to claim market share and defeat competitors. The analysis used to find out market conduct is the pricing and market institutional system (Salem, 2014). Market performance illustrates competition in the marketing system, that is closely related to the theory of company performance (Tung et al., 2010). The existing market structure of hospitality cannot be avoided, but to create competition in the hotel industry, conduct and performance improvement can be carried out to review this market structure, because these three elements are indeed very closely related.

Based on the explanation above, this study needs to be conducted to examine the market structure, conduct, and performance of the hotel industry in North Sumatra using the SCP approach.

2. Literature Review

2.1 SCP theory

The SCP paradigm in industrial economics is used to connect elements of market structure with the conduct and performance of an industry (Sunarta et al., 2020). Structure refers to the market structure that is usually defined by

the market concentration ratio. This is the ratio that measures the distribution of market share in the industry. Conduct is the behaviour of companies in the industry (Phillips et al., 2015). This conduct is competitive or collusive, such as in pricing, advertising, production, and so on. Performance, meanwhile, is a measure of social efficiency, which is usually defined by the ratio of market power (in which the greater the market power, the lower the social efficiency). Another performance measure is company profit or profitability.

2.2 Market structure

Identification of market structures in an industry has a theoretical basis regarding the market position in the economy, as the market is a meeting place for sellers and buyers to bargain and agree on prices (Aminursita & Abdullah, 2018). Rizkyanti (2017) defines a market structure as a condition that can provide information about business conduct and market performance. By understanding the market structure, the market form of an industry can be determined, whether it is a monopoly, perfect competition, monopolistic competition, or oligopolistic competition (Idrees et al., 2018). Thus, the market structure is a real market form in the real world. There are three approaches to market structure (Zhu et al., 2009): market share, which is the percentage of the total market sales of a target obtained from a company; the level of market concentration, which is the combined market of several oligopoly companies realising their interdependence on one another; and barriers to entry, which is everything that causes a decrease in production value, opportunity, or speed of entry by new competitors (Narangajavana & Hu, 2008).

Based on the characteristics of the types of goods produced, the market structure is divided into four forms (Hsiao et al., 2018). The perfect competition market is the most ideal market structure because it guarantees the realisation of activities producing goods or services with high (optimal) efficiency. In this market form, the seller and buyer can only accept prices that have already emerged in the market. The monopoly market is a form with a single company. This company produces goods that does not have very close replacements. The monopolistic competition market is a combined market of monopoly and perfect competition market. In this case, there are substitution products, so that every decision taken by the producers impacts other companies. Lastly, the oligopolistic market consists of some producers

and the goods produced or traded have different characteristics or patterns (Stylos & Vassiliadis, 2015).

To determine the intensity of the market structure, several measures can be used, including: concentration ratio (CR), Herfindahl-Hirschman index (HHI), Hall-Tideman index (HTI), and the Lerner index (LI).

2.3 Concentration ratio

CR is the level of concentration that shows the share of a company in the industry (Olson et al., 2005). The basic measure used can be in the form of production, assets, sales, capacity, employment, and added value. The percentage is determined by the number of companies that show the level of concentration. Each part of the company can be determined by the following formula:

$$P_i = \frac{X_i}{T}$$

Where P_i is the market share of i^{th} firm (i = 1, …, n), X_i is the sales of i^{th} firm (or the other variables), T is total sales of the sector (or the other variables). The market share (CR) of some companies can be calculated as follows:

$$CR_n = \sum_{i=1}^{n} P_i$$

Where CR_n is concentration rate for n firms, n is the number of large firms in the industry, P_i is the market share of ith firm (i = 1,…, n). In general, this CR is referred to based on the number of companies. For example, the CR level of four companies is called CR4, the CR of eight companies is called CR8, and so on. Basically, this ratio is used as an indicator of monopolistic power.

2.4 Herfindahl-Hirschman index

This measure was established based on the reference that market competition will be dominated by some companies if there is concentration on some companies that have the power to dominate the market. HHI uses the following formula:

$$HHI = (\sum_{i=1}^{n} MS_i^2).100$$

where MS_i is the market share of each company. The maximum number of HHI is 10,000 (square of 100). HHI numbers close to 10,000 indicate that there is a concentration of market power in several companies, and *vice versa*. If it is close to 1, it indicates the practice of intense competition. Alternatively, it can also be calculated by the following formula (Ukav, 2017):

$$HHI = \sum_{i=1}^{N} P_i^2$$

$$HHI = \sum_{i=1}^{N} P_i^2 = (P_1^2 + P_2^2 + P_3^2 + \cdots + P_n^2)$$

$$HHI = \sum_{i=1}^{N} (1/N_i)^2$$

Where N is total number of firms in the industry, P_i is the market share of i^{th} firm (i =1, 2, N)

2.5 Hall-Tideman index

HTI is based on the basic principles for the concentration index due to the entry of new companies into industry (Svoboda, 2016). The following is the index formula:

$$HTI = \frac{1}{(2\sum_{i=1}^{n} is_i - 1)}$$

The value is the company share in the market. This value is weighted based on rank, namely the companies with the largest to the smallest market share. The letter represents the number of companies in the market. The biggest company has an weight = 1. The value of HTI ranges from 0 to 1, in which the value of 0 indicates that there are a large number of companies

of the same size in the market, and a value of 1 means that the market is a monopoly.

2.6 Lerner index

LI is used to measure monopoly power quantitatively (Herlambang et al., 2005; Dushku, 2015) with the following formula:

$$Lerner\ Index = (P - MC)/P = 1/\eta$$

LI values vary between 0 and 1. The greater the value of LI, the greater the monopoly power of the company. In perfect market competition, the value of LI = 0. In a monopoly market, when the elasticity (η) of demand is getting lower, it is possible to obtain a mark-up where the price (P) is above the marginal cost (MC), which is high so that the monopoly power is higher. In other words, monopoly power will be lower if the price gets closer to the MC.

2.7 Barriers to entry

According to Orfila-Sintes et al. (2005), barriers to entry can naturally be structural or strategic. The structural barriers to entry are exogenously determined, such as economies of scale and product differentiation. Conversely, strategic barriers to entry arise from strategies that prevent entry (such as limiting prices) or forcing competing companies to exit (predatory pricing). Another type of barrier to entry that is widely used in empirical studies of SCP is product differentiation, which is proxied by the ratio of advertising expenditure to sales. An indication of barriers to entry is the minimum efficient scale (MES). To calculate MES, the following formula can be used (Natalia & Deoranto, 2012):

$$MES = \frac{Average\ output\ (sales)\ of\ 4\ biggest\ companies}{Total\ Output\ (sales)}$$

2.8 Conduct

According to Hilman and Kaliappen (2014), conduct is the pattern of responses and adjustments of an industry in the market to achieve its goals. The conduct of one industry may differ from another, which is caused by differences in the market structure. Conduct is related to a pattern of responses and adjustments of various companies in an industry to achieve their goals and face competition. Furthermore, Harris and Mongiello (2001) and Carson et al. (2014) explain that industrial conduct can be seen in how companies determine selling prices, promote or advertise products, coordinate activities in the market (for example, by colluding), as well as research and development. In perfect market competition, the company's conduct regarding prices is a price taker, while in other markets, the company can conduct strategic behaviour.

Elements of conduct consist of pricing behaviour; product strategy; research and innovation; and advertising. The first element is pricing behaviour. In addition to perfect competition, companies can carry out collusion in pricing, for example by limiting product output (the price will be higher), so that the profit achieved is maximum. The second element is the product strategy, which is carried out to answer the wishes of the company, whether to stay focused on existing product lines, or diversify products towards the addition of new products. The third element is research and innovation, which can be carried out to create products that are truly new (product innovation) or find more efficient ways of production (process innovation) (Al-Rousan & Mohamed, 2010). The fourth element is advertising, which is carried out to increase product differentiation and customer loyalty (Phillips et al., 2015).

2.9 Performance

According to Stylos and Vassiliadis (2015), performance is a measure of the success of company activities in the market. Performance is a criterion that is difficult to measure because the size of each company's success varies, depending on the goals of each company. However, to make it more detailed, performance can also be reflected through efficiency, growth (including market expansion), job opportunities, professional prestige, personnel welfare, and group pride. In practice, performance measures can vary

depending on the type of industry. First, performance measures are based on the viewpoints of management, owners, or lenders. Second, performance in an industry can be observed through added value, productivity, efficiency, and so on. Industrial performance can be measured by market dominance or the number of profits achieved by companies in an industry (Stylos & Vassiliadis, 2015). Other performance elements include profitability, efficiency, economic growth, full employment, and equity (Tung et al., 2010).

Empirically, Anh et al. (2014) state that LI is a good measure to measure company performance by looking at the company's market power. When LI > 0, the company is categorised to have market power. However, because it might be difficult to obtain marginal cost data, the following formulations can be used:

$$\pi = \text{profit /revenue}$$
$$\pi = \text{profit / capital}$$
$$\pi = \text{profit / equity}$$
$$\pi = \text{profit / net worth}$$
$$\text{Market value of equity} = \text{equity/revenue}$$

where π is performance or market power.

Hsiao et al. (2018) also state that LI is a better indicator of a firm's price-setting discretion than its ability to sustain monopoly prices. Further, Choi and Kim (2012) note that based on profit-maximising behaviour, the usual interpretation of LI is that a zero value reflects competitive behaviour, while a positive value is associated with market power. They investigate to what extent the usual interpretation of the LI remains valid in a setting where firms do not pursue profit maximisation, but instead maximise revenues subject to a minimum-profit constraint. A positive LI still indicates market power, but that the magnitude of a positive LI can no longer be used to determine how much market power there is (Abu Kasim & Minai, 2009). Furthermore, extra information would be required to draw conclusions about the presence or absence of market power when the LI is zero or negative.

3. Theoretical Model

This study is motivated by the increasing demand for hotel accommodation services to create competition. This will influence the application of prices and performance for each of these hotels (Bouranta et al., 2017). Further, this will influence the market structure, conduct, and performance of hotels in the region. The entry of new hotels is also one of the factors causing new competition, which can bring about changes in existing hotels (Nzioka & Njuguna, 2017). The market structure will be explained by the size of the hotel market share, concentration of hotels, and the barriers to entry (Tung et al., 2010; Göçen et al., 2017). Market conduct can be explained descriptively by looking at the pricing and promotion strategies carried out by the hospitality business (Þuclea & Pãdurean, 2008). While for market performance, it is explained descriptively by looking at performance elements (Idrees et al., 2018), such as growth, profitability, and efficiency (Kim et al., 2013). After obtaining the results of the assessment of market structure, behaviour and performance, the next thing to do is look at the relationship between market structure, behaviour and performance (Buffa et al., 2018). Then the relationship between the SCP model and the hotel market is examined (Lelissa & Kuhil, 2018).

In the analysis of Tung et al. (2010) on the market SCP of the international tourist hotel industry in Taiwan, they found that there is a two-way causal relationship between market structure and strategic conduct detected from the SCP model incentive pattern; there is a positive influence of the brand on market share; and that company profitability has a positive and significant influence on market share, but a negative influence on total operating costs and capital intensity. This confirms that the problem of the hotel industry is closely related to capital. Salem (2014) uses two approaches to analyse the travel agency market and the hotel industry, namely SCP and the game theory model. Game theory can be used to explain and estimate product strategy, price, distribution, and capital investment. The results of the study show that the strategy of raising prices is preferred by tourism hotel operators, but there is no certainty that competitors will respond to this strategy. The study of Emeksiz et al. (2006) on Antalya reveals that the current competitive business environment forces all kinds of companies to struggle to gain a greater market share. Globalisation has played a key role in accelerating this trend. Also, in terms of the structure of the hospitality

market in Antalya, it was found that the existence of major hotels, market intensity, and market share are tied to the competitive advantage of the hotel industry (Sunarta et al., 2020).

4. Research Method

The hotel industry data to be analysed is limited to the category of one-star, two-star, three-star, four-star, and five-star hotels in the period of 2013 to 2018. The data coverage includes: number of star hotels, occupancy rate, length of stay (days), number of rooms, beds, and employees, room rates, and marketing activities. To determine the market structure of the star hotel, the following analysis is carried out:

4.1 Concentration ratio

CR is used to measure the largest hotel market share by total hotel room sales. Each market share of hotel categories can be determined by using:

$$P_i = \frac{X_i}{T} \tag{1}$$

where P_i = *i* star hotel market share (*i = 1, 2, 3, 4, 5*), X_i = number of *i* rooms sold by star hotels, *T* = total room sales of all star hotels.

Then, the market share (CR) of several companies can be calculated as follows:

$$CR_n = \sum_{i=1}^{n} P_i \tag{2}$$

Where CR_n = concentration ratio for the *n* number of the *i* star hotel, *n* = the largest number of hotels in the *i* star hotel category, P_i = the market share of the *i* star hotel.

According to Gonzalez et al. (2019), if the four largest companies control at least 40% of the sales market share of the industry concerned, the industrial structure is categorised as an oligopoly. But Khan and Hanif (2018) state that a rule of thumb is that an oligopoly exists when the top five firms in the market account for more than 60% of total market sales (Appendix A.1).

4.2 Herfindahl-Hirschman index

The market structure of the star hotel can also be analysed using HHI, which is the sum of the squares of the market share of each star hotel. According to Khan and Hanif (2018) and Yawika and Handayani (2019), the value of this index is between more than 0 to 1. If the index is close to 0, it means that the industrial structure tends to be perfect market competition, while if the index is close to 1, it tends to be monopolistic.

$$HHI = \sum_{i=1}^{N} P_i^2 \tag{3}$$

$$HHI = \sum_{i=1}^{N} \left(\frac{1}{N_i}\right)^2 \tag{4}$$

where N = the sum of all star hotels (one- to five-star), P_i = the market share of the i star hotel.

Another explanation states that the HHI ranges from 1/N to one, where N is the number of firms in the market. Equivalently, if percentages are used as whole numbers, the index can range up to 100^2, or 10,000. A *HHI* below 0.01 (or 100) indicates a highly competitive industry. A *HHI* below 0.15 (or 1,500) indicates an unconcentrated industry. A *HHI* between 0.15 to 0.25 (or 1,500 to 2,500) indicates moderate concentration. A *HHI* above 0.25 (above 2,500) indicates high concentration (Muller & Peres, 2018).

4.3 Barriers to entry

Muller and Peres (2018) state that barriers to entry can include high start-up costs, regulatory hurdles, or other obstacles that prevent new competitors from easily entering a business sector. Barriers to entry benefit existing firms, because they protect their market share and ability to generate revenue. In market structure of hotel businesses, barriers to entry can be measured by MES.

$$MES = \frac{\text{Average output(sales)of 4 biggest star hotels}}{\text{Total Output (sales)}} \tag{5}$$

According to Lemy et al. (2019), the lower the value of MES, the more new companies have the opportunity to gain market share with a low level of difficulty, or remain competitive in a healthy manner to obtain greater market

share and *vice versa*. Abdullah et al. (1990) argue that market size is directly linked to the industrial MES and the number of industries in a territory, and consequently to competition. They add that a small market size relative to MES is a barrier to entry. Furthermore, Alberto et al. (2019) confirm that a high MES is an essential indicator of entry barriers. As it requires the production of larger quantities to achieve economies of scale, newcomers will find it challenging. They must invest heavily on a large scale to build production facilities. And not all companies are capable, either due to lack of capital or technical knowledge of the production process.

5. Results

5.1 Market structure analysis of star hotels in North Sumatra

The market structure of star hotels in North Sumatra is measured using the CR, HHI, and barriers to entry. To determine the values of three measurements, it is necessary to provide data that includes the number of hotels, number of rooms, occupancy rate, and the number of rooms sold. Then, the number of rooms sold is calculated based on the following formula (BPS Sumatra Utara, 2019):

$$\textit{Number of rooms sold} = \textit{occupancy rate (\%)} \times \textit{number of rooms available}$$

The number of rooms sold in each star hotel category in North Sumatra for the period of 2013 to 2018 is presented in Table 2 (see also Appendix A.3).

5.2 Concentration ratio

In determining CR, market share is first calculated using equation (1) and then CR is determined using equation (2). By using the data on the number of rooms sold in equation (1), the market share of each star hotel category is obtained, as presented in Table 1.

Table 1: Market Share of Star Hotels in North Sumatra, 2013-2018

Year	1-star (%)	Δ %	2-star (%)	Δ %	3-star (%)	Δ %	4-star (%)	Δ %	5-star (%)	Δ %
2013	11.78		20.55		31.99		22.83		12.85	
2014	6.55	-44.43	13.40	-34.80	30.75	-3.87	31.94	40	17.37	35.17
2015	5.01	-23.47	12.26	-8.49	27.74	-9.79	33.65	5	21.34	22.88
2016	7.85	56.78	11.15	-9.06	32.43	16.88	25.63	-24	22.94	7.50
2017	6.50	-17.21	10.44	-6.33	26.10	-19.51	35.80	40	21.15	-7.81
2018	6.25	-3.85	8.79	-15.81	34.80	33.34	39.73	11	10.42	-50.73
Average		-6.44		-14.90		3.41		14.41		1.40

Source: Data Processing Results (2019).

For 2013 to 2018, the largest market share was owned by four-star hotels with an average increase of 14.41% per year, followed by three-star hotels and five-star hotels with an average increase of 3.41% and 1.40% per year, respectively. The market share of one-star and two-star hotels decreased by an average of 6.44% and 14.90% per year, respectively. According to Kuncoro and Suriani (2017) and Alberto et al. (2019), if some of the largest companies control at least 40% of the sales market share of the industry concerned, the industrial structure is categorised as an oligopoly. Therefore, it can be seen that during this period, there were no star hotel categories that occupied a minimum market share of 40%.

However, in this study, to determine the concentration level of the star hotel market, a modification was made to equation (2) by summing the market share of the star hotel with the closest characteristics of a star hotel to another, which is the concentration of one- and two-star hotels (for example in 2013: 11.78% + 20.55% = 32.33%, etc.), the concentration of three- and four-star hotels (for example in 2013: 31.99% + 22.83% = 54.82%, etc.), and the concentration of four- and five-star hotels (for example in 2013: 22.83% + 12.85% = 35.68%, etc.). This is carried out due to incomplete data to accommodate the concentration of the four biggest star hotels (CR4) or the concentration of the eight biggest star hotels (CR8). Based on this concentration classification, the concentration level of star hotels is obtained, as presented in Table 2.

Table 2: Concentration Level of Star Hotels in North Sumatra, 2013-2018

Year	Concentration level of 1-star and 2-star hotels	Concentration level of 3-star and 4-star hotels	Concentration level of 4-star and 5- star hotels
2013	0.3233	0.5482	0.3568
2014	0.1994	0.6269	0.4931
2015	0.1727	0.6139	0.5499
2016	0.1900	0.5805	0.4857
2017	0.1694	0.6190	0.5696
2018	0.1504	0.7454	0.5016

Source: Data Processing Results (2019).

Thus, based on Table 2 above, the concentration of three- and four-star hotels and that of four- and five-star hotels have an oligopoly market structure because they control the hotel market share above 40%. For the period 2013 to 2018, the concentration of three- and four-star hotels controlled an average market share of 62.23% per year, followed by a concentration of four- and five-star hotels with an average market share of 49.28% per year.

5.3 Herfindahl-Hirschman index

By using the HHI formula as described in equation (3) and the data in Table 1, the HHI is obtained as presented in Table 3 below.

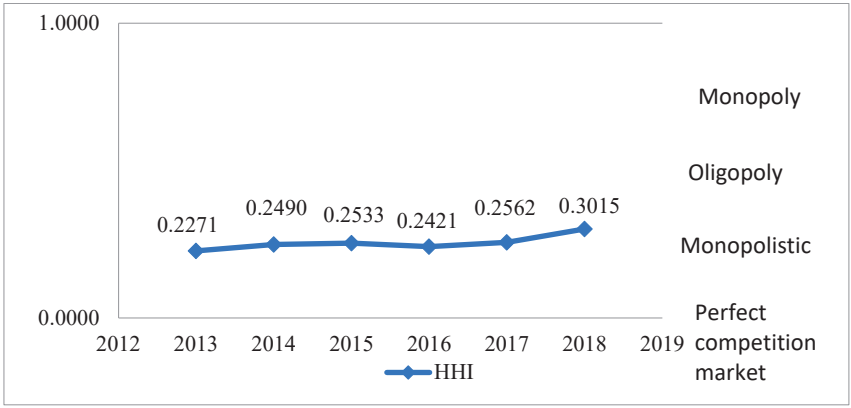
Table 3: HHI of Star Hotels in North Sumatera, 2013-2018

Year	P_1^2	P_2^2	P_3^2	P_4^2	P_5^2	HHI $(\sum_{n=1}^{N} P_i^2)$
2013	0.0139	0.0422	0.1023	0.0521	0.0165	0.2271
2014	0.0043	0.0179	0.0946	0.1020	0.0302	0.2490
2015	0.0025	0.0150	0.0770	0.1132	0.0455	0.2533
2016	0.0062	0.0124	0.1051	0.0657	0.0526	0.2421
2017	0.0042	0.0109	0.0681	0.1282	0.0447	0.2562
2018	0.0039	0.0077	0.1211	0.1579	0.0109	0.3015

Source: Data Processing Results (2019).

Graphically, the HHI values above can be presented in Figure 1. According to Ukav (2017) and Pidada (2017), the value of HHI is between more than 0 to 1. If the index is close to 0, it means that the industrial structure tends to be perfect market competition, while if the index is close to 1, it tends to be monopoly. By applying this index, it can be formulated by dividing equally against the four market types (monopoly, oligopoly, monopolistic, perfect competition) that an index of 0.00 to < 0.25 refers to perfect competition, an index of 0.25 to < 0.50 refers to a monopolistic competition, an index of 0.50 to < 0.75 refers to an oligopoly, and an index of 0.75 to 1.00 refers to a monopoly. Thereby, the market structure of the star hotels in North Sumatra during the period of review is between perfect competition and monopolistic.

Figure 1: HHI of Star Hotels in North Sumatra, 2013-2018



Source: Authors' own.

5.4 Barriers to entry

To determine the barriers to entry in the industrial market, we can use the MES formula as in equation (5). However, in this study, the largest company is determined by taking three-star hotel categories with the most number of rooms sold. These are presented in Table 4.

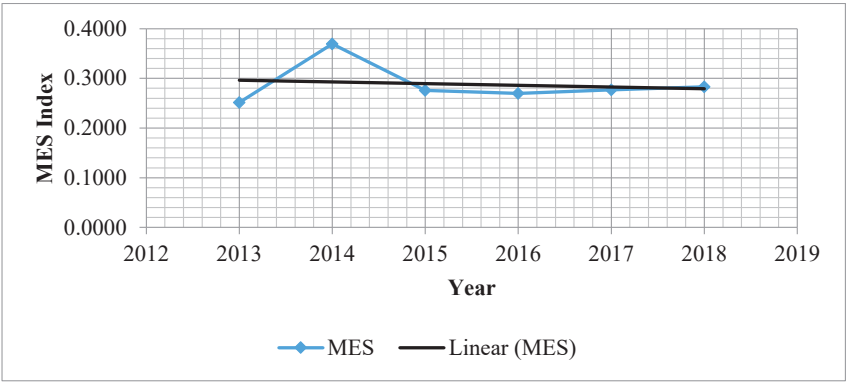
Table 4: MES Index of Star Hotels in North Sumatra, 2013-2018

Year	1-Star	2-Star	3-Star	4-Star	5-Star	Average sales*	MES
2013	427	744	1159	827	465	910	0.2512
2014	258	528	1212	1258	684	1455	0.3694
2015	280	685	1549	1879	1192	1540	0.2758
2016	397	564	1640	1296	1161	1366	0.2700
2017	418	671	1677	2301	1359	1779	0.2769
2018	401	563	2230	2546	668	1814	0.2832

Note: *Average sales of the 3 biggest star hotel categories.
Source: Data Processing Results (2019).

Graphically, the MES index above can be presented in Figure 2 below.

Figure 2: MES Index of Star Hotels in North Sumatra, 2013-2018



Source: Authors' own.

Figure 2 shows that for the period 2013 to 2018, the trend of MES index of star hotels was getting lower, which illustrates that the establishment of new star hotels has a good opportunity to remain in healthy competition for a greater market share. This result is supported by Sánchez-Casado et al. (2020) and Zhang et al. (2020). They point out that the estimation of MES for the service sector is likely to be lower than the manufacturing sector, so that the service sector can easily enter the market. On the contrary, Reza et al. (2020) state that companies are able to exploit the market when the range

of their MES is high as this implies a barrier to entry. The higher the barriers to entry, the greater the ability of established firms to raise price above the long run average costs without letting new firms, including foreign firms, to enter the market.

5.5 Market conduct of star hotels in North Sumatra

Market conduct is how market participants, consisting of producers, consumers, and marketing institutions, adjust to the situation of sales and purchases that occur (Liow et al., 2019). Market conduct is not always constant. Tung et al. (2010) and Lo and Yeung (2019) argue that market behaviour includes how companies determine selling prices, product promotion or advertising, perceptions, and coordination of activities in the market. In this study, however, the market conduct analysis of star hotels only includes pricing and consumer perceptions. This is due to limited data and information on star hotels in North Sumatra.

Price is an important factor in an industry. Market conduct encourages cooperation in pricing. There are two reasons for this. First, price is the most effective and dangerous weapon in competition. Second, price is a critical part that must be controlled (Ali et al., 2020). Based on observations on star hotels in North Sumatra from 2019 to 2020, room rates are as presented in Table 5.

These hotel room rates can be influenced by internal and external factors. Internal factors include the target price of the hotel business, hotel occupation rates, and hotel activity operating costs. External factors include price agreements determined by hotel business organisations, government policies due to price increases for fuel, electricity and water, regulations on tourism and management of hotel services, as well as conditions of demand and supply (Ali et al., 2020). According to Orfila-Sintes et al. (2005), room quality, location, and attributes can also influence the room rates. Zhu et al. (2009) find that the important determinants of hotel room prices are popularity ratings (derived from customer reviews), the hotel star rating, weeks of advance booking, and certain hotel characteristics, such as express checkout, room service, or internet access.

Table 5: Room Rates of Star Hotels in North Sumatra

Hotel categories	Room types	Range of room rate per night (IDR)
5-star	President Suite	2,000,000 – 2,500,000
	Premium Deluxe	1,500,000 – 1,850,000
	Superior Deluxe	1,000,000 – 1,330,000
	Deluxe	700,000 – 900,000
4-star	Executive	1,500,000 – 1,850,000
	Deluxe	1,000,000 – 1,350,000
	Superior	650,000 – 900,000
	Standard	450,000 – 600,000
3-star	Deluxe	700,000 – 850,000
	Superior	500,000 – 700,000
	Standard	300,000 – 450,000
2-star	Deluxe	500,000 – 700,000
	Superior	300,000 – 450,000
	Standard	200,000 – 275,000
1-star	Deluxe	500,000 – 600,000
	Superior	300,000 – 450,000
	Standard	150,000 – 275,000

Source: Collected data from various star-hotels in North Sumatra (2020).

In providing services to consumers, a hotel must pay attention to the quality of the services it provides, which can be seen from the perspective of consumer perceptions. Consumers can assess the quality of service after they receive services from a hotel (Stylos & Vassiliadis, 2015). In this study, due to limited published information, the perception data of consumers only includes three-, four- and five-star hotels summarised from Tripadvisor and Agoda in 2019. Tripadvisor is an American online travel company that operates a website and mobile app with user-generated content and a comparison shopping website. It also offers online hotel reservations and bookings for transportation, lodging, travel experiences, and restaurants. Agoda is an online travel agency and metasearch engine for hotels, vacation rentals, flights, and airport transfer (Orfila-Sintes et al., 2005).

The hotels studied here comprise: Five-star: Grand Aston Hotel, Grand Swiss Bell Hotel; four-star: Santika Premiere Dyandra Hotel, Tiara Hotel, Polonia Hotel; and three-star: Madani Syariah Hotel, Danau Toba Hotel, Radisson Hotel, Raz Hotel, Grand Kanaya Hotel (Appendix A.3).

Consumer perceptions as described in Table 6 are based on a scale of 1 to 5, namely (1) very dissatisfied, (2) dissatisfied, (3) indifferent, (4) satisfied, and (5) very satisfied. Table 6 shows that the perception level of consumer indicators for five-star hotels averages at 4.4 (very satisfied); four-star hotels average at 4.2 (very satisfied); three-star average at 3.75 (satisfied).

5.6 Market performance of star hotels in North Sumatra

In 2017, the number of foreign tourists coming in North Sumatra reached 270,792 people, meaning that there was an increase of 37,149 people, or around 15.96% (BPS Sumatra Utara, 2018). The development of the hotel market can be followed through indicators, such as number of hotels, number of rooms, and number of beds. The development of market indicators of star hotel performance in North Sumatra is shown in Table 6 below:

Table 6: Number of Hotels, Rooms, and Beds for Star Hotels in North Sumatra, 2013-2017

Year	1-Star	2-Star	3-Star	4-Star	5-Star	Total
Number of hotels						
2013	23	26	25	16	6	96
2014	20	31	32	16	7	106
2015	20	31	36	17	7	111
2016	16	22	35	12	4	119
2017	21	25	49	22	9	126
Number of rooms						
2013	1212	2562	2366	1697	923	7860
2014	925	1838	2736	2647	1407	9553
2015	830	1888	2919	2816	1535	9988
2016	1097	1480	3418	1970	1568	10533
2017	935	1541	3779	3367	1794	11416
Number of beds						
2013	2091	3904	3925	3040	1554	14514
2014	1538	2870	4382	3915	2242	14947
2015	1390	2942	4519	4460	2137	15448
2016	1701	2424	5320	4449	2329	16223
2017	1675	2837	6658	5926	3204	20300

Source: BPS Sumatra Utara, 2018 (data processed).

Based on Table 6, in 2017 in the North Sumatra Province, there were 126 star hotels with a total of 11,416 rooms and a total of 20,300 beds. This shows an increase from 2016 in the number of rooms by 8.38%, and the number of beds by 27.29%. The number of rooms increased by 17.97% from 26,697 in 2016 to 31,495 in 2017, and the number of beds increased by 38.87% from 39,032 in 2016 to 54,203 in 2017. Most of the hotels and other accommodations are located in the cities of Medan (218 units), Samosir (101 units), Karo (104 units), Deli Serdang (101 units), Simalungun (70 units), Langkat (99 units), with the remaining 463 units spread throughout other regencies/cities.

The occupancy rate for hotels is an indicator that can advance productivity, because the higher the rate, the more the hotel is able to increase sales. In North Sumatra in 2017, the average occupancy rate of the hotel room was 45.47%, meaning that of all hotel rooms, 14,321 rooms (45.47% x 31,495 rooms) were always occupied every night during the year. The average rate in star hotels was 55.22%, and 36.47% for budget hotels. Seen from the occupancy rate of the hotel room in 2017 based on its class, the highest was in five-star hotels with an average of 75.76%, followed by four-, three-, two-, and one-star hotels with an average of 68.33%, 44.38%, 43.54%, and 44.69% respectively (BPS Sumatra Utara, 2018).

Overall, in North Sumatra, the average length of stay in 2017 ranged from one to two days. For more details, the average length of stay for all hotels was 1.57 days, with star hotels averaging at 1.77 days, and budget hotels averaging at 1.36 days. This shows that the average number of guests staying at star hotels was higher than that of budget hotels. Of the many guests who stayed in all hotels in North Sumatra in 2017, most were domestic guests (95.10%), while foreign guests were only 4.90%. This shows that domestic guests are still the mainstay of income for hotel entrepreneurs. However, most domestic guests stayed in budget and two-star hotels, while foreign guests mostly stayed in five- and one-star hotels.

5.7 Relationship between market structure, conduct, and performance

The market structure that occurs will affect market conduct, which impacts company performance. The simplest relationship between the three variables is a linear relationship, in which the structure influences conduct and conduct influences performance. The SCP approach is carried out to

monitor competition among producers in a market. It sees how producers take action due to the existing market structure and further to the market's appearance (Bassa & Woldeamanuel, 2019; Sánchez-Casado et al., 2020). In the star hotel market in North Sumatra, the market structure will influence the market conduct of the hotel industry, and the conduct will influence the performance of the hotel business individually (Banerjee & Chua, 2016). Zhang et al. (2020) state that the market structure will influence the conduct of companies in the market which together determine the performance of the overall market system.

Consequently, there is a mutually influential relationship between market structure and performance. If the market share of the star hotel is high, the hotel performance is also high. If the CR of the hotel is high, the performance value will be high, and if the MES value is high, the performance value is also high (Alberto et al., 2019; Lemy et al., 2019). The relationship that occurs between market structure and market conduct is that if the MES value is high, the hotel room rates will be cheap (Kaselimi et al., 2011). The relationship between market conduct and market performance is that if hotel performance increases, the room rates will be low. This will increase the number of guests who extend the room occupancy rate (Baradarani & Kilic, 2018). Thereby, the statement indicates that the market structure of the star hotel greatly influences the conduct of the hotel industry in North Sumatra, and the conduct of the hotel industry will greatly influence the performance of the hotel business.

6. Conclusion

There is a tendency that the concentration of three- and four-star hotels and the concentration of four- and five-star hotels have an oligopoly market structure. For the period 2013 to 2018, the concentration of three- and four-star hotels controlled an average market share of 62.23% per year, and the concentration of four- and five-star hotels controlled an average market share of 49.28% per year. The market structure of the star hotels in North Sumatra from 2013 to 2018 is monopolistic. For that period, the MES index of star hotel was getting smaller, which illustrates that new star hotels have an opportunity to remain in healthy competition to gain a larger market share. The levels of service and availability of star hotel facilities in North Sumatra is very satisfactory for four- and five-star hotels, while for three-star hotels

are categorised as satisfactory. For the same period, the performance of star hotels in North Sumatra increased by an average of 8.38%, the occupancy rate by 55.22%, and productivity by 14.15%.

Furthermore, the market structure highly influences the conduct of the hotel industry in North Sumatra, and the conduct of the industry influences the performance of the hotel business. The monopolistic hotel market structure has opened up opportunities for new hotels to compete. To improve service quality better, the hotel business must re-evaluate consumer satisfaction. At present, the provincial government of North Sumatra is intensifying tourism, and entrepreneurs are expected to take advantage of this opportunity. Therefore, the business of star hotels and others can accommodate the number of tourists, and in turn, increase hotel occupancy rates and the market share. In the future, other studies can focus on the different attributes of competitiveness based on location and the size of economies to evaluate the level of competitiveness among star hotels in North Sumatra.

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Appendix A.1: Concentration Levels in Market Structure

Concentration level	Concentration ratio	Explanation
Perfect competition	n/N %	Perfect competition exists where an industry's concentration ratio is CRn = n/ N, where N defines the number of firms in the industry. That is, all firms have an equal market share.
Low concentration	0% - 40%	A concentration ratio of 0% implies perfect competition or monopolistic competition at the least. A concentration ratio close to 0% is only possible in an industry where there is a very large number of firms.
Medium concentration	40% - 70%	An industry in this range is likely to be an oligopoly. An oligopoly describes a market structure which is dominated by a small number of firms, each with significant market shares.
High concentration	70% - 100%	This category ranges from an oligopoly to a monopoly.

Source: Based on the literature.

Appendix A.2: Number of Hotels, Rooms, Occupancy Rate, and Number of Rooms Sold for Star Hotels in North Sumatra, 2013-2018

Year	1-star				2-star				3-star			
	Number of hotels (units)	Number of rooms (units)	Occupancy ratio (%)	Rooms sold (units)	Number of hotels (units)	Number of rooms (units)	Occupancy ratio (%)	Rooms sold (units)	Number of hotels (units)	Number of rooms (units)	Occupancy ratio (%)	Rooms sold (units)
2013	23	1212	35%	427	26	2562	29%	744	25	2366	49%	1159
2014	20	925	28%	258	31	1838	29%	528	32	2736	44%	1212
2015	20	830	34%	280	31	1888	36%	685	36	2919	53%	1549
2016	16	1097	36%	397	22	1480	38%	564	35	3418	48%	1640
2017	21	935	45%	418	25	1541	44%	671	49	3779	44%	1677
2018	n.a.	1047	38%	401	n.a.	1564	36%	563	n.a.	4445	50%	2230

Year	4-star				5-star			
	Number of hotels (units)	Number of rooms (units)	Occupancy ratio (%)	Rooms sold (units)	Number of hotels (units)	Number of rooms (units)	Occupancy ratio (%)	Rooms sold (units)
2013	16	1697	49%	827	6	923	50%	465
2014	16	2647	48%	1258	7	1407	49%	684
2015	17	2816	67%	1879	7	1535	78%	1192
2016	12	1970	66%	1296	4	1568	74%	1161
2017	22	3367	68%	2301	9	1794	76%	1359
2018	n.a.	3339	76%	2546	n.a.	1118	60%	668

Note: NA = not available.

Source: BPS Sumatra Utara, 2018, 2019.

Appendix A.3: Consumer Perceptions about Indicators of Star Hotel Services in North Sumatra, 2019

5-star hotels		**4-star hotels**		**3-star hotels**	
Rating indicators	Score	Rating indicators	Score	Rating indicators	Score
Swimming pool facilities	4.5 / 5	Swimming pool facilities	4.0 / 5	Swimming pool facilities	4.0 / 5
The best hotel	4.5 / 5	The best hotel	4.5 /5	The best hotel	3.5 / 5
Fitness centre facilities	4.5 / 5	Fitness centre facilities	4.5 / 5	Fitness centre facilities	4.0 / 5
Suitable hotels for families	4.5 / 5	Room facilities with a nice view	4.0 / 5	Suitable hotels for families	3.5 / 5
Spa facilities on site	4.0 / 5	Suitable hotels for families	4.5 / 5	Hotels with free breakfast	3.5 / 5
Hotels that offer a sauna	4.5 / 5	Hotels with free breakfast	4.0 / 5	Have free parking facilities	4.0 /5
The availability of airport transportations	4.5 / 5	Have free parking facilities	4.0 / 5	Spa facilities on site	3.5 / 5
Hotels that have AC	4.5 / 5	Spa facilities on site	4.0 / 5	Facilities for children's activities	4.0 / 5
The availabilityof restaurants on site	4.5 / 5	Facilities for children	4.0 / 5	Child care facilities at the hotel	4.0 / 5
Hotels that have family rooms	4.0 / 5	Hotels that offer a sauna	4.0 / 5	The availability of airport transportations	3.5 / 5
Wheelchair access	4.5 / 5	The availability of airport transportations	4.5 / 5	Hotels with a small kitchen	4.0 / 5
Room rates	4.0/5	Room rates	4.0 / 5	Room rates	3.5 / 5

Source: Orfila-Sintes et al. (2005).