Prioritization of Effective factors on customers' satisfaction in the sector of banking services (Case Study: Refah bank of Zanjan Province)

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ABSTRACT

The main purpose of this study is to identify and Prioritization the most important factors that influence customer satisfaction using fuzzy Analytical Hierarchy Process (FAHP). In this study, first the Effective factors on customer satisfaction were recognized by library studies and interviewing customers, then Hierarchical decision tree was designed. The questionnaire which consists of fuzzy decision matrix was then distributed among customers. Then in order to ranking the criteria, gathered information were analyzed through fuzzy Analytical Hierarchy Process. The results show that Fast service, Range of offered services, Bank location, Privacy for in branch transactions is respectively the most important factors that influence customer satisfaction.

Keywords: customer satisfaction, Prioritization, fuzzy Analytical Hierarchy Process , banking services

1. INTRODUCTION

Improving customer satisfaction has been identified as one of the major challenges in the whole construction industry in the recent decade. A number of reports have highlighted the need for a change, greater efficiency and stronger client focus in the construction industry (Egan, 1998). Customer satisfaction has gained very much attention in the last few decades in all areas of production. In an increasingly competitive and dynamic environment, greater attention is continuously paid to customer relationships and satisfied customers (Eriksson and Vaghukt, 2000). Customers are often seen as the basis of a company’s profitability. This has led to a customer-centric view in marketing theory as well as in practice. The efficient allocation of limited resources to maximize value requires focusing on relationship oriented customers and strong, long-lasting customer retention (Rust et al., 2005). Customer satisfaction largely depends on the degree to which a product supplied by an organisation meets or surpasses customer expectation. Customer satisfaction is an abstract and rather ambiguous concept. Manifestations of satisfaction vary from one person to another and from one product to another. The state of the so-called “satisfaction” depends on a number of psychological and physical variables, and correlates with certain behaviours. The concept of satisfaction has been the subject of numerous controversies over the last 30 years. The current tendency is to define it as:

A phenomenon that is not directly observable (a psychological state that must be distinguished from its behavioral consequences . . .) . . . an evaluative judgment . . . that results from cognitive processes and that integrates affective elements . . . a global judgment of a consumer experience . . . with a relative character, resulting from the fact that the evaluation is a comparative process between a consumer’s subjective experience and an initial reference base . . . (Robinot and Giannelloni, 2010).

According to Gro¨nroos (1990), customer-perceived service quality has two dimensions: the functional dimension (process), which denotes “how” in the customer-seller interaction and the technical dimension (outcome), which relates to “what” in the actual service provision. Evidence supports the notion that service management is concerned with not only the technical but also the functional quality (Gro¨nroos, 1998). The postulated link between satisfaction and loyalty rests on several assumptions, for which empirical support does not always exist (Iyer and Bejou, 2004). For example, researchers tend to assume that highly satisfied customers lack incentives to search for alternatives, face sunk costs associated in their interactions with a particular supplier, are less likely to be swayed by prices, and have developed strong emotional bonds and structural ties with their current supplier. A growing number of studies demonstrate, however, that the impact of customer satisfaction on customer loyalty is rather complex (e.g., Bloemer and Kaspar, 1995) and indicative of the influence of moderator variables on this relationship. Satisfaction is often used as a predictor of future consumer purchases. Satisfied customers have a higher likelihood of repeating purchases in time (Zeithaml et al., 1996), of recommending that others try the source of satisfaction (Reynolds and Arnold, 2000), and of becoming less receptive to the competitor’s offerings (Fitzell, 1998). The American Customer Satisfaction Model (ACSM) (Fornell et al., 1996) is one of the most widely employed
models in satisfaction research. It is a causal model describing several key antecedents and consequences of customer satisfaction. The model and its various adaptations have been utilized in numerous multi-discipline investigations, for example, in information systems, banking (Ball et al., 2004), transportation, communications, and retailing (Arnett et al., 2003).

The conceptual definition of service quality developed by Parasuraman et al. (1988) has been largely employed for comparing excellence in the service encounters by customers. Bitner (1990) defined service quality as the customers’ overall impression of the relative inferiority/superiority of a service provider and its services and is often considered similar to the customer’s overall attitude towards the company (Parasuraman et al., 1988). This definition of service quality covers several points. One of them is an attitude developed over all previous encounters with a service firm (Bitner, 1990; Parasuraman et al., 1988).

Decision makers usually are more confident making linguistic judgments than crisp value judgments. This phenomenon results from inability to explicitly state their preferences owing to the fuzzy nature of the comparison process. Many studies have continually introduced the fuzzy concept to improve MCDM and solve linguistic and cognitive fuzziness problems. For example, fuzzy theory and AHP are combined to become the Fuzzy AHP (FAHP) method (Cheng, 1997; Cheng et al., 1999), which is a fuzzy extension of AHP, and was developed to solve hierarchical fuzzy problems. FAHPs are systematic approaches to the alternative selection and justification problem that use the concepts of fuzzy set theory and hierarchical structure analysis. FAHP can be applied to measure fuzzy linguistic cognition, and suffers form the disadvantage of unstable (i.e., non-unique) results being obtained by different defuzzification methods, and the ordering of alternatives will arise ranking reversion (Gharakhani, 2012).

The remainder of this paper is organized as follows: Effective factors on customer satisfaction are presented in Section 2. Section 3 describes the methodologies of fuzzy AHP. Research methodology is presented in Section 4. Section 5 outlines the process of Data analysis to determine the importance of Effective factors on customer satisfaction. Section 6 carries out our conclusions and suggestions.

2. EFFECTIVE FACTORS ON CUSTOMER SATISFACTION

The study of satisfaction had always received large attention by researchers. It is however a subjective concept, as it can be inferred from the different definitions found in literature. Having said that, it must be pointed out that there is wide consensus that “satisfaction is a person’s feeling of pleasure or disappointment resulting from comparing a product’s perceived performance (or outcome) in relation to his or her expectations”. Therefore, satisfaction is closely related to consumers’ expectations. More specifically, the narrower the gap is between the consumers’ expectations and the actual performance of the product or service, the higher is the consumer’s satisfaction (Santouridis and Trivellas, 2010). Customer satisfaction can be measured as either a single-item scale or as a multi-item construct assessing the satisfaction for each component of the service. For example, Cronin and Taylor (1992) measured customer satisfaction as a one-item scale that asks for the customers’ overall feeling towards an organization, while Anderson and Srinivasan (2003) used a 6-item construct to measure customer satisfaction in the context of electronic commerce (Santouridis and Trivellas, 2010).

Measuring customer satisfaction has several benefits for organisations:

- Improvement of communication between parties and enabling mutual agreement;
- Recognition of the demand of improvement in the process;
- Better understanding of the problems;
- Evaluation of progress towards the goal; and
- Monitoring and reporting accomplished results and changes.

Based on the previous literatures, we focus on twelve Effective factors on customer satisfaction. These factors are as follows:


3. ANALYTIC HIERARCHY PROCESS (AHP)

AHP integrates experts’ opinions and evaluation scores, and devises the complex decision-making system into a simple elementary hierarchy system. The evaluation method in terms of ratio scale is then employed to perform relative importance pair-wise comparison among every criterion. In the AHP approach, the decision problem is structured hierarchically at different levels with each level consisting of a finite number of decision elements. The upper level of the hierarchy represents the overall goal, while the lower level consists of all possible alternatives. One or more intermediate levels embody the decision criteria and sub-criteria. Through AHP, the importance of several attributes is obtained from a process of paired comparison, in which the relevance of the attributes or categories of drivers of intangible assets are matched two-on-two in a hierarchical structure (Gharakhani, 2011).
3.1. Determining the linguistic variables

An appropriate linguistic variable set can help decision makers to give right judgments on decisions. Here, we use this kind of expression to evaluation dimension by nine basic linguistic terms, as “Perfect,” “Absolute,” “Very good,” “Fairly good,” “Good,” “Preferable,” “Not Bad,” “Weak advantage” and “Equal” with respect to a fuzzy nine level scale. In this paper, the computational technique is based on the following fuzzy numbers defined by Gumus (2009) in Table 1. Here, each membership function (scale of fuzzy number) is defined by three parameters of the symmetric triangular fuzzy number, the left point, middle point, and right point of the range over which the function is defined.

<table>
<thead>
<tr>
<th>Fuzzy number</th>
<th>Linguistic</th>
<th>Scale of fuzzy number</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Perfect</td>
<td>(8, 9, 10)</td>
</tr>
<tr>
<td>8</td>
<td>Absolute</td>
<td>(7, 8, 9)</td>
</tr>
<tr>
<td>7</td>
<td>Very good</td>
<td>(6, 7, 8)</td>
</tr>
<tr>
<td>6</td>
<td>Fairly good</td>
<td>(5, 6, 7)</td>
</tr>
<tr>
<td>5</td>
<td>Good</td>
<td>(4, 5, 6)</td>
</tr>
<tr>
<td>4</td>
<td>Preferable</td>
<td>(3, 4, 5)</td>
</tr>
<tr>
<td>3</td>
<td>Not bad</td>
<td>(2, 3, 4)</td>
</tr>
<tr>
<td>2</td>
<td>Weak advantage</td>
<td>(1, 2, 3)</td>
</tr>
<tr>
<td>1</td>
<td>Equal</td>
<td>(1, 1, 1)</td>
</tr>
</tbody>
</table>

Step1. The value of fuzzy synthetic extent with respect to its object is defined as:

$$S_i = \sum_{i=1}^{m} M_{gi} \otimes \left[ \sum_{i=1}^{n} \sum_{j=1}^{m} M_{gi} \right]^{-1}$$  \hspace{1cm} (2)

To obtain $\sum_{j=1}^{m} M_{gi}$ perform the fuzzy addition operation of m extent analysis values for a particular matrix. Such that:

$$\sum_{j=1}^{m} M_{gi} = \sum_{j=1}^{m} l_j \cdot \sum_{j=1}^{m} m_j \cdot \sum_{j=1}^{m} u_j$$ \hspace{1cm} (3)

and to obtain $\sum_{i=1}^{n} \sum_{j=1}^{m} M_{gi}$ perform the fuzzy edition operation of m extent analysis values for a particular matrix such that:

$$\sum_{i=1}^{n} \sum_{j=1}^{m} M_{gi} = \sum_{i=1}^{n} l_i \cdot \sum_{i=1}^{m} m_i \cdot \sum_{i=1}^{n} u_i$$ \hspace{1cm} (4)

Therefore, m extent analysis values for each object can be obtained and shown as follows:

$$M_{gi}^1, M_{gi}^2, \ldots, M_{gi}^n \quad i = 1, 2, \ldots, n$$  \hspace{1cm} (1)

Where all the $M_{gi}^j$ (j = 1; 2, . . . , m) are triangular fuzzy numbers (TFNs) whose parameters are: l, m and u. They are the least possible value, the most possible value, and the largest possible value respectively. A TFN is represented as (l, m, u). The steps of the extent analysis method can be given as follows:

3.2. Extent Analysis Method on Fuzzy AHP

In this study, we prefer Chang (1996) extent analysis method because the steps of this approach are easier than the other fuzzy-AHP approaches (Fuzzy sets and AHP are not detailed here because of being well-known applications). The outlines of the extent analysis method on fuzzy AHP can be summarized as follows:

Let $X = \{x_1, x_2, \ldots, x_n\}$ be an object set, and $U = \{u_1, u_2, \ldots, u_m\}$ be a goal set. According to the Chang’s extent analysis method, each object is taken and extent analysis for each goal $g_i$ is performed, respectively.

Table 1. Membership functions of linguistic scale (example).

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<td>Absolute</td>
<td>(7, 8, 9)</td>
</tr>
<tr>
<td>3</td>
<td>Very good</td>
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<td>4</td>
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</tr>
<tr>
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To obtain $\sum_{j=1}^{m} M_{gi}$ perform the fuzzy addition operation of m extent analysis values for a particular matrix. Such that:

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and to obtain $\sum_{i=1}^{n} \sum_{j=1}^{m} M_{gi}$ perform the fuzzy edition operation of m extent analysis values for a particular matrix such that:

$$\sum_{i=1}^{n} \sum_{j=1}^{m} M_{gi} = \sum_{i=1}^{n} l_i \cdot \sum_{i=1}^{m} m_i \cdot \sum_{i=1}^{n} u_i$$ \hspace{1cm} (4)

Then, the inverse of the vector in equation (5) is computed as:
\[
\left[ \frac{1}{\sum_{i=1}^{n} u_i} \sum_{i=1}^{n} M_{gi}^j \right]^{-1} = \left[ \frac{1}{\sum_{i=1}^{n} m_i} \sum_{i=1}^{n} l_i \right]^{-1}
\]

(5)

Step 2. The degree of possibility of \(M_2 = (l_2, m_2, u_2) \geq M_1 = (l_1, m_1, u_1)\) is defined as:

\[
V = (M_2 \geq M_1) = \text{SUP}\{\mu_{M_1}(x) \cdot (\mu_{M_2}(y))\}
\]

(6)

can be expressed equivalently as follows:

\[
V = (M_2 \geq M_1) = \text{hgt}(M_2 \cap M_1) = \mu_{M_2}(d) = \begin{cases} 
1 & \text{if } m_2 \geq m_1 \\
0 & \text{if } l_1 \geq u_2 \\
\frac{l_1-u_2}{(m_2-u_2)-(m_1-l_1)} & \text{otherwise}
\end{cases}
\]

(7)

where \(d\) is the ordinate of the highest intersection point \(D\) between \(\mu_{M_1}\) and \(\mu_{M_2}\). To compare \(M_1\) and \(M_2\), both the values of \(V(M_1 \geq M_2)\) and \(V(M_2 \geq M_1)\) are needed.

Step 3. The degree possibility for a convex fuzzy number to be greater than \(k\) convex fuzzy numbers \(M_i (i = 1, 2, \ldots, k)\) can be defined by:

\[
V(M \geq M_1, M_2, \ldots, M_k) = \text{MIN}\{V(M \geq M_1) \text{ and } (M \geq M_2) \text{ and } \ldots \text{ and } (M \geq M_k)\}
\]

(8)

Assume that:

\[
d'(S_i) = \text{MIN}\{S_i \geq S_{ik}\}
\]

(9)

For \(k = 1, 2, \ldots, n; k \neq i\). Then the weight vector is given by:

\[
W = (d(S_1), d(S_2), \ldots, d(S_n))^T
\]

(10)

where \(S_i (i = 1, 2, \ldots, n)\) are \(n\) elements.

Step 4. After normalization (the elements of column is divided each by the sum of that column and the elements in each resulting row are added and this sum is divided by the number of elements in the row), the normalized weight vectors are obtained as follows:

\[
W = (d(S_1), d(S_2), \ldots, d(S_n))^T
\]

(11)

Where \(W\) is not a fuzzy number (Gumus, 2009).

4. RESEARCH METHODOLOGY

Given the goal of this research that is identify and ranking Effective factors on customer satisfaction, this is done in two stages. In first stage, the researcher tries to recognize the Effective factors on customer satisfaction, which is done through library studies and also interview with different customers, during which Effective factors on customer satisfaction is classified into 12 major criteria. In second stage, the researcher makes fuzzy decisions matrix in order to ranking the recognized criteria, whose entries are all fuzzy data. The statistical Population in this research is included on Customers that have borrowed in January 2012 from Refah bank of Zanjan Province. The statistical sample is considered 105 persons by using Cochrane Formula. Cochrane Formula is shown in equation 2.

\[
n = \frac{NZ^{(\alpha/2)^2} \cdot p(1-p)}{\Sigma(N-1) \cdot e^2 + Z^{(\alpha/2)^2} \cdot p(1-p)}
\]

(2)

\(n\) : number of statistical sample

\(N\) : number of statistical population

\(\alpha\) : Error coefficient

\(p\) : Success percent

\(e\) : estimate accuracy

In this paper, statistical population is 350 persons, Error coefficient is 0. 5, Success percent is 0.5, and estimate accuracy is 0.08, thus we have:

\[
n = \frac{350(1.96)^2 \cdot 0.5(1-0.5)}{(350-1)(0.08)^2 + (1.96)^2 \cdot 0.5(1-0.5)} \geq 105
\]

In this study, researcher distribute 105 questioner that 5 questioner are incomplete.
5. DATA ANALYSIS

FAHP Process was applied for data analysis. The AHP model provides priority weights for the Effective factors on customer satisfaction. After collecting hundreds of questionnaires, the following data were obtained using the geometric mean (Table 2).

<table>
<thead>
<tr>
<th>A1</th>
<th>A2</th>
<th>A3</th>
<th>A4</th>
<th>A5</th>
<th>A6</th>
<th>A7</th>
<th>A8</th>
<th>A9</th>
<th>A10</th>
<th>A11</th>
<th>A12</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.50, 0.69</td>
<td>0.50, 0.54</td>
<td>0.50, 0.86, 1.18</td>
<td>0.50, 0.57</td>
<td>0.50, 0.49</td>
<td>0.50, 0.76, 1.09</td>
<td>0.50, 0.94, 1.18</td>
<td>0.50, 0.76, 0.94</td>
<td>0.50, 0.76, 1.18</td>
<td>0.50, 0.69</td>
<td>0.50, 0.69</td>
</tr>
<tr>
<td>0.22, 0.25, 0.31</td>
<td>1</td>
<td>(1.12, 1.36, 1.73)</td>
<td>(1.44, 1.74, 2.13)</td>
<td>(0.79, 1.02, 1.34)</td>
<td>(1.28, 1.63, 2.09)</td>
<td>(1.12, 1.46, 1.81)</td>
<td>(1.28, 1.63, 2.09)</td>
<td>(1.28, 1.63, 1.84)</td>
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</tr>
<tr>
<td>0.44, 0.54</td>
<td>0.49</td>
<td>0.50, 0.86, 0.69</td>
<td>0.50, 0.57, 0.19</td>
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<td>0.50, 0.69</td>
<td>0.50, 0.69</td>
</tr>
</tbody>
</table>


The weight calculation details using Table 2 are given below.

The value of fuzzy synthetic extent with respect to the i<sup>th</sup> object (i = 1, 2, 3, ...., 12) is calculated as:

\[ S_i = 0.00529, 0.00645, 0.00788 \to 0.0959, 0.1460, 0.2197 \]

\[ S_2 = 0.00529, 0.00645, 0.00788 \to 0.0770, 0.1137, 0.1720 \]

\[ S_3 = 0.00529, 0.00645, 0.00788 \to 0.0677, 0.1010, 0.1458 \]

\[ S_4 = 0.00529, 0.00645, 0.00788 \to 0.0628, 0.0919, 0.1315 \]

\[ S_5 = 0.00529, 0.00645, 0.00788 \to 0.0615, 0.0903, 0.1302 \]

\[ S_6 = 0.00529, 0.00645, 0.00788 \to 0.0544, 0.0819, 0.1235 \]

\[ S_7 = 0.00529, 0.00645, 0.00788 \to 0.0548, 0.0808, 0.1176 \]

\[ S_8 = 0.00529, 0.00645, 0.00788 \to 0.0540, 0.0683, 0.1067 \]

\[ S_9 = 0.00529, 0.00645, 0.00788 \to 0.0468, 0.0690, 0.1055 \]

\[ S_10 = 0.00529, 0.00645, 0.00788 \to 0.0399, 0.0596, 0.0916 \]

\[ S_11 = 0.00529, 0.00645, 0.00788 \to 0.0338, 0.0498, 0.0747 \]

\[ S_12 = 0.00529, 0.00645, 0.00788 \to 0.0310, 0.0462, 0.0697 \]

According to the values S, To each other, the weights and rank of factors is obtained. They are shown in Table 3.
These weights show that Fast service and Range of offered services are more important for customers. The weights for each factor are: Fast service (0.2639), Range of offered services (0.1852), Bank location (0.1388), Privacy for in branch transactions (0.1047), Convenience of ATMs locations (0.0794), Helpfulness of staff (0.0660), Courteous of employees (0.0526), Self-banking services (0.0464), and Handing of complaints (0.0229). Moreover, the less important factor is inadequate training and instruction (0.077).

6. DISCUSSION AND CONCLUSIONS

   The main purpose of this study is to identify the most important factors that influence customer satisfaction with banks in Refah bank of Zanjan Province and to determine the level of the overall satisfaction of the customers of these banks. To achieve this purpose, a fuzzy Analytical Hierarchy Process (FAHP) by Chang (1996) was pursued. This methodology was selected for this study mainly to avoid the shortcomings associated with the single-item measure succinctly discussed earlier. The results show that Fast service, Range of offered services, Bank location, Privacy for in branch transactions is respectively the most important of Effective factors on customer satisfaction. The results of this study also showed that Cleanliness of branch, Parking spaces and Service charges are the least important factors that influence customer satisfaction. A number of studies have indicated that only a small percentage of dissatisfied customers voice their complaints and that those who do not do so respond in several different behaviors, such as engaging in negative word-of-mouth, frequenting their service provider less often, switching patronage to another service provider or complaining to a third party (Blodgett and Li, 2007; Fernandes and dos Santos, 2007). The most important limitation was inherent in the present study and is acknowledged here. Data were collected from a convenient sample, implying that the generalizability of this study’s results to the population of the customers of banks in Iran should be viewed with caution. Future studies can also identify the Prioritization factors that influence customer satisfaction in other banks with other method as SAW and TOPSIS.

REFERENCES


