MEASURING BANKS SERVICE QUALITY FROM CUSTOMER’S PERSPECTIVE: USING FUZZY IPA APPLICATION

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Abstract

The paper proposes a contemporary fuzzy decision making approach for evaluating customer satisfaction level in Indian banks over importance performance analysis approach. Most of the service quality measures are stated using lingual expressions by using five point or seven point Likert scale. Hence, evaluation of perceptions and expectations of customers regarding service quality using non-fuzzy methods ignores the ambiguity involved in individual judgments. The paper attempts to eliminate the ambiguity by replacing a conventional importance performance analysis (IPA) approach with Fuzzy IPA approach. The study deals with the concept of fuzziness in individual’s perception. The relative importance of attributes is specified by consolidating logarithmic expressions and partial correlation analysis. Therefore, fuzzy set theory is applied to conventional IPA. Finally, Fuzzy IPA is suggested and implemented in an Indian bank case study. The suggested model can help bank managers in ascertaining crucial service attributes to improve service quality.

Keywords: Fuzzy logic, service quality, customer performance.

1. Introduction

The service quality of banking services and customer satisfaction can be studied from various perspectives and it may be evaluated by using several techniques. The term customer satisfaction can be stated as an approach in which a bank meets the customer’s expectations according to the model of the ideal bank from customer’s point of view (Beerli, Marti & Quintana, 2004). The banks are increasingly focusing upon customer satisfaction as the cost of attracting a new customer is much higher than retaining the existing ones. (Krishnan, Ramaswamy, Meyer, & Damien, 1999). Blocker, 2012 noted that customers who are highly satisfied stays loyal longer and are less likely to switch to another bank. Customers not only expect good services and

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safety of financial transactions but also expect that the bank selected is the best 
manager of their money.

The long waiting in lines, mistakes in banking transactions due to service personnel 
error has the highest effect on the quality of banking services (Mattos 1999). There 
are certain factors that impact over the banking environment such as technology, 
infrastructure and regulation all over the globe (Eneizan & Wahab, 2016; Eneizan et 
al, 2016c). Emerging technologies and growing competition, have crucial impact on 
the relationship between banks and clients. (Patsiotis, Hughes, & Webber, 2012). 
Recently banks are providing quality services by adopting modern technology and 
this rapid improvement in technology has allowed the entire banking sector to 
increase the customer satisfaction to the great extent (Raza et al., 2015) [36]. Mualla, 
2011; Paradi, Rouatt, & Zhu, 2011 noted that there are several studies conducted on 
the evaluation of service quality in banking sector and customer satisfaction. The 
models for evaluating the level of customers’ satisfaction depend on the relationship 
with customers in the particular bank as proposed by Virk & Mahal, (2012). Another 
preferred model for the assessment of service quality is Importance Performance 
Analysis (IPA) model which is based on several presumptions like Importance and 
performance attributes are independent variables. Another supposition is that the 
association between attribute performance and overall performance is linear and 
symmetrical.

Such presumptions are inaccurate as the association between attribute performance 
and overall performance is unsymmetrical (Matzler et al,2003). Delighting customers 
is different satisfying customers (Berman 2005). Delighting a customer requires that 
service performance delivered to the customer exceeds their expectations. Matzler and 
Sauerwein (2002) noted that attributes that lead to customer satisfaction can be 
studied via various factors viz. basic, performance and excitement factors. The effect 
of satisfaction attribute performance on OCS varies according to category. Therefore, 
advocates of IPA should consider triple factor theory to identify features that can 
result in satisfaction of customers and their subsequent loyalty.

Human Perceptions are uncertain and fuzzy in nature. The estimation of service 
quality based on traditional approach of using Likert scale is absurd. Customer 
perceptions are subjective as well as inexplicit. Further differences in individual 
perceptions means the same word may result in different interpretations. (Chiou et. al. 
2005). So Fuzzy number is more accurate than crisp number to denote the 
individual’s perception. The present paper suggests a novel Fuzzy IPA approach that 
includes fuzzy approach, partial correlation and logarithmic values. The suggested
model can be of great help to bank managers in improving service quality in banks by ascertaining crucial service attributes.

2. Literature Review:

Importance Performance Analysis (IPA): IPA first used by Martilla and James (1977) is a simple graphical tool technique used to evaluate strategy and make allocation recommendations for future (e.g. O Neill et. al. 2001; Skoketal., 2001). IPA is a popular tool to enhance customer satisfaction of an organization by focusing on specific service attributes. The data from surveys along with importance attributes are used to create a two dimensional grid. In this the mean importance and performance results can be graphically shown on a two dimensional grid. Attribute importance is measured using some form of self-stated importance e.g. rating scales or by implicitly derived importance e.g. partial correlation. The importance means and performance means are used to split the grid into four zones (Figure 1).

![Figure 1: Traditional Importance Performance matrix](image-url)
Based on this major strengths and major weaknesses can be identified and accordingly they are targeted for either immediate improvement or consistently maintain. Some studies have suggested that service attributes can be measured via factors like basic, performance and excitement factors (Oliver, 1997; Matzler, 2004). Basic factors are lowest level requirements that result in discontentment when not fulfilled, but when fulfilled do not necessarily cause satisfaction. Excitement factors increase customer satisfaction when delivered, but do not result in dissatisfaction when not delivered. On the other hand, when service performance is high performance factors cause satisfaction and when performance is low performance factors cause dissatisfaction. Therefore, service attributes have following two features in triple factor theory:

i. Importance of a basic or excitement factor is a matter of its high or low performance. Basic factors are crucial during low performance and are irrelevant during high performance. Similarly, when performance is high excitement factors are essential and when performance is low excitement factors are irrelevant (Matzler et al 2004a).

ii. The association between attribute performance and OCS is symmetrical. Therefore, the conventional IPA model that uses customers self-stated importance requires modification.

**Fuzzy set theory:** Fuzzy set theory was developed to deal with problems involving uncertainty. Zadeh defined fuzzy sets as, "sets with boundaries that are not precise. The membership in a fuzzy set is a matter of degree rather a matter of consent or denial. By converting linguistic strategies into control actions, fuzzy logic ensures high-level of computation (Sivanandam, Sumathi, & Deepa, 2007. Fuzzy set theory has been used in various research problems involving uncertainty.

**Proposed algorithm using Fuzzy Importance Performance approach (FIPA):** This approach comprises of following steps:

i. First step involves measuring customer perception for attribute performance and Overall customer perception for services. The instrument used is based on five point likert scale. The first part of the questionnaire deals with the range of each linguistic term based on respondent’s own assessment.

ii. Assigning an average triangular fuzzy number (TFN) to customer perception of attribute performance and overall customer perception.

iii. This step involves transforming above calculated fuzzy numbers into crisp numbers by performing defuzzification.
iv. Calculating the attribute’s importance through logarithmic expressions and partial correlation.
v. Develop a Fuzzy IPA matrix divide it into four quadrants by using mean of derived importance for attributes and the mean of all performance attributes.
vi. Plot all attributes mean on the Fuzzy IPA grid: The proposed FIPA approach presents a novel approach to study the extent of fuzziness in customer perception. Particularly service attributes in “Concentrate here” Quadrant can be improved for better satisfaction of customers.

3. Objective

The paper proposes a contemporary fuzzy decision making approach over importance performance analysis approach for evaluating customer satisfaction level in Indian bank.

4. Research Methodology

The novel fuzzy evaluation framework: using FIPA: As mentioned earlier the devised framework combines fuzzy theory, partial correlation analysis logarithmic observations. In sections below such modules are discussed in detail.

4.1 Modelling of values to indicate the perception of respondents:

The measurement of service equality in surveys is mostly based on linguistic terms. But individual perceptions differ considerably even when the same term is used (Chiou et al. 2006). The research paper used a triangular fuzzy number (TFN) to represent linguistic term of individual’s perception of bank’s service quality. The linguistic term chosen to indicate individual’s perceptions towards services were from highly satisfied (5) to highly dissatisfied (1). In the first part of the research instrument customers specified about the range of each term based on their own assessment. Finally, the authors calculated the average TFNs for all respondents by aggregating individual’s opinion regarding specific linguistic terms. The TFNs of each respondent was used for indicating customer perceptions. The integration formula is as follows.

\[ \tilde{A}_{l \text{avg}} = \frac{\sum_{i=1}^{n} A_{l}^{i}}{n} = \left( \frac{\sum_{i=1}^{n} a_{l1}^{(i)} \sum_{i=1}^{n} a_{l2}^{(i)} \sum_{i=1}^{n} a_{l3}^{(i)}}{n} \right), \quad i=1,2..., n; \quad l=12345. \]
Where $A^i_r$ is the TFN of $l^{th}$ linguistic term under $i^{th}$ respondent; $a^i_{r1}, a^i_{r2}$ and $a^i_{r3}$ represent the lower, the middle and the upper values of linguistic term. $n$ is the no of respondents and $l$ is the no of attributes.

4.2 Defuzzification of individual customer’s perceptions: After assigning TFNs to customer’s perceptions the necessary defuzzification is performed which is explained below.

Defuzzification of respondent perceptions:

Average $r^{th}$ attribute performance:

$$A_{r_{avg}} = \frac{\sum_{i=1}^{n} A^i_r}{n} = \left( \frac{\sum_{i=1}^{n} a^i_{r1} \sum_{i=1}^{n} a^i_{r2} \sum_{i=1}^{n} a^i_{r3}}{n} \right) i=1,2,…n; r=1,2,…m$$

Where $A^i_r$ is the TFN of $r^{th}$ linguistic term under $i^{th}$ respondent; $a^i_{r1}, a^i_{r2}$ and $a^i_{r3}$ represent the three different values of linguistic term $n$ is the no of respondents and $m$ is the no of attributes.

Average OCP:

$$\bar{O}_{avg} = \frac{\sum_{i=1}^{n} O^i}{n} = \left( \frac{\sum_{i=1}^{n} O^i_1 \sum_{i=1}^{n} O^i_2 \sum_{i=1}^{n} O^i_3}{n} \right) i=1,2,…n; r=1,2,…m$$

Where $O^i$ is the TFNs of OCP under $i^{th}$ customer’s perception. $O^i_1, O^i_2, O^i_3$ represent the lower, middle and the upper values of the support of $O^i$ respectively; where $n$ is the no of respondents.

Fuzzy number (TFNs) and its defuzzification.

The paper compares the performance of triangular fuzzy number (TFN s) using the following formula.

$$P_{\tilde{A}} = \frac{(a_{1}+2a_{2}+a_{3})}{4}$$

Where $P_{\tilde{A}}$ is the crisp number of $\tilde{A}$ TFN $(a_{1},a_{2},a_{3})$

This method is chosen due to its simplicity. Crisp numbers obtained are used to calculate the importance of service attributes.
4.3 Calculating the importance of attributes

The proposed approach combines following steps:
Transform attribute performance into a logarithmic value:

\[ \text{Avg. Perf }_{ir} = \log(\text{Avg Perf }_{ir}) \text{ where } i = 1, 2, \ldots, n; r = 1, 2, \ldots, m \]

Where Avg Perf \(_{ir}\) is the crisp number of attribute performance on \(r^{\text{th}}\) attribute under \(i^{\text{th}}\) individual; \(n\) represents no. of respondents; \(m\) shows no of attributes.

i. Logarithmic values (\(\log(\text{Avg Perf }_{ir})\)) and Overall Customer Perception (OCP) the crisp number obtained after defuzzification of OCP are included in multivariate correlation model as \(m+1\) variables. Each variable has total \(n\) data.

ii. Perform partial correlation of each \(\log(\text{Avg Perf }_{ir})\) with OCP. The correlation values between OCP and \(\log(\text{Avg Perf }_{ir})\) is the implicitly derived importance of \(r^{\text{th}}\) attribute.

The partial correlation analysis used eliminates problem of a symmetrical relationship between attribute performance and overall customer perception. The logarithmic expressions of attributes performance used in this method also captures more sensitivity for correlation model variables. (Anderson and Sullivan 1993)

5. Analysis

*Instrument and its validity and reliability:* The data for measuring bank’s service quality was collected using questionnaires. Items for questionnaires were extracted from literature and customized by expert opinions. The questionnaire has four parts. The first part was based on the range of each linguistic term. The next two parts deals with service attribute performance and overall customer perception. The last part was based on respondent’s demographic information. In this paper, authors used five linguistic expressions which are modelled by TFNs and are given in the following way.

Highly Dissatisfied – \(\sim S1 = (x; 0, 2.581, 22.564)\)
Dissatisfied – \( \tilde{S}_2 = (x; 6.5556, 25.0994, 44.786) \)
Fair – \( \tilde{S}_3 = (x; 24.6984, 47.29, 67.72) \)
Satisfied – \( \tilde{S}_4 = (x; 54.606, 74.286, 91.785) \).
Highly Satisfied – \( \tilde{S}_4 = (x; 74.7666, 92.286, 100) \).

A total of 180 useable responses were collected for analysis. Since most of the statements were extracted from scientific sources so their face validity is verified. Exploratory Factor analysis was performed after assigning crisp numbers to attribute performance in order to verify the construct validity in Indian context. Exploratory factor analysis (EFA) was performed. Principal component analysis using Oblimin rotation with Kaiser normalization to reduce cross loadings was employed and only loadings of 0.5 or greater were considered. All items showed factor loadings > 0.51  
The factors had eigen value >1 explaining 68.11 per cent of the variance. Most items showed heavy loadings on extracted factors but items which cross loaded were removed, leading to a reduction in the number of items to twenty-three. The rotated factor matrix resulted in extraction of six factors namely (PSB, ECB, AAEB, ETSB, CC and Accuracy).

The reliability of the instrument was verified using Cronbach’s \( \alpha \). The Cronbach’s \( \alpha \) scale was found to be reliable with the reliability coefficient of 0.769. Cronbach’s \( \alpha \) for all factors ranged from .61 to .79 showing that the scales have good reliability. The KMO measure of sampling adequacy for the items was 0.725 indicating sufficient inter-correlations of the Bartlett’s test of sphericity which was found to be significant (p<.0005). Thus the sample size of 180 was sufficient and satisfactory for this study.

Table 1: shows the results of reliability analysis for all constructs and verifies instrument reliability. The rotated factor matrix resulted in extraction of six underlying factors.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Rotated factor score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personalized and Secure banking (PSB)</strong>:</td>
<td></td>
</tr>
<tr>
<td>Interacts with customers in local language</td>
<td>.723</td>
</tr>
<tr>
<td>Acknowledge me by name</td>
<td>.718</td>
</tr>
<tr>
<td>Provide secure services</td>
<td>.639</td>
</tr>
<tr>
<td>Provides financial security and confidentiality</td>
<td>.578</td>
</tr>
<tr>
<td>Is Personalized</td>
<td>.562</td>
</tr>
</tbody>
</table>
Eigen value = 4.16; Variance explained (%) = 21.76; $\alpha = 0.791$

**Easy and Convenient banking (ECB)**
- Adequate parking space .705
- All banking needs included in menu .697
- Easy to use .653
- Have been working for 24 hours a day (24x7x365) .587
- Have user friendly graphic screens with easy to follow Instructions. .526
Eigen value = 3.37; Variance explained (%) = 13.62; $\alpha = 0.779$

**Accurate ATM and Electronic banking (AAEB)**
- ATM facilities on par with other banks .772
- Satisfy complaint within 24 hours .724
- My ATM is in proximity .610
- Well maintained ATM premises. .585
Eigen value = 2.94; Variance explained (%) = 10.65; $\alpha = 0.650$

**Excellent Telephone and Service banking (ETSB)**
- Telephone banking connects immediately .623
- Provides information about other services .553
- Have adequate menu options for everyday banking .507
- Error free transactions .501
Eigen value = 1.78; Variance explained (%) = 8.43; $\alpha = 0.691$

**Competitive charges (CC)**
- Adequately explains service charges .585
- Charges competitive fees. .533
- Clearly shows service charges .507
Eigen value = 1.53; Variance explained (%) = 7.12; $\alpha = 0.624$

**Accuracy (A)**
- Accurate record of all transactions. .757
- Process transactions immediately. .628
Eigen value = 1.24; Variance explained (%) = 6.53; $\alpha = 0.612$
Table 2: shows the bank’s performance in both TFNs and crisp number. The importance and performance values of each attribute of bank are also shown in Table 2. In the last part of the table the mean OCP and mean crisp numbers are shown. The derived importance of service attributes is calculated by using the defuzzification crisp numbers and overall customer perception and performing partial correlation and is listed in Table 3.

Table 2: Bank’s performance in both TFNs and crisp number

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Bank’s Performance In (TFN s)</th>
<th>Bank’s Performance (in crisp numbers)</th>
<th>Bank’s Importance (in lingual scale )</th>
<th>Bank’s Performance (in lingual scale )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Service delivery technologies</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>An ideal electronic banking service should</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Be easy to use</td>
<td>48.89, 74.44, 83.33</td>
<td>70.42</td>
<td>4.55</td>
<td>4.17</td>
</tr>
<tr>
<td>Have been working for 24 hours a day. (24x7x365)</td>
<td>47.79, 69.10, 63.27</td>
<td>67.31</td>
<td>4.20</td>
<td>3.85</td>
</tr>
<tr>
<td>Provide accurate record of all transactions that have taken place.</td>
<td>49.95, 75.27, 85.27</td>
<td>71.44</td>
<td>4.34</td>
<td>4.31</td>
</tr>
<tr>
<td>Be personalized</td>
<td>45.43, 65.73, 82.98</td>
<td>64.97</td>
<td>3.72</td>
<td>3.69</td>
</tr>
<tr>
<td>Process transactions immediately</td>
<td>46.37, 71.10, 82.28</td>
<td>67.71</td>
<td>4.40</td>
<td>3.91</td>
</tr>
<tr>
<td>Adequately explains service charges</td>
<td>40.18, 60.27, 73.94</td>
<td>58.66</td>
<td>4.12</td>
<td>3.35</td>
</tr>
<tr>
<td>Charge competitive fees</td>
<td>40.22, 62.12, 76.24</td>
<td>62.31</td>
<td>3.41</td>
<td>3.46</td>
</tr>
<tr>
<td>Clearly show the service charge on statement when a transaction is</td>
<td>40.54, 60.39, 77.92</td>
<td>59.12</td>
<td>4.24</td>
<td>3.50</td>
</tr>
<tr>
<td>Criteria</td>
<td>Bank’s Performance In (TFN s)</td>
<td>Bank’s Performance (in crisp numbers)</td>
<td>Bank’s Importance (in lingual scale)</td>
<td>Bank’s Performance (in lingual scale)</td>
</tr>
<tr>
<td>----------------------------------------------</td>
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<td>--------------------------------------</td>
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</tr>
<tr>
<td>conducted</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfy complaint within 24 hours</td>
<td>40.10, 58.27, 70.18</td>
<td>60.17</td>
<td>4.98</td>
<td>3.28</td>
</tr>
<tr>
<td>Provide secure services</td>
<td>41.75, 64.25, 77.61</td>
<td>61.96</td>
<td>4.30</td>
<td>3.42</td>
</tr>
<tr>
<td>ATM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>An ideal electronic banking service should</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have its ATM in close proximity</td>
<td>46.44, 66.56, 83.54</td>
<td>65.77</td>
<td>4.59</td>
<td>3.68</td>
</tr>
<tr>
<td>Have sufficient parking space</td>
<td>40.10, 58.27, 70.18</td>
<td>56.70</td>
<td>4.03</td>
<td>3.18</td>
</tr>
<tr>
<td>Have all banking needs included in menu.</td>
<td>46.24, 68.28, 83.95</td>
<td>66.68</td>
<td>4.56</td>
<td>3.77</td>
</tr>
<tr>
<td>Have well maintained ATM premises (writing material, deposits etc.) are easily available.</td>
<td>40.54, 60.39, 77.92</td>
<td>59.81</td>
<td>4.18</td>
<td>3.53</td>
</tr>
<tr>
<td>Acknowledge customers by name</td>
<td>41.64, 61.49, 78.92</td>
<td>60.88</td>
<td>3.68</td>
<td>3.59</td>
</tr>
<tr>
<td>Have user friendly graphic screens with</td>
<td>48.27, 74.47, 84.27</td>
<td>70.37</td>
<td>4.37</td>
<td>4.18</td>
</tr>
</tbody>
</table>
## Bank’s Performance

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Bank’s Performance In (TFN s)</th>
<th>Bank’s Performance (in crisp numbers)</th>
<th>Bank’s Importance (in lingual scale)</th>
<th>Bank’s Performance (in lingual scale)</th>
</tr>
</thead>
<tbody>
<tr>
<td>easy to follow instructions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interact with customer in local language.</td>
<td>49.94, 69.78, 85.35</td>
<td>68.71</td>
<td>3.96</td>
<td>3.97</td>
</tr>
<tr>
<td>Should have Facilities on par with facilities offered by other banks</td>
<td>48.17, 69.19, 79.15</td>
<td>66.42</td>
<td>4.45</td>
<td>3.89</td>
</tr>
</tbody>
</table>

### Telephone Banking

<table>
<thead>
<tr>
<th>An ideal telephone banking</th>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Connect customers immediately to the service with no waiting time.</td>
<td>40.27, 58.21, 70.15</td>
<td>56.71</td>
<td>4.41</td>
<td>3.15</td>
</tr>
<tr>
<td>Have adequate menu options for everyday banking</td>
<td>41.24, 64.18, 70.45</td>
<td>62.36</td>
<td>4.16</td>
<td>3.66</td>
</tr>
<tr>
<td>Provide information about other services while waiting in queue</td>
<td>41.24, 61.59, 77.15</td>
<td>60.39</td>
<td>3.84</td>
<td>3.55</td>
</tr>
</tbody>
</table>

### Internet banking

<table>
<thead>
<tr>
<th>Have error free transactions</th>
<th>48.25, 73.66, 82.33</th>
<th>69.47</th>
<th>4.52</th>
<th>4.08</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide Financial security and confidentiality</td>
<td>47.17, 72.25, 84.26</td>
<td>68.98</td>
<td>4.51</td>
<td>3.92</td>
</tr>
<tr>
<td>Criteria</td>
<td>Bank’s Performance In (TFNs)</td>
<td>Bank’s Performance (in crisp numbers)</td>
<td>Bank’s Importance (in lingual scale)</td>
<td>Bank’s Performance (in lingual scale)</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------------------------------</td>
<td>--------------------------------------</td>
<td>-------------------------------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>Average OCP(In TFNs )</td>
<td>(46.59,67.47,79.79)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average (crisp number)</td>
<td>65.33</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Importance of service attributes

<table>
<thead>
<tr>
<th>S. No</th>
<th>Service attribute</th>
<th>Implicitly derived Importance</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Overall Service delivery technologies</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Be easy to use</td>
<td>0.100</td>
<td>13</td>
</tr>
<tr>
<td>2</td>
<td>Have been working for 24 hours a day. (24x7x365)</td>
<td>0.124</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>Provide accurate record of all transactions that have taken place.</td>
<td>0.140</td>
<td>11</td>
</tr>
<tr>
<td>4</td>
<td>Be personalized</td>
<td>0.150</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>Process transactions immediately</td>
<td>0.101</td>
<td>14</td>
</tr>
<tr>
<td>6</td>
<td>Adequately explains service charges</td>
<td>0.248</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>Charge competitive fees</td>
<td>0.186</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>Clearly show the service charge on statement when a transaction is conducted</td>
<td>0.133</td>
<td>9</td>
</tr>
<tr>
<td>9</td>
<td>Satisfy complaint within 24 hours</td>
<td>0.134</td>
<td>8</td>
</tr>
<tr>
<td>10</td>
<td>Provide secure services</td>
<td>0.249</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><strong>ATM</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Have its ATM in close proximity</td>
<td>0.241</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>Have sufficient parking space</td>
<td>0.215</td>
<td>5</td>
</tr>
<tr>
<td>13</td>
<td>Have all banking needs included in menu.</td>
<td>0.107</td>
<td>12</td>
</tr>
<tr>
<td>14</td>
<td>Have well maintained ATM premises (writing material, deposits etc.) are easily available.</td>
<td>0.073</td>
<td>17</td>
</tr>
<tr>
<td>15</td>
<td>Acknowledge customers by name</td>
<td>0.052</td>
<td>18</td>
</tr>
<tr>
<td>16</td>
<td>Have user friendly graphic screens with</td>
<td>0.001</td>
<td>23</td>
</tr>
<tr>
<td>S. No</td>
<td>Service attribute</td>
<td>Implicitly derived Importance</td>
<td>Ranking</td>
</tr>
<tr>
<td>-------</td>
<td>-----------------------------------------------------------------------------------</td>
<td>--------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td></td>
<td>easy to follow instructions.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Interact with customer in local language.</td>
<td>0.044</td>
<td>19</td>
</tr>
<tr>
<td>18</td>
<td>Should have Facilities on par with facilities offered by other banks</td>
<td>0.035</td>
<td>20</td>
</tr>
<tr>
<td><strong>Telephone Banking</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>An ideal telephone banking should</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Connect customers immediately to the service with no waiting time.</td>
<td>0.009</td>
<td>22</td>
</tr>
<tr>
<td>21</td>
<td>Have adequate menu options for everyday banking</td>
<td>0.087</td>
<td>15</td>
</tr>
<tr>
<td>22</td>
<td>Provide information about other services while waiting in queue</td>
<td>0.077</td>
<td>16</td>
</tr>
<tr>
<td><strong>Internet Banking</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Have error free transactions</td>
<td>0.033</td>
<td>21</td>
</tr>
<tr>
<td>24</td>
<td>Provide Financial security and confidentiality</td>
<td>0.229</td>
<td>3</td>
</tr>
</tbody>
</table>

Subsequently IPA matrix was designed using importance and performance values of attributes. Further importance and performance means were used to split the IPA grid. Figure 2 Shows the conventional IPA matrix and all attributes were plotted using importance and performance attributes.

Figure 2: The importance performance grid
The factors extracted are plotted in the grid.

Figure 3: Fuzzy Importance Performance Analysis grid.
To build Fuzzy IPA matrix, mean derived importance of attribute and attributes performance were used to split the two axes of the grid. Based on conventional IPA model, bank managers should focus on two factors viz. (Personalized and secure banking) and (Excellent Telephone and Service banking) as these two factors and their underlying attributes lie in the ‘concentrate here’ quadrant. These are the areas that banks need to work on to improve the level of service they perform. However Fuzzy IPA model highlights customer attribute (Accurate ATM & Electronic banking...
and competitive charges must be prioritized to achieve competitive advantage. In addition to this personalized and secure banking has moved to “keep up the good work” quadrant. Hence, the assessment result of service attributes which are critical for bank’s performance is different for both the models. Subsequently managers can develop an effective action plan to improve service quality of each attribute.

6. Conclusion

The triple factor theory shows presence of a non-linear relationship between importance and performance attributes. Although, it raises doubts regarding relevancy of IPA and its implications. Practitioners must be cautious as changes to attribute importance and performance are associated with each other (Matzer et al 2003). In competitive environment mangers must work with limited resources. The present study developed a contemporary Fuzzy IPA approach. The importance of attributes is derived through logarithmic values and partial correlation. Furthermore, the Fuzzy IPA approach eliminates the need for measuring the importance mean thereby saving workload of 50 % in questionnaire survey. This will enable respondents to mark responses more effectively by saving time. Also it will eliminate the duplication of efforts in analyzing data thereby enhancing efficiency of analysts. Subsequently bank managers can ascertain service attributes of essential importance and instead of focusing on all attributes can develop an action plan for essential attributes via Fuzzy IPA to improve service quality and customer satisfaction.

References


