



# A new model to rate the level of customers' loyalty using mixed ANP and TOPSIS approach (Case study: grocery stores in the Ahvaz city)

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**Abstract** Considering the importance of customers' loyalty and the existing competitive environment, it is necessary to assess the factors affecting customer loyalty to find out the levels of effectiveness of different factors on customer' loyalty and the performance of different stores in this field. Therefore, in this research, a model is provided to rate the customer loyalty levels of grocery stores in the Ahvaz city with ANP and TOPSIS mixed approach. Different stages of the presented model include designing the conceptual model of the effective factors on loyalty of the customers of grocery stores, measuring the weights of the factors using ANP and rating the performances of the stores using TOPSIS. The results show that pricing is the most important factor when it comes to customer loyalty and after that quality of the goods, quality of the services, variety and innovation and technology are the most important factors in customer loyalty, respectively. Also the best performance by a grocery store is determined.

**Keywords** Customer loyalty; Multi-criteria decision making; Analytic network process; TOPSIS

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## 1. Introduction

Today is the era of loyalty. This includes customer loyalty, staff loyalty, management loyalty, and loyalty to the society, ethics, ideals, believes etc. Satisfaction is not the final key to success and profitability. In fact, even the marketing concepts, pointing their finger to this matter before, do not insist on it. Thus nowadays only happy and

enthusiastic customers and those whose hearts are satisfied are counted as the profitable investments of organizations [Davar and Safaiian \(2002\)](#).

There are several definitions by intellectuals on the subject of loyalty and this is acceptable with respect to the complicated and multi-dimensional concept of loyalty [Hapson et al. \(2002\)](#). The most well-known and acceptable definition of loyalty belongs to Jacoby and Kyner which defines loyalty as a prejudice on a brand or a behavioral response in time in which a person prefers a specific brand to other brands and has a psychological commitment in deciding about that brand [Ball et al. \(2004\)](#).

Loyalty is an important factor in management and financial analytics decision making. Customer's rate of return is an essential component in life cycle value analysis which is a tool for short term decisions procurements. It is obvious that calculating every customer's profitability is very important for organizations, however due to the infinite nature of organization life cycle, it is better to consider calculating such profit in a long-term period (not only as a present value) [Gorondutse et al. \(2014\)](#).

One of the most important traits of successful companies and department stores is knowing customers exactly, properly defining the target market, the ability to encourage staff to raise the quality as well as emphasizing on customers [Donio et al. \(2006\)](#). Due to the importance of customer loyalty and the competitive environment, it is necessary to assess the effective factors on customer loyalty in order to measure the performance of stores in this field. Therefore, in this research first, effective factors on customer loyalty is identified and rated using an efficient approach and then the customer loyalty of central grocery stores in the Ahvaz city is evaluated.

## 2. Research background

The study by [Haghighi Kafash et al. \(2010\)](#) was done on effective factors on the loyalty of insurance clients (case study: Iran Insurance Co.). In this research the European customer satisfaction model was employed in which three actors including client satisfaction, perceived company image and perceived software quality is considered. In this research 310 questionnaire forms were distributed among Iran insurance company clients of which 267 were filled and returned. The results show that in the 95% confidence interval, all identified factors on the two main indexes of loyalty (buying again and recommending to friends) of the clients of Iran insurance company were effective.

The study by [Haghighi Kafash and akbari \(2010\)](#) was done concerning prioritization of the factors affecting customer loyalty using ESCI model. In the research 420 questionnaires was distributed between the customers of this company in Tehran. 385 questionnaires were completed and gathered and their results after the statistical analysis showed that for consumers of Shirin Asal Co products, in a 95% confidence interval, all of the identified factors were effective on both indexes of the loyalty, buying again and recommending to friends.

The study by [Zamani Moghaddam and Lahiji \(2012\)](#) was done titled as surveying factors influencing customer loyalty in private banks based on fast response organization's model. In this research 6 key factors, service quality, reliability, service speed, subjective image, innovation and flexibility were rated to have the highest impact on the loyalty of the Iranian private banks (Parsian and Eghtesade Novin) customers and based on the data analysis, the reliability of the services and the perceived image of Parsian bank in the minds of customers are better compared to Eghtesade Novin Bank. Other factors for both banks were almost the same.

A study by [Maleki Gholandoz et al. \(2013\)](#) titled as identifying and ranking factors affecting customer satisfaction of the household wood furniture industry by multi-attribute decision making method (case study: home furniture) was provided. The results demonstrated that sub-indexes, harmony with the interior environment, proper clothing, foam and wooden parts quality, product life cycle with respect to price, on-time delivery, honesty of the sales staff when giving technical information of the products and the superiority of the household wooden furniture has the highest proximity compared to similar products and are counted as the most important factors affecting customer satisfaction. Sub-indexes, size and mass of the product, repair ability, payment condition provided by the company, installation, product manual, and environmental issues are the factors which have the least impact on customer satisfaction.

[Rajabi and Abbasi \(2013\)](#) studied factors and barriers of e-loyalty to e-banking services in private banking customers in Golestan province. The results of this research using factors analysis showed that 7 factors, customer satisfaction, perceived image, service quality, trust, warrantee, features and values of received services, respectively, were effective in e-loyalty of the customers and 4 technical, security and privacy, financial-economic and social-cultural barriers respectively play the most important roles as deterrent factors affecting customer's loyalty to electronic banking.

Study by [Sabzeei et al. \(2014\)](#) was titled as reviews on the factors affecting customer loyalty (case study: agricultural bank). Results of this research showed that investments on customer loyalty is effective and profitable for service companies. Generating loyalty by enhancing revenue, reducing costs of gaining new customers, reducing customers' sensitivity to prices and reducing costs of familiarizing customers with the methods of the company results in profitability.

[Noyan and Simsek \(2013\)](#) investigated on antecedents of customer loyalty. In this study a concept model provided a bright insight from customer loyalty which is designed in structural equations. They used a data analysis tool for modeling among 1530 participants from the customers of 4 super markets. The results show that customer satisfaction is the most customer loyalty factor. Generally, customer loyalty includes three different components, first: the intension to continue the purchase, the intension to increase the purchase and third to recommend and advertise for purchasing to other customers. Desired quality beside low price, discounts, good quality, good value, good service are all customer satisfaction factors which have positive and direct impact on customers' loyalty.

Giovanis *et al.* (2014) presented a research titled as the antecedents of customer loyalty for broadband services: The role of service quality, emotional satisfaction and corporate image. This study developed and examined a model in order to investigate the antecedents of customer loyalty for service providers in Greece. The technical aspect and the performance of service quality understanding, emotional satisfaction and the perceived image of the company have positive and negative relationships with the loyalty of the customers. According to the sampling which included 573 participants from service customers, the results shows that understanding the aspect of good quality services, emotional satisfaction and the perceived image of the company are the main incentives in loyalty. This study also shows that structures and emotional relations in today's technology leads to customer's understanding and their satisfaction.

Chen (2015) worked on a study with the title: "Customer value and customer loyalty: Is competition a missing link? The results in this research demonstrated that there is a meaningful relationship between value and customer loyalty. In fact, there is a sort of competition between these two. This study shows that the credit of the brand and trade mark is considered very important by customers. This study helps to get the best understanding of the customer value in relation with loyalty and to figure out the considerable role of competition.

### 3. Research methodology

From the viewpoint of phenomenon control, *modus operandi*, data gathering and data and statistical analysis, in this research no intervening has been done by the researchers, therefore the research method in this article is analytical-descriptive and to figure out the factors, the author tries to ask opinions of experts. The intension of using this method is to really and clearly describe traits of a reality or phenomenon. The author tries to address what exists without any intervening. Most of the field researches in this study are descriptive. Also since a questionnaire is used as a field tool for measuring the variables of the research, it can be considered as an exploratory and comparing research. The population under study in this research comprehends all central grocery stores in the Ahvaz city and a random sampling method is used. The analytical model of this research is as shown in Figure 1.

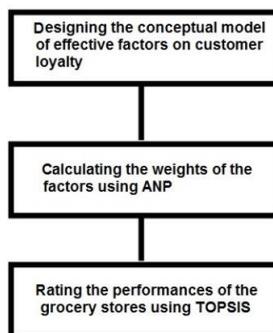


Figure 1. The analytical model of the research.

## 4. Case Study

The presented model of the research is a case study on central grocery stores of the Ahvaz city and the stages and the results are shown in the following.

### 4.1. designing the concept model of the effective factors on customer loyalty of the grocery stores

In this step, in order to design the conceptual model of the effective factors on loyalty of the customers of grocery stores first the factors are identified. To do this, at the first phase the opinions of the people in the sample are gathered and secondly the literature is reviewed. And finally a list of the factors which have the highest redundancy and emphasis is written. Then the identified factors are categorized under quality of the products, price, quality of the service, technology and variety and innovation and now the concept model is designed as shown in the following figure 2.

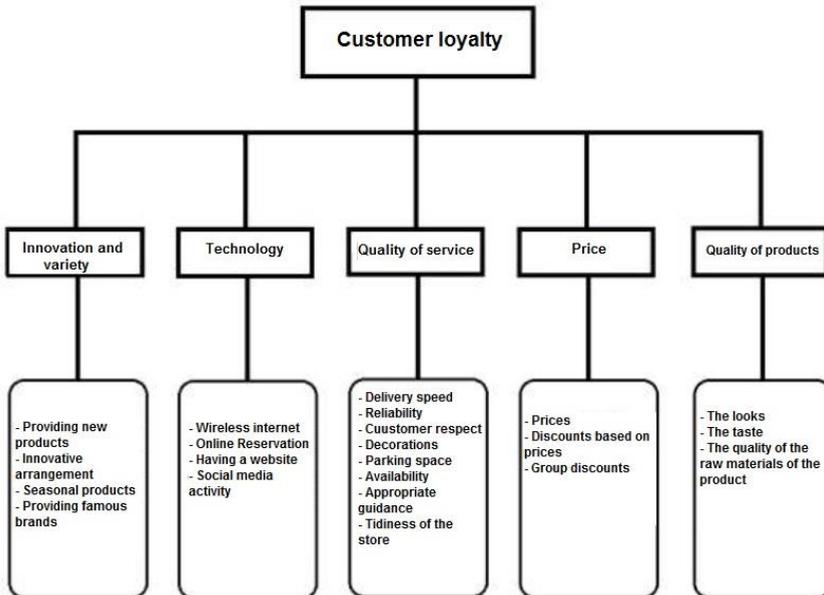


Figure 2. The conceptual model of the factors affecting customer loyalty of the central grocery stores.

### 4.2. Calculating weights of the factors using ANP

Further we describe different stages of implementing analytic network process to rate factors affecting the loyalty of the grocery store customers.

#### 4.2.1. Designing the network

Using analytic network process requires modeling and designing the network in SuperDecisions software which is demonstrated in figure 3 in the following.

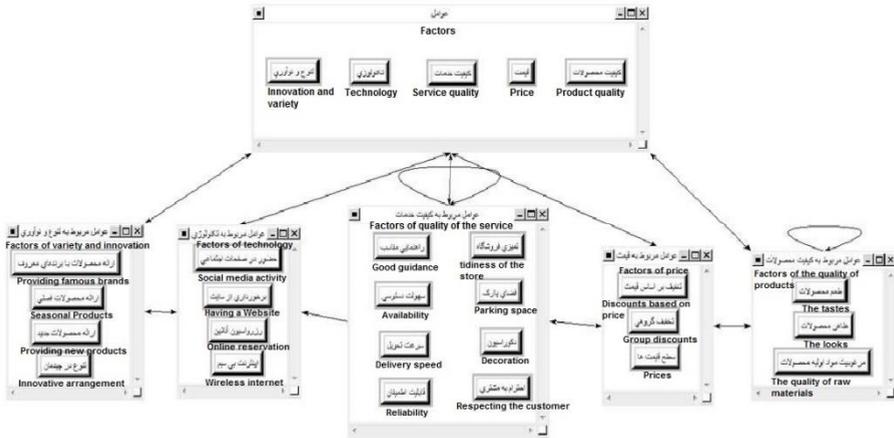


Figure 3. The designed network in SuperDecisions Software.

#### 4.2.2. Pairwise comparison

After designing the network, pairwise comparisons are performed to determine the factors. Standard questionnaires are designed intending to do this. After assuring the compatibility and validity of the questionnaire by the experts, the final questionnaire was distributed between the sample participants. The population under questioning, included loyal customers and other customers and they are asked to compare the factors in pairs.

#### 4.2.3. Calculating the weights

After gathering the questionnaires, due to the pairwise comparisons by different people, the weights are calculated. To calculate these weights SuperDecision software is employed. Thus after entering the input data and simulating the model, the output of the software is given as shown in the figure 4 in the following.

Here are the priorities.

Score	Name	Normalized by Cluster	Priority
No Score	تنوع و نوآوری	0.10325	0.02045
No Score	تکنولوژی	0.10228	0.02031
No Score	قیمت	0.43196	0.08577
No Score	کیفیت خدمات	0.10524	0.02088
No Score	کیفیت محصولات	0.25727	0.05079
No Score	ارائه محصولات با برندهای معروف	0.14825	0.02968
No Score	ارائه محصولات جدید	0.42717	0.07718
No Score	ارائه محصولات فصلی	0.28652	0.05816
No Score	توجه در مبلمان	0.14825	0.02968
No Score	اینترنت بی سیم	0.47981	0.07376
No Score	برقراری وبسایت	0.17908	0.03590
No Score	فعالیت در شبکه های اجتماعی	0.17908	0.03590
No Score	رزرواسیون آنلاین	0.16495	0.03313
No Score	تخفیف گروهی	0.14825	0.02968
No Score	تخفیف بر اساس قیمت	0.17286	0.03458
No Score	مستقیم قیمت ها	0.40275	0.08148
No Score	احترام به مشتری	0.14825	0.02968
No Score	تعمیرات فرستاده	0.11217	0.02243
No Score	تأثیر آسپن	0.07087	0.01416
No Score	راهنمایی مناسب	0.11217	0.02243
No Score	سرعت تحویل	0.14825	0.02968
No Score	سهولت دسترسی	0.14825	0.02968
No Score	فضای پارک	0.08141	0.01628
No Score	قابلیت اعتماد	0.17983	0.03596
No Score	طعم محصولات	0.47219	0.09448
No Score	ظاهر محصولات	0.13825	0.02765
No Score	مراقبت از مواد اولیه محصولات	0.36775	0.07355

Figure 4. The output of SuperDecisions software.

Further, the output of the software is described in details. First, the clusters of factors are analyzed. The output of the software for the clusters is described in Table 1.

Table 1. Output weights of the factor clusters using ANP.

Qty.	Factor	Weight
1	Quality of products	0.25727
2	Price	0.43196
3	Quality of services	0.10524
4	Technology	0.10228
5	Variety and innovation	0.10325

As it can be seen in Table 1, the price is the most important factor affecting customer loyalty. After the price, quality of products, quality of services, Variety and innovation and technology, respectively, are the most important factors effective of customer loyalty.

According to the figure 4, the output of the software for the factors of quality of the service are as described in table 2.

Table 2. Weights of the quality of the service cluster using ANP.

Qty.	Factors	Weights
1	The looks	0.16025
2	The tastes	0.47219
3	The quality of raw materials	0.36755

As it can be seen in table 2 in this cluster of factors, the tastes is the most important factor effective on customer loyalty. After the tastes, the quality of raw materials and the looks, respectively, are the most important factors affecting customer loyalty.

According to the figure 4, the output of the software for the factors of price are as described in Table 3.

Table 3. Weights of the price cluster using ANP.

Qty.	Factors	Weights
1	Prices	0.40575
2	Discounts based on prices	0.25396
3	Group discounts	0.34029

As it can be seen in table 3 in this cluster of factors, prices are the most important factor effective on customer loyalty. After prices, group discounts and discounts based on prices, respectively, are the most important factors affecting customer loyalty.

According to the Figure 4, the output of the software for the factors of quality of services are as described in Table 4.

Table 4. weights of the cluster of quality of services using ANP

Qty.	Factors	Weights
1	Delivery speed	0.14535
2	Reliability	0.17543
3	Respecting customers	0.14672
4	Decorations	0.07267
5	Parking space	0.09140
6	Availability	0.14410
7	Good guidance	0.11217
8	Tidiness of the store	0.11217

As it can be seen in table 4 in this cluster of factors, *reliability* is the most important factor effective on customer loyalty.

According to the figure 4, the output of the software for the factors of technology are as described in Table 5.

Table 5. Weights of the technology cluster using ANP.

Qty.	Factors	Weights
1	Wireless internet	0.47903
2	Online reservation	0.36305
3	Having a website	0.07896
4	Social media activity	0.07896

As it can be seen in Table 5 in this cluster of factors, *wireless internet* is the most important factor effective on customer loyalty. After wireless internet, online reservation, having a website and social media activity, respectively, are the most important factors affecting customer loyalty.

According to the Figure 4, the output of the software for the factors of variety and innovation are as described in Table 6.

Table 6. Weights of the variety and innovation cluster using ANP.

Qty.	Factors	Weights
1	Providing new products	0.42737
2	Innovative arrangements	0.14315
3	Seasonal products	0.28632
4	Providing famous brands	0.14315

As it can be seen in table 6 in this cluster of factors, *providing new products* is the most important factor effective on customer loyalty. After providing new products, seasonal products, innovative arrangements and providing famous brands respectively, are the most important factors affecting customer loyalty.

### 4.3. Rating the performances of grocery stores using TOPSIS

After calculating the weights of different factors with analytic network process, the decision matrix is made. According to the questionnaires the decision matrix is described in table 8.

#### TOPSIS Method

TOPSIS or the technique for order preference by similarity to ideal solution, originally developed by Hwang and Yoon in 1981, is one of the multi-criteria decision making method similar to AHP. This technique can be used to rate and compare different alternatives and choose the best of them and also determine the distance between alternatives and grouping them.

One of the advantages of this technique is that criterions or indexes used to compare alternatives can have different units as well as negative or positive nature. Based on this technique the best alternative or solution is the nearest solution to the ideal alternative or solution or the most distant from the negative-ideal solution. The ideal solution is the one

with the highest profit and lowest cost while the negative-ideal solution is the one with the highest cost and the lowest profit. In brief, the ideal solution is yielded from the sum of maximum values of each factor, while the negative-ideal solution is yielded from the sum of the lowest values of the factors.

Further, we use this technique to rate between different grocery stores.

Table 7. The decision matrix.

The store \ The factor	Quality of products	Price	Quality of services	Technology	Variety and innovation
Store 1	8	9	9	3	4
Store 2	6	1	8	1	7
Store 3	5	9	9	6	5
Store 4	4	6	3	8	7
Store 5	2	4	5	6	9

According to Table 7 the normalized matrix is described in Table 8:

Table 8. The normalized decision matrix.

The store \ The factor	Quality of products	Price	Quality of services	Technology	Variety and innovation
Store 1	0.873	0.780	0.839	0.287	0.331
Store 2	0.655	0.087	0.746	0.096	0.579
Store 3	0.546	0.780	0.839	0.575	0.414
Store 4	0.436	0.520	0.280	0.766	0.579
Store 5	0.218	0.347	0.466	0.575	0.745

After yielding the normalized decision matrix, the positive and negative ideal solution is determined. The positive and negative ideal solution is determined as follows,

$$A^- = \{0.085, 0.041, 0.029, 0.009, 0.023\}$$

$$A^* = \{0.192, 0.331, 0.088, 0.080, 0.090\}$$

Then the distance of each grocery store from the positive and negative ideal solution and the closeness index is calculated and presented in Table 9.

Table 9. The distance of each grocery store from the positive and negative ideal solution and their closeness index.

Grocery stores	$d_i^-$	$d_i^+$	$C_i^+$
Store 1	0.1411	0.2327	0.3776
Store 2	0.0923	0.3022	0.2340
Store 3	0.2300	0.1235	0.6507
Store 4	0.3007	0.0895	0.7705
Store 5	0.2350	0.1222	0.6580

Looking at the closeness index for each grocery store in table 9, the highest performance in customer loyalty belongs to store 4. After that stores 5, 3, 1 and 2, respectively have the best performance.

## 5. Conclusion

Satisfaction is not the final key to success and profitability. Nowadays only happy and enthusiastic customers and those whose hearts are satisfied are counted as the profitable investments of organizations. Due to the importance of customer loyalty and to the existing competitive environment it is necessary that effective factors on customers' loyalty be investigated so that the amount of impact of effective factors on customer loyalty can be found out and also the performance of different commercial units in this matter can be measured. Therefore, in this research primarily the effective factors on customer loyalty is identified and rated and after that the loyalty level of customers in grocery stores in the Ahvaz city is evaluated and the results shows that:

- *Price* is the most important factor affecting the customer loyalty. After price, quality of products, quality of services, variety and innovation and technology, respectively are the most important factors affecting customer loyalty.
- Among factors of quality of products, *the tastes* is the most important factor affecting the customer loyalty. After the tastes, the quality of the raw materials and the looks, respectively, are the most important factors affecting customer loyalty.
- Among price factors, *prices* is the most important factor affecting the customer loyalty. After prices, group discounts and discounts based on prices, respectively, are the most important factors affecting customer loyalty.
- Among factors of quality of service, *reliability* is the most important factor affecting the customer loyalty.
- Among technology factors, *wireless internet* is the most important factor affecting the customer loyalty. After wireless internet, online reservation, having a website and social media activity, respectively, are the most important factors affecting customer loyalty.
- Among variety and innovation factors, *providing new products* is the most important factor affecting the customer loyalty. After providing new products, seasonal products, innovative arrangements and providing famous brands respectively, are the most important factors affecting customer loyalty.
- Among grocery stores, number 4 has the highest performance and after that stores 5, 3, 1 and 2, respectively have the highest performance.

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