Prioritization of Revenue Management Factors: A Synthetic Extent Analysis Approach

Getiri Yönetimi Faktörlerinin Önceliklendirilmesi: Sentetik Kapsam Analizi Yaklaşımı

Mehmet Emre GÜLER¹

ABSTRACT

Purpose: This paper presents a novel approach for revealing the success factors of revenue management practices in hospitality industry. Our study aims to point out the favorably contributing ‘ingredients’ of a successful revenue management application. We investigate what revenue managers have learned from their past experience by using real empirical data and fuzzy synthetic evaluation procedure. Researchers and practitioners may regard this work as a functional benchmark analyzing a function (revenue management) which is widely used in those companies belongs to a particular industry (hospitality industry).

Design/methodology/approach: Revenue managers’ judgments about the underlying success factors are highly subjective and qualitative in nature. In order to capture this imprecision, we employed the fuzzy synthetic extent analysis and provided with a sensible prioritization of the success factors.

Research limitations/implications: Employing fuzzy concepts within a prioritization procedure requires constructing a fuzzy linguistic variable set and assigning a fuzzy conversion scale to it. Usually the implementation steps in fuzzy techniques are more cumbersome when compared to the conventional multi attribute techniques (i.e. conventional AHP).

Originality/value: This paper discusses the prioritization of effective factors that concede to a successful revenue management application in hospitality industry with a synthetic extent analysis approach. This paper provides with a ‘snapshot’ of the current practice in the area and serves for researchers and practitioners.

Keywords: Fuzzy prioritization, synthetic extent analysis, revenue management, hospitality industry.

1. INTRODUCTION

Today’s managers have to realize that contributing to control their costs is not alone sufficient to succeed in the current intense competition, yet, simultaneously they have to find a means of controlling their revenues as well. The latter task is more involved, as it is highly dependent on uncontrollable external factors rather than the ‘inbound and hence manageable’ ones. The companies offering perishable products or services (i.e. storage for future possible sale is impossible) and those operate with fixed capacities are much sensitive to external uncontrollable factors. Typical companies having these properties are the airline companies and hotels.

Revenue Management System is used for determining the state in desirable time in the future with using past data and reviewing present state and estimating future. This system is widely used in service sector as hospitality and airline industry but also used in some solving methods for problems

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cited in literature as capacity estimating and assignment problem (Modarres and Sharif Yazdi, 2009), determining service flow and price between the wholesaler and retailer in supply chain (Hu et al., 2009), optimization of airline pricing system with linear programming (Topaloglu, 2008), optimization of flight reservation and selling inventory with the customer satisfaction (Lindenmeier and Tscheulin, 2008) and developing pricing strategy in remanufactured product (Mitra, 2007).

2. LITERATURE REVIEW

The studies on critical success factors in revenue management are encountered in literature. Griffin (1995) investigated critical success factors with 27 variables for rooms to let and defined five factors as system classification, user training, user characteristics, organizational support and external environment. Hansen and Eringa (1998) studied critical success factors on revenue management using structural equation modeling. The model was formed with relationship between organization of revenue management function, authorization, employee behavior, revenue management system and percentage of income. The other study on difficulties of revenue management approach and critical success factors were studied in small and medium hotel enterprises in Florence (Luciani, 1999). This investigation was framed three main topics listed below:

- Knowledge of respondent about revenue management,
- Decision support system of human resource, technology and information system in hotel and
- Strategic and tactical decision making system

Upchurch et al. (2002) made an exploratory analysis in revenue management approach used a questionnaire form to revenue management managers and front desk officer. As a result of this analysis, they exposed a critical success factor into five topics as revenue management (short term), demand indicator (mid-term), benchmarking, demand forecasting (long term) and supply-demand maximization.

2.1. Preliminaries

Since the analytic hierarchy process (AHP) was first introduced in the late 1970s (Saaty, 1977; Saaty, 1980), it gained widely acceptance by many researchers and have been applied to several areas ranging from supplier selection to common vote prediction. It has been primarily designed to guide decision makers coping with multiple criteria decision situations. Readers interested in the mathematical theory behind AHP and its applications are referred to (Saaty, 1980; Zahedi, 1996; Vaidya and Kumar, 2006). Managerial judgments as articulated by pair-wise comparisons are the fundamental inputs for facilitating the AHP procedure. Each pair-wise comparison results in a numerical value $aij$ representing the ratio between the weights of the two criteria defined by $i$ and $j$. AHP method employs crisp values from Saaty’s static nine-point fundamental scale. However, when the decision maker’s judgments are uncertain, obtaining such precise crisp values may be very difficult. Therefore, static crisp values may lack the ability to capture the decision makers’ blurred preferences. A logical way to overcome this limitation is to define the comparison ratios as being fuzzy numbers.

A triangular fuzzy number $F$ is a fuzzy set and its membership function $\mu_F(x)$ is a piece-wise linear function having following properties:

1. $F$ is a particular subset of $\mathbb{R}$;
2. $\mu_F(x)$ is a continuous mapping from $\mathbb{R}$ to the closed interval $[0,1]$;
3. $\mu_F(x) = 0$ for all $x \in (-\infty,l_F] \cup [u_F, +\infty)$ and $\mu_F(x) = 1$ for $x = m_F$ where $l_F, m_F, u_F \in [d_F, l_F]$ and $u_F$ are the lower and upper limits and $m_F$ is the most likely value of $F$, respectively;
4. $\mu_F(x)$ is monotonically increasing when $x \in [l_F, m_F]$ and monotonically decreasing when $x \in [m_F, u_F]$.

In this article, we characterize the comparison ratios between the success factors $i$ and $j$ with triangular fuzzy numbers which describes the judgment ‘about $a_{ij}$’ and denote them with $\tilde{a}_{ij}$. Hence, we were able to describe some degree of blurred human perception about the corresponding pair-wise comparison. Next, we introduce particular linguistic assessment terms, so called ‘fuzzy linguistic variables’ to represent the underlying fuzzy numbers employed for factor evaluations.

A fuzzy linguistic variable is an expression in natural or artificial language (Zadeh, 1975) which describes a collection of values. For our purposes, we employed five fuzzy linguistic variables to help the decision maker describe his/her subjective judgment about the relative importance of a factor versus another. These linguistic variables are: equally important, moderately important, more important,
strongly important and extremely important. In Table 1, we illustrate a summary of our fuzzy linguistic variable set with lower, most likely and upper values of underlying triangular fuzzy numbers and their definitions.

Introduction of fuzzy linguistic variables instead of exact crisp values will enable the decision maker to use non-numerical terms and it can incorporate the imprecision related to decision maker’s preference, thus it eliminates the drawback of the static structure of the fundamental scale of AHP in capturing uncertainty related to pair-wise comparisons.

Fuzzy set theory bears a resemblance to the logical behavior of human brain faced with imprecision. For example, when the conditions in the financial market start to get risky, rather than giving exact investment decisions, people prefer to allocate the subject capital into several investment alternatives and prefer to ‘fuzzify’ their investment decisions by allocating less to risky instruments, more on promising instruments and the largest part to the mostly regarded alternative. For example, in case of high risk, one may choose to allocate less to stocks, more to governmental bonds and the largest part to overnight instruments as a consequence of rational behavior. This way of thinking is due to inherent response characteristic of human brain towards ambiguity in the decision situation. The idea of generalizing the crisp descriptions to fuzzy descriptions in order to capture human reasoning better is applicable to many methods in operations research. Parallel to many fuzzy extensions of other operational research methods, a fuzzy version of the AHP was developed by Van Laarhoven and Pedrycz (1983), who studied with triangular membership functions and compared underlying fuzzy ratios.

Table 1: Fuzzy Linguistic Variable Set and Their Underlying Fuzzy Numbers

<table>
<thead>
<tr>
<th>Linguistic Variable</th>
<th>Fuzzy Number</th>
<th>Membership Function</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equally important</td>
<td>1</td>
<td>(1, 1, 2)</td>
<td>Practical knowledge and experience assert that factor i is equally important when compared to factor j.</td>
</tr>
<tr>
<td>Moderately important</td>
<td>3</td>
<td>(2, 3, 4)</td>
<td>Practical knowledge and experience assert that factor i seems moderately more important when compared to factor j.</td>
</tr>
<tr>
<td>More important</td>
<td>5</td>
<td>(4, 5, 6)</td>
<td>Practical knowledge and experience assert that factor i is more important when compared to factor j.</td>
</tr>
<tr>
<td>Strongly important</td>
<td>7</td>
<td>(6, 7, 8)</td>
<td>Practical knowledge and experience assert that factor i is strongly important when compared to factor j.</td>
</tr>
<tr>
<td>Extremely important</td>
<td>9</td>
<td>(8, 9, 9)</td>
<td>Practical knowledge and experience assert that factor i is extremely important when compared to factor j, and totally outweighs it.</td>
</tr>
</tbody>
</table>

Since they introduced the fuzzy AHP modeling, several authors contributed both with conceptual and application oriented papers. Among the conceptual papers, Buckley (1985) derived fuzzy comparison priorities from trapezoidal membership functions, Boender et al. (1989) proposed an approach for local priority normalization and Leung and Cao (2000) discussed the consistency and ranking issues contributing with a consistency definition. The method was successfully applied for evaluating different production cycle alternatives (Weck et al., 1997), priority setting for software development process (Lee et al., 1999), evaluating military systems (Cheng et al., 1999), technology selection (Chan et al., 2000), customer satisfaction measurement (Cebeci and Kahraman, 2002), customer satisfaction measurement (Cebeci and Kahraman, 2002), location decisions (Kuo et al., 2002) and facilitating quality function deployment procedure (Kwong and Bai, 2002), multi-criteria inventory classification (Cakir and Canbolat, 2008).
Then, the synthetic extent analysis procedure. In what follows, we briefly summarize the synthetic extent analysis approach which is an ingenious technique and well suited for studying with triangular fuzzy numbers.

3. METHODOLOGY

Synthetic extent analysis is one of the most popular fuzzy prioritization methods. The permutation of the decision elements is very similar to the conventional AHP and the two methods almost have equal implementation steps. First, pair-wise comparisons are carried out using triangular fuzzy numbers. Then, the synthetic extent value $S_i$ of each element is found. Next step is to calculate the non-normalized weights by applying the principle of fuzzy number comparison (Chang, 1996). The last step is to normalize the weights found for each decision element. In what follows, we briefly summarize the synthetic extent analysis procedure.

Consider an object set of $n$ objects indexed by $i$ and a goal set of $m$ goals indexed by $j$. The idea is to take each object and perform extent analysis with respect to each goal. We end up with having $m$ extent analysis values $e_i^j$, $i = 1, ..., m$ where each $e_i^j$ value is a triangular fuzzy number characterized by three parameters $(l_i^j, m_i^j, u_i^j)$. Then, the synthetic extent value regarding to the $i$th objective is given by:

$$S_i = \sum_{j=1}^{m} e_i^j \otimes \left( \sum_{i=1}^{n} \sum_{j=1}^{m} e_i^j \right)^{-1}$$  

where $\otimes$ is the the fuzzy multiplication operator and additions are performed using the fuzzy addition operator. Therefore, for the first term in the above formula, we have

$$\sum_{j=1}^{m} e_i^j = \left( \sum_{j=1}^{m} l_i^j, \sum_{j=1}^{m} m_i^j, \sum_{j=1}^{m} u_i^j \right), \forall i = 1, ..., n$$

and for the second term, we have

$$\left( \sum_{i=1}^{n} \sum_{j=1}^{m} e_i^j \right)^{-1} = \frac{1}{\sum_{i=1}^{n} \sum_{j=1}^{m} l_i^j}$$

These calculations are the natural outcomes of fuzzy operational laws and quite different from regular additions and multiplications. The readers further interested in the main operational laws of triangular fuzzy numbers are referred to (Kaufmann and Gupta, 1991).

Next, consider two fuzzy numbers $F_i = (l_i, m_i, u_i)$ and $F_j = (l_j, m_j, u_j)$. For a sensible comparison between these two fuzzy numbers, we have to investigate both the degree of possibility that $F_i$ is bigger than or equal to $F_j$ and the degree of possibility that $F_1$ is smaller than or equal to $F_2$. Let $D(F_i \geq F_j)$ denote the degree of possibility that $F_i$ is bigger than or equal to $F_j$. We have three possible cases for $D(F_i \geq F_j)$:

Case 1: If $u_i \leq l_j$, then we have $D(F_i \geq F_j) = 0$.

Case 2: If $m_i \geq m_j$, then we have $D(F_i \geq F_j) = 1$.

Case 3: For all other possible cases the corresponding degree of possibility is given by

$$D(F_i \geq F_j) = \frac{l_2 - u_1}{(m_1 - u_1) - (m_2 - l_2)}.$$

For a logical comparison, Chang (1996) uses the degree of possibility that a fuzzy number $F_i$ to be greater than $k$ fuzzy numbers. This term can be written as follows

$$D(F_i \geq F_1, ..., F_k) = (D(F_i \geq F_1) \land (F_i \geq F_2) \land ... \land D(F_i \geq F_k)).$$

The principle of fuzzy number comparison (Chang, 1996) states that the degree of possibility that a fuzzy number $F_i$ is greater than or equal to a set of fuzzy numbers is equal to the minimum degree of possibility among these values. Therefore, we have

$$D(F_i \geq F_1, ..., F_k) = \min(D(F_i \geq F_j)|j = 1, ..., k).$$

After stating the fuzzy number comparison principles, we recall our prioritization problem characterized by an $(n \times n)$ fuzzy comparison matrix. Consider the synthetic extent values $S_i$ found from such matrix using equation (1). Let $h = \min(D(S_i \geq S_j) | j = 1, ..., n; j \neq i)$ and note that $h$ is the
projection of the highest intercept point of two membership functions on the number axis. Then we have a non-normalized priority vector for \( n \) elements:

\[
P' = [h_1, \ldots, h_n]^T.
\]

The priority vector is calculated with normalizing the components of this vector (i.e. \( P = \frac{h_i}{\sum_{i=1}^{n} h_i} \)):

\[
P = [p_1, \ldots, p_n]^T.
\]

3.1. Prioritizing Revenue Management Success Factors

In this section we illustrate how fuzzy concepts can be used with real empirical data to reveal the success factors of revenue management in hospitality industry. In the first step of this study, a study was conducted with 460 hotel managers that operates in Aegean region, which is a popular touristic area located at southwest coast of Turkey. In this study, the sample was diverse in terms of the hotel size and location, number of employees, operating budget and annual revenues generated. We employed

<table>
<thead>
<tr>
<th>Factor Group</th>
<th>Success Indicators within Factor Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Benchmarks</td>
<td>Match the room rate to market demand \hspace{3cm} Arrival and departure patterns by market segments \hspace{3cm} Identify local or citywide events \hspace{3cm} Understand pricing temperament of transient travelers \hspace{3cm} Review group activities so as to identify current booking pattern \hspace{3cm} Establishment of an overbooking policy \hspace{3cm} Utilize demand tracking reporting to predict patterns of demand \hspace{3cm} Utilize demand tracking reporting to predict early departure patterns \hspace{3cm} Know when to close reservation arrival dates \hspace{3cm} Know when to require a minimum length of stay</td>
</tr>
<tr>
<td>( \alpha = 0.924 ) \hspace{1cm} ( \sigma_p^2 = 22.077 )</td>
<td>\hspace{3cm} Conduct a periodic check of competitor's occupancy percentage \hspace{3cm} Determine special promotions \hspace{3cm} Implementation of an overbooking policy \hspace{3cm} Determine when discount rates should be closed while maintaining a sufficient room supply for rack rate guests \hspace{3cm} Limit the room capacity and denial reservations if the rate does not meet the high rate during peak season \hspace{3cm} Review of no-show pattern \hspace{3cm} Be able to forecast future lengths of stay \hspace{3cm} Be able to project demand for future rate types</td>
</tr>
<tr>
<td>Market Analysis</td>
<td>\hspace{1cm} Demand Forecasting \hspace{3cm} Competitive Advantage \hspace{3cm} Customer Profile</td>
</tr>
<tr>
<td>( \alpha = 0.934 ) \hspace{1cm} ( \sigma_p^2 = 18.441 )</td>
<td>\hspace{3cm} Review historical booking performance to identify future forecasting patterns \hspace{3cm} Understand pricing temperament of group travelers \hspace{3cm} Utilize demand tracking reporting to predict no-show patterns \hspace{3cm} Keep track of all reservation denials on a daily basis \hspace{3cm} Utilize demand tracking reporting to predict cancellation \hspace{3cm} Adjust prices to suit market demand and booking policies specific to high and low demand cycles \hspace{3cm} Review of historical demand \hspace{3cm} Conduct a periodic check of competitor's rates \hspace{3cm} Be able to match room rate to market demand</td>
</tr>
<tr>
<td>Demand Forecasting</td>
<td>\hspace{3cm} Determine last minute rates \hspace{3cm} Be able to project demand for future arrival dates \hspace{3cm} Know when to eliminate or restrict discount allocations \hspace{3cm} Determine discount structure</td>
</tr>
<tr>
<td>( \alpha = 0.907 ) \hspace{1cm} ( \sigma_p^2 = 16.290 )</td>
<td>\hspace{3cm} Review of walk-in pattern \hspace{3cm} Length of guest stay \hspace{3cm} Review of reservation cancellation pattern \hspace{3cm} Tracking of seasonal cycles \hspace{3cm} Be able to project demand for future room types</td>
</tr>
<tr>
<td>Competitive Advantage</td>
<td>\hspace{3cm} Determine last minute rates \hspace{3cm} Be able to project demand for future arrival dates \hspace{3cm} Know when to eliminate or restrict discount allocations \hspace{3cm} Determine discount structure</td>
</tr>
<tr>
<td>( \alpha = 0.851 ) \hspace{1cm} ( \sigma_p^2 = 12.682 )</td>
<td>\hspace{3cm} Review of walk-in pattern \hspace{3cm} Length of guest stay \hspace{3cm} Review of reservation cancellation pattern \hspace{3cm} Tracking of seasonal cycles \hspace{3cm} Be able to project demand for future room types</td>
</tr>
<tr>
<td>Customer Profile</td>
<td>\hspace{3cm} Review of walk-in pattern \hspace{3cm} Length of guest stay \hspace{3cm} Review of reservation cancellation pattern \hspace{3cm} Tracking of seasonal cycles \hspace{3cm} Be able to project demand for future room types</td>
</tr>
<tr>
<td>( \alpha = 0.866 ) \hspace{1cm} ( \sigma_p^2 = 11.165 )</td>
<td>\hspace{3cm} Review of walk-in pattern \hspace{3cm} Length of guest stay \hspace{3cm} Review of reservation cancellation pattern \hspace{3cm} Tracking of seasonal cycles \hspace{3cm} Be able to project demand for future room types</td>
</tr>
</tbody>
</table>
several 36 success indicators (Upchurch, 2002) and
surveyed managers’ opinions about the contribution
of these indicators to the revenue management
practices. Then we conducted a factor analysis as a
preprocessing step to group these indicators into
factor groups. We used Cronbach's α to test the
reliability of our grouping scheme. In Table 2 success
indicators are illustrated and grouped into 5 major
factor groups.

We tried as much as possible to name the factor
groups regarding to the common characteristics of
the indicators contained within that group. Thus, we
labeled our factor groups as: ‘Internal Benchmarks
(IB); ‘Market Analysis (MA); ‘Demand Forecasting (DF);
‘Competitive Advantage (CA); and ‘Customer Profile
(CP). The α values shown under each factor group is
the corresponding Cronbach's α reliability coefficient.

The α values for each factor group indicate a high
degree of reliability with our scale and found to
be sufficient for our grouping scheme's internal
consistency. The σ^2 values are the percentage
variances explained by each factor group. We were
able to explain 80.655% of the total variance with
these 36 indicators. We discarded a few remaining
indicators due to the factor analysis results.

After this preprocessing step, we asked the
respondent managers to compare factor groups
using our fuzzy linguistic variable set illustrated in
Table 1. Since it is not practical to conduct a Delphi
type controlled group process with such a big sample
size, we used the modal values of the judgments
acquired by this procedure. Hence, we were able to
construct the fuzzy linguistic pair-wise comparison
matrix as illustrated in Table 3.

### Table 3: Fuzzy Linguistic Pair-Wise Comparison Matrix

<table>
<thead>
<tr>
<th></th>
<th>IB</th>
<th>MA</th>
<th>DF</th>
<th>CA</th>
<th>CP</th>
</tr>
</thead>
<tbody>
<tr>
<td>IB</td>
<td>Equal</td>
<td></td>
<td></td>
<td></td>
<td>Strongly imp.</td>
</tr>
<tr>
<td>CA</td>
<td></td>
<td></td>
<td></td>
<td>Equal</td>
<td></td>
</tr>
<tr>
<td>CP</td>
<td></td>
<td>More imp.</td>
<td></td>
<td>Equal</td>
<td></td>
</tr>
</tbody>
</table>

Using the information in Table 1 and Table 3, we
can generate the fuzzy pair-wise comparison matrix
with the underlying triangular fuzzy numbers. The
fuzzy pair-wise comparison matrix is illustrated in

### Table 4: Fuzzy Pair-Wise Comparison Matrix

<table>
<thead>
<tr>
<th></th>
<th>IB</th>
<th>MA</th>
<th>DF</th>
<th>CA</th>
<th>CP</th>
</tr>
</thead>
<tbody>
<tr>
<td>IB</td>
<td>(1, 1, 1)</td>
<td>(1/4, 1/3, 1/2)</td>
<td>(1, 1, 2)</td>
<td>(1, 1, 2)</td>
<td>(6, 7, 8)</td>
</tr>
<tr>
<td>MA</td>
<td>(2, 3, 4)</td>
<td>(1, 1, 1)</td>
<td>(1/4, 1/3, 1/2)</td>
<td>(4, 5, 6)</td>
<td>(8, 9, 9)</td>
</tr>
<tr>
<td>DF</td>
<td>(1/2, 1, 1)</td>
<td>(2, 3, 4)</td>
<td>(1, 1, 1)</td>
<td>(8, 9, 9)</td>
<td>(4, 5, 6)</td>
</tr>
<tr>
<td>CA</td>
<td>(1/2, 1, 1)</td>
<td>(1/6, 1/5, 1/4)</td>
<td>(1/9, 1/9, 1/8)</td>
<td>(1, 1, 1)</td>
<td>(1/4, 1/3, 1/2)</td>
</tr>
<tr>
<td>CP</td>
<td>(1/8, 1/7, 1/6)</td>
<td>(1/9, 1/9, 1/8)</td>
<td>(1/6, 1/5, 1/4)</td>
<td>(2, 3, 4)</td>
<td>(1, 1, 1)</td>
</tr>
</tbody>
</table>

The next step is to calculate synthetic extent values corresponding to each factor. By applying formula (1),
we have:

\[
S_{IB} = (5.5, 7.5, 9.5) \otimes \left( \frac{1}{37.167}, \frac{1}{27.235}, \frac{1}{20.234} \right) = (0.148, 0.2754, 0.4695)
\]

\[
S_{MA} = (3.4, 4.667, 6.167) \otimes \left( \frac{1}{37.167}, \frac{1}{27.235}, \frac{1}{20.234} \right) = (0.0915, 0.1714, 0.3048)
\]
Next, using the principle of fuzzy number comparison, we calculate the degrees of possibilities

\[ D(S_{IB} \geq S_{MA}) = 1, \quad D(S_{IB} \leq S_{MA}) = 0.6012 \]
\[ D(S_{IB} \geq S_{DF}) = 1, \quad D(S_{IB} \leq S_{DF}) = 0.9459 \]
\[ D(S_{IB} \geq S_{CA}) = 1, \quad D(S_{IB} \leq S_{CA}) = 0.5983 \]
\[ D(S_{IB} \geq S_{CP}) = 1, \quad D(S_{IB} \leq S_{CP}) = 0.4723 \]
\[ D(S_{MA} \geq S_{DF}) = 1, \quad D(S_{MA} \leq S_{DF}) = 0.6595 \]

Next, using the principle of fuzzy number comparison, we calculate the degrees of possibilities

\[ \min_i \{D(S_{IB} \geq S_i)\} = 1 \]
\[ \min_i \{D(S_{MA} \geq S_i)\} = 0.6012 \]
\[ \min_i \{D(S_{DF} \geq S_i)\} = 0.9459 \]

According to these possibilities, the non-normalized priority vector is calculated as \( P = (1, 0.6012, 0.9459, 0.5983, 0.4723) \). With normalizing this vector, we arrive at the priority vector: \( P = (0.277, 0.166, 0.262, 0.165, 0.130) \). According to the prioritization values found, the most important factors contributing to a successful revenue management application are Internal Benchmarks and Demand Forecasting. Subsequent to these, Market Analysis and Competitive Advantage are the equally important contributors. Lastly, Customer Profile is found to have a lower level of priority when compared to above factors. Some indicators clustered in the most important factor, Internal Benchmarks’ indicators imply that the most important qualifications that a hotel must acquire are to fully understand its own capabilities and the ability to analyze the outcomes of its own past revenue management decisions. It is evident that customer segmentation is vital for facilitating a sensible revenue management policy, hence indicators such as ‘arrival and departure patterns by market segments’, ‘Review historical booking performance to identify future forecasting patterns’, ‘Understand pricing temperament of group travelers’, ‘Conduct a periodic check of competitor’s occupancy percentage’, ‘Identify local or citywide events’ and ‘Utilize demand tracking reporting to predict no-show pattern’ are clustered in the first three factors having higher degree or priorities. Another point worthy for mention is that timing is crucial issue in all the revenue management and related operations as the indicators such as ‘Arrival and departure patterns by market segments’, ‘Tracking of seasonal cycles’ and ‘Length of guest stay’ all lie in relatively important factor groups.

The indicators such as ‘Review historical booking performance to identify future forecasting patterns’ and ‘Utilize demand tracking reporting to predict early departure patterns’ justify that projecting the internal data for future expectations is essential.
for a hotel allotting itself for success in its revenue management operations. Customer Profile is regarded as lower priority factor by most of the managers as the indicators in this group are found to be relatively hard to facilitate in practice. These indicators are ‘review of walk-in pattern’, ‘length of guest stay’, ‘review of reservation cancellation pattern’, ‘tracking of seasonal cycles’ and ‘be able to project demand for future room types’.

4. CONCLUSIONS

In this paper, we discussed a prioritization model based on empirical data on concepts from fuzzy AHP literature. We analyzed revenue management operations of 460 hotels located in Aegean Region, Turkey and presented our findings regarding to this study. Our prioritization scheme is comprised of 5 essential success factors and 36 indicators related to revenue management practices of the hotels within sample. On the other hand, in respect of fuzzy AHP ranking has a similarity with variance analysis. There is just a ranking difference between ‘Market Analysis’ and ‘Demand Forecasting’. This similarity shows that experts and sample groups have concurrence of opinion.

The main purpose of this study is to provide an effective framework to guide the hotel managers and interested researchers for defining and prioritizing the success factors of revenue management. Although our results illustrate the current practice in Aegean Region, the model can be applied in any country with including region-specific other indicators. Furthermore, our scheme can be applied to other service industries with including industry-specific indicators.

<table>
<thead>
<tr>
<th>Table 5: Comparison of Factor Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Respect of Variance Analysis</td>
</tr>
<tr>
<td>Internal Benchmarks</td>
</tr>
<tr>
<td>Market Analysis</td>
</tr>
<tr>
<td>Demand Forecasting</td>
</tr>
<tr>
<td>Competitive Advantage</td>
</tr>
<tr>
<td>Customer Profile</td>
</tr>
</tbody>
</table>


