

# A comparison of statistical and decision-making techniques in marketing mix evaluation

Marketing mix  
evaluation

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## Abstract

**Purpose** – Although customer satisfaction (CS) has been evaluated through using statistical and decision-making techniques so far, no research, to the best of the authors' knowledge, has been conducted for implementing both groups simultaneously and clarifying the different or similar aspects of the results given by these techniques. The purpose of this paper is to compare the techniques and clarify these unknown aspects.

**Design/methodology/approach** – First, the effect of the elements related to service marketing mix on CS was examined by using structural equation model (SEM). Then, the statistical methods such as Friedman test (FT) and SEM, and decision-making technique such as Analytical Hierarchy Process (AHP) were systematically compared for prioritizing the elements of service marketing mix. The sample included 159 special customers of an anonymous bank in Bojnurd, Iran. The reliability of the questionnaire was confirmed by using Cronbach's  $\alpha$  ( $\alpha = 0.934$ ). In addition, SPSS, Expert Choice and Smart PLS software were used.

**Findings** – Based on the results, FT and AHP method had exactly the same ranking for the elements of the marketing mix, as well as almost identical relative weights. The ranking included people, process, product, physical evidence, place, price and promotion, respectively, while the SEM technique had very different outcomes. Finally, none of the methods could assure the marketer to come to a reliable decision separately.

**Originality/value** – In this study, the authors' contribution is the understanding of the role of an effective marketing mix evaluation technique selection on marketing strategy. Different techniques had different and in some cases even contradicting outcomes.

**Keywords** Multi-attribute decision making, Customer satisfaction, Structural equation model, Services marketing mix

**Paper type** Research paper

## 1. Introduction

Nowadays, most firms and organizations around the world have been trying to retain their customers in the globalization and competitive world. In fact, they aim to assure the quality of services and satisfy the customers. In this regard, a large number of organizations are competing together to improve their customer satisfaction (CS) and loyalty as they apply new effective network strategies (Caiazza, 2016) since service quality and CS have been recognized as the heart of organization development. Actually, the firm's services should primarily meet the customers' needs. The firms even oblige to consider diversities of customers' cultures to retain them with respect to their differences (Caiazza and Volpe, 2015). The philosophy of modern management sciences considers CS as a baseline standard of performance and a possible standard of excellence for any business organization. Oliver Richard (1997) explained that CS is a full meeting of customer expectations of products and services. In fact, the customers are satisfied when the perceived performance matches the customer's expectations of services. Otherwise, they are dissatisfied. Accordingly, they return to the company and talk favorably to others about their satisfaction. Thus, satisfied



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customers are more likely to repurchase, are lower sensitive to their price, are engaged in positive word-of-mouth recommendations and become loyal customers (Picón *et al.*, 2014). In recent years, there has been an increasing interest in the marketing mix, which aims to achieve the maximum level of CS and retention, allowing firms to be competitive over the time. Based on a simple time series analysis of the Scopus data from 1968 to the end of 2017 (Figure 1), the number of studies related to services marketing mix has been increasing as the number of documents at the end of 2017 (908 documents) was tripled, compared to the number in the year 2000 (290 documents).

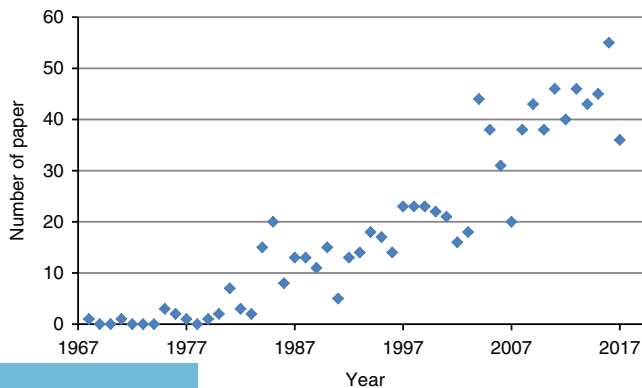
During the last decades, marketers and researchers have identified the significance of the 7Ps of services marketing and customer orientation for sustainable competitive advantage (Grönroos, 2004; Kushwaha and Agrawal, 2015; Alnaser *et al.*, 2017; Harrington *et al.*, 2017; Wu and Li, 2018). The concept of the marketing mix was originated by Neil Borden (1964). Then, McCarthy and Perreault (1993) summarized 12 elements of Borden’s marketing mix into “4Ps” – product, price, place and promotion. In addition, McCarthy and Perreault’s original 4Ps model just concentrated marketing thoughts on the goods marketing (Grönroos, 1994). Accordingly, the traditional marketing mix was inappropriate in the field of service industries (Gitlow, 1978; Shamah, 2013). According to Helm and Gritsch (2014), the marketing mix is incongruent with their needs regarding the marketing practitioners in the service area. They observed that the services have certain basic characteristics, which, in turn, limit the application of the original marketing mix (Kotler, 2000). The services are perishable, variable, inseparable and intangible. Therefore, the original marketing models and concepts should be developed in pursuing the service sector. Then, three additional Ps are added to the primary marketing mix such as people, physical evidence and process. These 7Ps of marketing mix, mainly in the banking industry, are introduced in more details as follows.

### 1.1 Product

A product is anything offered to the market for exchange or consumption (Kotler, 2000). In banking, the product is defined as the services given to the people including different banking accounts for customers to use such as current account and saving account.

### 1.2 Price

In the banking industry, price includes fees, bank charges, interest rates and the interest paid on the deposits (Gerrard and Cunningham, 2004).



**Figure 1.**  
Number of publications (Scopus) from a search on “services marketing mix” since 1968

### 1.3 Place

A place or distribution channel is a way for transferring the products (goods) to the customer. Regarding the services, this word refers to the locations in which the services are provided. In the banking sector, customers choose different service delivery channels in a complementary way such as the bank physical location (Oppewal and Vriens, 2000), the opening hours, distance to reach a bank, parking places and automated teller machine (ATM) availability (Levesque and McDougall, 1996; Wu, 2011).

### 1.4 Promotion

The promotions represent the communications which marketers use in the marketplace including advertising, public relations, personal selling, and sales promotion (McCarthy and Perreault, 1993). In banking, the CS is integrated with a good and widespread promotional policy.

### 1.5 People

Furthermore, service outcomes in labor-intensive services are more variable than in machine-dominated service delivery. In the case of banking, the service employees are often the primary contact point for the customer. The quality of the services is highly related to the way of presentation to the customer. The customers' perception of the performance among service employees is a matter when the customers are evaluating the service (Grönroos, 1982; Barnes *et al.*, 2015).

### 1.6 Physical evidence

As it was already mentioned, services are often intangible and customers cannot assess their quality well. Therefore, customers use the service environment as an important alternative for the quality. The appearance of buildings, landscaping, interior furnishing equipment, staff members' uniforms, signs, communication materials, and other visible stuff such as noise level, odors, temperature and colors all provide tangible evidence of the service quality of a firm (Fukey *et al.*, 2014).

### 1.7 Process

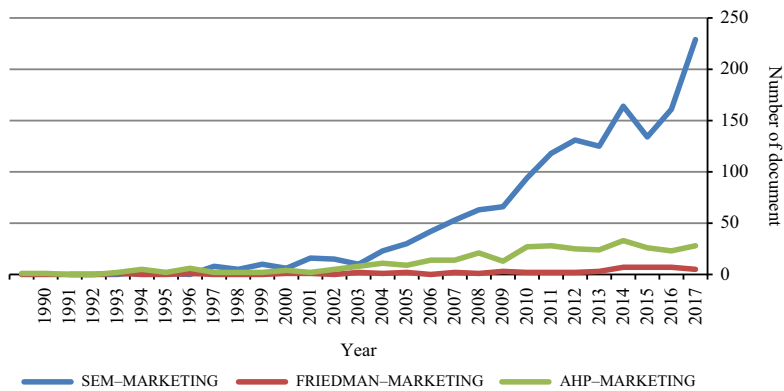
Process or the functional quality is considered as the way of service delivery. In other words, process describes the method and sequence in services and creates the value proposition represented in the customers' minds (Salloum and Ajaka, 2013). The processes involved in the banking services should be easy, fluent, fast, accurate and customer-friendly (Dabholkar and Bagozzi, 2002).

Statistical methods have been used widely for evaluating the hypothesis (Simoni and Caiazza, 2012, 2013; Caiazza and Simoni, 2015; Caiazza *et al.*, 2018). The hypotheses in marketing have also been tested through using statistical methods such as Friedman test (FT) and structural equation model (SEM) (Ivy, 2008; Harrington *et al.*, 2017). As well, some researchers utilized the multi-attribute decision-making (MADM) techniques for prioritizing in marketing (e.g. Wind and Saaty, 1980; Mihelis *et al.*, 2001; Misra and Panda, 2017; Abedi and Abedini, 2017). MADM technique is considered as a process of evaluating real-world situations based on various qualitative/quantitative criteria in certain/uncertain/risky environments in order to solve the problems involved in selection among a finite number of alternatives (Rao, 2007). There are many variants of the MADM techniques such as Analytical Hierarchy Process (AHP), TOPSIS, ANP, VIKOR, PROMETHEE, SAW and ELECTRE. These variants have been applied to health, psychology, agriculture, engineering, management, medicine, etc. (Jones, 2004; Wingfield *et al.*, 2007; Sterzer *et al.*, 2018; Yu *et al.*, 2018; Seejata *et al.*, 2018). The AHP method, developed by Wind and Saaty (1980), is a theory of

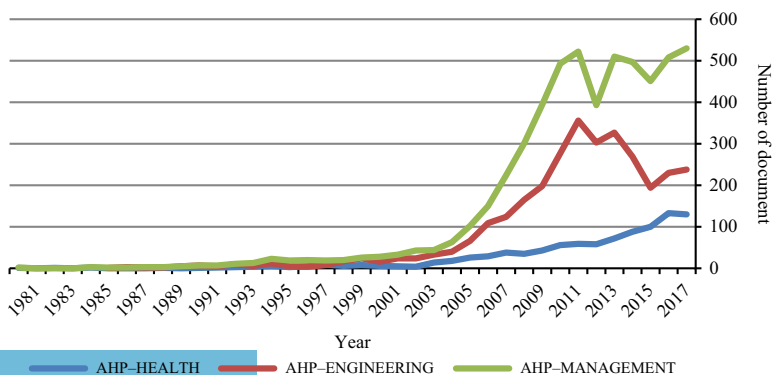
relative weights measurement through pair-wise comparison matrices by taking the decision makers' judgments to determine priority scales. The AHP overcomes complex problems by dividing them into levels of evaluation criteria. It has found ready acceptance by decision makers because of its simplicity and ease of use. AHP structures the decision maker's thoughts and organizes the problem in a manner to be simply followed and analyzed. Figure 2 illustrates a time series analysis of Scopus data during 1990–2017 regarding the number of publication on the three above-mentioned methods related to marketing. As shown, the SEM technique is a well-known and widely used technique in marketing, compared to the two other techniques. In addition, AHP as the most frequently used MADM technique has attracted a lot of attention among researchers (Figure 3). The technique has been implemented effectively in the fields of management and engineering as the pioneers. Furthermore, the MADM techniques have been originated from management and considered as well-known techniques. However, these techniques are not common in marketing and failed to be used in evaluating marketing mix well. As illustrated in Figure 2, the SEM is frequently applied in this regard, while Friedman is regarded as a less popular technique.

The main question raised is whether these methods give us the same response or not. If no, which method can reflect the reality more accurately? In addition, the present study seeks to answer why the MADM techniques are not epidemic and why the Friedman is not used more. In some cases, making a decision based on just one of the above

**Figure 2.** Number of publications (Scopus) from searches on “SEM and marketing”, “Friedman and marketing” and “AHP and marketing” since 1990



**Figure 3.** Number of publications (Scopus) from searches on “AHP and health”, “AHP and engineering” and “AHP and management” since 1981



methods may be misleading. Therefore, the decision maker should not be convinced based on the results obtained from just one method. Furthermore, he should not confine himself only to a finite number of tools. So far, no research has been conducted regarding the importance of choosing the best method of marketing mix evaluation. Thus, reflecting on all the different techniques used to assess CS should be emphasized in the literature. It is worth noting that the comparison of statistical methods and MADM techniques have been considered in management, but not in marketing and especially CS (Sinuany-Stern *et al.*, 2000; McMillan and Schumacher, 2010; Hadad and Hanani, 2011; Punniyamoorthy *et al.*, 2012). To tackle this shortcoming, the present study aimed to compare both statistical and decision-making techniques for prioritizing the effects of the marketing mix elements on CS. Furthermore, the present study attempted to fill the gap between blindly and judicious uses of statistical and decision-making methods in the field of marketing management. To this aim, the effect of the marketing mix on CS was first evaluated by using the SEM. Then, the statistical methods including FT and SEM, as well as AHP as an MADM tool were implemented for prioritizing the marketing mix elements. In the next procedure, the methods were compared and their dark and light aspects were identified for making the results more reliable and avoiding poorly/untrue marketing strategy. Therefore, the main hypotheses of the research are as follows:

- H1. Product has a positive and significant effect on CS.
- H2. Price has a positive and significant effect on CS.
- H3. Place has a positive and significant effect on CS.
- H4. Promotion has a positive and significant effect on CS.
- H5. People have a positive and significant effect on CS.
- H6. Physical evidence has a positive and significant effect on CS.
- H7. Process has a positive and significant effect on CS.

The suggested hypotheses were tested through a sample survey of special customers of an anonymous bank in Bojnurd, Iran. In the next section, the three already-mentioned methods are described with more details. Then, the results are compared to each other and more challenging arguments are presented in two levels. The first level is prepared for all marketing practitioners to get more understanding about the analysis methods, while some control measures are on hand for the senior managers of the bank to make a more effective policy in the second level. Finally, some concluding remarks are suggested.

## 2. Methodology

### 2.1 Measurement instrument

The survey instrument was developed according to an extensive review of the literature and fundamental definitions. Subsequently, the questionnaire was preliminary piloted with 30 different banking customers to confirm that the questions and response formats are flawless. The final questionnaire consists of two sections. First, the questions regarding demographic characteristics of the respondents such as gender, age, education, profession and gross income per month were included. In the second section, the questions related to CS in terms of the services marketing mix were embedded (Table I). The main theme of the questions focused on "how much does each item satisfy the customer?" All of the items were set on a five-point Likert scale where 1 indicates a strong disagreement and 5 represents a strong agreement. Furthermore, the content validity of the questionnaire was checked by consultation with experts. Then, based on the Cronbach's  $\alpha$  formula, the reliability of the survey questionnaire was high ( $r = 0.934$ ).

Marketing mix elements	Sub-criteria	Code	
Product (P1)	Presentation of new services and e-banking	P11	
	Diversified services	P12	
	How much the services tailored to customer requirements	P13	
	Providing equitable services (fairness and non-discrimination in the provision of services)	P14	
	Price (P2)	Appropriate and compliant monitoring systems	P15
		Providing loan repayment schedule	P21
		The interest paid on deposits	P22
		The interest rate paid on banking facilities	P23
		The amount of commission for banking services	P24
	Place (P3)	Lending condition	P25
		Location and accessibility of branches	P31
		The availability of ATM	P32
		Quietness of branches	P33
	Promotion (P4)	Existing the amenities such as parking near the branches	P34
Direct communication networks (telephone banking, mobile banking, etc.)		P41	
An attractive and dynamic website		P42	
Recommendations of friends and acquaintances (i.e. word of mouth)		P43	
Television advertising		P44	
People (P5)	Prizes and gifts granted by bank	P45	
	Staffs' behaviors and attitudes	P51	
	Staffs' secrecy and bailment	P52	
	Staffs' knowledge	P53	
	Staffs' appearance	P54	
	Staffs' response and guiding circumstance	P55	
Physical evidence (P6)	Sufficient number of staffs	P56	
	Existence of amenities such as furniture, cooler, heater, etc.	P61	
	Existence of appropriate digital hardware such as pose, pager, etc.	P62	
	Good arrangement of equipment in the branches	P63	
	Interior adornment of branches	P64	
	External appearance of branches	P65	
Process (P7)	Customer feeling of security and confidence about banking	P71	
	Turn right and observance of the queue system	P72	
	Simple and user friendly banking process	P73	
	Appropriate working hours and working days	P74	
	Waiting time for banking services	P75	
	Existence of poll process to improve the banking process	P76	
Customer	Overall service quality	C1	
	Safety and reliability of bank	C1	

**Table I.**  
The questions suggested in the questionnaires or sub-criteria in hierarchical model

### 2.2 Sampling and data collection

The research hypotheses were tested through a sample survey of special customers of a bank in Bojnurd, Iran. The special customers are those customers who deposited more than 100m Tomans in the bank and do their main banking activities in this bank. Based on the authors' experiences, Iranian responders fill the questionnaires carelessly. Actually, they do think that it is worthless and then do not spend enough time to answer the questions. Therefore, we decided to choose a more accurate method of sampling named "targeted judgment sampling method." Thus, the questionnaire was distributed among a special group of customers who were very important for the bank and the bank was very important for them. Actually, both special customers and bank managers respect to each other well. Although 270 special customers were identified, 159 persons were questioned based on the Cochran formula within the months of October–November 2017. Table II contains questions regarding demographic characteristics of the respondents such as gender, age, education and gross income per month.

Category	Percentage (%)
<i>Gender</i>	
Male	79.3
Female	20.7
<i>Age (year)</i>	
36–45	37.9
46–55	48.3
> 55	13.8
<i>Education</i>	
Undergraduate	34.5
Graduate	24.1
Post-graduate	34.5
doctorate	6.9
<i>Monthly income (Million Tomans)</i>	
< 2.5	20.7
2.5–3.5	37.9
3.5–4.5	17.2
4.5–5.5	10.3
> 5.5	13.8

**Table II.**  
Demographic  
breakdown of  
participants

### 2.3 Structural equation model (SEM)

SEM is regarded as the second generation of multivariate techniques which has some superiority over the first generation and measures the direct and indirect effects of multiple dependent variables by using several regression equations simultaneously. In addition, SEM analyzes all variables simultaneously, compared to the first generation which performs analyses separately. Partial least squares (PLS) is used as an approach to implement SEM, which focuses on the analysis of variance and can be conducted by using PLS-Graph, Visual PLS, Smart PLS and Warp PLS (Wong, 2013). In this paper, Smart PLS was implemented to evaluate the effects of 7Ps on CS.

**2.3.1 Validity and reliability of each variable.** In order to assess the validity of each latent construct, convergent and discriminant validity are examined. The average variance extracted (AVE) of each latent variable should be evaluated for checking the convergent validity. The convergent validity is confirmed if both AVE value and factor loading value are greater than the acceptable threshold of 0.5. According to Fornell and Larcker (1981), the second root of AVE in either latent variable can be used for setting up discriminant validity. The discriminant validity is confirmed if the value is larger than the correlation values of the latent variables. Internal consistency reliability can be measured by using composite reliability (CR).

**2.3.2 Model assessment.** Goodness-of-fit (GoF) index was used to evaluate the model, which is defined as follows:

$$\text{GoF} = \sqrt{\overline{\text{AVE}} \times \overline{R^2}}, \quad (1)$$

where  $\overline{\text{AVE}}$  represents the geometric mean in AVEs and  $\overline{R^2}$  indicates the mean of  $R^2$ s. The values of 0.1 (small), 0.25 (medium) and 0.36 (large) are suggested as cut-off points for validating the PLS model (Tenenhaus *et al.*, 2005; Wetzels *et al.*, 2009).

**2.3.3 Bootstrapping algorithm.** Smart PLS can generate *t*-statistics for testing the significance level of models by using a procedure named “bootstrapping.” In this step, a

large number of subsamples (e.g. 2,000) are selected from the original sample with replacement to give bootstrap standard errors which somehow provide *t*-values for a significant testing (Wong, 2013).

2.4 Friedman test (FT)

Friedman (1937, 1940) developed a procedure called the “method of ranks” to test hypotheses related to ordinal scaled data. This test has a null hypothesis ( $H_0$ ) in which there is no difference between the variables’ ranks. The null hypothesis is rejected if the calculated *p*-value is low (*p*-value is less than 0.05). Thus, at least two of the variables have different priorities (Kvam and Vidakovic, 2007; Batchelor and Dua, 1990). The computational formula for the FT is shown as follows:

$$\chi^2 = \frac{12}{kn(k+1)} \sum_{j=1}^k R_j^2 - 3n(k+1), \tag{2}$$

where *k* represents the number of treatments (marketing mix elements), *n* indicates the number of samples and  $R_j$  is considered as the sum of scores for *j*th variable. The test statistic is distributed according to the usual  $\chi^2$  distribution ( $\chi^2$ ) with *k*–1 degree of freedom (df).

2.5 Analytical hierarchy process (AHP)

The AHP method, developed by Wind and Saaty (1980), is a theory of relative weights measurement through pair-wise comparison matrices by taking the decision makers’ judgments to determine priority scales. The AHP is an MADM method which overcomes complex problems by dividing them into levels of evaluation criteria. In other words, AHP models subjective decision-making processes based on multiple attributes in a hierarchical structure. The first level sets the main goal of the decision problem. In the present study, it is related to the CS evaluation. In the second level, the goal is decomposed to several criteria and then the lower levels can follow this principle to be divided into other sub-criteria (Davies, 1994; Saaty and Vargas, 2006; Tzeng and Huang, 2011). In this paper, the 7P elements related to services marketing mix were considered as the main criteria located on the second level and the questions related to each 7P element were the sub-criteria in the third level. Therefore, the general outline of our AHP process is illustrated as in Figure 4.

In general, AHP includes the following steps:

- (1) Defining the problem and determining its goal.
- (2) Constructing a hierarchy system for its evaluation.
- (3) Constructing a set of pair-wise comparison matrices for each criterion and sub-criterion.

The following equation represents the general form of these comparison matrices:

$$A = [a_{ij}] = \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ a_{n1} & a_{n2} & \cdots & a_{nn} \end{bmatrix} \quad i, j = 1, 2, 3, \dots, n, \tag{3}$$

where A indicates the comparison pair-wise matrix, *n* represents the number of criteria/sub-criteria or matrix size,  $a_{ij}$  is considered as the weight of criterion/sub-criterion *i* over the weight of criterion/sub-criterion *j*. Then, an underlying semantic scale was employed based on the values from one to nine in order to



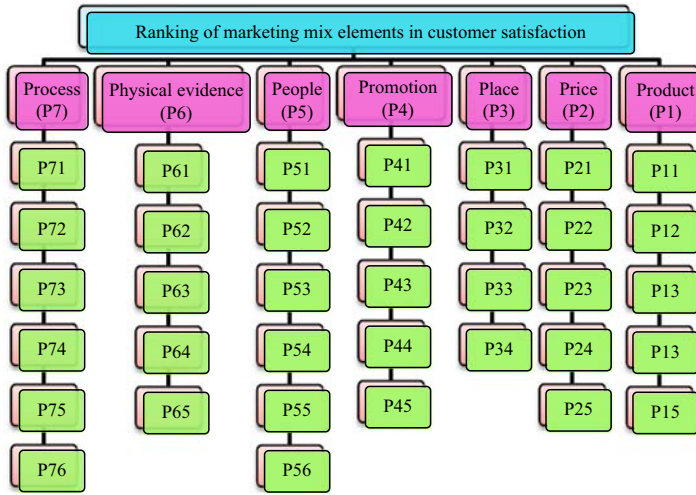


Figure 4. Hierarchy of marketing mix elements

determine the relative preference for each criterion/sub-criterion of the hierarchy in matrix A. Number 9 refers to extremely preferred and number 1 indicates equally preferred judgments.

- (4) Calculating the relative weights: there are some techniques such as the eigenvalue method to calculate the relative weights of criteria/sub-criteria in each pair-wise comparison matrix. The relative weights (*W*) of matrix A are obtained from the following equation:

$$(A - \lambda_{\max}I) \times W = 0, \tag{4}$$

where  $\lambda_{\max}$  represents the biggest eigenvalue of matrix A and I indicates the unit matrix.

- (5) Checking the consistency of the matrices: in this step, the consistency of the matrices is checked to ensure that the judgments of the decision makers are consistent. The inconsistency index (I.I) is calculated by using the following equation, where *n* is the matrix size:

$$I.I = \frac{(\lambda_{\max} - n)}{n - 1}. \tag{5}$$

Judgment consistency should be compared by the consistency of a randomly generated pair-wise matrix.

### 3. Data analysis and findings

#### 3.1 SEM results

The results indicated that both factor loading and AVE values are greater than 0.5 for all variables, which obviously indicates the acceptance of convergent validity. In addition, the square root of AVE is greater than all other construct correlations. Therefore, discriminant validity is confirmed. Furthermore, the value of CR exceeds 0.7 for all variables, which is translated to the fact that CR is confirmed. Totally, the measurement models reflect a good validity and reliability.

The calculated values of mean AVE = 0.644 and  $R^2 = 0.742$  are substituted in Equation (1), by which a value of 0.69 is obtained for GoF. The value confirms that the model assessment is analyzed as large (GoF is bigger than 0.36). Since multicollinearity can affect the results, collinearity statistics including tolerance and variance inflation factor (VIF) are used to assess the collinearity. Table III indicates the related collinearity statistics. As shown, the tolerance parameter is approximately more than 0.4 and VIF parameter is about 2 for all of the variables. There is no concern when a tolerance parameter ranges from 0.4 onward. In addition, no correlation is observed between the variable and the remaining predictor variables when the values of VIFs range between 1 and 4. Accordingly, no significant collinearity is observed among the variables (i.e. 7P's services marketing mix).

In the next stage, bootstrapping process with 1,000 re-samples was run to calculate the *t*-values for testing the significant of the structural path. Table IV indicates *t*-value, *p*-value and path coefficient value ( $\beta$ ). By using two-tailed *t*-test with a significance level of 0.05, the path coefficient value is significant when the corresponding *t*-value is greater than 1.96. The results indicated that the process and physical evidence could significantly influence on CS. However, the remaining Ps failed to indicate any positive effect on CS. Thus, they were rejected.

### 3.2 FT results

Table V indicates the first output of FT. In this test, at least two elements related to services marketing mix have a different ranking since the significant value is lower than 0.05. Similar to the significant value,  $\chi^2$  value confirms that the null hypothesis is rejected.

**Table III.**  
Collinearity statistics

Variables	Collinearity Statistics	
	Tolerance	VIF
Product	0.412	2.428
Price	0.557	1.796
Place	0.574	1.741
Promotion	0.396	2.525
People	0.475	2.107
Physical evidence	0.505	1.980
Process	0.472	2.119

**Table IV.**  
Structural model estimates

Path	Path coefficients ( $\beta$ )	<i>t</i> -values	<i>p</i> -value
Product	0.064	0.697	0.486
Price	0.124	1.554	1.121
Place	0.011	0.130	0.896
Promotion	0.120	0.892	0.373
People	0.037	0.294	0.769
Physical evidence	0.227	2.095	0.037
Process	0.514	4.496	0.000

**Table V.**  
The first output of Friedman

<i>n</i>	159
$\chi^2$	122.139
df	6
Sig.	0.000

The second column of Table VI shows FT ranking for marketing mix elements. As indicated, seven priorities include people with 5.95, process with 4.84, product with 4.71, physical evidence with 3.75, place with 3.52, price with 2.86 and promotion with 2.38.

3.3 AHP results

First, pair-wise comparison matrices of criteria/sub-criteria for each questionnaire were separately imported to Expert Choice software. Then, the matrices were combined and the relative weights of the criteria/sub-criteria were calculated based on the Equation (4). In addition, the inconsistency ratios (IR) for the entire of matrices were checked to evaluate the validity of judgments. Based on the results, the IRs were lower than 0.1 in all cases. Table VI indicates the results. Regarding the prioritization, the highest and lowest weights are devoted to the people and promotion, respectively.

4. Discussion

In this section, the results related to both criteria and sub-criteria are first provided, along with presenting some challenging arguments to all researchers. Then, some practical recommendations are suggested for the bank managers.

As shown in Table VI, the FT and AHP methods resulted in creating the same ranking for the criteria. It is worth noting that the weighting processes are completely different in these two methods. In fact, the output in AHP technique is provided in a relative form (i.e. the summation of weights is equal to 1) while the output of FT is presented according to the average rating. As a result, in order to the fair and reasonable comparison of the two methods, each calculated average rate of FT is divided by the sum of all rates. Figure 5 illustrates the comparison of the results related to both methods in a relative form. As observed, these two methods represent a very close relative priority. In addition, there

Marketing mix elements	Average rating (Friedman test)	Relative weight (AHP method)
People	5.95	0.202
Process	4.84	0.166
Product	4.71	0.157
Physical evidence	3.75	0.133
Place	3.52	0.124
Price	2.86	0.115
Promotion	2.38	0.104

Table VI. Prioritization of services marketing mix elements (criteria)

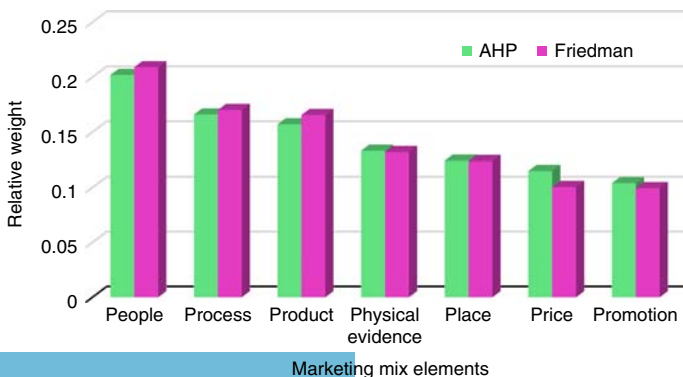
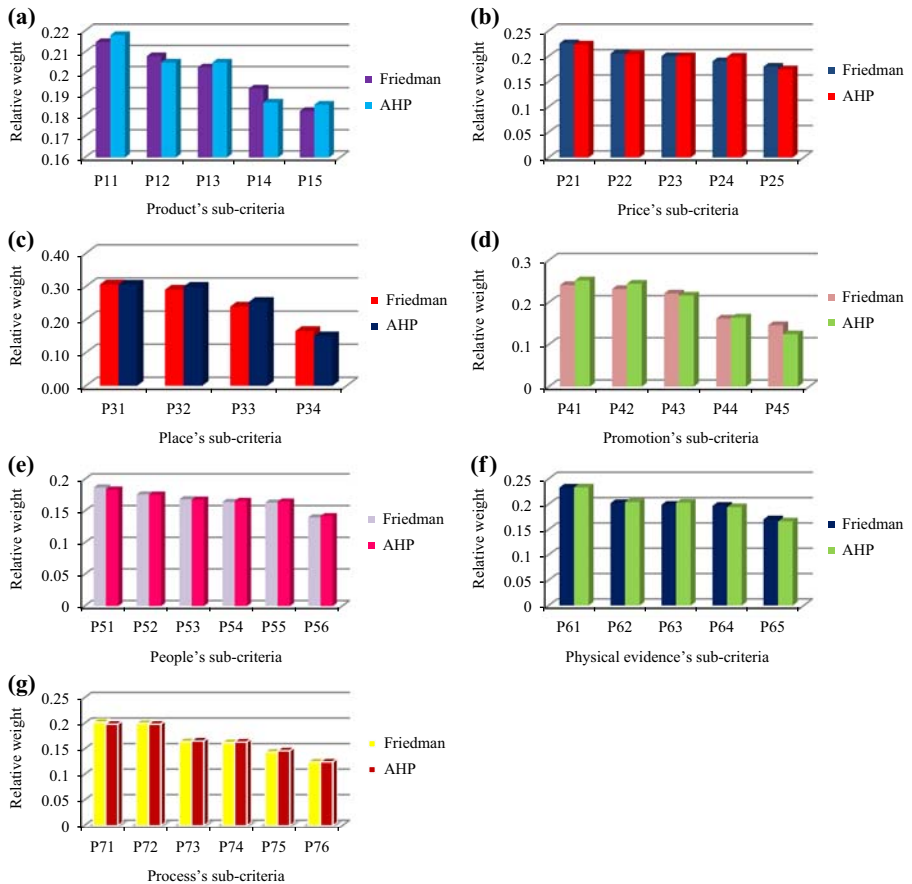


Figure 5. Comparison of the criteria's ranking resulted from AHP and FT

are similar situations for all sub-criteria (Figure 6). Based on computational results, both FT and AHP led to the same ranking and almost identical relative weights, although, they used two completely different logics. Both ranking and relative weights of criteria for these two methods had a good consistency with the current marketing strategy of the given bank. Indeed, the strange and same ranking of the two techniques as well as their complete agreement and coordination with the existing marketing strategy of the bank mean that both methods are applied well and their results are strongly reliable. Furthermore, the bank has reached its marketing goals.

Based on SEM, just physical evidence and process play a positive effect on CS while other variables failed to have any significant effect. Some believe that ranking the elements is possible by using multivariate techniques (e.g. Chatterjee and Hadi, 2015; Siegel, 1956; Keith, 2014). In other words,  $\beta$  value directly represents the correlation between dependent and independent variables. In this study, Table IV represents the ranking of the variables in SEM. It is worth noting that ranking those variables which do not have a positive effect on



**Figure 6.**  
The comparison of ranking the sub-criteria resulted from the AHP and FT

**Notes:** (a) Sub-criteria ranking of product; (b) sub-criteria ranking of price; (c) sub-criteria ranking of place; (d) sub-criteria ranking of promotion; (e) sub-criteria ranking of people; (f) sub-criteria ranking of physical evidence; (g) sub-criteria ranking of process

CS is not meaningful. Generally, based on the results of the three methods, SEM cannot predict the effect of independent variables (7Ps) on the dependent variable (CS) unexpectedly while FT and AHP resulted in exactly the same ranking. Table VII indicates a summary of the results given by these three methods. The numbers in Table VI indicate the priority of the elements for marketing mix.

As shown in Table VII, a very good agreement was observed between all methods for place, price and promotion and relatively a good accordance for the process. The effect of price, place and promotion variables was initially rejected by SEM, which largely authenticates the results of the two other methods where they assigned the lowest relative weight to these variables. Regarding the people, the situation is ambiguous as it obtained the first rank in two out of three methods while the situation was different in another method.

Now, the question raised here is related to the source of the variation in the data to link the 7Ps to the CS. It is expected that rather low variation is available in how they rate the service aspects because they may all receive the same level of services at the same bank when 159 high-priority customers rated the same bank. However, different customer's expectations are regarded as the most important thing leading to these dissimilarities. In general, the present study aimed to enhance the reliability of the marketing mix strategy by comparing the implemented methods and not optimizing the sampling technique. Furthermore, the special customers were selected to fill the questionnaires in order to overcome this problem. As shown in Table VII, the inconsistent results may be related to the process of selecting unmanned/wrong method for marketing mix evaluation.

In conclusion, no logical reason was found for why the SEM failed to coincide with the results of FT and AHP. As it was already mentioned, different techniques result in different and even contradictory outcomes in some cases. Furthermore, both AHP and FT could determine the relative rank of the marketing mix well. In addition, the same ranking and identical relative weights are absolutely inevitable. Different methods may lead to different results and a firm should not just rely on one method.

Based on the above discussion and the introduced methods, the applied controlling measures which should be adopted by the bank senior managers are addressed. As illustrated in Figure 6(a), the sub-criteria P15 had the lowest relative importance. Thus, it is proposed that appropriate and flexible monitoring systems should be considered. Furthermore, lending condition and banking facilities (P25) failed to satisfy the customers (Figure 6(b)). Therefore, it is suggested that some easier rules and regulations are prepared at least for special customers who have a good and reliable background. In addition, as displayed in Figure 6(c), the sub-criteria P34, i.e., existing the amenities such as parking near the branches could not attract the customers. The lack of parking lot or existence of parking near the branches is the main challenging task which the customers are dealing with during their banking activities. In line with the lowest relative weight of promotion, the bank managers should pay more attention to all of the sub-criteria related to promotion, especially the prizes and gifts granted by the bank, i.e., P45 (Figure 6(d)). TV advertisement and word of mouth are considered as the most important areas for promotion.

Based on the results, an insufficient number of staff is the main dissatisfying factor (P56) (Figure 6(e)). When the customers are getting services by an employee, they usually ask

Method	Product	Price	Place	Promotion	People	Physical evidence	Process
SEM	-	-	-	-	-	2	1
FT	3	6	5	7	1	4	2
AHP	3	6	5	7	1	4	2

**Table VII.**  
Summary of  
the results

some more questions and guides, which takes time and leads to a long queue. In order to solve the problem, it is suggested that bank should hire a person just for guiding and answering. Furthermore, as shown in Figure 6(f), the bank should attempt to improve the facade of the buildings as the external appearance of branches is in the lowest priority of physical evidence in the sub-criteria P65. Regarding the results in Figure 6(g) (P76), respecting the customers by using a poll process can create a good feeling for the customers.

## 5. Conclusion

Regarding the question whether the results of the statistical tests or multi-criteria decision-making techniques are separately satisfactory as a ranking tool for marketing mix elements in CS or not, the present study compared three methods including SEM and FT as statistical methods and AHP as an MCDM method. To this aim, 159 special customers of an anonymous bank in Bojnurd were selected as a case study. The SEM was first used for evaluating the effect of the elements in services marketing mix on CS. The results indicated that all hypotheses except the two last ones were rejected. In other words, only process and physical evidence were confirmed. Then, the marketing mix elements were prioritized by using FT and AHP methods and subsequently a completely identical rankings such as people, process, product, physical evidence, place, price and promotion, respectively, as well as an absolutely equal relative weight were achieved. Based on the results, it is proposed that none of the methods could be applied separately for ranking objectives and it should be supported at least by another method. In the present paper, it cannot be declared that the results of one method are interesting separately; however, since the two methods out of three methods had the same results, thus their ranking is more persuading. As a future research direction, it is suggested that further consideration of combined statistical and MADM techniques might be helpful. As well, other variants of MADM should also be tested.

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