

Research Article

Evaluating and Ranking Businesses' Branches, Based on Clients' Perception, a Study in Insurance Industry

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Abstract: Both financial and non financial information is needed for decision making by many businesses. Accurate ranks of business branches, is very important information for management and many outsiders as owners, potential investors, labor union, government agencies, bankers, other creditors and the public, because all these groups have some interest in the business that will be served by information about its position and ranks. MCDM method is useful to rank businesses' branches and 3-stage procedure (S.E.T) can be used to rank service organizations such as insurance firms, travel agencies and banking. The present study aims to evaluate and rank a business' branches based on the clients' perception of their shopping experience. For this purpose, a sample of 270 clients who has had the experience of shopping from XYZ insurance firm in Shiraz-Iran was used in order to collect data and 240 questionnaires were returned and used in this study. So service quality based on the clients' perception by SERVPERF was evaluated, then for calculating the criteria weights Entropy method was applied and finally, Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) used to achieve the final ranking results. Branches final ranks are: C, A, B. full results of ranking branches are shown in Table 7 and 8.

Keywords: Entropy, insurance, MCDM, SERVPERF, TOPSIS

INTRODUCTION

Many businesses, compile financial and nonfinancial information needed for decision making. This information is used by the entire business and by outsiders as well. Accurate ranks of business branches, is very important information for management and many outsiders. These outsiders include owners, potential investors, labor union, government agencies, bankers, other creditors and the public, because all these groups have supplied money to the business or have some other interest in the business that will be served by information about its position and ranks. Operation research is a collection of quantitative (mathematical) technique, help managers make optimal decisions. Decision making for solving problems is very important in management. A group of these problems is Multi Criteria Decision Making (MCDM). MCDM decision making models were introduced in early 1970s. These models include Multi Objective Decision Making (MODM) and Multi Attribute Decision Making (MADM) (Hwang and Yoon, 1998). In many real situations and problems, decision makers have more than one objective. MODM model, unlike linear programming with single objective, considers

several objectives and their priority has been predetermined (Triantaphyllou *et al.*, 1998). Moreover to alternatives, there are some criteria that must be defined in problems. Service quality helps companies to differentiate themselves from other organizations and gain competitive advantage. The studies have shown that the good service quality leads to the preservation of the existing customers and the attraction of new ones, enhances the company image and enhances customer satisfaction (Cronin and Taylor, 1992; Vazifedost and Taghipouryan, 2011). Managers are interested in customer satisfaction since it is a strong predictor of customer loyalty (Tuu and Olsen, 2009; Kue-Chien *et al.*, 2010; Heidarzadeh and Rahpeima, 2012).

On the other hand, service quality is related to positive word-of-mouth advertisement (Caruana, 2002; Heidarzadeh and Rahpeima, 2012), reduces costs (Crosby, 1979; Heidarzadeh and Rahpeima, 2012) and finally enhances profitability (Santos, 2003; Heidarzadeh and Rahpeima, 2012). Furthermore, service quality level affects the individuals' post-purchase behaviors and their future decisions (Jabnoun and Al-Tamimi, 2003; Heidarzadeh and Rahpeima, 2012). High service quality is necessary for the establishment of a strong relationship with

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Table 1: Some models for measuring service quality (Vazifedost and Taghipouryan, 2011)

Author	Model	Main characteristics	Application
Gronroos (1984)	There is no mathematical representation	Quality is a function of expectations, outcome and image	Different types of services
Parasuraman <i>et al.</i> (1985, 1988)	SERVQUAL $Q_i = P_i - E_i$	22-item scale using 5 quality dimensions	Different types of services
Brown and Swartz (1989)	$Q_i = E_i - D_i$	Use 10 quality dimension defined by Parasuraman <i>et al.</i> (1985)	Medical surgery
Bolton and Drew (1991)	Assessment model of service and value. There are many equations representing the model	Use four dimensions developed by Parasuraman <i>et al.</i> (1988) and introduce the concept of value for quality assessment	Telephone services
Cronin and Taylor (1992)	SERVPERF $Q_i = P_i$	Use 5 quality dimensions defined by Parasuraman <i>et al.</i> (1988)	Different types of services
Teas (1993)	Model of ideal performance $Q_i = -[\sum_{i=1}^m w_i P_i - I_i]$	Use 5 quality dimensions defined by Parasuraman <i>et al.</i> (1988)	Retail stores
Zeithaml <i>et al.</i> (2002)	e- SERVQUAL $Q_{i_e} = P_{i_e} - E_{i_e}$	5 e-Service quality dimension	Different types of electronic services
Ribbink <i>et al.</i> (2004)	e- SERVQUAL $Q_{i_e} = P_{i_e} - E_{i_e}$	4 e-service quality dimension	Online book and CD stores
Parasuraman <i>et al.</i> (2005)	e- SERVQUAL $Q_{i_e} = P_{i_e} - E_{i_e}$	5 e-service quality dimension	Online shopping sites

customers and his loyalty. So many studies conducted to defining, modeling and measuring service quality and improving it (Heidarzadeh and Rahpeima, 2012).

This study deal with ranking insurance firm branches from clients' viewpoint by using 3-stage procedure (S.T.E) in insurance industry in Iran. So at first, we evaluate service quality from viewpoint of customers by SERVPERF, then for calculating the criteria weights we applied Entropy method. Finally, we conduct Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) to achieve the final ranking results.

LITERATURE REVIEW

SERVQUAL and SERVPERF: Through the previous two decades, many studies have dealt with the various aspects of service quality (Fisk *et al.*, 1993; Newman and Cowling, 1996; Amy and Amrik, 2006; Heidarzadeh and Rahpeima, 2012). Because of the competition derived from globalization and the increase in customers' requirements and expectations, service institutions in various industries are obsessed with service quality, which has resulted in the development of research in this area. Some studies focus on some special industries such as health, tourism, insurance and banking. Excess of measurement instruments and techniques for evaluating service quality and consumer satisfaction have been developed. Table 1 shows some of these models. Parasuraman *et al.* (1988) define customer evaluation of general service quality as the distance between the customer expectations about what an institute should provide and the perceived service performance levels. In order to measure the quality of provided services by service institutes, they developed SERVQUAL instrument. SERVQUAL have five dimensions: Reliability, Responsiveness, Assurance, Empathy and Tangibles. Expectations and perceptions are measured across 5 dimensions of service quality (Parasuraman *et al.*, 1988; Alexandris *et al.*, 2008). On the other hand, service quality can be divided into two

parts: Functional Service Quality (doing works correctly) and Technical Service Quality (doing right things) (Maddern *et al.*, 2007; Vazifedost and Taghipouryan, 2011).

In spite of vast employment over years, the SERVQUAL measure has attracted criticism for developing scales without sufficient validation, the scales reliability, the length of the survey, excluding the assessment of the customer buying process, actual number of dimensions and items in the scale, overlapping of five dimensions, the problem of matching the scale to different industries, the use of gap scores, the poor predictive and convergent validity, the ambiguous definition of the "expectation" construct and unstable dimensionality (Carman, 1990; Cronin and Taylor, 1992; Peter *et al.*, 1993; Asubonteng *et al.*, 1996; Dabholkar *et al.*, 1996; Van Dyke *et al.*, 1999; Dedeke, 2003; Kim *et al.*, 2005; Arasli *et al.*, 2005; Badri *et al.*, 2005; Parasuraman *et al.*, 2005; Landrum *et al.*, 2007; Vazifedost and Taghipouryan, 2011).

On identifying these deficiencies, Cronin and Taylor (1992), leave off the expectation part in the SERVQUAL and develop the SERVPERF or performance-only instrument instead of the gap measurement approach. In this study the performance-only instrument or SERVPERF model is the questionnaire which used in the study. SERVPERF are studied and used by many researchers in different industries because of higher Validity and reliability than SERVQUAL. Cronin and Taylor (1992), Gilbert (2006), Hensley and Sulek (2007), Qin and Prybutok (2009) and Vazifedost and Taghipouryan (2011).

Entropy: Entropy is an important concept in social sciences, physics and information theory. When, elements of a decision making matrix, are determined completely, entropy can be used for appraisal of weights. The entropy idea is, the more divergence in the amounts of a criterion, the more important that criterion. Knowing of relative importance of each criterion is generally necessary in solving MCDM

problems. It is usually given as a set of normalized weights. For assessing the weight of predetermined decision making matrix in a given MCDM Problem, entropy method is used. Decision matrix contains information that entropy can be used, for assessment of that information. Entropy is an uncertainty criterion in information theory and represented by a discrete probability distribution (Soo, 2004). Entropy analysis has three measures: entropy (Ej), degree of divergence (dj) and degree of importance weight (wj). The calculation processes of entropy method are as below (Shanian and Savadogo, 2006):

- Normalization of the decision making matrix:

$$P_{ij} = \frac{r_{ij}}{\sum_{i=1}^m r_{ij}} \quad i = 1, 2, \dots, I \quad j = 1, 2, \dots, J \quad (1)$$

- Calculation of the entropy with each criterion data, the entropy of the set of normalized outcomes of the jth criterion is given by:

$$E_j = -k \sum_{i=1}^m [p_{ij} \ln(p_{ij})] \quad i = 1, 2, \dots, I \quad j = 1, 2, \dots, J \quad (2)$$

- Weights of criteria:

$$d_j = 1 - E_j$$

$$w_j = \frac{d_j}{\sum_{j=1}^n d_j} \quad \forall j \quad (3)$$

TOPSIS

TOPSIS model was introduced by Hwang and Yoon (1981). This model is one of the best models for Multi Criteria Decision Making (MCDM) and is used in many problems. TOPSIS technique is based on the ideal solution and negative ideal solution and the selected alternative must have minimum distance to ideal solution and maximum distance to negative ideal solution (Opricovic and Tzeng, 2004; Wang, 2008).

TOPSIS is used in many fields such as choosing a project (Salehi and Tavakkoli-Moghaddam, 2008), development of a new performance measurement of manufacturing system using both financial and non-financial criteria simultaneously where traditional performance based measurement systems are inadequate (Kim *et al.*, 1997); choosing a factory place (Chu, 2002; Yong, 2006), measurement of service quality by assessment of comparative approaches (Mukherjee and Nath, 2005); choosing logistic information technology (Kahraman *et al.*, 2007); Indicating performance difference between companies

on each financial ratio by inter-company comparison based on their financial ratios, where traditional ratio analysis often give contradictory results (Deng *et al.*, 2000).

The calculation processes of TOPSIS method are as below:

- **Establishment of the normalized performance matrix:** The purpose of normalizing the performance matrix is to unify the unit of matrix entries. Assume the original performance matrix is:

$$X = (X_{ij}) \quad \forall i, j \quad (4)$$

where, X_{ij} is the performance of alternative i to criterion j.

- **Creation of the weighted normalized performance matrix:** TOPSIS defines the weighted normalized performance matrix as:

$$V = (X_{ij}) \quad \forall i, j \quad (5)$$

$$V_{ij} = (X_{ij}) \quad W_j \times r_{ij}$$

where, w_j is the weight of criterion j.

- **Determination of the ideal solution and negative ideal solution:** The ideal solution is computed based on the following equations:

$$A^+ = \{(\max V_{ij} | j \in J), (\min V_{ij} | j \in J'), \quad i = 1, 2, \dots, m\}$$

$$A^- = \{(\min V_{ij} | j \in J), (\min V_{ij} | j \in J'), \quad i = 1, 2, \dots, m\} \quad (6)$$

where,

$j = \{j = 1, 2, \dots, n/j \text{ belongs to benefit criteria}\}$

$j = \{j = 1, 2, \dots, n/j \text{ belongs to cost criteria}\}$

- Calculation of the distance between idea solution and negative ideal solution for each alternative:

$$S_i^+ = \sqrt{\sum_{j=1}^n (V_{ij} - V_j^+)^2} \quad i = 1, 2, \dots, m \quad (7)$$

$$S_i^- = \sqrt{\sum_{j=1}^n (V_{ij} - V_j^-)^2} \quad i = 1, 2, \dots, m \quad (8)$$

- Calculation of the relative closeness to the ideal solution of each alternative:

$$C_i^* = \frac{S_i^-}{S_i^+ + S_i^-} \quad i = 1, 2, \dots, m \quad (9)$$

where, $0 \leq C_i^* \leq 1$ that is, an alternative i is closer to A_i^* as C_i^* approaches to 1.

Table 2: Perceived service quality of clients in branches

Item, in terms of service delivery and my experience with insurance firm XYZ	A	B	C
Ta1 Insurance firm XYZ employees appear neat and natty.	2	2	2.5
Ta2 The milieu of insurance firm XYZ is nice and pleasant.	4	4	4
Ta3 There are enough signs for clients' guidance.	3	2	2
Ta4 The branches of insurance firm XYZ are available.	2	2	2
Ta5 The forms are readable and easy to perception.	3	2	2
Tangibility	3	2	2
Rel6 Insurance firm XYZ has a service of very high quality and error-free.	2.50	2	2
Rel7 Insurance firm XYZ provides its service at the time it promise to do so.	2.50	3	3
Rel8 Insurance firm XYZ employees are responsible, trying to correct mistakes.	4	4	4
Rel9 Insurance firm XYZ employees have enough capability to solve problems.	2.50	2	3
Reliability	2.50	2.5	3
Res10 The employees have adaptable reception with clients at the busy times.	2	2	2
Res11 The employees give necessary information about former and new services.	3	4	4
Res12 The employees guide and give suggestion to clients based on their needs.	4	4	4
Res13 Communication between clients and branches managers is easy.	3	2	2
Res14 The employees answer the clients as fast as possible.	3	4	4
Responsiveness	3.75	4	4
As15 The employees are trustee, honest and confidential every time.	3	4	3.5
As16 The employees give clear and understandable answers.	2	2.5	2
As17 The employees have technical knowledge to answer your question.	2	2	2
Assurance	2.50	3	2.5
Em18 Insurance firm XYZ has employees who give you personal attention.	4	4	4
Em19 The employees perceive your specific needs.	5	4.5	4
Em20 The employees perform the service at suitable time and place.	4	5	5
Em21 Insurance firm XYZ has opening hours convenient to all its clients.	4	4.5	5
Em22 Insurance firm XYZ has your best interests at heart.	5	5	5
Empathy	4	4.5	5

- **Ranking of the preference order:** A set of alternatives can be preference ranked according to the descending order of C_i^* .

METHODOLOGY

The test sample of the study consists of the individuals who used xyz insurance firm services. For this purpose, the clients of three branches of XYZ insurance firm in Shiraz, a city with population estimated 1,517,653 in 2011 in south-west of Iran, were tested in March 2012. The research data were elicited from a questionnaire that was completed by the clients and became the analysis base of the study. Questionnaire which used in this study is performance-only instrument or SERVPERF model and consist of two sections. First section is about some respondent characteristics. In second section, the respondents were asked to answer a five-item Lickert type scale questionnaire with 22 questions. The reliability of the SERVPERF instrument was tested by computing Cronbach alpha coefficients. Alpha coefficients for the five dimensions and total service quality were ideal Cronbach alpha (higher than 0.7).

270 questionnaires were distributed in population and 240 questionnaires were returned and used in this study. Regarding gender, 55.6% of the respondents were male and 44.4% were female. Regarding age, 23.6% were between 20-29 years old, 33.7% were between 30-39 years old and 42.7% were over 40 years old.

FINDINGS

Service quality measure of branches: Means of clients' perceptions by questionnaire item are shown in Table 2. For calculating weights of dimensions by using Entropy and as the matrix of performance in TOPSIS method, the data used to determine the three branches' ranks.

Calculation of weights and criteria: Fig. 1 represents the weights of the five dimensions of service quality, obtained by applying Entropy. The weights for each dimension are: Tangibility (0.201), Reliability (0.205), Responsiveness (0.197), Assurance (0.199) and Empathy (0.198).

Ranking of the branches: Now TOPSIS is used to rank branches. So the matrix of performance was obtained to evaluate the three branches' performance by SERVQUAL (Table 3) and criteria weight by Entropy (Fig. 1). Table 3 to 7, represent the steps of TOPSIS. According to Table 7, branches final ranks are: C, A, B.

Step 1: Table 3, 4

Step 2: Table 5

Step 3: Determine the ideal solution and negative ideal solution

$$A_i^+ = \{0.146, 0.132, 0.116, 0.133, 0.126\}$$

$$A_i^- = \{0.097, 0.110, 0.103, 0.095, 0.101\}$$

Step 4: Table 6

Step 5: Table 7

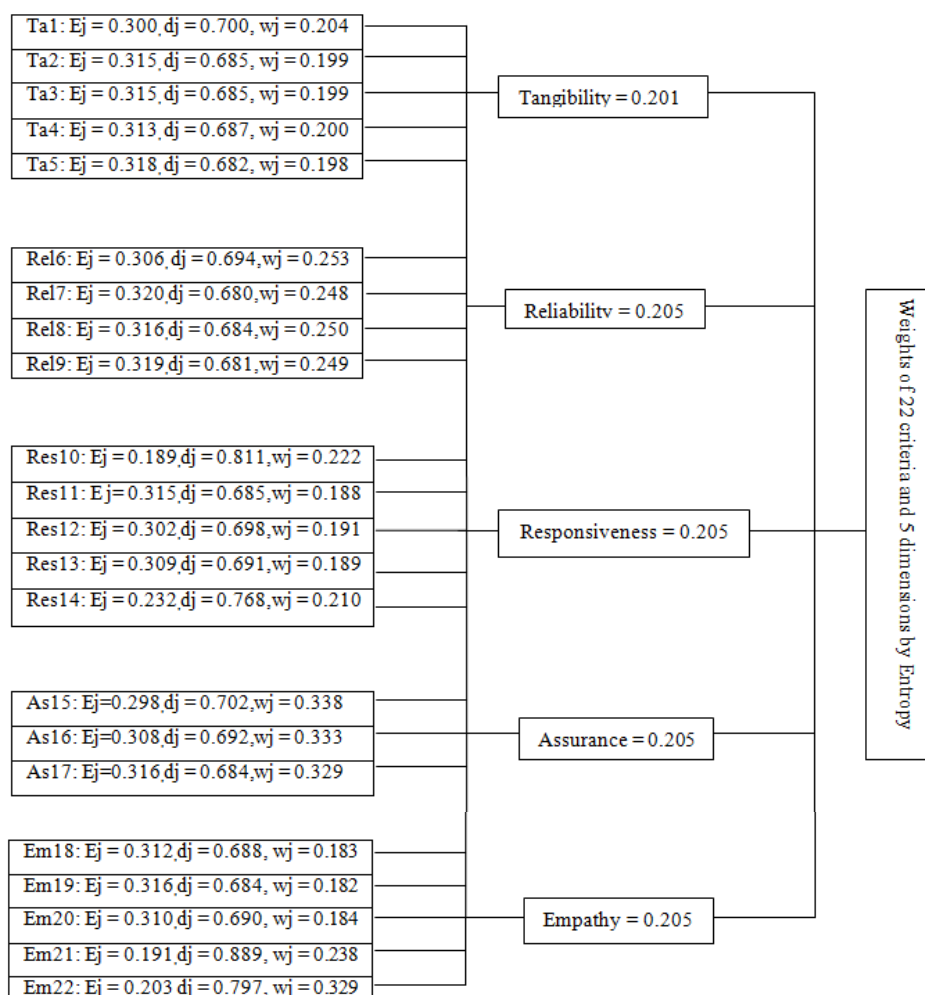


Fig. 1: Weights of five dimensions and criteria by using entropy

Table 3: Performance matrix

	Ta	Rel	Res	As	Em
A	3	2.5	3.75	2.5	4
B	2	2.5	4	3	4.5
C	2	3	4	3.5	5

Table 4: Normalized performance matrix and criteria weights

	Ta	Rel	Res	As	Em
A	0.727	0.539	0.552	0.476	0.511
B	0.485	0.539	0.589	0.572	0.575
C	0.485	0.647	0.589	0.667	0.639
W	0.201	0.205	0.197	0.199	0.198

Table 5: Weighted normalized performance matrix

	Ta	Rel	Res	As	Em
A	0.146	0.110	0.103	0.095	0.101
B	0.097	0.110	0.116	0.114	0.114
C	0.097	0.132	0.116	0.133	0.126

Table 6: Distance between idea solution and negative ideal solution

	A	B	C
S ⁺	0.052	0.058	0.049
S ⁻	0.049	0.026	0.052

Table 8 shows the final ranks of branches based upon 5 dimensions one by one. First rank belongs to branch a

Table 7: Final ranking of branches

Branch	Closeness to ideal solution (C)	Rank
A	0.485	2
B	0.309	3
C	0.515	1

in three dimension (Tangibility, Responsiveness and Empathy). In Assurance, branch B and in Reliability Branch C has the first rank.

CONCLUSION

The present study aims to evaluate and rank a business' branches based on the clients' perception of their shopping experience by using MCDM method in XYZ insurance firm in Shiraz-Iran. For this purpose, a sample of 270 clients who has had the experience of shopping from XYZ insurance firm in Shiraz-Iran was used in order to collect data and 240 questionnaires were returned and used in this study. Regarding gender, 55.6% of the respondents were male and 44.4% were female. Regarding age, 23.6% were between 20-29 years old, 33.7% were between 30-39 years old and

Table 8: results of ranking branches by TOPSIS upon five dimensions

	Branch A		Branch B		Branch C	
	C	R	C	R	C	R
Tangibility items (Ta1-Ta5)	0.790	1	0	3	0.209	2
Reliability items (Rel6-Rel9)	0.547	2	0.279	3	0.659	1
Responsiveness items (Res10-Res14)	0.511	1	0.488	2	0.488	2
Assurance items (As15-As17)	0	3	1	1	0.333	2
Empathy items (Em18-Em22)	0.377	3	0.612	2	0.623	1
Service quality (5 dimension, 22 items)	0.485	2	0.309	3	0.515	1

C: Closeness to the ideal solution of each alternative; R: Rank

42.7% were over 40 years old. Questionnaire which used in this study is performance-only instrument or SERVPERF model. So service quality based on the clients' perception by SERVPERF was evaluated, then for calculating the criteria weights, Entropy method was applied. Weights of the five dimensions and twenty two items of service quality were obtained by using Entropy method. The weights priorities for each of the dimensions are: Reliability, Tangibility, Assurance, Empathy and Responsiveness (Fig. 1). And finally, Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) used to achieve the final ranking results. Table 3 to 7, represent the steps of TOPSIS. Full results of ranking branches are represented in Table 7 and 8.

Branches final ranks according to service quality based on the clients' perception are: "branch C, branch a, branch B" but based upon five dimensions one by one, first rank belongs to branch A in three dimension (Tangibility, Responsiveness and Empathy). In Assurance, branch B and in Reliability Branch C has the first rank.

MCDM method is useful to rank businesses' branches and 3-stage procedure (S.E.T) can be used to rank service organizations such as insurance firms, travel agencies and banking.

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