Original Research Article

Investigating Pricing Strategies of Hotel Rooms in City Centre: A Case Study

***Abstract*:** In this article, the pricing strategies among hotel rooms dwelling in city centre are investigated. A sample of 25 hotels with star ratings from 2 to 4 are selected, all situated in the heart of Georgetown, Penang. The primary data is collected, in which hotel room prices is observed for December 2018 through online travel operator, agoda.com platform. A comparison study of four forecasting methods, i.e. simple moving average, adaptive response rate exponential smoothing and multiplicative decomposition method are used to investigate the patterns of pricing strategies for these hotel rooms, together with their accuracies. The findings revealed that the average pricing of hotel room is at its peak before public holiday, with the presence of seasonal pattern, in which the prices are higher every Friday. Room prices for hotel with higher star rating are also observed to be more sensitive to holiday effects as opposed to hotel with lower star rating.

Keywords: Hotel pricing model, forecasting, service industry.

1.0 Introduction

City centre is the prime location for many activities in a country. In the recent years, urban tourism has gained attraction in the literature due to its versatility in coping with the decline of demand for traditional urban-industrial activities (Rogerson, 2014). Its multifunctional entities (Ashworth & Page, 2011) such as business and cultural activities, accessibility to transportation hubs, paired with exciting scheduled programs throughout the year are among reasons why many local and international tourists prefer to stay in hotels that are located in the heart of the city centre.

In Malaysia, Georgetown is known as among the most popular urban destination in the country due to its strategic location as the city centre of Penang Island, labelled as the UNESCO world's heritage site that is rich in culture and history, including gastronomy (Ling et al., 2011; Jumaadi, 2013; Suet Leng & Badarulzaman, 2014; Khoo & Badarulzaman, 2014). Its streets are lined with colonial-era buildings and Chinese temples, added to the historical value of this site. Said (2008) reported that the number of tourist arrivals to this city is increasing every year. Thus, sufficient supply of accommodation is a must for this bustling city. As such, hotels are the most common mode of supply for accommodation in the heart of Georgetown.

Among issues that are normally related to the study of hotel industry is its supply chain management (Zhu et al., 2010; Nazri, Misiran & Abdullah, 2015; Chowdhury, Alam & Habib, 2017), tourism management (Chen, 2010; Shaw, Bailey & Williams, 2011; FitzPatrick et al., 2013), and hotel room pricing (Aziz et al., 2011; Schamel, 2012; Li et al., 2016), to mention only a few. Though Tan (2017) argued that accommodation costs is among the most significant part of travel expenses, and hotel-type accommodation is still the foremost common type of stay. As price is critical variable for profit generation in hotel industry, hotel managers will need to encourage or limit demand accordingly, standardize existing room, and strategize room pricing. The rise of online tour company such as in agoda.com and booking.com encourages hotels to implement dynamic pricing policies, changing their respective costs over time based on the demand and competitive pressure (Raya, 2010).

In the hospitality business, yield management ends up in wide range of varied room rates for hotel room betting on the time of the day, week, or year. Guest could experience similar levels of service throughout two hotel stays, however their satisfaction levels may well be totally different based on the room rate. According to Anna & John (2003), having paid a rack rate, the buyer could also be less happy with level of service received than if they booked the room earlier with a cheaper price.

In this study, we aim to investigate the pricing behaviour of hotel rooms in Georgetown, Penang. This locality is selected since Georgetown, Penang is booming in tourism industry in Malaysia, with many hotels, either premium or budget, are mushrooming together with nonconventional Airbnb platform. Online travel operator agoda.com is used in this study since this platform has been widely accepted and is commonly sought after by travellers. Thanangthanakij et al. (2012) proposed the use of agoda.com as this website provides more detail of hotel information, assists users to book suitable hotel rooms, and has feedback system that allow users to review their stay. Some forecasting methods will be used to assist with our analysis. This analysis can be expended to other bustling cities that are in high demand for tourism and business centre, as the behaviour of these cities are similar.

In what follow, we will investigate the room rates in selected hotels by using some forecasting methods, followed by the analysis of the said models and some concluding remarks.

2.0 Room Pricing Trend among Penang Hotels

Data Collection

This research is conducted for the period of two months through the observation of hotel price's changes. We select 25 hotels that are located inside the city centre of Georgetown, Penang in this study. To ease the investigation, the pricing for room type - *double deluxe room* is considered for the duration of one month (1 – 31 December 2018) from Agoda.com. This platform is selected since it is commonly sought after by travelers and provides details of hotel information as compared to other online travel operators. Agoda.com can also assists users to book suitable room through review of their feedback system. The list of sample hotels is shown in Table 1.

TABLE 1. List of Sample Hotels' Name with Hotel Star Rating

Hotel Name	Hotel Star Rating
1. Campbell House	
2. Jawi Peranakan Mansion	
3. Le Dream Boutique Hotel	
4. Mango Tree Place - Hideaway	
5. Areca Hotel	4 Star
6. Muntri Mews	
7. Yeng Keng Hotel	
8. The Wembley- A St Giles Hotel	
9. Royale Chulan Penang	
10. Hotel Jen	
1. Nam Keng Hotel	
2. Deluxcious Luxurious Heritage Hotel	
3. Palm Mansion Boutique Suites	
4. Chulia Mansion	
5. MEI Hotel	
6. Coffee Atelier	3 Star

7.	East Indies Mansion	
8.	Reunion Heritage House	
9.	Museum Hotel	
10.	The Sourthern Boutique Hotel	
11.	Armenian Street Heritage Hotel	
1.	Islander Lodge	
2.	Wil House	2 Star
3.	118 Hotel Macalister	
4.	ZEN Rooms Kinta Alley	

We illustrated the average of hotel room pricing in Figure 1.

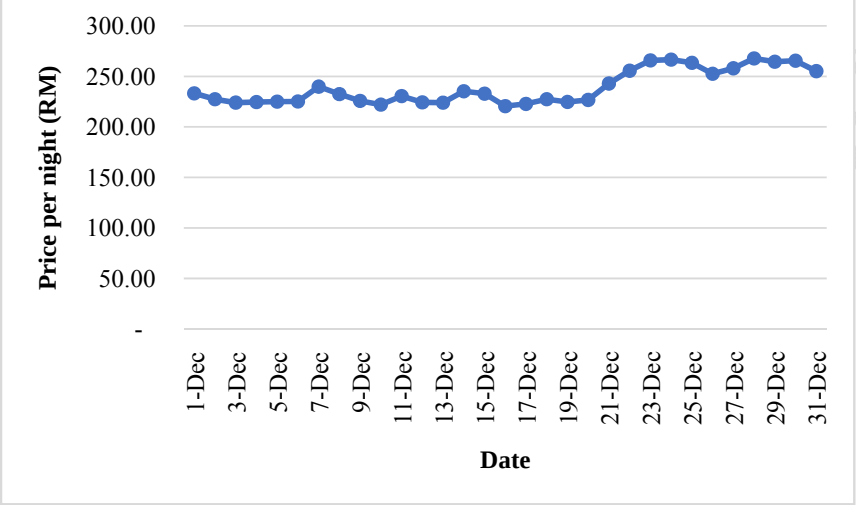

FIGURE 1. Average room prices of 25 hotels in Georgetown, Penang during December 2018

Based on Figure 1, the average of hotel room's price showed an upward trend where the price rises as the date nearing 31st December. However, when the duration is segmented for the first three weeks (1st to 21st December 2018), the data showed a seasonal pattern, in which the average prices are higher on every Friday of each week. We use forecasting methods suitable for trended data (moving average and exponential smoothing) and seasonal data (decomposition methods) to further analyse our data, with the accuracy of such methods will be analysed by using error measurements. The subsections that follow show brief explanation of the considered methods:

Moving Average

The method of simple moving average focused on the most recent k observations to forecast value in the next period. The smaller value of k should be used in the case where only the most recent observations are considered relevant. In this study, $k = 2$ days is selected.

$$\text{Simple Moving Average} = \frac{\sum(\text{most recent k data values})}{k}$$

where k is the number of periods in the moving average.

Exponential Smoothing

We follow Trigg & Leach (1967) for the use of adaptive response rate exponential smoothing (ARRES) as follows

$$\mathrm{F}_{t+1} = \alpha_t Y_t + (1-\alpha_t)F_t$$
$$\alpha_t = \left|\frac{E_t}{AE_t}\right|$$
$$E_t = \beta e_t + (1-\beta)E_{t-1}, 0 < \beta < 1$$
$$AE_t = \beta|e_t| + (1-\beta)AE_{t-1}$$
$$e_t = y_t - F_t$$

where

F_t = forecast value at time *t*, Y_t = actual value at time *t*, E_t = smoothed average error at time *t*, AE_t = smoothed absolute error at time *t*, and α_t = smoothing constant at time *t*.

The value of α increased when the forecasts go out of control so that more weight is put to the recent data, and vice versa.

Decomposition Method

We follow Haobin, Ming, & Quan (2018), where the decomposition methods are based on an analysis of the individual components of a time series. The strength of each component is estimated separately and then substituted into a model that explains the behavior of the time series. The basic idea behind these models is to decompose the time series into several factors: Trend (Tr), Seasonal (Sn), Cycle (Cl), Irregular (I), which are time series components. In general, the model is

$$\mathrm{y_t} = \mathrm{f}(\mathrm{Tr_t}, \mathrm{Sn_t}, \mathrm{Cl_t}, \mathrm{I_t}),$$

and the forecast model is

$$\hat{\mathrm{y}}_\mathrm{t} = \mathrm{f}(\text{forecast for } \mathrm{Tr_t}, \mathrm{Sn_t}, \mathrm{Cl_t}),$$

where

$\mathrm{y_t}$ = Value of the time series at time *t*, $\mathrm{Tr_t}$ = Trend component at time *t*, $\mathrm{Sn_t}$ = Seasonal component at time *t*, $\mathrm{Cl_t}$ = Cyclical component at time *t*, and $\mathrm{I_t}$ = Irregular component at time *t*.

The multiplicative decomposition model is expressed as the product of the four components of a time series (Weatherford & Kimes, 2003):

$$y_t = Tr_t \cdot Sn_t \cdot Cl_t \cdot I_t,$$

Whereas the additive decomposition model is expressed as the total of the four components of a time series:

$$\mathrm{y_t} = \mathrm{Tr_t} + \mathrm{Sn_t} + \mathrm{Cl_t} + \mathrm{I_t}.$$

The accuracy of the methods will be determined by using several measurements of error, i.e. mean absolute deviation, mean square error and mean absolute percentage error. The method that produces the lowest error measurements will be chosen.

3.0 Results and Discussions

Room Pricing Strategy (1 – 31 December 2018)

Table 2 shows the error measurements between the models in Section 2, with ARRES method provides the lowest value for all error measurements, implicating that this model is superior in accuracy.

Table 2. Error measurement for four forecasting methods

Method	MAD	MSE	MAPE
Simple Moving Average	6.6097	79.4070	2.7258
ARRES*	5.7774	62.5301	2.3998
Additive Decomposition Method	8.3733	95.5823	3.5289
Multiplicative Decomposition Method	8.3636	95.7486	3.5232

Note: * shows method with the lowest measurement error

Subsequently, Figure 2 showed similar trend between the actual and forecasted values, with their relationship is significantly close over the period under study. Later, we will use this model to determine the trend of average hotel room pricing for 1 – 31 December 2018.

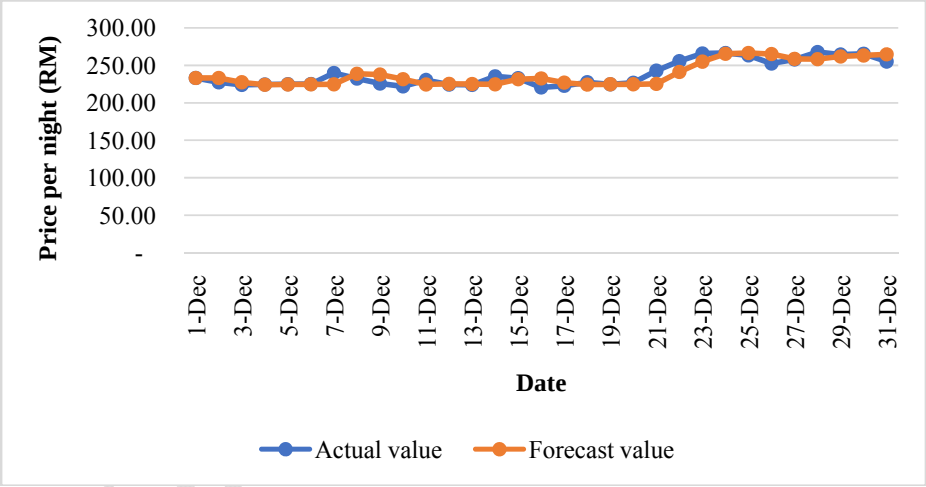

Figure 2. Actual versus forecasted value of hotel room prices by using ARRES method

Table 3 and Figure 3 presented detail forecasted errors. Positive value of forecast error represents the actual value of hotel room price that is higher than the forecasted value, i.e., room price is overpriced, as the listed price is higher than expected price. Conversely, negative value represents actual value of room price that is lower than the forecasted value, i.e., under-priced.

Table 3. Actual Value, Forecast Value and Forecast Error of ARRES from 1st to 31st December 2018

Date	Day	Actual value	Forecast value	Forecast error
1-Dec	Saturday	233.25	233.25	0
2-Dec	Sunday	227.42	233.25	(5.83)
3-Dec	Monday	224.12	227.42	(3.30)
4-Dec	Tuesday	224.60	224.12	0.48
5-Dec	Wednesday	225.04	224.49	0.56
6-Dec	Thursday	225.17	224.72	0.45
7-Dec	Friday	239.90	224.77	15.13

8-Dec	Saturday	232.57	238.73	(6.17)
9-Dec	Sunday	225.79	237.85	(12.06)
10-Dec	Monday	222.04	231.49	(9.44)
11-Dec	Tuesday	230.54	224.48	6.06
12-Dec	Wednesday	224.36	225.36	(1.00)
13-Dec	Thursday	224.00	225.14	(1.14)
14-Dec	Friday	235.39	224.74	10.65
15-Dec	Saturday	232.96	231.48	1.48
16-Dec	Sunday	220.63	232.50	(11.87)
17-Dec	Monday	222.83	226.87	(4.03)
18-Dec	Tuesday	227.50	224.33	3.17
19-Dec	Wednesday	224.80	224.80	(0.00)
20-Dec	Thursday	226.79	224.80	1.99
21-Dec	Friday	243.00	225.36	17.64
22-Dec	Saturday	255.70	241.17	14.52
23-Dec	Sunday	265.90	255.03	10.87
24-Dec	Monday	266.63	265.62	1.00
25-Dec	Tuesday	263.48	266.60	(3.12)
26-Dec	Wednesday	252.59	265.22	(12.63)
27-Dec	Thursday	258.05	258.73	(0.68)
28-Dec	Friday	267.80	258.36	9.44
29-Dec	Saturday	264.52	261.97	2.55
30-Dec	Sunday	265.59	263.31	2.29
31-Dec	Monday	255.26	264.79	(9.53)

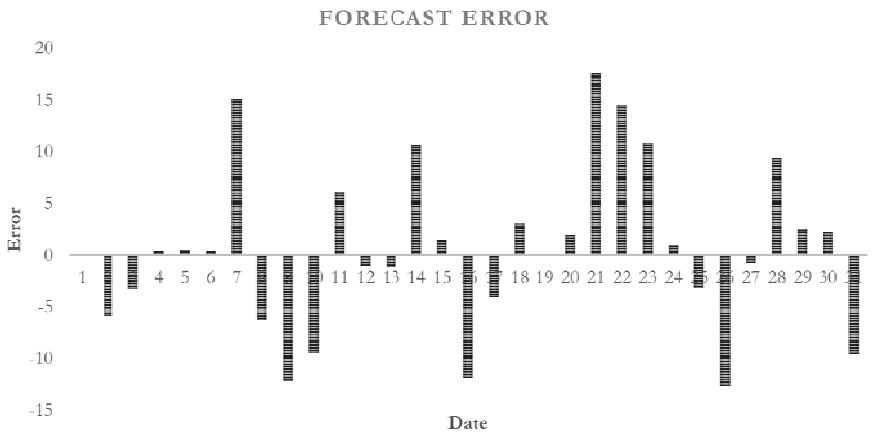

Figure 3 Illustration of the forecasted room pricing

Based on Table 3, the room is mostly overpriced on 21 December 2018 (Friday), where the actual price is RM17.64 higher than expected. The trend is consistent for the subsequent days in 22nd, 23rd and 24th December 2018 (also overpriced). Such condition suggests the confidence among hoteliers of the higher demand on these days. This is evident due to various contributing effects such as school holiday, weekend and the coming of public holiday on 25th December (Christmas Day). Such finding is consistent with Pitubaeva (2014) that suggested holiday effect as critical factors that influence pricing decision making in tourism industry.

Further analysis showed the room is under-priced mostly on 26th December 2018, which is just the following day after public holiday, with its actual price is

RM12.63 less than expected price on the particular day. This is followed by 9th December (RM12.06) and 16th December (RM11.87). Readers should note that 9th and 16th December are both fall on Sunday. Such situation indicates the behaviour of hoteliers that perceive low demand after public holidays and weekends. Such behaviour can be capitalized by customers in making decision to increase their competitive advantage on the pricing strategy.

Room Pricing Strategy (1 – 21 December 2018)

We further segmented the analysis focusing more on the first three weeks of December, due to possible seasonal factor. Do note that the period after 21st December is omitted to reduce the influence of public holiday during these duration. The accuracy results are shown in Table 4.

Table 4. Comparison of Error Measurement between Simple Moving Average, ARRES, Additive and Multiplicative Decomposition Method

Method	MAD	MSE	MAPE
Simple Moving Average	5.7259	60.2342	2.4837
ARRES	4.5518	41.7324	1.9701
Additive Decomposition Method	1.6291	4.2665	0.7100
Multiplicative Decomposition Method*	1.6243	4.2640	0.7078

Note: * shows method with the lowest measurement error

By referring to Table 4, multiplicative decomposition method had the highest accuracy determined by all error measurements. This indicates that the forecasted value by using this method is nearest to the actual value. The seasonal pattern can be observed clearer in Figure 4, where seasonal patterns are repeated every week with its highest price on Friday, followed by Saturday. We can see that the lowest price is on every Monday, followed by Sunday. The pattern is summarized further in Table 5.

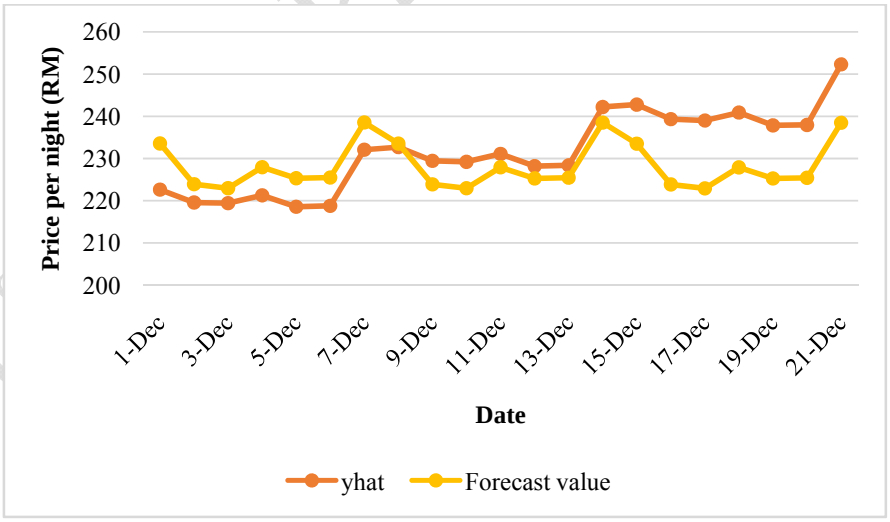

Figure 4. Comparison of actual and forecast value of hotel room prices by using Multiplicative Decomposition Method

Table 5. Weekly Seasonal Pattern of Average Hotel Room Price in Georgetown, Penang during 1st to 21st December 2018.

Day	Changes in Average Hotel Room Price
Monday	-
Tuesday	+
Wednesday	-
Thursday	+
Friday	+
Saturday	-
Sunday	-

Note: '+' indicates increase in price as compared to previous day and '-' indicates decrease in price as compared to previous day.

Room Pricing Strategy (Based on Star Rating)

Figure 5 illustrates differences in pricing strategies of hotels according to their star ratings. The average room price for a 4-star, 3-star, and 2 star hotel is in the range of RM286.40 – RM 359.25, RM187.40 – RM237.27, and RM125.75 – RM152.00, respectively. This indicates that the hotels with higher star rating set their price higher and wider range in comparison to a much lower star rating hotels.

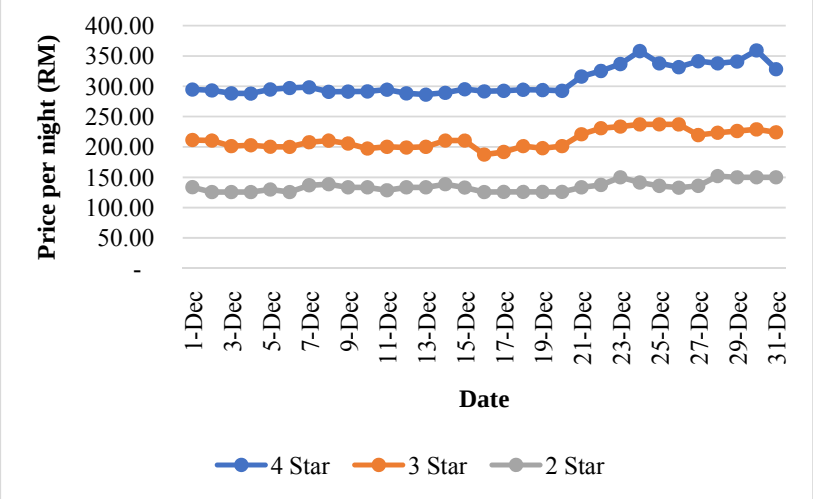

Figure 5. Comparison of average room price of 4-star, 3-star and 2-star hotels

In addition, such condition is more pronounced nearing public holiday. Starting from 21st December 2018, the average room price of 4-star rating hotels significantly increasing compared to lower star rating hotel. The average price is fluctuated after the public holiday until the end of the month. Besides, the increment room price for 3-star rating hotel is less than 4-star rating hotel, and more than 2-star rating hotel. Further observation showed that the 2-star rating hotels do not increase much in their room pricing offering, in fact they lower the room price on 24th December 2018, a day before Christmas Day.

4.0 Conclusion

To conclude, the average room pricing among hotels in Georgetown, Penang showed a seasonal pattern when there is no public holiday. The prices are higher on the days before weekend (Friday and Saturday) and lower in the start of weekdays (Sunday and Monday) every week. This is reasonable provided that Malaysia is

having weekend on Saturday and Sunday. Thus, the demand of hotel stays will be higher in nights of Friday and Saturday. Besides, the average of room pricing is significantly increasing before public holiday (Christmas Day). This shows the pre-holiday effect. As mentioned by Pitubaeva (2014), public holidays will affect the hotel room price, known as pre-holiday effects and post-holiday effects. Thus, it is suggested that customers should book a room on Monday or Sunday in order to experience the similar services at a lower competitive price.

Based on the forecasted error calculated by using forecasting methods of ARRES and multiplicative decomposition method, customers are advised to refrain from booking hotel room with positive forecast errors since it will cost more (overprice) than the expected price. Conversely, they should book hotel room on the days with negative forecast errors. We also noted that the higher the star rating of the hotel, the higher the room price charged per night, with the higher overprice condition. The room price of higher star rating hotels is set at a wider range and influenced more by the holiday effects. Thus, in the case of service and luxury provided is not the main concerned for customers, they are advised to choose hotels with lower star rating, as they provide the accommodation with lower costs with minimal influencer of holiday seasons.

Such observations can contribute to better understanding of how to strategize pricing (for hotel management), and also to strategize the best timing for hotel booking (for customer), which is lacking from previous study. Most past study focusing more on one dimensional discussion only. The observed pattern of demand and revenue behaviour was also found to be consistent for hotel in all market segments for all countries with homogeneous locality.

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