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DETERMINING CUSTOMER NEEDS PRIORITIES FOR IMPROVING SERVICE QUALITY USING *QFD*

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ABSTRACT

The presented research aimed to get QFD model to improve service quality using customers` needs priorities in terms of case study in 4 star hotel of Zanjan. In the research customers` satisfaction of the services and importance degree of each need was investigated using survey method. Information was collected from two different community and samples. The first statistical community were the customers, employees and managers of Zanjan`s grand hotel that whom were needs-assessed to determine the factors affecting customer satisfaction. After identifying the factors, one questionnaire was offered to the customers to rank their satisfaction of services received from the hotel. According to the statistical procedures used in the third chapter, selected sample of clients were 150. Second statistical community or better said, decision team consisted of 4 managers and senior employees of the hotel whose opinions were applied when completing the quality house. The results shows that from the view point of customers, offering qualified food, existence of sauna and swimming pool, friendly behavior and attitude of personnel and their proper appearance are more important.

Keywords: *customer satisfaction, service quality, Quality function deployment (QFD) , house of quality*

1. INTRODUCTION

Quality function deployment (QFD) was conceived in Japan in the late 1960s and Akao first presented its concept and method during this time (Akao and Mazur, 2003). QFD) has been widely used as a technique for performing the translation of customer requirements into design requirements (Chan and Wu, 2002). QFD has been widely applied in different sectors. QFD also suffers from certain disadvantages (Akao and Mazur, 2003). Kuijt-Evers et al. (2009) have suggested QFD as a useful method to assist design teams in the ergonomic design of more comfortable hand tools. Celik et al. (2009) have extended the QFD principles towards shipping investment process based on proposed ship of quality framework. Fung et al. (2002) have optimized product design resources using a nonlinear fuzzy QFD model. They have presented a case study to illustrate the benefits of their model to enable decision makers to deploy their design resources for gaining customers satisfaction. Karsak (2004) has presented a fuzzy multiple objective programming approaches that incorporate subjective information in QFD planning process to determine the fulfillment level of the design requirements. QFD provides an understanding of customer expectations and needs, and applies features that will meet these expectations and needs to the product/service. The major focus of QFD is to design the product/service so that it will satisfy the customer.

Buyukozkan et al. (2007) have presented a new fuzzy group decision making approach to blend multiple preference styles to respond customer needs in product development in a better way.

Lee et al. (2008) have presented an integrated approach by incorporating Kano model with fuzzy mode into the QFD matrix and adjusting customer requirements weights. The Kano model of customer satisfaction can determine “attractive” or “must-be” requirements which can be used in the QFD matrix to assure that most critical needs are translated into the next phases of product development. Researchers such as Akao (1990a), Clausing (1994) , Hauser and Clausing (1988), Prasad (2000), Reich and Levy (2004) , Raharjo et al. (2006),

Hanumaiah et al. (2006) and Chen et al. (2007), have outlined the QFD approach. This methodology is used to translate customer requirements into technical requirements. The first step is to identify potential customers. As soon as potential customers are identified, the next step is to understand their needs. Service quality plays a critical role in success and survival in the fiercely competitive market (Miciak and Desmarais, 2001). For example, service quality has a positive impact on customer loyalty to the company (Jayawardhena, 2010) and customer intentions (Spreng et al., 2009). Despite the substantial advantages of current tools and approaches, the viewpoint of customers and their requirements is still lacking and the requirements are not identified and linked to the service design process.

2. LITERATURE REVIEW

2.1. QFD

Quality function deployment (QFD) is a well-known method that is powerful in designing high quality services (Mazur, 2008). A significant number of QFD successful applications in the service sector have been reported, including service areas such as education (Koksal and Egitman, 1998; Lam and Zhao, 1998), technical libraries and information services (Chin et al., 2001), public sector (Gerst, 2004), e-banking (Gonzalez et al., 2004), spectator events (Enriquez et al., 2004), hospitality (Stuart and Tax, 1996). QFD is a technique used in more proactive product development and quality improvement in many fields (Tan and Shen, 2000). QFD technique investigates customer requirements in intensive detail and enables organizations to outperform effective competitive strategies. Hence, QFD is a customer-driven quality management system (Kaulio, 1998) aiming to create higher customer satisfaction.

The central idea of QFD is to establish the necessary control points prior to production start-up so that product quality could be assured in the planning stage (Akao, 1990b). Firmly grounded on the principles of total quality management (TQM), QFD focuses on delivering value by understanding the customers' needs and deploying this information throughout the development process as well as to the manufacturing process and control systems (Hill, 1994). QFD is a widely used systematic process utilized by cross-functional teams to identify and resolve issues arising from the provision of products, processes, services, and strategies intended to enhance customer satisfaction Gonzalez et al. (2003). Quality function deployment (QFD) is a methodology for the development or deployment of features, attributes, or functions that give a product or service high quality. The successful application of QFD in different circumstances has been highlighted by many researchers. Olhager and West (2002) used QFD methodology in an attempt to build a structured method to deploy flexibility-related customer requirements in the features of various manufacturing systems.

2.2. The QFD process

QFD is a visual connective process that helps teams focus on the needs of the customers throughout the total development cycle. It provides the means for translating customer needs into appropriate technical requirements for each stage of a product/process development life-cycle. It is well documented that the use of QFD can reduce the development time by 50 percent and start-up and engineering costs by 30 per cent (Clausing and Pugh, 1991).

The QFD process involves four phases:
(1) Product planning: house of quality.
(2) Product design: parts deployment.
(3) Process planning.
(4) Process control (quality control charts).
A chart (matrix) represents each phase of the QFD process. The complete QFD process requires at least four houses to be built that extend throughout the entire system's development life-cycle (Figure 1), with each house representing a QFD phase. In the first phase, the most important engineering characteristics, that satisfy most of the customers' demands defined by the scoring at the bottom of the house, go on to form the input to the subsequent stage in the QFD process.

2.3. The house of quality

As can be seen in Figure 1, HOQ includes six phases:
1 identifies customer requirements (WHATs) and evaluates those weights in the left wall of the house;
2 compare the competitiveness of the service in the right wall;
3 translate customer requirements into service design characteristics (HOWs) just below the roof;
4 define the relationship between WHATs and HOWs in the central deployment matrix or called relationship matrix;
5 define the relationships between the various service design characteristics in the correlation matrix in the roof; and

6 design the target values of the service on the ground floor of the house, which is the absolute importance for each service design characteristic.

The QFD charts help the team to set targets on issues, which are most important to the customer and how these can be achieved technically. The ranking of the competitors' products can also be performed by technical and customer benchmarking. The QFD chart is a multifunctional tool that can be used throughout the organization. For engineers, it is a way to summarise basic data in a usable form. For marketing, it represents the customer's voice and general managers use it to discover new opportunities (Clausing and Pugh, 1991).

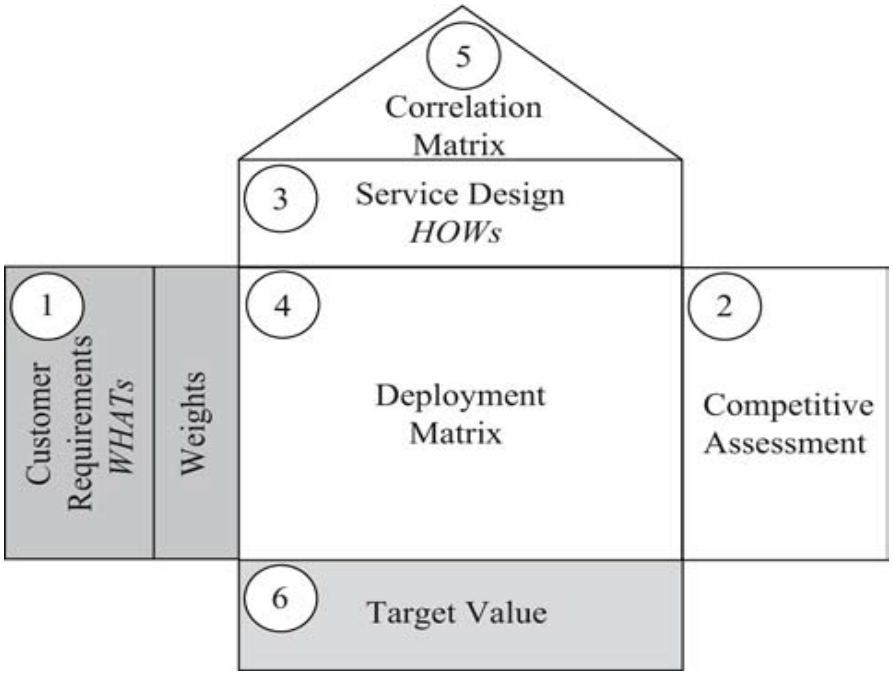


Figure 1. House of quality

2.4. Research Questions

1. What is the degree of customer satisfaction from service quality of Zanjan Grand Hotel?
2. Which is more important dimension of quality for customers? (Priorities)
3. In which aspect the hotel has shown poor performance? (Identifying weaknesses)
4. In which aspect hotel has shown an ideal performance? (Identifying strengths)
5. Regarding limitations of the hotel, how it can communicate between customer expectations and service quality? (Reflecting the demands of customer to service design)

3. RESEARCH PROCESS

The main steps in applying the model are as follows:

Step1. Identifying customers` needs: This step was conducted using needs - assessment questionnaires. The questionnaires were designed for the three groups of employees and managers of hotels, travelers and passengers of Iranian and foreign guests.

Step2. Determining the current performance of Zanjan Grand Hotel and the degree of needs from customers point of view: This step was done through collected components from 1st step. This means that according to the identified needs and demands a questionnaire was designed to determine performance and importance degree of the needs and also to be used in relative quality house and was offered to the hotel`s guests.

Step3. Forming a decision making team: Decision making team consists of senior managers of different sectors of Zanjan grand hotel that necessary information about correlation matrix, communication matrix, sale points and performance objective were collected from them.

Step4. Completing the column of numbers of performance objective and sale point: The information which is relevant to these two columns was collected by decision making team and through a special questionnaire.

Step5. Determining the number of needed improvement ratio for each need: Improvement ratio is calculated through this formula and is inserted in the quality house:

$$\text{Improvementratio} = \frac{performance\ objective}{Current\ performance}$$

Step6. Calculating raw weight of each need: In this step, the raw weight of each affecting factor on customer satisfaction is calculated using the following formula:

Raw weight = Importance degree of the customer × Improvement ratio × Sale point

Step7. Determining the relative weight of each need: In this step the resulted numbers of step 6 will be calculated relatively .

Step8. Identify and determining the requirements of service design manager: Using a questionnaire the decision making team announce how to access the customers` needs.

Step9. Completing communication matrices: In this step, the relative numbers are allocated to the communication matrix by decision making team.

Step10. Completing Correlation matrix: This step corresponds to the relevant symbols to the roof of the quality house the correlation matrix .

Step11.Determining the raw and relative weight of each element of management requirements / design services

Step12. Quality house description

3.1 HOQ for hotel of Zanjan

Figure 2 shows the HOQ for the hotel of Zanjan. The customer wants are listed in order of customer preferences as follows:

1. Showing the home and interested in solving the customer problems
2. Fulfilling the customers required services with the 1st request
3. Making bills & reports correctly
4. Providing customers with fast services
5. Personnel's knowledge and information on responding to the customers
6. Personnel`s interest to help the customers
7. Friendly attitude of personnel`s toward customers
8. Safe environment for customers accommodation
9. Fast Reservation & settlement system
10. Personnel`s attention to all the customers
11. Understanding special needs of customers by the personnel
12. Proper working time of each sector for all the customers
13. Proper appearance of the personnel
14. Physical facilities such as furniture , decoration , carpets, etc
15. Proper location of the hotel
16. Existence of clean and tidy rooms
17. Existence e of swimming pool, sauna and Jacuzzi
18. Internet accessibility in hotel rooms
19. Praying room, Koran, etc
20. Offering qualified food

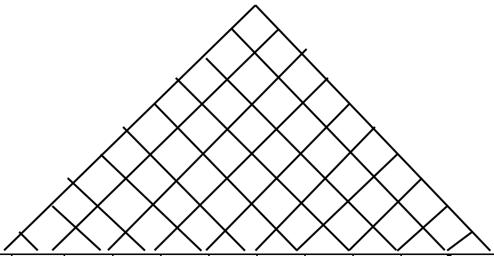
Relationship

Disaffiliation = 0

Weak = 1

Medium = 3

Strong = 10



Customer`s demands and requirements	Management requirements	Politeness & humble	Fast room giving	Considering the complaints	Hotel cleanness	Rooms cleanness and arrangement	Providing services on time	Price	Friendly behavior of personnel	Hygiene	Food Quality	Importance degree	Organization evaluation	Performance objective (organization plan)	Improvement ratio	Sale point	Absolute weight	Relative weight
confidentiality	Showing the home and interested in solving the customer problems	10	3	10	3	1	3	0	10	1	1	4.6	3.7	5	1.35	1.2	7.45	5.34
	Fulfilling the customers required services with the 1st request	0	10	3	1	1	10	0	1	0	1	4.7	4.9	5	1.3	1.2	5.75	4.12
	Making bills & reports correctly	1	0	10	0	0	3	10	0	0	1	4.2	4.6	5	1.8	1.5	6.8	4.87
Accountability	Providing customers with fast services	1	10	1	0	0	10	0	1	0	0	4.5	4.7	5	1.6	1.5	7.15	5.12
	Personnel's knowledge and information on responding to the customers	1	0	1	0	0	1	0	3	0	1	3.7	3.4	5	1.47	1.2	6.52	4.76
	Personnel`s interest to help the customers	10	1	10	1	1	3	0	10	0	0	4	3.7	5	1.35	1.5	8.1	5.8
Guarantee	Friendly attitude of personnel`s toward customers	10	1	1	0	1	1	0	10	0	1	4.9	3.8	5	1.31	1.5	9.62	6.89
	Safe environment for customers accommodation	3	0	1	1	1	0	0	1	3	3	4.4	4.5	5	1.11	1.2	5.86	4.2
	Fast Reservation & settlement system	0	10	1	0	0	3	10	0	0	0	4.5	3.5	4	1.14	1	5.13	3.67
Empathy	Personnel`s attention to all the customers	3	1	3	0	0	1	0	10	0	0	4.3	4.2	5	1.19	1.2	6.14	4.4
	Understanding special needs of customers by the personnel	1	0	3	0	0	3	3	3	0	0	3.7	3.3	4	1.21	1.2	5.55	3.97
	Proper working time of each sector for all the customers	0	3	1	1	1	10	0	0	1	0	4.1	3.2	4	1.25	1	5.12	3.67
Physical and tangible points	Proper appearance of the personnel	0	0	0	1	1	0	0	1	1	0	4.6	3.2	5	1.56	1.2	8.61	6.17
	Physical facilities such as furniture , decoration , carpets, etc	0	0	0	10	10	0	0	0	1	1	4.7	3.8	4	1.5	1.5	7.45	5.34
	Proper location of the hotel	0	1	0	1	0	0	1	0	0	0	4.2	4.3	4	0.39	1.2	4.68	3.35
	Existence of clean and tidy rooms	0	1	1	3	10	3	0	1	3	0	4.6	3.8	5	1.31	1.2	7.23	5.18
	Existence e of swimming pool, sauna and Jacuzzi	0	0	1	3	0	1	1	0	10	0	4.6	1.2	4	1.9	1.2	10.48	7.51
	Internet accessibility in hotel rooms	0	0	1	0	0	1	1	0	0	0	4.4	2.4	4	1.66	1	6.70	4.8
	Praying room, Koran, etc	0	0	1	0	1	1	0	0	0	0	2.4	4.7	5	1.6	1.5	3.81	2.73
	Offering qualified food	0	0	1	1	0	1	3	0	10	10	4.7	3.1	5	1.61	1.5	11.3	8.1
Modeling Organization * Organization`s competitor 0		0	*				*			*						Total sum		
		*	0	*	*	0		*	*		*						139.4	100
						*	0	0		0								
				0					0		0							
Weight	Raw weight	224	181	254	142	144	254	137	275	210	124	1949						
	Relative weight	11.53	9.33	13.4	7.33	7.44	13.6	7.5	14.1	10.7	6.36	100						

Figure 2. HOQ for the hotel of Zanjan

The Management requirements that are important to improve the service in order to meet customer requirements are listed below.

1. Politeness and humble
2. Fast room giving
3. Considering the complaints
4. Hotel cleanness
5. Rooms cleanness and arrangement
6. Providing services on time
7. Price
8. Friendly behavior of personnel
9. Hygiene
10. Food Quality

The HOQ indicates the features that customers perceive as important. The relationship between customer wants and Management requirements are rated on a scale of 0 = Disaffiliation , 1 = weak, 3 = medium, and 10 = strong.

4. ANALYSIS AND RESULTS

Any activity requires clear expression and specific objectives. The objective is to "express the expected results, including a clear and measurable work within a certain time and with certain costs." So an activity is considered successful when it is successful to fulfill its primary determined objectives. Now, we respond them according to the objectives and research questions.

About the first research question, the customer satisfaction of service quality, it should be said that about the current performance of Zanjan grand hotel calculating average current performance or customers` satisfaction from the components in each dimension we then have:

Table 1. The customers` satisfaction from dimensions of service quality

dimensions	**satisfaction (Current performance)**	**rank**
Reliability	4.4	1
Accountability	3.93	2
Guarantee	3.92	3
Empathy	3.56	4
Tangible and physical	3.42	5

Satisfaction with the number of 4/9 relative to serve customer`s demand in first request belongs to confidentiality dimension and lowest satisfaction the reliability and the lowest satisfaction with 2/1 belongs to the existence of a swimming pool and sauna which relates to the tangible and physical component.

In response to the question of which quality is more important to customers, the degree of importance through the average of the components response written in quality house set forth in the table 2:

Table2.the degree of importance of service quality dimensions

dimensions	**degree of importance**	**rank**
Guarantee	4.6	1
Reliability	4.5	2
Tangible and physical	4.4	3
Accountability	4.06	4
Empathy	4.03	5

Zanjan Hotel's functional gap was another question that this study seeks to answer. We have the following formula:

Functional gap = Importance degree - Satisfaction

Regarding the degree of satisfaction and importance of the dimensions are not calculated in table 2 and 1.

Table 3.the functional gap between dimensions of service quality

dimensions	**degree of importance**	**satisfaction (Current performance)**	**gap**
Reliability	4.5	4.4	0.1
Accountability	4.06	3.93	0.13
Guarantee	4.6	3.92	0.68
Empathy	4.03	3.56	0.47
Tangible and physical	4.4	3.42	0.98

About identifying the strengths and weaknesses of the hotel's it can be said that since using scale of the questionnaire has been five parts Likert and if we consider number 3 as the average of this spectrum, hotel`s performance has been week in two dimensions of: existence of swimming pool, sauna and Jacuzzi with number 1/2 and internet accessibility with number 2/4. It is claimed that in some components, satisfaction with the hotel's current performance from the customers need to be improved because it may decline to less than number 3.these components are as follows: understanding special needs of customers with number 3/3, working hours of different hotel`s sectors with number 3/3, good and proper appearance of personnel with 3/2, providing qualified food and for other points the hotel has had an acceptable performance that could achieve strong points. But investigating the voice of the organization with hotel limitations in designing the services, suggests that

personnel`s intimate relationships with 13/84 % weight and then offering services with 12/8% and also paying attention to the complaints with 12/79% weight had the most effects on providing customers with the services. Making priorities for the voice of the organization is like table 4:

Table 4. rating of organization sound		
Management requirements (organization sound)	**Weight**	**rank**
Friendly behavior of personnel	13.84	1
Politeness and humble	11.31	4
Providing services on time	12.81	2
Considering the complaints	12.79	3
Hygiene	10.57	5
Fast room giving	9.15	6
Rooms arrangement	7.29	7
Hotel cleanness	7.19	8
price	6.91	9
Food quality	6.24	10

5. CONCLUSION

In today's competitive world, customer satisfaction is a vital goal to be accomplished at an affordable cost. One important factor in customer satisfaction is the effective identification of customer expectations. The presented research aimed to get QFD model to improve service quality using customers` needs priorities in terms of case study in 4 star hotel of Zanjan. In the research customers` satisfaction of the services and importance degree of each need was investigated using survey method. In this paper A HOQ matrix was developed to identify customer wants and product attributes needed to satisfy customer requirements. The results shows that from the view point of customers, offering qualified food, existence of sauna and swimming pool, friendly behavior and attitude of personnel and their proper appearance are more important. This research has several important contributions. First, it suggests a useful solution to the design of academic programs, where all the expectations of potential employers can be satisfied. Second, it presents a methodology for analyzing customer expectations. Finally, it opens the window for future research in the area to include the uses of innovative tools to solve real problem. The findings of the study provide a number of implications for future research. First of all, it showed that although the perceived service quality of the company was found to be above the tolerable level, the expected service quality was higher than perceived service quality. Second, to extend the approach presented in this paper, the needs and expectations of the institutional customers will be collected and included in a HOQ in the near future and thereby complete the voice of the customers. Finally, recommendation is about determining customers' future voices. Perhaps forecasting-based approaches or fuzzy trend analysis may be useful in addressing the time dimension involved in the voice of customer.

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