THE INFLUENCE OF MAIN QUALITY FACTORS ON THE EVOLUTION OF TOURISTS NUMBER - A STUDY IN A ROMANIAN BUSINESS HOTEL

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Abstract: Quality requires a perfect adaptation to customer needs in terms of optimal costs. The first determinant factor of the buying process is quality, this having a fundamental impact. The services quality in a hotel is influenced by a number of factors in which falls material and personnel behavior. The aim of this paper is to identify the influence of main quality factors – quality costs based on material and quality costs for human resources – on the evolution of tourist’s number accommodated in a Romanian 4 stars hotel, using the dispersion analysis method.

Key words: hotel, quality, costs, material, human resources

1. INTRODUCTION

Quality in hospitality industry is more difficult to achieve than in other sectors. Ensuring quality requires quality in three major chronological stages (before consumption, consumption, after consumption), each being required for obtaining customer satisfaction.

It is essential to know the degree of clients’ satisfaction, their needs and expectations so that it can highlight the quality costs, considered an important tool of quality valorization.

Representing a potential source of maximizing the profit of organizations, the quality costs are used as a tool for optimization of processes and activities relevant to quality.

Due to changes taking place continuously, is necessary description and analysis of economic and social phenomena and processes and analyze the influence of factors which may change them. To highlight the degree of influence of different factors may apply multifactorial regression model, respectively dispersion analysis method Analysis of Variance – ANOVA.

ANOVA method implies defining a regression model, which involves: determining the regression equation, testing the validity of the regression model, establishment and testing correlation, and testing significance and estimation of linear regression model parameters on confidence intervals.

For a better understanding of issues relating to determination and analysis of dependency between the number of tourists, quality costs based on material and quality costs for human resources, it will be applied multiple regression method for the value registered in a Romanian 4 stars hotel – Alpha Hotel (to maintain confidentiality the hotel was renamed; the data provided and used for the research are real).

Here are the steps followed for dispersion analysis method ANOVA. To facilitate the calculations and problem solving it has been used Excel software.

2. DETERMINE THE REGRESSION EQUATION

Analyzing characteristics: number of tourists accommodated in Alpha Hotel, quality costs based on material and quality costs for human resources, we establish:

- Yi – number of tourists accommodated in Alpha Hotel
- x1 – quality costs based on material (lei)
- x2 – quality costs for human resources (lei)

Regression equation which model the link between the variables mentioned is:

\[ y_i = b_0 + b_1 \times x_{1i} + b_2 \times x_{2i} \]  

In Table 1, are presented intermediate values necessary for apply the least squares method:

<table>
<thead>
<tr>
<th>Years</th>
<th>yi</th>
<th>x1i</th>
<th>x2i</th>
<th>yi x1i</th>
<th>yi x2i</th>
<th>yi x1i x2i</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>13.924</td>
<td>590.477</td>
<td>650.234</td>
<td>7941.783</td>
<td>348660.3875</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>14.025</td>
<td>669.778</td>
<td>677.955</td>
<td>448602.5693</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>14.458</td>
<td>671.452</td>
<td>710.437</td>
<td>458647.3884</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>16.800</td>
<td>674.742</td>
<td>805.700</td>
<td>455276.7666</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>17.258</td>
<td>681.152</td>
<td>853.544</td>
<td>463968.0471</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>17.582</td>
<td>702.472</td>
<td>885.622</td>
<td>493666.9108</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>17.869</td>
<td>753.925</td>
<td>915.497</td>
<td>529979.1396</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>18.256</td>
<td>975.662</td>
<td>987.556</td>
<td>591916.3382</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>25.643</td>
<td>1386.322</td>
<td>1455.248</td>
<td>1921888.688</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: calculations made by the authors. To facilitate calculations, values were expressed in thousands of tourists, respectively lei.

Tab. 1. ANOVA table with the necessary values for analysis the regression model

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Significance F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residual</td>
<td>55</td>
<td>12443647.219</td>
<td>2262236.045</td>
<td>3.75</td>
<td>0.0049</td>
</tr>
<tr>
<td>Total</td>
<td>56</td>
<td>1444448.000</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Tab. 2. ANOVA table with the necessary values for analysis the regression model

3. TESTING THE VALIDITY OF THE REGRESSION MODEL

To confirm the model establishment and use the approach was to verify the validity of the method. This is achieved in the following stages of linear regression model analysis.

The established assumptions are:

- H0: the model is not valid (null hypothesis)
- H1: the model is valid (alternative hypothesis)

To use the F test, compared with the analyzed data was to verify the validity of the model. This is achieved in the following stages of linear regression model analysis.

Tab. 2. ANOVA table with the necessary values for analysis the regression model

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Knowing that the probability of occurrence of the results is 95% and the limit of significance \( \alpha = 0.05 \) it was obtained the limit region of rejection: \( F_{0.05, 2, n} = 5.14 \) (4)

For analyzed characteristics (number of tourists accommodated at Alpha Hotel, quality costs based on material and quality costs for human resources), \( F_l = 744.0433605 > F_{0.05, 2, n} = 5.14 \). In this case \( H_0 \) is rejected, the regression model being statistically valid.

Another element which reflects the validity of the model is Significance F. If the value obtained for this element is less than 0.05, \( H_0 \) is rejected. In Table 2 it is shown that Significance F = 6.47629E-08 < 0.05, and the regression model is statistically valid.

4. DETERMINING AND TESTING THE CORRELATION

For determining the correlation was used Excel software. The values obtained for the correlation (R), R Square (R²), and standard deviation of errors (sₑ), are presented in table 3:

<table>
<thead>
<tr>
<th>Regression Statistics</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple R</td>
<td>0.997990065</td>
<td></td>
</tr>
<tr>
<td>R Square</td>
<td>0.995984169</td>
<td></td>
</tr>
<tr>
<td>Adjusted R Square</td>
<td>0.994645558</td>
<td></td>
</tr>
<tr>
<td>Standard Error</td>
<td>260.370129</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

Tab. 3. The values of parameters R, R², Rₑ and sₑ.

The correlation value (Multiple R) is set to 0.997990065 and shows that between number of tourists, quality costs based on material and quality costs for human resources, registered in the period under review at Alpha Hotel, is a very strong connection, almost perfect.

R² is called the coefficient of determination (Kennedy, 2003). R Square is set to 0.995984169 and shows that the influence of the two factors (quality costs based on material and quality costs for human resources) on the number of tourists accommodated at Alpha Hotel is about 99.60%, the remaining 0.40% is due to other random factors.

Adjusted R Square value can increase or decrease along with the inclusion of new exogenous variables in the regression model (Andrei, 2003). The value of standard error shows that points are not placed near the regression right.

5. TESTING THE SIGNIFICANCE AND ESTIMATION OF PARAMETERS FOR LINEAR REGRESSION MODEL ON CONFIDENCE INTERVALS

Estimators for regression parameters are determined by least squares method.

Testing their significance has in view the size of the selected collectivity, so if \( n <30 \), it is applied Student test (Gogonea & Zaharia, 2008). In Table 4, an ANOVA table, are presented the necessary elements for testing parameters and establish confidence intervals.

From the table below we establish the linear adjusting equation of the connection between analyzed indicators:

\[
y_i = 4131.3959 - 0.0049 \times x_1 + 0.0194 \times x_2
\]

(5)

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>X Variable 1</th>
<th>X Variable 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>4131.3959</td>
<td>-0.0049</td>
</tr>
<tr>
<td>Standard Error</td>
<td>359.4397</td>
<td>100.01</td>
</tr>
<tr>
<td>t Stat</td>
<td>11.4933</td>
<td>-3.4951</td>
</tr>
<tr>
<td>P-value</td>
<td>2.60589E-05</td>
<td>0.01290E2631</td>
</tr>
<tr>
<td>Lower 95%</td>
<td>3251.8297</td>
<td>-0.0084</td>
</tr>
<tr>
<td>Upper 95%</td>
<td>5010.9621</td>
<td>-0.0015</td>
</tr>
</tbody>
</table>

Tab. 4. Elements necessary for testing parameters and establish confidence intervals

The value of \( b_0 \) is 4131.3959 and shows that if quality costs based on material are remaining constant, respectively quality costs for human resources, the number of tourists accommodated in Alpha Hotel, was set to a value of approximately 4131. Analyzing the value resulted for t test, \( t_0 = 11.4933 \), and significance threshold P-value = 2.60589E-05 < 0.05, we see that free term is statistically significant. This is reflected also by the presence of the confidence interval, respectively 3251.8297 < \( b_0 < 5010.9621 \).

The value of \( b_1 \) coefficient is -0.0049 and shows that by decreasing Variable 1 with one leu per year, the Intercept will decrease with 0.0049. This means that the decrease of quality costs based on material with 204.08 lei will decrease the number of tourists accommodated in Alpha Hotel by one. Threshold of significance P-value is 0.012902631 < 0.05, and the result \( t_{0.05} = [-3.4951] > 2.365 = t_{0.025} \), shows us that this coefficient is considered statistically significant. The limits of the confidence interval of this parameter are: -0.0084 < \( b_1 < -0.0015 \).

The value of coefficient \( b_2 \) is approximately 0.0194 and it shows that by increasing Variable 2 with one leu per year, the Intercept will increase with the value of \( b_2 \). This means that the increase of quality costs for human resources with approximately 51.55 lei will increase the number of tourists accommodated in Alpha Hotel by one. For this coefficient the threshold of significance P-value is 1.04885E-05 < 0.05, respectively \( t_{0.05} = 13.4449 > 2.365 = t_{0.025} \), the coefficient being statistically significant.

The lower limit of the confidence interval of this parameter is approximately 0.0159, and the upper limit reaches 0.0230.

6. CONCLUSION

After testing the validity of regression model was established that this model is statistically valid. Thus, it was observed that between the number of accommodated at Alpha Hotel and quality costs based on material costs, namely quality costs for human resources is a strong connection.

For the most part, service quality dimensions are determined by the activities of staff. Because the improvement of quality of service and productivity growth is found in an inverse relationship, requires the activity in a manner that ensures a balance between quality and quantity of services, that balance is a benchmark used to staff. Always investments in human resources and material basis will attract, through the quality of services, new tourists.

7. REFERENCES


*** Alpha Hotel – financial-accounting department