Prediction Model for Average Daily Rate (ADR) of Bangkok Hotel

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Abstract

The main objective of this research was to propose an Average Daily Rate (ADR) prediction model for three to five star hotels in Bangkok using the Hedonic Price Model. The variables included in the model were derived from a literature review and suggested by an expert panel. Factor analysis was adopted to merge highly correlated variables. The data from 461 hotels in Bangkok were acquired from www.agoda.com. The results showed that 11 variables affecting the ADR and the five variables that had the highest regression coefficients were 1) star rating, 2) score of location overview, 3) score of room comfort, 4) score of staff performance and 5) fitness center availability (presence or absence). The log-linear model was selected as it showed the highest Adjusted R^2 (Adjusted R^2 = 0.843). The observed ADRs and the predicted ADRs from the proposed model were not significantly different, as shown by the pair sample t-test's value of 0.153 at the 0.05 significant level and 0.472 Theil's U statistical value. This suggests that the proposed model can be used to provide useful information for Bangkok hotel investors or developers regarding hotel value appraisal, or the pricing of hotel room rates.

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1. Introduction

Bangkok is the capital of Thailand and a world famous travel destination (Tripadvisor.com, 2015). Comparing the revenues of the hotel sector on a provincial basis, the highest portion is from Bangkok, at about 22.02% of Thailand's hotel revenue, which is close to the revenue from all of the provinces in the middle region and more than the revenue from the north and north east regions combined, as shown in Table 1.

Region	Revenue (MB)	Ratio
Bangkok	33,147	22.02%
Middle	33,844	22.48%
North	17,091	11.35%
North East	8,578	5.70%
South	57,871	38.45%
Total	150,534	100.00%

Table 1. Thailand's hotel revenue by region.

In addition, information from the Annual Registration Statement (56-1 Form) from 2012 to 2014 of five Thai hospitality companies listed on the Stock Exchange of Thailand, showed that room revenue is the major revenue stream of them in every year, as detailed in Table 2.

Company	Room Revenue Ratio		
	Year 2012	Year 2013	Year 2014
CENTEL (2015)	62.00%	56.00%	53.00%
DTC (2015)	54.32%	55.00%	52.16%
GRAND (2015)	66.43%	66.43%	64.47%
ROH (2015)	59.67%	60.09%	57.12%
SHANG (2015)	55.41%	55.05%	52.67%

Table 2. Room Revenue of Hospitality Listed Companies.

Moreover, information from the National Statistical Office (2012) shows that the room revenue of hotels in Bangkok is about 62.79% of the total revenue which is the main revenue source of the hotels in Bangkok.

Room revenue directly affects the hotel's value because it is normally appraised by the income approach technique. This technique is widely adopted because the value is reflected in the future net cash flow (Raleigh & Roginsky, 1999). Moreover, an important indicator to evaluate the sales performance in the hotel business is the Average Daily Rate (ADR). In Thailand, it is calculated for a specific time frame, such as monthly, quarterly, or yearly. The unit of the ADR is Baht (Thailand's currency) per room per night. The ADR can be calculated as presented below (Raleigh & Roginsky, 1999):

$$ADR = \frac{Room\ Revenue}{Number\ of\ Room\ Sold} \quad (1)$$

This finding expresses the importance of the ADR to hotel value, which is in accordance with the work of Corgel and deRoos (1993). Reviewing several previous studies regarding hotel price prediction models in several regions, i.e. Israeli (2002), White and Mulligan (2002), Zhang, Ye and Law (2011), Abrate, Capriello and Fraquelli (2011), Chen and Rothschild (2010), Andersson (2010), Roubi and Littlejohn (2004), it can be concluded that hotels in different regions probably have different significant determinants. However, there is no work that specifically studies the determinants and price prediction model of the hotels in Bangkok. For these reasons, the findings of this research have several expected contributions. Bangkok hotel investors and developers can use the acquired determinants and their correlation coefficients, as well as the ADR prediction model, as supporting data in making more effective decisions for several key business

operations such as project feasibility studies, setting the room rates, hotel value appraisal, and hotel renovation for higher room rates. Finally, academia will also benefit from the acquired determinants and ADR prediction model applicable to Bangkok hotels as they will be sources of information for performing further research work.

2. Literature Review

Hedonic Price Model

The Hedonic Price Model is an implicit price prediction model for each goods attribute by Multiple Regression Analysis. The predicted variable is the good's price and the determinants are the physical attributes of the goods (Rosen, 1974, pp. 34-55). A number of academics have selected this method to explored hotel room rates. For example, Israeli (2002) found the star rating is the most significant determinant from 215 hotels in Israel and linear-form models were proposed with 0.620-0.820 Adjusted R^2 values. At a similar time, White and Mulligan (2002) studied 584 hotels in four states of the United States of America: 1) Arizona, 2) Colorado, 3) New Mexico, and 4) Utah, and proposed linear-form models with 0.570 - 0.583 Adjusted R^2 values. There were four significant determinants in the models: 1) hotel brand, 2) average room size, 3) CBD location, and 4) location in travel destination.

Then, Zhang, Ye and Law (2011) collected data from 243 hotels in New York, USA and proposed 0.311-0.686 Adjusted R^2 values with log-linear form models with the hotel facilities as the major significant determinant. In another region, Italy, Abrate, Capriello and Fraquelli (2011) studied 140 hotels in Turin and found that the best fit model was a natural log-linear form with a 0.780 Adjusted R^2 value and two significant determinants: 1) star rating and 2) hotel facilities. In Asia, Chen and Rothschild (2010) collected data from 73 hotels in Taipei and proposed log-linear models with 0.681 - 0.703 Adjusted R^2 values. Four significant determinants were found in this research: 1) hotel brand, 2) average room size, 3) hotel facilities, and 4) CBD location. In Singapore, Andersson (2010) collected data from 69 hotels. A natural log-linear model with a 0.892 Adjusted R^2 value was proposed. The significant determinants were classified into three groups: 1) hotel attributes, 2) customer satisfaction, and 3) location attributes. Additionally, mass transit transport systems are important for travel in Bangkok (Iamtrakul, Satichob & Hokao, 2013, pp. 21-34).

Moreover, related research work from the UK proposed by Roubi and Littlejohn (2004) studied the determinants of the hotel transaction values. Data were collected from 211 hotels between 1996 and 2002 and analyzed by the Hedonic Price Method. They found seven significant determinants, sorted by their level of effect on the predicted variable: 1) number of rooms, 2) local economic conditions during the year, 3) details of recreation facilities, 4) meeting and banquet facilities, 5) affiliation with major hotel chain, 6) number of food and beverage outlets, and 7) location attributes.

In addition, according to Halvorsen and Pollakowski (1981), there is no general model form for the Hedonic Price Model. However, from previous research mentioned above, four model forms are normally used, as listed below:

1. Linear–linear form.
2. Log-linear form, predicted variable was transformed by taking the logarithm.
3. Linear-log form, determinants were transformed by taking the logarithm.
4. Log-log form, both variables were transformed by taking the logarithm.

Multicollinearity Problem

A multicollinearity problem will occur when any pair of determinants has a correlation of more than 0.750 (Prasith-rathsint & Sukkasem, 1993). Moreover, the Variance Inflation Factor (VIF) (Panichwong, 2002) is another multicollinearity investigation tool for which the value of the VIF of each selected determinant should not be more than 10 and the VIF value can be calculated as presented below:

$$VIF(X_h) = \frac{1}{1-R_h^2} \quad (2)$$

where, R_h^2 is the R^2 value of the equation in which X_h is the predicted variable.

Model Selection

There were four statistical criteria used in evaluating the Multiple Regression Analysis models in this research. The criteria are summarized from Prasith-rathsint and Sukkasem (1993), Wanitbancha (2003), and Panichwong (2002).

1) Significant value of each determinant - The specified significance value should not be less than 0.05. The value

is used in screening insignificant variables to be removed from the model.

2) Adjusted R^2 value - It can be used in measuring how the data fits with the regression model. The value should as high as possible.

3) VIF value of each determinant - It is used in multicollinearity problem tests. The value should not be more than 10.

4) Residual value from Multiple Regression Analysis – It should be in accordance with the following criteria:

4.1) Residual values of all data are normally distributed.

4.2) Mean of residual value is zero.

4.3) Relationship of each residual value and prediction value is independent. This can be observed from their scatter plot. This test can confirm that heteroscedasticity will not occur.

4.4) Relationship of each residual value is independent. It can be observed from the value of the Durbin-Watson statistic being between 2.50 and 1.50.

3. Methodology

This research analyzed and proposed an ADR prediction model using the Hedonic Price Model. The ADR is the predicted variable while the determinants are the hotel rating, physical attributes, and location attributes derived from the literature review, which are mentioned in the section above. Seven significant variables were classified into three groups as presented in Table 3.

In addition, all determinants were screened by 13 experts in the hotel business, who were in high-level management with more than five years of experience. The experts' details are presented in Table 4.

Table 3. Summary of Significant Variables from Literature.

Group	Variable
Rating	1. Star Rating 2. Hotel Brand
Physical Attributes	3. Amount of Rooms 4. Average Room Size 5. Hotel Facilities
Location Attributes	6. CBD Location 7. Distance from Major Transport

Table 4. Experts' Details.

No.	Role	Organization	Number of Hotel (s) Expert is Responsible For
1	Management in Sale and Marketing	Listed Company in Hotel Business	5
2	Management in Finance	Listed Company in Hotel Business	26
3	Management in Business Development	Listed Company in Hotel Business	16
4	President	Sale and Marketing Consultant	4
5	Management in Finance	Listed Company in Hotel Business	5
6	Management in Operation	Company in Hotel Business	5
7	Management in Finance	Listed Company in Hotel Business	11
8	Management in Marketing	Listed Company in Hotel Business	4
9	Hotel Owner	Stand Alone Hotel	2
10	Hotel Owner	Stand Alone Hotel	1
11	Hotel Owner	Stand Alone Hotel	1
12	General Manager	Stand Alone Hotel	1
13	Hotel Owner	Stand Alone Hotel	1

Figure 1. Research Framework.

The research framework shown in Figure 1 established the hypotheses that the determinants, i.e. rating group, physical attribute group and location attribute group, will have an effect on the predicted variable, or the ADR of the hotels in Bangkok.

Furthermore, the Stepwise Regression Method was applied to select the determinants for the model. It analyzed the inserted variables and the last inserted variable when a new variable was inserted into the model.

Prediction Model Test Method

In this research, two methods were adopted to measure the accuracy of the model. Both of them were used to test 90 random hotels that had not been used in the Multiple Regression Analysis process.

The first method was a pair samples t-test. This method compares the mean of the observed ADRs and the mean of the predicted ADRs from models at the 0.05 significance level to verify the accuracy of the model.

The second method was Theil's U statistic test. This method was proposed by Makridakis, Wheelright and McGee (1983). Theil's U statistic value is always more than 0, and if the value is less than 1 the model is accurate; therefore, if the value is more than 1, the model is inaccurate. The lower the value the test shows, the more accurately that the model can predict the predicted variable. Theil's U statistic value can be calculated by the following formula:

$$Theil's\ U = \sqrt{\frac{\sum_{i=1}^{n-1}(\frac{F_{i+1}-X_{i+1}}{X_i})^2}{\sum_{i=1}^{n-1}(\frac{X_{i+1}-X_i}{X_i})^2}} \qquad (3)$$

where, F is the predicted value from model
X is the observed value
i is the data number
n is the total number of data

4. Data

Determinants

There were 22 determinants derived from the literature review, as presented in Table 5. They were classified into three groups: (1) Rating, for which the authors put "R" in front of the variable's name, (2) Physical Attributes, for which the authors put "P" in front of the variable's name, and (3) Location Attributes, for which the authors put "L" in front of the variable's name. Then, all variables were verified by 13 experts, as shown in Table 4.

After all the variables were verified by the experts, some of the hotel facility variables were removed from the analysis. The total 19 determinants were retained for the analysis process. They can be classified into dummy variables and scale variables. Dummy variables would be "0" if the hotel did not have the attribute and would be "1" if hotel had the attribute. Furthermore, all dummy variables were standardized before performing the Multiple Regression Analysis. The details of the determinants for the prediction model are presented in Table 6.

Table 5. Derivation of Determinants.

No.	Variables Description	Source						
		Israeli (2002)	White and Mulligan (2002)	Chen and Rothschild (2010)	Andersson (2010)	Zhang, Ye and Law (2010)	Abrate, Capriello and Fraquelli (2011)	Added by Experts
1	Star Rating	X			X		X	
2	Hotel Brand	X	X	X				
3	Number of Rooms	X						
4	Room Size		X	X				
5	Room Facilities			X	X	X	X	
6	Located in CBD		X	X	X			
7	Distance from Transportation		X					
8	Score from AGODA Review							X

Table 6. Determinants for the Prediction Model.

Group	No.	Variables	Description	Measurement Type
Rating	1	R_Starn 3	3 Star (Presence or Absence)	Dummy
	2	R_Star 4	4 Star (Presence or Absence)	Dummy
	3	R_Brand	International Hotel Brand (Presence or Absence)	Dummy
Physical Attributes	4	P_NoRm	Number of Rooms	Scale
	5	P_Rmsize	Average Room Size (Square Meters)	Scale
	6	P_Staff	Staff Performance Score from Agoda Review	Scale
	7	P_Room	Room Standard Score from Agoda Review	Scale
	8	P_Outlet	Number of Outlets in Hotel	Scale
	9	P_Pool	Swimming Pool (Presence or Absence)	Dummy
	10	P_Fitness	Fitness Center (Presence or Absence)	Dummy
	11	P_Spa	Spa (Presence or Absence)	Dummy
	12	P_Recrea	Others Recreation Facilities such as Tennis Squad etc. (Presence or Absence)	Dummy
	13	P_Rs	Room Service (Presence or Absence)	Dummy
	14	P_meet	Meeting Room (Presence or Absence)	Dummy
	15	P_Internet	Free Internet in Room (Presence or Absence)	Dummy
Location Attributes	16	L_CBD	Located on CBD	Dummy
	17	L_Ovw	Location Score from Agoda Review	Scale
	18	L_BMRT	Distance from Hotel to Bangkok Mass Rapid Transit (Kilometers)	Scale
	19	L_Airport	Distance from Hotel to Airport (Kilometers)	Scale

It also should be noted that the distance variables, i.e. L_BMRT and L_Airport, were measured by Google MAP and there was no R_Star 5 (hotel with 5 star rating or not) because if the hotel was a 5 star hotel, the value for R_Star3 and R_Star4 would be "0". Other dummy variables would be "0" if the hotel did not have the attribute and would be "1" if hotel did have it. All the dummy variables had to be standardized for the regression analysis.

Determinants' Correlation Test

To prevent a multicollinearity problem, as mentioned above, the correlation values of all determinants were tested. It was found that a pair of variables had a correlation value of 0.797 (more than 0.750). These variables were P_Staff (staff performance score from Agoda review) and P_Room (room standard score from Agoda review). The correlation values of all the determinants are presented in Table 7.

These two variables were merged into one variable by Factor Analysis. The component score for P_Staff and P_Room was 0.528, with a new variable name of P_StfRm. After merging the highly correlated variables, the final number of determinants became 18.

Source of Data

The Ministry of Tourism and Sports refers to a "hotel" as a place that sells temporary rooms for rest. Services and facilities are indicated by the hotel rating that classifies hotels into five levels, i.e. one-star to five-star, where the most luxurious is five-star (Ministry of Tourism and Sports, 2007). The Thai Hotel Association rated hotels in 2012 using the Ministry of Tourism and Sports' criteria, as mentioned above (Thai Hotel Association, 2012). Fifty-six hotels in Bangkok were rated, consisting of 21 five-star hotels, 24 four-star hotels, 8 three-star hotels and 3 two-star hotels. However, the number of hotels from this source was not enough for Multiple Regression Analysis, which needs at least five samples per determinant, as suggested by Bartlett, Kotrlik and Higgins (2001). For this reason, the data from 461 hotels in Bangkok (70 five-star hotels, 158 four-star hotels, and 233 three-star hotels) were randomly collected from www.agoda.com, the most popular hotel reservation website in Thailand (alexa.com, 2014). From the authors' exploratory survey of a comparison between the hotel rating from the Thai Hotel Association (2012) and www.agoda.com, it was found that 54 from 56 hotels (96.42%) were rated in the same level. This finding showed the validity of this data source.

The variables concerning the physical and location attributes were collected from the hotels' public information such as hotel's website, online travel agent website, and hotel's staff. Then, the ADR of each hotel was calculated by averaging the room rate for all room types for 12 months from www.agoda.com. All data were collected in September to December 2014.

Sample Size

The number of three-star to five-star Bangkok hotels presented on www.agoda.com was 901, classified into 558 three-star hotels, 259 four-star hotels and 84 five-star hotels. The required sample size was calculated using Yamane's Formula (Yamane, 1973), as shown in the equation below. Where "n" is the sample size, "N" is the population size that is replaced by the number of hotels in each star rating, and "e" is the acceptable error that was replaced with 0.05. The number of samples from the calculation was equal to 461 hotels, as presented in Table 8. Therefore, the actual ratio of the acquired sample size and the number of determinants became 25.61 (461 divided by 18), which was more than that suggested by Bartlett, Kotrlik and Higgins (2001).

$$n = \frac{N}{1 + Ne^2} \quad (4)$$

5. Results

From the analysis, the log-linear form model was selected because it gained the highest Adjusted R^2 value of 0.843 and fit with the other criteria statistic tests mentioned in the "Model Selection" sub section. The Adjusted R^2 values of all models are presented in Table 9. The regression results show there were 10 significant determinants at the 95% confident level, and their Descriptive Statistic results are shown in Table 10. On the other hand, the other determinants with significant confidence levels lower than 95%, or in other words, those that cannot improve Adjusted R^2 value when added into the model, were deleted from the model.

Regarding the other statistical values for the Multiple Regression Analysis, the acquired model complied with the mentioned criteria, as the results in Table 11 show. The scatter plot between the residuals and the predicted ADRs from the model was freely dispersed, which shows that the predicted ADRs do not depend on the residuals and the model does not have a heteroscedasticity problem.

Table 7. Correlation Values of All Determinants.

Determinant	R_Star3	R_Star4	R_Brand	P_NoRm	P_Rmsize	P_Staff	P_Room	P_Outlet	P_Pool	P_Fitness	P_Spa	P_Recrea	P_Rs	P_meet	P_Internet	L_CBD	L_Ovw	L_BMRT	L_Airport
R_Star3	1.000																		
R_Star4	-0.730	1.000																	
R_Brand	-0.362	0.031	1.000																
P_NoRm	-0.458	0.208	0.389	1.000															
P_Rmsize	-0.399	0.163	0.101	0.133	1.000														
P_Staff	-0.406	0.068	0.320	0.175	0.229	1.000													
P_Room	-0.449	0.114	0.332	0.099	0.274	0.797	1.000												
P_Outlet	-0.486	0.117	0.423	0.660	0.114	0.328	0.268	1.000											
P_Pool	-0.575	0.378	0.310	0.420	0.388	0.238	0.264	0.356	1.000										
P_Fitness	-0.591	0.374	0.371	0.440	0.447	0.258	0.306	0.395	0.639	1.000									
P_Spa	-0.366	0.118	0.255	0.482	0.191	0.206	0.150	0.495	0.328	0.352	1.000								
P_Recrea	-0.209	0.063	0.175	0.345	0.204	0.153	0.146	0.366	0.194	0.239	0.247	1.000							
P_Rs	-0.305	0.194	0.097	0.183	0.164	0.154	0.150	0.197	0.307	0.218	0.255	0.124	1.000						
P_meet	-0.453	0.234	0.322	0.555	0.138	0.153	0.143	0.538	0.371	0.434	0.432	0.201	0.227	1.000					
P_Internet	-0.013	0.029	-0.026	-0.206	-0.035	0.136	0.203	-0.130	-0.081	-0.105	-0.090	-0.024	-0.009	-0.133	1.000				
L_CBD	-0.150	0.010	0.194	0.007	0.119	0.299	0.203	0.016	0.101	0.087	-0.098	0.014	0.026	-0.067	0.109	1.000			
L_Ovw	-0.326	0.086	0.322	0.110	0.138	0.477	0.619	0.197	0.157	0.127	0.096	0.130	0.134	0.098	0.145	0.379	1.000		
L_BMRT	0.089	0.007	-0.133	-0.045	-0.128	-0.232	-0.142	-0.094	-0.122	-0.022	-0.001	0.016	-0.019	0.010	-0.090	-0.471	-0.297	1.000	
L_Airport	-0.169	0.033	0.154	0.085	0.123	0.256	0.212	0.147	0.113	0.102	-0.015	0.121	0.016	0.002	0.072	0.520	0.306	-0.404	1.000

Table 8. Sample Size Summary.

Star Rating	Population Size	Sample Size
5	84	70
4	259	158
3	558	223
Total	901	461

Table 9. Adjusted R2 Values of All Models.

Model Form	Adjusted R2
log-linear	0.843
log-log	0.834
linear form	0.759
linear-log	0.729

Table 10. Descriptive Statistic of log-linear Model.

Variables	Coefficient	Std.Error	t-Statistic	Sig.	Collinearity Statistic: VIF
Constant	2.217	0.063	35.058	0.000	
R_Star3	-0.107	0.011	-9.762	0.000	5.846
R_Star4	-0.057	0.008	-6.843	0.000	3.367
P_StfRoom	0.056	0.008	7.435	0.000	1.894
P_Rmsize	0.003	0.000	10.092	0.000	1.491
P_Outlet	0.020	0.003	6.574	0.000	1.725
L_Ovw	0.049	0.007	6.975	0.000	1.651
P_Fitness	0.024	0.007	3.633	0.000	2.184
L_Airport	0.004	0.001	4.229	0.000	1.125
R_Brand	0.018	0.006	3.211	0.001	1.516
P_Pool	0.018	0.006	2.891	0.004	1.911

Table 11. Statistic Test for log-linear Model.

Statistic Test	Value
Adjusted R^2	0.843
VIF of all variables (less than 10)	Yes
Residual Analysis	
1. Normally distributed.	Yes
2. Mean is equal to zero.	Yes
3. Does not have heteroscedasticity problem.	Yes
4. No relationship between each residual.	2.059
(Durbin-Watson statistic between 1.50 to 2.50)	

Table 12. Dummy Variable Values for Model.

Variables	Presence	Absence
R_Star3	0.988	-1.010
R_Star4	1.383	-0.721
P_Fitness	0.863	-1.156
P_Pool	0.771	-1.295
R_Brand	1.935	-0.516

Finally, the acquired model is shown below. In addition, all the dummy variables had to be replaced by the standardized values presented in Table 12.

$$\begin{aligned}\log(ADR) = {} & -0.107(R\_Star3) - 0.057(R\_Star4) + \\ & 0.049(L\_Ovw) + 0.056(P\_StfRoom) + \\ & 0.024(P\_Fitness) + 0.020(P\_Outlet) + \\ & 0.018(P\_Pool) + 0.018(R\_Brand) + \\ & 0.004(L\_Airport) + 0.003(P\_Rrmsize) + 2.217\end{aligned} \quad (5)$$

where,

$$P\_StfRoom = 0.528(P\_Room) + 0.528(P\_Staff)$$

Model Accuracy Test

The pair samples t-test value of the selected model was 0.153 at the 0.05 statistical significance level. This means that the observed ADRs and the predicted ADRs from the proposed model were not significantly different, which conforms to Theil's U statistic value of 0.472 that showed the proposed model was suitably accurate.

6. Conclusion and Discussion

The best fit model for the ADR prediction from this research is a log-linear model with a 0.843 Adjusted R2 value, which was in accordance with previous research that the high level significant determinants are star rating and location, and it passed the residual analysis criteria. The model is acceptably accurate after being tested with the Pair Sample t-test, for which the p-value was 0.153 at the 0.05 significance level, and Theil's U statistic value was 0.472. Moreover, it should be emphasized that these findings are the correlation relationship between the determinants and the predicted variable because a multiple regression analysis can show only an association between variables, not necessarily causality.

However, using this form of the model it was difficult to analyze the ADR change when some determinants changed because the ADR will be changed in a non-linear form. Therefore, sensitivity analysis was performed to analyze the effect of changes on the determinants, as in Table 13.

There are 10 significant variables at the 95% confidence level, which includes the P_StfRoom variable that was derived from P_Staff and P_Room in the analysis process. Thus, there are 11 significant variables acquired from the analysis. The five variables that have the highest regression coefficients are 1) star rating, 2) score of location overview, 3) score of room comfort, 4) score of staff performance, and 5) fitness center availability (presence or absence).

The research results were presented to hotel business experts to verify and give some comments. There were also some interesting topics from the comparison between the research results and the results of former research. First, the hotel star rating (R_Star variable) is the most sensitive variable, in accordance with Israeli (2000), because it indicates the hotel's overall quality. The experts agreed with this finding. Second, focusing on the data from www.agoda.com, the effect of the location score is higher than the effects from the room facilities and staff performance scores. The experts gave opinions that, according to their experience, customers who book hotels via an online travel agency (OTA) (such as www.agoda.com) tend to give priority to location more than facilities and services. From the facility perspective, the effect of fitness center availability on the ADR is higher than the effect of swimming pool availability. The experts explained that the majority of customers who book hotels via an OTA are teenagers or of working age who are interested in exercise in a fitness center more than a swimming pool. As to the hotel brand, an international brand (R_Brand variable) has quite a low effect on the ADR, differs from the results of other research such as Israeli (2000), White and Mulligan (2002), and Chen and Rothschild (2010). The experts' opinions for this issue are that the customers who book hotels via an OTA tend to give priority to location and facilities more than the hotel brand. It means that the majority of the customers will select the hotel with more facilities but no international brand over the hotel with an international brand but less facilities.

Table 13. Sensitivity Analysis Table.

Predicted ADR 2,590.24 Baht/Room/Night		Location Score from Agoda Review				
		8.10	8.30	8.50	8.70	8.90
Room Size (sq.m.)	38.62	2,481.46	2,515.40	2,549.80	2,584.68	2,620.03
	39.62	2,501.06	2,535.27	2,569.94	2,605.09	2,640.72
	40.62	2,520.81	2,555.29	2,590.24	2,625.67	2,661.58
	41.62	2,540.72	2,575.47	2,610.69	2,646.40	2,682.60
	42.62	2,560.78	2,595.81	2,631.31	2,667.30	2,703.78

Bangkok hotel management or owners can apply the research results to find the optimal balance between the room price and the hotel quality, especially for the attributes concerning the determinants in the model. This practice was proved by Hartman (1989) who found that it can increase the hotel operating profit by improving the hotel's occupancy rate.

Finally, three issues should be noted. First, because the determinants of the hotels may vary from location to location, the results of this research are best applied to hotels located in Bangkok, the capital of Thailand. Second, the results of this research are focused on the customers who book hotels via an OTA, and the experts stated that these customers have different behaviors from walk-in customers who book hotels at the reception counter or by buying a package tour. Third, this research focused mainly on the revenue perspective only. However, several variables causing ADR changes also lead to investment costs to the hotel. Therefore, the research users should also be concerned about the increasing investment costs occurred from the changes in hotel attributes to acquire a comprehensive perspective.

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