



# A hands-on experience of the voice of customer analysis in maternity care from Iran

Customer analysis in maternity care

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## Abstract

**Purpose** – The purpose of this paper is to describe the use of voice of customer (VoC) analysis in a maternity care case study, where the aim was to identify the most important requirements of women giving birth and to determine targets for the improvement of maternity care in Fayazbakhsh Hospital in Tehran, Iran.

**Design/methodology/approach** – The tools of VoC analysis were used to identify: the main customer segment of maternity care; the most important of women's needs and requirements; the level of maternal satisfaction with delivered services at the study hospital and at a competitor; the nature of women's of requirements (termed Kano levels: assumed, expected, and unexpected); and the priorities of the study hospital for meeting these requirements.

**Findings** – Women identified the well-being of mother and baby as the most important requirements. Women's satisfaction with the services was, with a few exceptions, low to moderate. Services related to most of the maternal requirements were ranked better in the competitor hospital than the study hospital.

**Practical implications** – The results form a solid basis for achieving improvements in the processes of care for mothers and babies.

**Originality/value** – The paper presents a systematic approach to VoC analysis in health care settings as a basis for clinical process improvement initiatives.

**Keywords** Health services, Customer service management, Quality function deployment, Maternity services, Patient care, Iran

**Paper type** Case study



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### Introduction

In business, service quality is commonly defined as satisfying or exceeding the needs and requirements of the customer (Iacobucci *et al.*, 1995). Critically, organisations need to listen carefully to their customers and look at service provision through their eyes. Listening to the voice of the customer (VoC) is the starting point for planning and/or adapting services to satisfy customer needs and requirements. This means that improving the quality of any service, including health care, is likely to be unattainable unless the voice of the customer (or service user or patient) is brought into the process of improving services (Morand, 1995). VoC refers to articulated and unarticulated customer needs and requirements; as such it must be identified in order to start new process development (Duhovnik *et al.*, 2006).

VoC analysis has not been used in health care organisations for identifying their “customer” (patient) needs and requirements, or for designing/redesigning processes in order to be responsive to them. This is partly attributable to entrenched attitudes, limited resources, and lack of experience (Bamforth and Brookes, 2002).

VoC analysis was developed as a part of the quality function deployment (QFD) strategy. QFD has been employed for process design/redesign for decades in manufacturing and business enterprises. QFD, through its VoC analysis, brings quality into service or manufacturing processes (Mazur, 1997). VoC analysis is a distinct feature of QFD, though its special tools and techniques can also be used alongside other process improvement methods (Carey and Lloyd, 2001).

VoC analysis produces rich qualitative data from customers, which can be employed to improve the performance of relevant processes. According to the Kano model, VoC analysis also reveals three levels of requirements pertaining to the three levels of perceptions about quality:

- (1) assumed (basic);
- (2) expected (requested or revealed); and
- (3) unexpected (exciting) requirements (Figure 1).

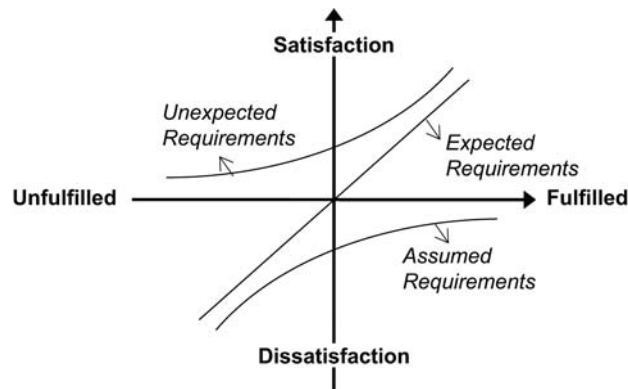
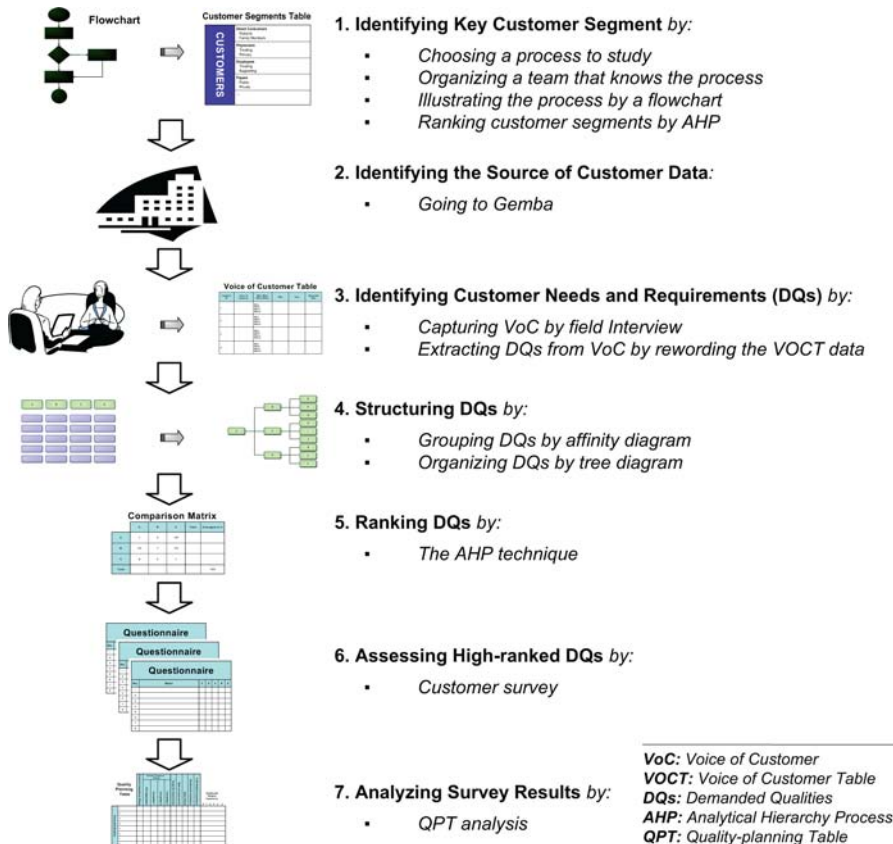


Figure 1.  
Kano Model

**Note:** The vertical axis represents the level of customer satisfaction, and the horizontal axis represents the level of meeting customer requirements

Assumed requirements are often so basic that customers may fail to mention them until we fail to deliver them. Their absence is very dissatisfying. However, meeting these requirements often goes unnoticed by most customers. Expected requirements are articulated or revealed requirements. They are typically, what we get by just asking customers what they want. These requirements satisfy (or dissatisfy) in proportion to their presence (or absence) in delivered service. Unexpected requirements are difficult to identify. They are beyond the customer's expectations or current. Their absence does not dissatisfy, but their presence excites or delights customers. Such requirements, however, provide the opportunity of creating immediate customer happiness and enthusiasm (Mazur, 1993).

This paper focuses on VoC analysis, that is, the tasks of identifying, organizing, and ranking customer needs and requirements followed by setting organisational priorities to meet these requirements (Griffin and Hauser, 1993). We outline a seven-step process to this end (Figure 2). After explaining the process, a case study from the maternity ward of an Iranian Social Security Organisation hospital serving a poor population, is presented in order to illustrate the power of VoC analysis in health care settings, especially in clinical areas.



**Figure 2.** The conceptual framework of the voice of customer analysis

### *1. Identifying the key customer segment of a process*

The first step of VoC analysis is to choose the specific process to be studied. A cross-functional team is then assembled from those who know the process. Subsequently, the process is flowcharted by the team. As a result, outputs, customer segments, activities, inputs, and providers of the process can be respectively recognised by focusing on the flowchart (Batalden, 1997). The customer segments are ranked using analytical hierarchy process (AHP). “AHP uses pairwise comparisons to enable decision making by considering many factors in seemingly complex, non-structured situations” (Saaty, quoted in Chaplin and Terninko, 2000). The process begins by setting up a matrix table for pairwise comparisons. Qualitative data (in this case the customer segments) are then entered in both columns and rows. Comparisons are made between each of the rows and columns to determine which is more important using a 1-9 scale. Finally, the average for each row represents the weight of each item. Through this process the main customer segment, called the key customer segment, is identified (Chaplin and Terninko, 2000).

### *2. Identifying the sources of customer voice data*

There are many sources for VoC data. However, the Japanese have coined a word, Gemba (a place in which source information can be learned), to describe the true source of data (Akao and Mazur, 2003). Gemba is applied to the place in which services are directly used by customers such as a hospital ward. In Gemba, you can actually see the customers, identify their requirements, and assess how the services meet these requirements. Gemba is not an artificial site such as a meeting room and we do not ask questions with technology and we are not relying on customers’ memories to report problems to us (Mazur, 1997).

### *3. Capturing VoC data*

Various methods, such as brainstorming, focus group discussion, field interviews, customer remarks, and customer complaints can be used to capture VoC data (Duhovnik *et al.*, 2006 and Ming-Chyuan *et al.*, 2006). An in-depth structured interview with a small sample of customers in Gemba is one of the best methods for obtaining the essential data on customer needs and requirements (Mazur, 1997). To this end, 15 to 20 customers are interviewed. The interview focuses on asking “why” and “how” they use the services. Customers do not usually say everything that is important to them. The voice of customer table (VOCT) builds a useful structure for capturing crucial data using 5Wh1H (who, what, when, where, why, and how) questions. After verbatim recording of the responses of customers on VOCT, customer requirements or demanded qualities (DQs) are extracted by re-framing responses as brief positive statements (Chaplin and Terninko, 2000). The captured DQs of the key customer segment are rich, qualitative and unorganised data, so they may not yet be in the form of practical suggestions (Duhovnik *et al.*, 2006).

At this stage, there is no need for interviews with a statistically representative sample of customers because the purpose of Gemba research is just to get an understanding of customer voice, not to determine customer preferences, and additional samples tend to yield little more than repetitious data (Mazur, 1997 and Terninko, 1997).

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#### 4. Structuring DQs

For developing more usable data, captured DQs must be initially organised in a hierarchy from the customer point of view. To this end, DQs are firstly grouped using an affinity diagram. Affinity diagram is a tool to sort and provide structure to a large number of ideas, here the DQs, by creating clusters or groups of related items. A descriptive title is selected for each group. The group titles should also be phrased as DQs since these headings are also DQs but at a higher level of abstraction. The affinity diagram is then converted to a tree diagram to build the hierarchy of DQs. The tree starts with the branches or the low level DQs (DQs in each group) and works toward the trunk or the high level DQs (the title of groups) (Chaplin and Terninko, 2000).

#### 5. Ranking DQs

All of the identified customer requirements do not have the same value and focusing on all requirements may waste limited resources. According to the Pareto principle (the 80/20 rule), the meeting of a few of the most highly ranked DQs can significantly increase customer satisfaction (Koch, 2005). So, the DQs must be precisely ranked. The AHP technique is used to rank DQs on the tree diagram. The AHP process begins with the high level DQs (trunk) and continues with the low level DQs (branches) on the tree diagram. The weight of low-level DQs provided by AHP, need to be adjusted for the weight of the higher category of which they are part. Hence, the relative weight for each low level DQ is determined via multiplying its weight by the weight for the related high level DQ. The relative weights are then related to the weight of the higher group so that, when the tree is complete, the different branches (the low level DQs) can be directly compared to each other (Chaplin and Terninko, 2000).

#### 6. Assessing high-ranked DQs

The most highly ranked DQs, a maximum of 20, are used to conduct a customer survey with a larger group of the key customer segment to assess:

- their preferences tied to selected DQs;
- their satisfaction level with given services in the study organisation and its competitor(s);
- the Kano levels of requirements.

In fact, the customer survey converts the earlier DQ qualitative data into a set of valid quantitative data.

According to the stated aims, the survey questionnaire must have three parts. The first part of the questionnaire rates high-ranked DQs from the customer point of view. In fact, this part tests whether qualitative data captured by the Gemba research are quantitatively important for the larger sample of customers. A five-point Likert scale (1 for “does not matter” to 5 for “very strongly matters”) is often appropriate to assess customer preference.

The second part of the questionnaire assesses the satisfaction level of customers with given services by comparing with one or more competitive providers. This part ranks the target organisation and its competitor(s) based on how they meet each of the selected DQs. The second part of the questionnaire also uses a Likert scale (1 for “poor” to 5 for “excellent”).

The third part of the questionnaire is designed to identify the three Kano levels of requirements. This part asks pairs of multiple-choice questions. The first half of each pair asks how customers will feel if a DQ is provided. The second half asks how they will feel if it is not provided. Customer responses to a paired question fall into one of the three levels: assumed, expected, and unexpected requirements. In practice, a table is usually used to interpret the result of part 3 of the questionnaire (Figure 3). The answers to negatively and positively phrased questions identify the columns and the rows of the table, respectively. As shown in Figure 3, there are 25 possible combinations for the paired questions categorised in the three levels (Chaplin and Terninko, 2000).

The reliability of the questionnaire is assessed by the computation of Cronbach's  $\alpha$  coefficient for internal consistency (Chang and Cheng, 2003). Note that the questionnaire pre-testing provides the variance of customer preference that is needed to calculate sample size (Pagano and Gauvreau, 2000).

7. Analysing the customer survey

The last step of VoC analysis is the determination of organisational priorities for improvement. To this end, the results of the customer survey are entered into the quality-planning table (QPT), in which the weight of DQs is determined by considering the capacity of the organisation. By QPT analysis, realistic planning for meeting customer requirements commences. The weight of a DQ presents the combination of the organisation capability to meet the DQ with customer preference on that DQ (Chaplin and Terninko, 2000 and Duhovnik *et al.*, 2006).

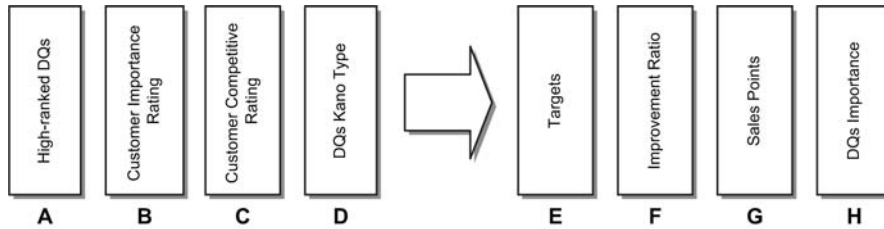
The left-hand columns of the QPT encompass the data captured from the customer survey in the following order (Figure 4):

- Selected DQs, which have been assessed by the survey.
- Customer importance rating, the median of the answers to the first part of the questionnaire.
- Customer competitive rating, the median of the answers to the second part of the questionnaire. According to the number of assessed competitor organisations,

Kano Table			How do you feel if X not provided?				
			5	4	3	2	1
			I like it	I expect it	I feel neutral	I can tolerate it	I dislike it
How do you feel if X provided?	5	I like it		U*	U	U	E*
	4	I expect it	RU*		I*	I	A*
	3	I feel neutral	RU	I	I	I	A
	2	I can tolerate it	RU	I	I		A
	1	I dislike it	RE	RA	RA	RA	

Figure 3.  
Kano table

Notes: \*A: Assumed, E: Expected, U: Unexpected, I: Indifferent, and R: Reverse answer. 25 different responses for the paired questions are shown



**Notes:** The table has listed high-ranked DQs (column A), the results of the questionnaire’s part 1 (column B), the results of the questionnaire’s part 2 (column C), and the results of the questionnaire’s part 3 (column D) captured by the customer survey. Targets (column E), improvement ratios (column F), and sales points (column G) have been identified by the organizational team based on assessing the customer survey results. The weight of DQs has been calculated as the output data of QPT (column H)

**Figure 4.** The data of the quality-planning table (QPT)

two or more columns can be included. The first column always demonstrates current customer satisfaction with the target organisation services and the next column(s) represent the satisfaction levels with the competitor(s) services.

- The Kano levels of DQs, the median of the answers to the third part of the questionnaire interpreted by the Kano table.

The columns on the right side of the QPT present organisational data and show the objectives of improvement in the following order:

- Targets are determined by a 1-5 rating scale; comparing the customer data (customer importance rating, customer competitive rating, and the Kano level of quality perception) is used for setting the target values for each DQ.
- The improvement ratio represents the potential improvement for each DQ. It is a ratio of the target to the current customer satisfaction with the services of the target organisation.
- “Sales points” represent the organisational ability to meet each DQ. The rating scale of 1, 1.2, and 1.5 is used to express no, medium, and strong “sales points”, respectively.
- Absolute importance (raw weight) of the DQs is calculated using equation (1):

$$AI_i = CI_i \times IR_i \times SP_i \quad (1)$$

Where  $AI_i$  is the absolute importance of the  $i$ th DQ;  $CI_i$  is the customer importance of the  $i$ th DQ;  $IR_i$  is the improvement ratio of the  $i$ th DQ, and  $SP_i$  is the “sales point” of the  $i$ th DQ.

- Relative importance of each DQ is calculated by multiplying the corresponding absolute importance of that DQ by 100.

DQs with the highest weights represent the organisational priority for improvement. They must be considered by re-allocating the organisational resources (Duhovnik *et al.*, 2006).

**A case study**

In October 2005, a cross-functional team of two physicians and five midwives was formed at the maternity ward of Fayazbakhsh hospital to analyze the voice of the “customer” of maternity care. This team mapped the process of maternity care and identified “women in labour” as the key customer segment of care (Table I).

Between 31 January and 4 February 2006, the midwives conducted in-depth structured interviews with women following birth ( $n = 18$ ), each one for about 45 minutes, to identify their needs and requirements. The team used 12 open-ended, 5Wh1H type questions. To be confident about the consistency and reliability of the interviews, the process of interview was standardised using a detailed flowchart (Figure 5).

Through these interviews, 54 maternal requirements (DQs) were identified and numbered. The team members helped a subgroup of the interviewees to organise identified DQs on the affinity and tree diagram. Then, they ranked DQs on the tree. From the rank order, the twenty highest-ranked DQs were selected with approximately 70 per cent cumulative weight, to design a three-part questionnaire for collecting data from a large sample of women (Table II).

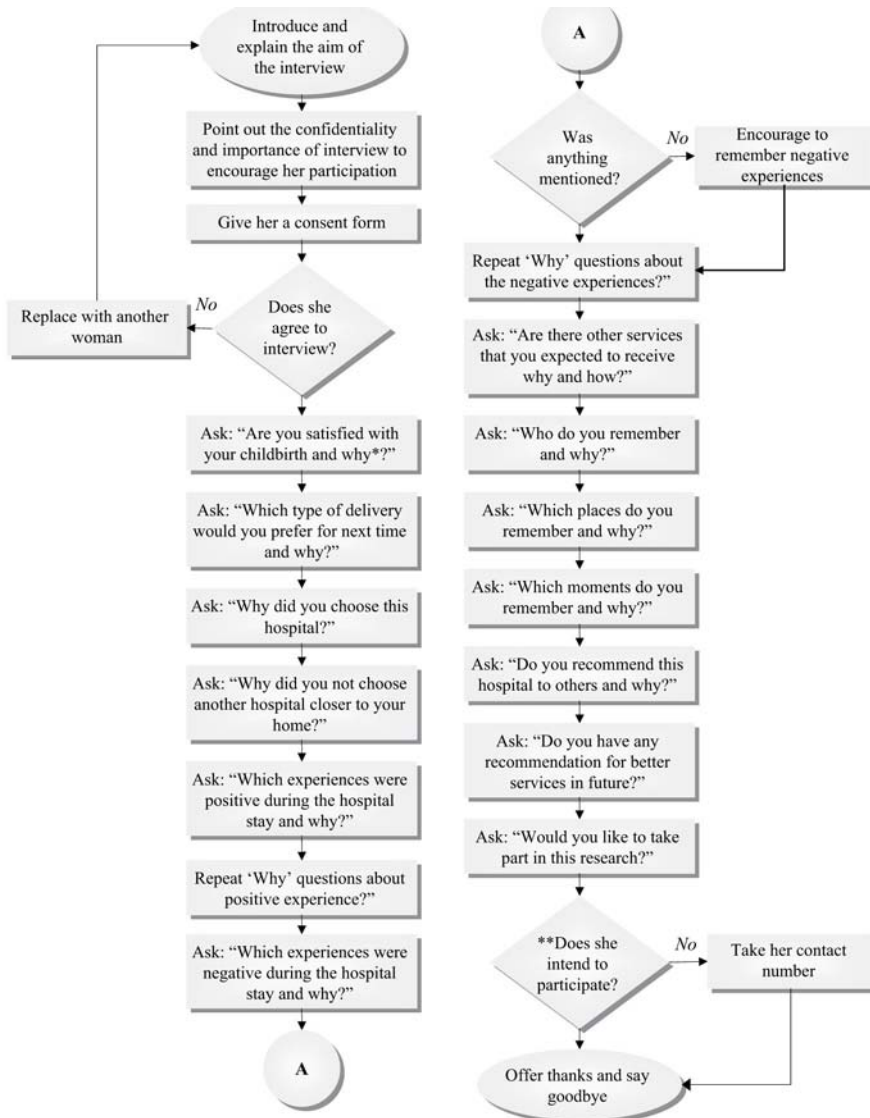
The previously identified top twenty DQs were used to construct a self-completed questionnaire. Likert-scale type responses were included. A modified “prioritization model 1-2-3” was used to assess selected DQs by the participants. In this method, women first determined the DQs that they found most important for them, giving them a score of five. Then, they selected the least important DQ giving this a score of one. The remaining DQs were rated between the most and the least important DQs with scores of two, three and four (Duhovnik *et al.*, 2006). The questionnaire was then piloted with 15 women. From the pilot data, the team could estimate the variance related to maternal preferences ( $= 1.92$ ) and calculate the required sample size ( $n = 82$  with  $\alpha = 0.05$ ,  $S^2 = 1.92$ , and  $d = 0.3$ ). After modifying three questions, the final questionnaire provided scale scores ranging from 0-21 and was found to be reliable, with a Cronbach’s  $\alpha$  of 0.90 indicating very high internal consistency (Devellis, 2003).

In order to achieve an adequate response rate and to ensure correct completion of the questionnaires, the midwives visited participants in their homes. Prior to the commencement of the survey, the team standardised the process of visiting by developing a flowchart for the conduct of the visit and by training the team members to increase the reliability of the survey. Between 23 July and 19 September 2006, the

**Table I.**  
The relative weight of the customer segments of maternity care at Fayazbakhsh hospital weighted by AHP

Customer segments	% AHP relative weight
Woman in labour	29.7
Midwife	21.3
Obstetrician	18.3
Insurer	12.6
Mother’s family	8.6
Anaesthetist	3.4
Admission unit	2.5
Radiologist	2.1
Paediatrician	1.5





**Notes:** \*Maternal needs and requirements are only identified by repeated “Why” and “How” questions; \*\*for organizing and ranking the requirements

**Figure 5.** The flowchart for interviews with women in the postpartum unit of Fayazbakhsh hospital

questionnaires were voluntarily completed by a random sample of women ( $n = 89$ ), who had given birth at Fayazbakhsh hospital within the previous year.

Unlike the commonly used Kano questions with five choices for each question, the nature of the questions in this study made it possible to use “triple-choice” questions. Therefore, we interpreted the results using a modified Kano’s table, which contained nine possible combinations for the paired questions (Figure 6).

Demanded qualities	% relative weight	% cumulative weight
1. Well-being of baby	9.0	9.0
2. Well-being of mother	6.4	15.4
3. Low-pain labour	5.6	21.0
4. Caring and sensitive staff	4.3	25.3
5. Frequent monitoring	4.2	29.5
6. Privacy during delivery and vaginal examination	3.8	33.3
7. Quick response to requests	3.1	36.4
8. Labour and childbirth education	2.9	39.3
9. Provision of comfort	2.9	42.2
10. Listening to the fetal heartbeat	2.8	45.0
11. Normal vaginal delivery	2.8	47.8
12. Companionship after delivery	2.7	50.5
13. Immediate opportunity to see the newborn	2.5	53.0
14. Bed linen changed frequently	2.5	55.5
15. Improved hospital facilities	2.4	57.9
16. Painless vaginal examination	2.3	60.2
17. Short labour	2.2	62.4
18. Helping mother with breastfeeding	2.2	64.6
19. Clean maternity ward	2.2	66.8
20. Quick admission	2.0	68.8

**Table II.**  
The high-ranked maternal requirements weighed by analytical hierarchy process (AHP)

		How do you feel if X not provided?			
		3	2	1	
		I feel neutral	I can tolerate it	I dislike it	
How do you feel if X provided?	3	I like it	U*	U	E*
	2	I expect it	I*	I	A*
	1	I feel neutral	I	I	A

**Figure 6.**  
Modified Kano table

**Notes:** \*A: Assumed, E: Expected, U: Unexpected, and I: Indifferent. By this modification, reverse answers are missed (compare with Figure 3)

The mean age of the participants was 29 years, with a range of 19 to 45, and standard deviation of 5.3 years. Most of them were covered by health insurance (92.1 percent). The demographic characteristics and the pregnancy status of participants are summarised in Tables III and IV, respectively.

The results of the first part of the questionnaire showed that four DQs namely, well-being of the mother, well-being of the baby, caring and sensitive staff, and clean maternity ward, were rated as the most important requirements. Painless vaginal examination, companionship after birth, and helping mother with breastfeeding were

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considered the least important requirements. The remaining 13 DQs were rated in between (Table V).

The results of the second part of the questionnaire demonstrated that the services related to 12 DQs were ranked better at Babak hospital, the competitor organisation, than at Fayazbakhsh hospital. Fayazbakhsh hospital was only rated better on one of the DQs, namely “bed linen changed frequently”. Services concerning the remaining seven DQs were evaluated similarly at the two hospitals. This part also showed that the satisfaction level with given services at the study hospital was low to moderate (mean < 3.6), except for a few items such as painless vaginal examination, low-pain labour and short labour.

The results of the third part of the questionnaire demonstrated that three DQs, namely “bed linen changed frequently”, “clean maternity ward”, and “improved hospital facilities”, were regarded as assumed (basic) requirements. Painless vaginal examination, vaginal birth, and low-pain labour were grouped as unexpected (exciting) requirements. The remaining 14 DQs were considered as expected (requested or revealed) requirements.

Finally, the medians of the answers to the questionnaires were entered into the quality-planning table (QPT). We used median values instead of means for two reasons. First, the survey results were discrete ordinal data obtained through an ordinal scale (Likert scale). So, medians were likely to be more appropriate than means (Pagano and Gauvreau, 2000). Second, the standard deviations of the variables were very small. Hence, the medians were very close to the means.

The team calculated the DQs’ weights by determining three variables, i.e. targets, improvement ratios, and “sales points” (Table VI).

The QPT analysis identified that the well-being of mother and baby were still the most important DQs with 8.5 per cent and 7.7 per cent relative weights, and painless vaginal examination was the least important DQ with 2.7 per cent relative weight.

## Discussion

The findings of this study include two distinct two parts: improvements in the methodology and findings related to the case study.

### *Methodology*

In contrast to most articles in the health care arena, we have focused here on the early phases of QFD. We found only 11 QFD articles in Medline and a few papers published in industrial journals. Except for two papers, which had concentrated on the VoC issues, the rest had focused on the entire QFD process. Most of the papers were not about clinical processes nor were patients the key customers. Review of the literature concerning VoC analysis revealed some methodological shortcomings that we have attempted to overcome in this study.

*The key customer segment.* Healthcare organisations have a chain of customers who may have different and sometimes conflicting requirements. In the chain of customers, the key customer segment ultimately determines the success or failure of relevant services (Mazur, 1993). Therefore, the key customer segment must be identified by an objective and accurate method. In most of the published articles, the method of identifying the key customer segment is ambiguous. We found that in some papers

**Table III.**  
The demographic  
characteristics of  
participant women

Age	SD	Level of education			Job			Insurance			Household income Mean	SD
		Elementary %	Middle school %	High school %	College %	Housewife %	Employed %	Social security %	Health %	Non %		
29	5.3	42.7	28.1	29.2	0	100	0	87.6	4.5	7.9	2/000/000IRR	730/000IRR
											(600 USD <sup>a</sup> )	(220 USD)

**Notes:** <sup>a</sup> Iranian rial (IRR) has been exchanged into US dollar (USD) based on purchasing power parity (PPP)

Gravidity Mean	SD	1	1.5	Abortion		21.3	16.8	12.3	22.5	Delivery type		Pervious delivery		Neonate's Status <sup>a</sup>	
				Mean	SD					VD <sup>a</sup>	SC <sup>b</sup>	VD	SC	Healthy	Ill
2.5	1	1	1.5	1	21.3	16.8	12.3	22.5	58.5	41.5	72	28	92.1	7.9	

**Notes:** <sup>a</sup> Vaginal delivery; <sup>b</sup> Caesarean section; based on the inpatient records

**Table IV.**  
The pregnancy status of  
participant women

**Table V.**  
The results of maternal survey

Demanded qualities	Part 1: Importance rating		Part 2: Competitive rating				Part 3: Triple choice questions				Kano level <sup>a</sup>
	Mean	SD	Fayazbakhsh hospital	Babak hospital	Positive question	Negative question	Mean	SD	Mean	SD	
1. Well-being of baby	4.92	0.27	3.30	0.80	4.32	0.90	4.88	0.31	1.05	0.23	E
2. Well-being of mother	4.54	0.64	3.50	0.81	4.27	0.90	4.77	0.41	1.14	0.35	E
3. Low-pain labour	3.93	1.22	4.37	0.77	4.49	1.04	4.74	0.51	1.64	0.50	U
4. Caring and sensitive staff	4.21	1.05	3.40	0.78	4.22	0.86	4.56	0.58	1.30	0.46	E
5. Frequent monitoring	3.82	1.18	3.58	0.75	4.40	0.74	4.66	0.49	1.51	0.54	E
6. Privacy during delivery and vaginal examination	3.80	1.28	3.46	0.79	4.19	1.04	4.5	0.58	1.41	0.67	E
7. Quick response to requests	3.60	1.12	3.46	0.82	4.22	0.97	4.67	0.49	1.39	0.53	E
8. Labour and childbirth education	3.93	0.97	4.30	0.79	4.29	0.93	4.43	0.62	1.57	0.76	E
9. Provision of comfort	3.95	0.94	3.50	0.88	4.37	0.77	4.61	0.51	1.44	0.50	E
10. Listening to the fetal heartbeat	4.02	1.20	3.46	0.81	4.38	0.88	4.68	0.55	1.26	0.53	E
11. Normal vaginal delivery	3.76	1.38	2.47	0.70	2.70	1.01	4.07	1.22	2.06	1.15	U
12. Companionship after delivery	3.22	1.52	2.64	0.80	4.48	0.56	4.38	0.74	1.71	0.78	E
13. Immediate opportunity to see the newborn	4.17	1.06	3.54	0.78	4.47	0.69	4.70	0.48	1.41	0.58	E
14. Bed linen changed frequently	4.11	0.97	3.50	0.81	3.34	0.85	4.44	0.50	1.14	0.38	A
15. Improved hospital facilities	3.43	1.21	2.78	0.91	4.25	0.87	4.33	0.49	1.44	0.54	A
16. Painless vaginal examination	3.14	1.27	4.41	0.67	4.32	1.07	4.46	0.62	1.66	0.62	U
17. Short labour	3.69	1.42	4.29	0.89	4.30	0.97	4.76	0.47	1.43	0.54	E
18. Helping mother with breastfeeding	3.05	1.44	3.41	0.80	3.48	0.85	4.41	0.70	1.61	0.71	E
19. Clean maternity ward	4.34	0.90	4.22	0.86	4.46	1.08	4.46	0.50	1.16	0.37	A
20. Quick admission	4.00	0.94	3.40	0.93	4.33	0.90	4.53	0.52	1.41	0.51	E

Notes: <sup>a</sup> A: assumed, E: expected, U: unexpected

Demanded qualities	Customer importance rating	Fayzabakhsh Hospital rating	Babak Hospital (competitor) rating	DQ Kano Level <sup>a</sup>	Target	Improvement ratio	Sales point	DQ absolute importance	DQ relative importance (%)
1. Well-being of mother	5.0	4.0	4.5	E	5.0	1.25	1.5	9.4	8.5
2. Well-being of baby	5.0	3.5	5.0	E	5.0	1.43	1.2	8.6	7.7
3. Caring and sensitive staff	5.0	3.5	5.0	E	5.0	1.43	1.0	7.1	6.4
4. Normal vaginal delivery	4.0	3.0	3.0	U	4.0	1.33	1.2	6.4	5.8
5. Listening to the fetal heartbeat	4.0	4.0	5.0	E	5.0	1.25	1.2	6.0	5.4
6. Low-pain labour	4.0	5.0	5.0	U	5.0	1.00	1.5	6.0	5.4
7. Clean maternity ward	5.0	5.0	5.0	A	5.0	1.00	1.2	6.0	5.4
8. Quick admission	4.0	4.0	5.0	E	5.0	1.25	1.2	6.0	5.4
9. Frequent monitoring	4.0	4.0	5.0	E	5.0	1.25	1.2	6.0	5.4
10. Improved hospital facilities	4.0	3.0	4.0	A	4.0	1.33	1.0	5.3	4.8
11. Provision of comfort	4.0	4.0	5.0	E	5.0	1.25	1.0	5.0	4.5
12. Immediate opportunity to see the newborn	4.0	4.0	5.0	E	5.0	1.25	1.0	5.0	4.5
13. Companionship after delivery	3.0	3.0	5.0	E	5.0	1.67	1.0	5.0	4.5
14. Short labour	4.0	5.0	5.0	E	5.0	1.00	1.2	4.8	4.3
15. Bed linen changed frequently	4.0	4.0	3.5	A	4.0	1.00	1.2	4.8	4.3
16. Privacy during delivery and vaginal examination	4.0	4.0	4.5	E	4.5	1.13	1.0	4.5	4.1
17. Quick response to requests	4.0	4.0	4.5	E	4.5	1.13	1.0	4.5	4.1
18. Labour and childbirth education	4.0	5.0	5.0	E	5.0	1.00	1.0	4.0	3.6
19. Helping mother with breastfeeding	3.0	4.0	4.0	E	4.0	1.00	1.2	3.6	3.2
20. Painless vaginal examination	3.0	5.0	5.0	U	5.0	1.00	1.0	3.0	2.7

Notes: <sup>a</sup> A: assumed, E: expected, U: unexpected. Sorted by the weight of demanded qualities

Table VI.  
The quality-planning table

researchers identified the key customers based on their opinion and in others, various segments were studied at the same time.

*Customer interview and survey.* Identifying customer requirements and their importance is critical for VoC analysis. Customer requirements, gathered as qualitative data, are determined through interviewing or discussion with a small group of customers. However, determining the importance of requirements, as quantitative data, requires a statistically valid sample of customers. This is what was missing in some of the papers. The method of sampling and the calculation of sample size were other ill-defined areas in most of the papers. In addition, reliability and validity tests have not usually been performed in the published studies.

*Other failures.* The absence of process-orientation, the lack of attention to the three Kano levels of customer perceptions of quality, and using pre-designed and standard questionnaires such as the SERVQUAL questionnaire, were other important pitfalls that we encountered in some of these articles (Lim *et al.*, 1999).

#### *The case study*

As the term implies, health care should demonstrate care for those it serves, and it is now well recognised that patients are not listened to enough in health care organisations (Lloyd, 2004). Our study results demonstrate that patients are well aware of their needs and requirements. For example in this study the well-being of mother and baby have been ranked higher than other requirements. The expressed maternal requirements also cover all dimensions of health care quality as defined by international organisations such as The Joint Commission and The Institute of Medicine (Mayberry *et al.*, 2006). Clearly there is merit in capturing the voice of customer/patient in quality improvement activities in health care settings.

The well-being of mother and baby, categorised as the most important maternal requirements by a small group of women (interviewees), also remained as the most important maternal requirements through the maternal survey, as well as in the quality-planning table analysis. This indicates that for increasing maternal satisfaction as well as improving the quality of maternity care, the study hospital must first shift the available resources to guarantee maternal and neonatal health status before dealing with other issues.

Painless vaginal examination, low-pain labour and vaginal birth were grouped as unexpected (exciting) requirements. This indicates that, contrary to general belief, the studied women did not want caesarean birth. They mostly feared the pain of vaginal birth. So strategies to improve the management of labour pain and also enhance women's confidence in dealing with pain could be effective in achieving lower rates of caesarean section in this hospital.

In conclusion, listening to the voice of the customer is a starting point for any quality improvement initiative, and healthcare organisations need a rigorous and reliable method to capture and analyse "customer"/patient requirements. The voice of customer (VoC) analysis method, as a part of a quality function deployment (QFD) strategy, is a well-established process for this purpose in other settings, although there is much less experience of it in the health care arena.

Capturing the voice of the customer, eliciting customer requirements, organizing these requirements, and conducting a customer survey to identify the importance of identified requirements have been demonstrated in this study as a feasible method for



getting a complete and accurate set of both the spoken and unspoken patient requirements.

We have presented a step-by-step method, which proved feasible and useful in the context of improving maternity care at our study hospital. Whether the VoC analysis employed in this case study has value in other clinical settings and processes, will only be demonstrated by further application of it in these settings.

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