A strategic service quality approach using analytic hierarchy process

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Abstract

Purpose – The paper aims to develop a technique that considers competition using the analytic hierarchy process (AHP) framework to measure service quality.

Design/methodology/approach – The present study adapted the AHP methodology to the measurement of service quality, involving five steps – referred to as “analytical hierarchy process for service quality” (“AHP-SQ”). Subsequently, the authors demonstrate how the technique can be applied to the fast-food restaurants.

Findings – The AHP-SQ approach described in this study thus assists management to devise and maintain a relevant, competitive plan for ongoing improvements in service quality. Specifically, such analysis enables the following questions to be addressed: “How does the firm perform in terms of service quality in relation to its competitors?”; “Given the firm’s resources, which service initiatives will enhance its service competitiveness?”; “Which service areas require immediate improvement?”; “How should the firm’s service improvement be prioritized?”; and “What opportunities exist for service improvement in relation to the competition?”

Research limitations/implications – It would be important to consider the “right” dimensions of service quality that are relevant to the respective industry. It would also be essential to collect responses from customers who have utilized the services of the focal firm as well as its competitors in order to have an accurate opinion.

Practical implications – The framework proposed here allows management to address two main issues pertaining to its competitive advantage: establishing its performance ranking in the marketplace; and identifying the service elements that most require improvement.

Originality/value – The paper develops a cohesive approach to help managers identify which reliability, assurance, tangibles, empathy, responsiveness (RATER) service dimensions require attention to create a sustainable competitive advantage. It offers a “bigger picture” in service-quality management.

Keywords SERVQUAL, Analytical hierarchy process, Gap analysis, Customer satisfaction, Competitive strategy, Service quality assurance

Paper type Research paper

Introduction

In the presence of fierce competition, service firms strive to stay in the forefront of today’s marketplace by offering quality service. Research has shown that service quality is an essential strategy for winning and retaining customers (Ghobadian et al., 1994; Buzzell and Gale, 1987, Zeithaml, 2000). Indeed, the quality of service is more important than price in differentiating a service firm from its competitors and in fostering customer loyalty (Kandampully and Suhartanto, 2000, 2003). Delivering...
quality service is thus vital if firms are to increase market share and profitability. However, in attempting to increase market share, most assessments of service quality do not consider the strategies of competitors. Parasuraman et al. (1990) noted that it is essential for a service firm to compare its strengths and weaknesses against those of its competitors when developing priorities for service improvement. The present paper develops an approach that will assist managers in prioritizing aspects of service improvement – while taking account of the service priorities of competitors.

The approach advocated here assists management in addressing the following questions:

- How does the firm perform in terms of service quality in relation to its competitors?
- Given the firm’s resources, which service initiatives will enhance its service competitiveness?
- Which service areas require immediate improvement?
- How should the firm’s service improvement be prioritized?
- What opportunities exist for service improvement in relation to the competition?

**Literature review**

Measuring service quality is a challenging task because the concept of service quality is inherently intangible in nature and difficult to define (Kandampully, 1997). Measuring improvements in service quality is even more challenging (Parasuraman et al., 1990). Commonly used techniques for measuring service quality include customer service audits (Takeuchi and Quelch, 1983), gap analysis (Zeithaml et al., 1988), SERVQUAL (Parasuraman et al., 1988), SERVPERF (Cronin and Taylor, 1994), critical incident technique (Bitner et al., 1990), and sequential incident technique (Stauss and Weinlich, 1997). A common feature of all these methods is that they all focus on measuring internal service quality without considering the strategies of competitors. As Min and Min (1997, p. 582) pointed out with respect to SERVQUAL: “[It] alone may not help evaluate the firm’s comparative service performance”.

Such consideration of competitors is important. Indeed, Parasuraman et al. (1990) provided five guidelines for conducting service-quality research – one of which was measuring service performance in relation to competition. In response to this need, a few instruments have been developed that include an assessment of the competition in measuring service quality. Parasuraman et al. (1988), Min and Min (1996, 1997), and Min et al. (2002) all attempted to measure competitive service quality. Moreover, Parasuraman et al. (1990) suggested adapting the SERVQUAL instrument to measure service quality in relation to competition. SERVQUAL is a well-established “gap-assessment” methodology that can be used to develop service-improvement initiatives by examining the “gap” between expectations and perceptions. The adapted SERVQUAL instrument (Parasuraman et al., 1991) uses a non-comparative evaluation model – that is, customers of firm A are asked to state their perception or their expectation of firm A’s services and another group of customers are asked to state their perception or their expectation of firm B’s services. After obtaining the perceptions and expectations, the SERVQUAL scores are calculated and gaps between the two firms are assessed.

In addition to this adaptation, Johns and Tyas (1996) have extended the use of SERVQUAL to include competitors. Moreover, Fick and Ritchie (1991) have employed
the SERVQUAL instrument to compare services provided by various types of organizations within the travel and tourism industry.

The difficulty with these approaches is that SERVQUAL requires the collection of several sets of data to do a competitive analysis. For example, if SERVQUAL is used to conduct a comparative analysis of three firms, three sets of questionnaires are required; each with 44 statements – assuming the original 22 items of Parasuraman et al. (1988).

Authors have questioned the value and purpose of the separate data sets (Johns and Tyas, 1996).

The present study takes a different perspective. Rather than use a non-comparative model, the approach advocated here uses a comparative evaluation model – that is, the customers are asked to compare firm A and firm B with regard to a service dimension, and then rate their satisfaction level for either firm A or B. The paper develops a cohesive approach using analytic hierarchy process (AHP) to help managers identify which reliability, assurance, tangibles, empathy, responsiveness (RATER) service dimensions require attention to create a sustainable competitive advantage. AHP is used as a comparative service-improvement technique for two reasons. First, the AHP technique allows pairwise comparisons to be made among the alternatives with respect to the service dimensions. This provides a more meaningful analysis for developing a competitive set of service attributes that will satisfy customers and assist the service provider in outperforming its competitors. Second, to determine comparative service performances, AHP requires the collection of only one set of data – as opposed to several sets with the adapted SERVQUAL instrument.

Conceptual framework for the study
The AHP technique, which was developed by Saaty (1980, 1990, 1994), uses a process of pairwise comparisons to determine the relative importance (and thus the priority) of alternatives in a multi-criteria decision-making problem. AHP involves decomposing a complex and unstructured problem into a set of variables that are organized into a hierarchy (as shown in Figure 1). It enables decision-makers to make choices among a number of alternatives and criteria by formulating priorities and making a series of tradeoffs. Although the AHP technique was originally developed for solving multi-criteria decision-making problems, its practicality and versatility has allowed AHP to be widely applied in many different areas – including marketing (Wind and Saaty, 1980) and accounting/auditing (Arrington et al., 1984). Zahedi (1989) has provided a comprehensive survey of the application of AHP.

The present study adapted the AHP methodology to the measurement of service quality. The industry chosen for the study was the “fast-food” restaurant industry. The service quality problem was structured into a two-level hierarchical form (as shown in Figure 1). The first level – the “service-dimension level” – addressed the relative importance of various service dimensions in defining service quality. Customers were asked to compare pairs of service dimensions (for example, “tangibles” versus “reliability”) and to indicate whether they felt that one dimension was “equal to”, “more important than” or “less important than” another dimension. The second level of the hierarchy – the “choice level” – compared the performance of service providers (in this case, fast-food restaurants) with respect to the service dimensions. The customers were asked to state their preference for the restaurants in a pairwise manner on a nine-point relational satisfaction scale.
The AHP procedure thus provided a ranking order of firms with respect to the dimensions that define service quality, as well providing relative standings of each service provider with respect to its competitors.

**Data collection**

**Questionnaire design**

In accordance with the conceptual framework described above, the questionnaire was structured into two sections.

The first section contained ten pairwise comparison items for customer evaluation of the importance of service dimensions in “fast-food” restaurants. To minimize interpretation bias, respondents were provided with definitions of each service dimension. The judgments were based on a nine-point relational scale of importance – similar to the one used in the original AHP instrument (Saaty, 1980). According to the scale used in this study, 1 represented Equally important; 2 = Equally important to somewhat important; 3 = Somewhat important; 4 = Somewhat important to moderately important; 5 = Moderately important; 6 = Moderately important to very important; 7 = Very important; 8 = Very important to extremely important; 9 = Extremely important.

The second section of the questionnaire (corresponding to the second level of the hierarchy), contained five questions to evaluate customers’ satisfaction with dining in three fast-food restaurants (“McDonald’s”, “Burger King”, and “Harvey’s”) with respect to the five dimensions. Within each of these five questions were three sub-questions that compared McDonald’s with Burger King, McDonald’s with Harvey’s, and Burger King with Harvey’s. Again, the judgments were based on a nine-point relational scale of satisfaction. In this case, 1 represented Equally satisfied; 2 = Equally satisfied to somewhat satisfied; 3 = Somewhat satisfied; 4 = Somewhat satisfied to moderately satisfied; 5 = Moderately satisfied; 6 = Moderately satisfied to very satisfied; 7 = Very satisfied; 8 = Very satisfied to extremely satisfied; 9 = Extremely satisfied.

An example of the instructions and questions is provided in Figure 2.
Over a three-week period, the questionnaire was administered to customers who were leaving or entering the McDonald’s restaurant at Bay Street, Toronto, Canada. Overall, about one in four customers who were approached was willing to fill in the questionnaire. Johns and Tyas (1996) also encountered the problem of respondents not being willing to participate in a survey. In the present study, each respondent was given a dollar for participating in the survey. The respondents were first screened to ensure that they had patronised all three fast-food restaurants (McDonald’s, Burger King, and Harvey’s) in the past four months.

A total of 80 customers participated in the survey. After checking for inconsistencies (see “Data analysis”, below), eight respondents were excluded – giving a response rate of 84 percent.

Data analysis
Each respondent’s weights and scores were computed using Microsoft EXCEL. Then all respondents’ weights and satisfaction scores were analyzed using SPSS.

Applying the AHP methodology to service quality involved five steps – referred to here as “analytic hierarchy process for service quality” (“AHP-SQ”). The AHP-SQ steps were as follows:

(1) Step 1. Obtain customers’ tradeoff judgments for the service dimension and restaurant choice displayed in the pairwise comparison matrices.

(2) Step 2. Check for consistency.

(3) Step 3. Compute the weights of the service dimensions and satisfaction scores for the restaurant choice of each respondent.

(4) Step 4. Compute the mean overall weights and satisfaction scores over all respondents.

(5) Step 5. Compute the quality gap.

Each of these is described below.

Step 1
As described above, a questionnaire was used to gather the respondents’ pairwise comparison judgments for the two levels in the hierarchy (see Figure 1). These were used as inputs for two pairwise comparison matrices – one for the “service-dimension level” and the other for the “choice level” (as shown in Tables I and II).
The pairwise comparison matrix for the “service-dimension level” shows service dimensions at the top and on the left (Table I). Based on the judgments of the respondents, the matrix shows numerical values (based on the nine-point importance scales) denoting the importance of the service dimension on the left relative to the importance of the service dimension at the top. A high value denotes that the service dimension on the left is more important than the service dimension at the top.

For the “choice level” of the hierarchy, the restaurants were compared with each other to determine relative satisfaction with each restaurant with respect to each of the service dimensions. Five pairwise comparison matrices were constructed at this level – one for each of the service dimensions. However, due to the limitations of space, only one matrix is displayed – for “tangibles” (as shown in Table II). The cell values in the matrix denoted as $a_{ij}$ represent the customers’ judgments. The remaining cells of the pairwise comparison matrix were placed with the inverse of the respondents’ corresponding value (denoted as $1/a_{ij}$).

**Step 2**

After the respondents’ judgments had been obtained, it was necessary to check the consistency of each respondent’s tradeoff judgments. This was measured by a consistency index (denoted as CI), equivalent to $(\lambda_{\text{max}} - n)/(n - 1)$ where $n$ stands for number of service dimensions and $\lambda_{\text{max}}$ denotes the largest eigenvalue. Eigenvalues are a set of scalars associated with a linear system of equations (or a matrix equation). They are the square roots of judgment values, and a consistency index was derived by Saaty (1980) to check for any inconsistent judgments. For example, if a respondent prefers A to B, and B to C, that respondent cannot prefer C to A. The CI index should be low, so that the ratings will not be affected.

For each respondent, the CI was computed for each pairwise comparison matrix. A CI value of 0.15 was adopted as the allowable upper limit (Sato, 2004). Only those samples with a CI value equal to or smaller than 0.15 were accepted for analysis.

**Step 3**

After checking for the consistency of the respondents’ judgments, the product of the respondent’s importance judgments for each service dimension obtained in step 1 was

<table>
<thead>
<tr>
<th>Service dimension level</th>
<th>Tangibles</th>
<th>Reliability</th>
<th>Responsiveness</th>
<th>Assurance</th>
<th>Empathy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tangibles</td>
<td>1</td>
<td>$a_{12}$</td>
<td>$a_{13}$</td>
<td>$a_{14}$</td>
<td>$a_{15}$</td>
</tr>
<tr>
<td>Reliability</td>
<td>$1/a_{12}$</td>
<td>1</td>
<td>$a_{23}$</td>
<td>$a_{24}$</td>
<td>$a_{25}$</td>
</tr>
<tr>
<td>Responsiveness</td>
<td>$1/a_{13}$</td>
<td>$1/a_{23}$</td>
<td>1</td>
<td>$a_{34}$</td>
<td>$a_{35}$</td>
</tr>
<tr>
<td>Assurance</td>
<td>$1/a_{14}$</td>
<td>$1/a_{24}$</td>
<td>$1/a_{34}$</td>
<td>1</td>
<td>$a_{45}$</td>
</tr>
<tr>
<td>Empathy</td>
<td>$a_{15}$</td>
<td>$1/a_{25}$</td>
<td>$1/a_{35}$</td>
<td>$1/a_{45}$</td>
<td>1</td>
</tr>
</tbody>
</table>

Table I. Pairwise comparison matrix for service dimension level

<table>
<thead>
<tr>
<th>Based on tangibles</th>
<th>McDonald's</th>
<th>Burger King</th>
<th>Harvey's</th>
</tr>
</thead>
<tbody>
<tr>
<td>McDonald's</td>
<td>1</td>
<td>$b_{12}$</td>
<td>$b_{13}$</td>
</tr>
<tr>
<td>Burger King</td>
<td>$1/b_{12}$</td>
<td>1</td>
<td>$b_{23}$</td>
</tr>
<tr>
<td>Harvey's</td>
<td>$1/b_{13}$</td>
<td>$1/b_{23}$</td>
<td>1</td>
</tr>
</tbody>
</table>

Table II. Pairwise comparison matrix for choice level
noted, and the fifth root of the product was then calculated to obtain the relative weights. The rows in the pairwise comparison matrix were then added together. The weights were then normalized by computing the sum of each row and then dividing each row by the corresponding sum.

The same computation procedure was performed for the respondent’s satisfaction ratings of the fast-food restaurants. These were then converted into satisfaction scores (or priorities).

**Step 4**
The results obtained in step 3 were then synthesized. The overall satisfaction score was obtained by multiplying the weights with the satisfaction scores. All the respondents’ overall satisfaction scores were then averaged to obtain a mean overall satisfaction score for each restaurant. The mean overall satisfaction score was used to rank the restaurants. The restaurant with the highest score was regarded as the “market leader”.

**Step 5**
The quality gap \( \text{QGap}_i \) of each service dimension was derived from the discrepancy between the satisfaction scores of the focal firm (McDonald’s) and that of the best performer (referred to as the “market leader” in step 4). The mathematical form of the quality gap was defined as follows:

\[
\text{QGap}_i = S_{iF} - S_{iM} \quad \forall i
\]

where:
- \( \text{QGap}_i \) = quality gap for dimension \( i \);
- \( i \) = service dimension (tangibles, reliability, responsiveness, assurance, empathy);
- \( S_{iF} \) = satisfaction scores for dimension \( i \) of the focal restaurant; and
- \( S_{iM} \) = satisfaction scores for dimension \( i \) of the market leader.

A positive value for \( \text{QGap}_i \) indicates that the focal firm outperformed the market leader on the dimension \( i \). A negative gap indicates that the focal firm underperformed relative to the market leader. A \( \text{QGap}_i \) value of zero means that the focal firm performed well on the dimension \( i \) compared with the market leader.

**Findings and discussion**
The findings are summarized in Tables III and IV. As previously noted, McDonald’s was selected as the focal firm in this study for illustrative purposes. In other words, McDonald’s could use this study to establish which service dimensions should be improved to achieve a competitive advantage.

Table III shows the mean importance ranking of the service dimensions. The results show that the customers regarded “empathy” as the highest priority in assessing service quality of a “fast-food” restaurant. It is apparent that it is important for a restaurant to provide a caring and personalized service to customers. Customers regarded “tangibles” (the appearance of the restaurant’s physical facilities, equipment, personnel, and communication materials) as the second most important dimension of service quality. “Assurance”, defined as the knowledge and courtesy of a restaurant’s
employees and their ability to convey trust and confidence (Parasuraman et al., 1988), was viewed as the third most important aspect of the service experience. It is apparent that diners like to have a knowledgeable employee when being served, and prefer to dine in a comfortable atmosphere. “Reliability” (a restaurant’s ability to perform the promised service dependably and accurately) and “responsiveness” (a restaurant’s willingness to help customers and provide prompt service) were not rated as highly as the other aspects of service quality.

However, the rankings depicted in Table III are not sufficient to develop a service-improvement agenda. Although the service dimension of “empathy” was ranked first in terms of importance to the customers, McDonald’s should not immediately allocate limited resources to this dimension without first comparing its own performance on this dimension against that of its competitors. Table IV shows the service performances of McDonald’s in comparison with its competitors. The results show that Harvey’s rated as the best overall performer, with McDonald’s and Burger King approximately equal in overall ranking. For each service dimension, the restaurants were ranked with the mean weighted satisfaction scores. It is apparent that McDonald’s did well on the dimension of “empathy” – in which it ranked better than Harvey’s (even though, overall, Harvey’s was the “market leader”).

To assess which dimension McDonald’s should accord highest priority to improve its services, it is necessary to consider McDonald’s position on each dimension with

<table>
<thead>
<tr>
<th>Service dimensions</th>
<th>Mean importance</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tangibles</td>
<td>0.21</td>
<td>2</td>
</tr>
<tr>
<td>Reliability</td>
<td>0.16</td>
<td>4</td>
</tr>
<tr>
<td>Responsiveness</td>
<td>0.15</td>
<td>5</td>
</tr>
<tr>
<td>Assurance</td>
<td>0.18</td>
<td>3</td>
</tr>
<tr>
<td>Empathy</td>
<td>0.29</td>
<td>1</td>
</tr>
</tbody>
</table>

Table III. Ranking of mean importance by service dimensions

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>McDonald’s</th>
<th>Burger King</th>
<th>Harvey’s</th>
<th>Mean QGap, ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tangibles</td>
<td>0.31</td>
<td>0.23</td>
<td>0.46</td>
<td>-0.15</td>
</tr>
<tr>
<td></td>
<td>(2)</td>
<td>(3)</td>
<td>(1)</td>
<td>SD = 0.58</td>
</tr>
<tr>
<td>Reliability</td>
<td>0.15</td>
<td>0.26</td>
<td>0.59</td>
<td>-0.44</td>
</tr>
<tr>
<td></td>
<td>(3)</td>
<td>(2)</td>
<td>(1)</td>
<td>SD = 0.35</td>
</tr>
<tr>
<td>Responsiveness</td>
<td>0.25</td>
<td>0.27</td>
<td>0.48</td>
<td>-0.22</td>
</tr>
<tr>
<td></td>
<td>(3)</td>
<td>(2)</td>
<td>(1)</td>
<td>SD = 0.50</td>
</tr>
<tr>
<td>Assurance</td>
<td>0.17</td>
<td>0.24</td>
<td>0.60</td>
<td>-0.43</td>
</tr>
<tr>
<td></td>
<td>(3)</td>
<td>(2)</td>
<td>(1)</td>
<td>SD = 0.32</td>
</tr>
<tr>
<td>Empathy</td>
<td>0.39</td>
<td>0.37</td>
<td>0.24</td>
<td>0.14</td>
</tr>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>SD = 0.45</td>
</tr>
</tbody>
</table>

Mean overall satisfaction scores

| Ranking based on overall satisfaction scores | 3 | 2 | 1 |

Table IV. Mean overall satisfaction scores and gap scores

Note: Sample size is 62; the number in parentheses denotes the ranking of restaurants by dimension; SD = standard deviation
respect to its competitors. Having established Harvey’s as the market leader, the mean \(Q_{\text{Gap}_i}\) for McDonald’s was calculated for each dimension. Four out of the five dimensions had negative \(Q_{\text{Gap}_i}\) values. This implies that McDonald’s under-performs in the dimensions of “tangibles”, “reliability”, “responsiveness”, and “assurance” when compared with Harvey’s. To develop a strategy of service improvement, it is necessary to prioritize these services. The largest \(Q_{\text{Gap}_i}\) negative value implies that a large satisfaction discrepancy exists between the focal firm and the market leader. McDonald’s “reliability” dimension ranked first in this respect – which implies that it needs to improve its ability to perform its services dependably and accurately. “Assurance” ranked second on the “gap” (only slightly below “reliability”) – and this should therefore be the second priority. McDonald’s should then focus on “responsiveness”, followed by “tangibles”. The customers rated McDonald’s highly on the “empathy” dimension relative to Harvey’s and Burger King.

Managerial implications and recommendations
Many restaurants utilize “customer feedback” cards to obtain information on customer perceptions of the quality of service. Such cards typically pose questions about the various dimensions of customer service – including questions on the knowledge of the server, the timeliness of the service, and the physical appearance of the restaurant. It is important to note that such customer-satisfaction surveys seek feedback only from customers who attend the restaurant responsible for the survey; and the surveys ask questions only about the service at that particular restaurant. Whether these respondents are (or have been) customers of competitors is ignored, and their opinions on competitors are also ignored. Data collected from such survey methods are clearly insufficient for devising an adequate competitive strategy. The approach presented in this paper addresses this issue. When applied correctly, the comparative knowledge that can be obtained from the methods described in this study can drastically improve important business outcomes.

Adapting the AHP methodology in the manner proposed in this paper allows managers to prioritize service dimensions and to compute a gap analysis in a way that provides a competitive perspective in managing service quality. Applying this approach, managers are able to address the following questions:

• What is the firm’s competitive position, and how does the firm’s overall performance compare with its competitors?

• Which service dimensions can be improved to enhance competitiveness?

• Constrained by limited resources, which service dimensions should be given top priority?

The framework proposed here allows management to address two main issues pertaining to its competitive advantage:

(1) establishing its performance ranking in the marketplace; and

(2) identifying the service elements that most require improvement.

In particular, the satisfaction disparity indicates which dimension the firm should concentrate on to enhance its competitive position.

Creating a competitive advantage does give a firm an edge over its competitors. However, customers have many alternatives, and a competitive advantage might not necessarily be sustained. Even if customers are satisfied with the services of a given
firm at the present time, they might find that they are even more satisfied with a competitors’ improved services. All strategies that strive for a competitive advantage must be constantly market-driven and market-aware. This can be achieved only if the opinions of customers about competitors are known. The AHP-SQ approach described in the present study thus assists management to devise and maintain a relevant, competitive plan for ongoing improvements in service quality. It offers a “bigger picture” in service-quality ongoing improvements.

Limitations and research directions
Although the customers in the present study had visited all three “fast-food” restaurants during the preceding four months, a limitation of the present study is that it did not investigate switching behavior among the respondents. Future research could address this question.

A further limitation in the present approach is that it does not provide guidance on action to be taken. Although it identifies which service dimensions require improvement, the present framework does not provide guidance on an appropriate action plan to address deficiencies. Future studies could extend the framework in this respect.

A third limitation is that the framework adopted only the SERVQUAL service dimensions. Future studies could consider incorporating other dimensions in extending the framework proposed here.

With respect to generalizability, although the model was applied in the present study to “fast-food” restaurants, the authors believe that it could be used by a variety of service industries to evaluate service performance against that of competitors.

References


**Further reading**


