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Optimizing the quality of services based on the grading of recreational swimming pools (Case study of 29 Bahman Pool, Tabriz)

Leyla Khosravi [1]*, Mohammad Rasoul Khodadadi [2], Mehdi Jahangiri [3], Rasoul Ghorbanian [4]

1. Phd student of Sports Management Department, University of Tabriz
2.Associate Professor, Sports Management Department, University of Tabriz
3. Assistant Professor, Department of Applied Mathematics, Faculty of Basic Sciences, Maragheh University
4. Graduated with a master's degree in business management Department *of Higher Education Institute of Charkh Niloufari Azerbaijan*

Abstract

The aim of the current research is to optimize the quality of recreational swimming pool srvices based on the grading of pool (the case study of 29 bahman pool in tabriz). The present study is considered as an applied and descriptive-analytical research and the field method was used in this study. In the first part, experts in the field of quality of sports pool services, university professors specializing, and experts from the federation and the swimming and lifeguard board. In the second part, customers of 29 Bahman Pool in Tabriz. 242 people were selected based on Cochran's formula and cluster random sampling method was used in this study. The validity of the questionnaires was confirmed by 5 professors of sports management. Cronbach's alpha coefficient was used to calculate the reliability of the questionnaire in a preliminary study on 30 members of the sample using of 0.82 which was equal to 0.82. The Analytic Hierarchy Process (AHP) method, the mathematical methods of the algorithm, the K-nearest neighbor (KNN) algorithm, were used for standard grading of pools based on star grading using SPSS, Excel, expert choice, and Matlab software. According to the results and based on the geometric average, the quality indicators of sports-recreational pool services can be rated in 5 clusters and stars. The weights of each indicator were estimated based on their importance from the experts' point of view according to the results obtained from the hierarchical analysis, and the highest weight belonged to the pool bowl standards and the lowest weight to other characteristics.

Keywords: grading, service quality optimization, recreational sports pool

1. Introduction

In recent years, paying attention to the needs of customers and responding to their demands, both in the production sector and in the service sector, has become one of the main and essential tasks or goals of organizations. Since more than half of the gross production of most countries of the world comes from the service sector and due to the special characteristics of this sector (such as direct communication with customers), it is very important to pay attention to this sector. Despite the passage of a long time from the issue of service quality and its measurement and evaluation methods, not only attention to this important issue has not decreased, but due to the increasing importance of services in the economy of countries, its role has become more important (Goodall and Ashworth, 2013, 8). Therefore, service quality is an effort to respond to the needs and demands of customers and how to meet customer expectations (Potro et al., 2020, 152). Therefore, organizations and companies must provide quality services to customers in order to survive and succeed in competitive markets. The results of many researches show that service quality is a precursor to customer satisfaction. Nevertheless, many customer-oriented organizations have encountered problems in the process of identifying and evaluating customer preferences and often have a wrong understanding of customer demands and expectations, because providing higher quality services requires knowing the relationship between customer demands and the quality of services provided by the organization. Sohrabi et al., 2017, 121). On the other hand, identifying service quality indicators along with the importance of each of them from the point of view of experts, as well as identifying customers' demands and finding the optimal solution using the quality

* Email: Leyla.khosravi.1368@gmail.com

performance expansion method and mathematical models can be the most complete way to optimize services (Sayani and Olya, 2015). On the other hand, the expansion of the optimal quality of services based on the grading of swimming pools can provide and provide the right services and satisfy the experts, officials and managers who have complete and accurate information about the demands and expectations of their customers. So far, no research has been done on the optimization of the service quality based on the rating of swimming pools, on the other hand, the managers of the sports facilities do not have any scientific indicators to improve themselves. Therefore, the current research is based on using the quantitative research paradigm and mathematical modeling to make the service quality in sports pools have specialized and professional indicators.

2. Methodology

Based on the purpose of the research, this research is an applied research. And based on the measurability of the data, it is quantitative. The statistical population of the research was in two parts: experts and users of sports-recreational pools. In the first part, the statistical population consisted of experts in the field of service quality of sports pools, sports facility management professors and experts of the Federation and Swimming and Lifeguard Board, and in the second part, the customers of the 29 Bahman pool in Tabriz, 242 people were selected based on the Cochran formula and by random cluster sampling. . The first part included experts in the field of service quality of swimming pools and sports facilities, experts of the swimming board and lifeguard board, and finally university professors in the field of sports facilities management. The statistical population in a small part includes the customers of the 29 Bahman pool who have used the pool services many times. Sampling in the section related to specialists was a non-probability sampling of the targeted type and in the second phase, cluster random sampling. In this section, the different working hours of the 29 Bahman pool are considered as clusters. In this research, "CRISP methodology" has been used for data mining and data modeling. The CRISP methodology is an industry-proven method for guiding data mining efforts. In fact, CRISP is a data mining process model that describes common strategies used by experienced data miners to overcome data mining problems (Scherer, 2005, 13). This six-step process starts from understanding the main needs of the business and ends with providing a solution for the development of that need.

3. Results

According to the information in Table 1, 9 of the experts, i.e. 33.34% were men and 17 people with 62.96% were women. 5 specialists in the age range of 20-29 (18.51 percent), 9 people in the age range of 30-39 years (33.34 percent), 1 person in the age range of 40-49 years (3.70 percent) And 3 people were in the age range of 50 years and above with (11.11 percent) and 9 people did not answer with (33.34 percent). 12 of the specialists had a bachelor's degree (44.44%), 10 had a master's degree (37.03%), 4 had a doctorate (14.81%), and 3 did not answer (11.11%). The distribution of the frequency of the group of experts based on the field of people who had a physical education field had a frequency of 20 and 74.07%, which accounted for the most statistics, and people who had a non-physical education field had a frequency of 25.92 and 7%.

According to the results obtained from the hierarchical analysis, the weights of each index were estimated based on their importance according to experts. According to Figure 1, the highest weight was assigned to the standards of the pool bowl and the lowest weight to other features.

It should be noted that these weights will be used in allocating stars to the desired pool. According to the results obtained from the hierarchical analysis, the weights of each index were estimated based on their importance from the experts' point of view, and the highest weight was given to the standards of the pool bowl and the lowest weight to other features.

Investigating the condition of the 29th Bahman pool in Tabriz based on star rating indicators based on optimization

In order to star the 29 Bahman pool in Tabriz, the checklist prepared in the first stage of the research was given to 242 customers of this pool. By taking the geometric mean of the customers' responses, an overall score was awarded to the standard features of the 29 Bahman pool. Now, to determine which star belongs to this pool, the weighted KNN algorithm with k=1 will be used.

The k-nearest neighbor method selects a group of k records from the set of training records that are closest to the test record and decides on the test record category based on the superiority of their category or label. In simpler terms, this method selects the category that has the highest number of records in the selected neighborhood; Therefore, the categories that are most observed among the k nearest neighbors are considered as the new record category.

k-nearest neighbor is a simple classification algorithm that keeps all the existing items and classifies the new item based on the similarity calculation. A new sample is classified based on the majority of its neighbors, so

that k is the maximum number of neighbors with which the new sample should be compared. This comparison is based on the degree of similarity or distance between the new sample and the existing samples. In this article, the aim is to determine in which category this pool falls by comparing the points of the pool given by customers with the standard criteria collected from experts for the number of stars of the pool; Therefore, k=1 will be considered. The user's procedure is that the distance between the points of this pool is measured with the experts' points for each category of star classification, and the category with the smallest distance with the points of the desired pool is considered as the pool category or the same number of stars in the pool. One of the distance functions that is used is the Euclidean distance function, which is defined as follows:

$$d(p,q)=\sqrt{((p_1-q_1)^2+(p_2-q_2)^2+\cdots+(p_n-q_n)^2)}$$

where p=(p_1,p_2,...,p_n) and q=(q_1,q_2,...,q_n). Assuming that p and q are weighted, the distance function is written as follows, where w_i is the weight of 〖_i〗 and q_i.

$$d_w(p,q)=\sqrt{(w_1(p_1-q_1)^2+w_2(p_2-q_2)^2+\cdots+w_n(p_n-q_n)^2)}$$

The following codes, written in MATLAB, determine how many stars Bahman 29 pool is based on customer ratings and comparing it to expert standards, using the weighted distance function that was defined.

```
G=cell(5,1);
G{1,1}='1_star_ SWIMMING_POOL ';
G{2,1}='2_star_ SWIMMING_POOL ';
G{3,1}='3_star_ SWIMMING_POOL ';
G{4,1}='4_star_ SWIMMING_POOL ';
G{5,1}='5_star_ SWIMMING_POOL ';
X=zeros(5,53);
X(1,:)=xlsread('1_star_ SWIMMING_POOL ');
X(2,:)=xlsread('2_star_ SWIMMING_POOL ');
X(3,:)=xlsread('3_star_ SWIMMING_POOL ');
X(4,:)=xlsread('4_star_ SWIMMING_POOL ');
X(5,:)=xlsread('5_star_ SWIMMING_POOL ');
Mdl = fitcknn(X,G);
Y=xlsread('29_bahman');
s=pdist2(X,Y);
t=min(s);
u=find(s==t);
Mdl
Mdl.ClassNames
Mdl.Prior
disp(['THE NUMBER OF STAR IS: ' num2str(u) ])
```

By executing these commands, the following output is obtained, which concludes that the 29 Bahman pool is 1 star based on existing standards.

```
>> SWIMMING_POOL
Mdl =
  ClassificationKNN
           ResponseName: 'Y'
    CategoricalPredictors: []
              ClassNames: {'1_star'  '2_star'  '3_star'  '4_star'  '5_star'}
         ScoreTransform: 'none'
        NumObservations: 5
               Distance: 'euclidean'
           NumNeighbors: 1
  Properties, Methods
ans =
  5×1 cell array
    {'1_star'}
    {'2_star'}
    {'3_star'}
    {'4_star'}
    {'5_star'}
ans =
       0.2        0.2        0.2        0.2        0.2
THE NUMBER OF STAR IS: 1
```

Finally, in the study of 29 Bahman swimming pool and according to the codes written in MATLAB software, using the defined weighted distance function, it is determined that the 29 Bahman swimming pool is based on customer scores and comparing it with experts' standards, which results 29 Bahman pool is 1 star according to existing standards.

4. Discussion and Conclusion

Today, blind and basic competition on price or increase or improvement of services is not enough for

customers. You should know your customers and based on the behavioral characteristics they show, predict the next moves and offer acceptable offers to the target customers. Today, the survival of organizations depends on their intelligence, and data mining is one of the tools to acquire this intelligence in a changing world. Considering the importance of service quality in sports facilities such as recreational pools, the present research was carried out in several steps in order to base the optimal quality of services based on the rating of recreational swimming pools. Service quality has been considered as one of the most important factors determining the success of service organizations in today's competitive environment, any decrease in customer satisfaction due to low service quality is a concern for service organizations. Therefore, the researchers in this research wanted to express a criterion for rating the quality of services. Also, today, most organizations have realized that customer satisfaction plays a central role in their long-term success. The attention of these organizations to the category of customer satisfaction is not accidental, because they know very well that having a customer satisfied with the services is the best chance that the organizations have in order to achieve their goals. If in providing service to customers, the quality level of service is lower than the expectations of customers, the quality will be at a lower level and the result will be customer dissatisfaction, and if the quality of service is at the level of customer satisfaction or in addition to the level of expectations and expectations. If the customers are evaluated, the quality level will be considered high and the result will be manifested in creating more satisfaction in the customers. When there is a basis and a criterion for the rating of sports pools, both officials, managers and users can easily achieve what they want, despite the basis, managers will find out what rank their pool is in, when they reach this point, their efforts will certainly be multiplied If he realizes that his pool is in a lower rank with a smaller difference, he will try to compensate for his weaknesses and reach a higher rank. On the other hand, the duties of the user and the recipient of the services will also be clear, so the other consumer knows what services he will get in return for the payment. and will receive facilities.

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