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Improving the Quality of Hospital Services Through the Integration of Servqual, Kano, and Two Iterations of Quality Function Deployment (QFD)

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ABSTRACT

Purpose – This research focuses on the problem of decreasing the number of private hospital visits, one of the causes of which is patient dissatisfaction with the healthcare services provided. This research aims to design recommendations for improving the quality of a hospital's health services based on the perceived needs of patients so that it is hoped that patient satisfaction can be achieved well.
Methodology/approach – The literature review defines service quality and patient requirements in this research. Servqual and Kano questionnaires are used in this research, with 150 patients as respondents. After the quantitative data has been obtained and analyzed, the next step is to collect qualitative data by conducting interviews with health service management experts. By using QFD analysis, the relations between patient requirements and service characteristics are obtained. Targeted health service criteria will be chosen to be used as recommendations to improve hospital services.
Findings – Some patient requirements are not optimally fulfilled by the hospital. Service characteristics and service critical parts are prioritized for the recommendation in improving the hospital health services.
Novelty/value – The research combines scientific disciplines marketing, namely Service Quality (Servqual) and scientific disciplines operations management, namely Kano and Quality Function Deployment (QFD) first iteration (House of Quality) and second iteration (Part Deployment), with the hospital's health service as the research object. The integration can be used in other service companies, especially in health services.

JEL (Journal of Economic Literature) Classification Number: M110, M300

INTRODUCTION

The health issues currently occurring in Indonesia have quite an impact on the health industry, especially in the Bandung City area, where over the last five years health complaints from Indonesian people have increased, followed by the number of hospitals starting to increase significantly each year.

(Central Statistics of Indonesia, 2022; Central Statistics of Indonesia, 2023). So, if it is linked to the number of hospital visits, as the number of public complaints increases, the average number of visits to each hospital in Bandung City will increase, followed by the competitiveness of each hospital also increasing (Department of Bandung City Health, 2023). The healthcare industry will become increasingly competitive, with many patients starting to demand higher levels of healthcare quality (Tan et al., 2019). The quality of service starts from fulfilling customer needs and achieving customer satisfaction (Iskamto et al., 2023). Improving the quality of health services, especially in hospitals, is one of the most important things in maintaining hospital competitiveness in the health industry. Quality is something that every organization as a whole needs to consider (Herman, 2023). A service improvement that meets customer expectations, ultimately leads to increased customer satisfaction and also increases their market size (Alsaadi et al., 2018).

One of the private hospitals in the city of Bandung, Indonesia, has experienced a decline in the number of patient visitors over the last five years, starting from 2018. This is also supported by a preliminary survey conducted by researchers, which concluded that the hospital's services had not been able to meet customer satisfaction (Preliminary Survey, 2023). Of course, this problem is quite worrying, and it is very likely that in the future it will continue to decline if the hospital does not implement a solution to this problem (Nottingham et al., 2018).

Apart from that, there are previous researches regarding improving health services based on customer requirements using several theories that focus on improving service quality. First, research was conducted by Lacerda et al. (2022), regarding the evaluation of the quality of public health services in Brazil using dimensional integration Servqual and Kano Model. The results of this research show that 6 patient requirements need to be developed, one of which is a clean and comfortable environment. However, this research only focus on the form of health service requirements that need to be met by service providers without providing details of the actions that must be taken. Second, research was conducted by Gavahi et al. (2023), regarding service improvement radiology unit health by translating customer requirements into service quality specifications, using Quality Function Deployment (QFD). The results of this research show that 7 technical characteristics are not optimal, so one way that needs to be done is to add new technological devices and equipment to increase patient satisfaction. However, this research does not focus on providing priority recommendations regarding what actions are more effective in improving the quality of health services in hospitals. So, this research tries to combine the methods used by the two studies which will be a novelty in this research.

The combination of methods carried out is by combining two scientific disciplines, namely, marketing which consists of Service Quality (Servqual), and operations management which consists of Kano and Quality Function Deployment (QFD). Apart from that, this research also adds a second iteration process or Part Deployment in the QFD analysis, which is a continuation of the QFD first iteration of House of Quality (Ginting et al., 2020). This was done because this research aims to improve the quality of hospital; health services based on patient requirements and focuses on recommendations for effective actions that can be taken by hospital management. So, with this merger, it is hoped that improvements in health services at hospitals can be achieved more optimally.

Based on the explanation above, it can be concluded that this research is necessary to find out what the patients' requirements are. So that recommendations for improving the quality of a hospital's health services can be obtained. It is hoped that these recommendations can increase the competitiveness of hospitals in the health industry, especially in the city of Bandung, in providing the best health services to patients so that patient needs will be met optimally, and patient satisfaction will be achieved.

LITERATURE REVIEW

Service Quality

Service quality or servqual is a service scale measure developed by Parasuraman in 1988, which is used to measure customer perceptions of service quality. By assisting the company in understanding the needs and expectations of its customers, quality promotes the development of a strong relationship with

customers (Hidayah et al., 2019) Customer satisfaction has been influenced by several aspects, including service quality (Samsul et al., 2022). So, it can be said that if the hospital's services meet high standards of quality, it will lead to increased patient satisfaction (Wulansari and Pratama, 2022). In conclusion, service quality is used as a powerful tool in increasing the superiority and competitiveness of a company or organization, especially in the service sector (Lizarelli et al., 2021; Lacerda et al., 2022). The following is the equation of Servqual (Altuntas and Kansu, 2020; Lacerda et al., 2022), namely as follows:

$$SQ = PS - ES \quad (1)$$

Where,
SQ: Servqual Score (service quality value)
PS: Perceptions Score (perceived value of services)
ES: Expectations Score (value of service expectations)
Equation model Servqual above, will show the value of the gap between the services or services provided by the company or organization to their customers. There are five dimensions in the theory of service quality, namely as follows (Kotler and Keller, 2022; Lacerda et al., 2022; Gavahi et al., 2023).

(1) Tangible, namely the physical appearance of service facilities such as equipment, employee appearance, and other physical facilities.
(2) Reliability, namely the ability to provide promised services reliably and accurately.
(3) Responsiveness, namely the ability to respond to customer requests or complaints quickly and appropriately.
(4) Assurance, namely a guarantee of services provided to customers so that a sense of trust arises in the service provider.
(5) Empathy, namely the attention given by the service provider to customers that is personal or individual in nature.

Customer Satisfaction

In competitive markets, customer satisfaction is considered an important element in business strategy so it is hoped that companies can acquire and retain customers (Rachman and Hendayani, 2023). Customer satisfaction will arise when a product or service performs better than expected, where customers will compare the perceived and expected service performance (Indrawati et al., 2021). The way to assess customer satisfaction value is usually called CSV (Customer Satisfaction Value). This value refers to the dimensions determined to improve service quality. The CSV calculation formula is as follows (Ishak et al., 2020; Nurjannah et al., 2020).

$$Gap = Reality - Expectations \quad (2)$$
$$CSV = Gap \times Importance\ Value \quad (3)$$

Kano

In the Kano Model, several attributes that influence customer satisfaction are classified into six categories. This category is based on the relationship between performance and satisfaction non-linear. The six categories are as follows (Gangurde and Patil, 2018; Lizarelli et al., 2021; Lacerda et al., 2022).

(1) Attributes Must-be (M): Basic attributes that customers expect, if they are absent or underperformed, customers will be very disappointed. However, when working well, this attribute doesn't bring any satisfaction.
(2) Attributes One-dimensional (O): Attributes where the higher the performance value, the higher the customer satisfaction value, and vice versa.
(3) Attributes Attractive (A): Attributes that are important for proportional customer satisfaction. However, if it is not fulfilled, it won't bring customer dissatisfaction.
(4) Attributes Indifferent (I): Attributes that won't bring satisfaction if present and won't bring dissatisfaction if these attributes are absent.
(5) Attributes Reverse (R): An additional attribute that brings dissatisfaction when present and satisfaction if this attribute is absent.

(6) Attributes Questionable (Q): Attributes that lead to circumstances when customer satisfaction cannot be defined.

According to Fofan and Asian in (Lacerda et al., 2022), in the Kano Model questionnaire, there are two types of questions or statements, namely functional and dysfunctional. Statement functional is a statement that is expected by respondents if the attribute is applied by the product or service provider. A statement dysfunctional is a statement that is expected by respondents if the attribute is not implemented by the product or service provider.

When analyzing the influence of the availability of a customer requirement attribute on the level of customer satisfaction and dissatisfaction, a calculation is carried out which is called Customer Satisfaction Coefficient (CSC). The calculation formula for CSC is as follows (Lizarelli et al., 2021; Lacerda et al., 2022).

$$SC\% = (A\% + O\%) / (A\% + O\% + M\% + I\%) \quad (4)$$

$$DC\% = ((O\% + M\%)\ x\ (-1)) / (A\% + O\% + M\% + I\%) \quad (5)$$

Where,
SC% : Satisfaction Coefficient
DC%: Dissatisfaction Coefficient
A% : Percentage of respondents who meet the category attribute of attractive
O% : Percentage of respondents who meet the category attribute of one-dimensional
M% : Percentage of respondents who meet the category attribute of must-be
I% : Percentage of respondents who meet the category attribute of indifferent

The value range for the level of satisfaction is between 0 and 1. If the resulting value is close to 1, it shows a stronger influence. Meanwhile, if it is close to 0, it shows a weak influence. The negative sign (-) obtained in the dissatisfaction value indicates the direction of influence of the attribute (Lizarelli et al., 2021; Lacerda et al., 2022).

Quality Function Deployment (QFD)

The main tool in QFD First Iteration or the planning phase is interconnected matrices, namely a matrix that connects customer needs and desires "voice of customer" and the design characteristics of a product or service. This matrix is also known as House of Quality or HoQ (Cohen, 1995; Ishak et al., 2020). The House of Quality translates the voice of customer or customer requirements (the WHAT's) become design characteristics or technical characteristics (the HOW's). These technical characteristics are obtained based on existing literature studies and also the capabilities and needs of service providers or those who create products (Cohen, 1995; Natte et al., 2016; Gavahi et al., 2023).

In QFD second iteration or what is called the design phase contains part deployment matrices. At this stage, modeling of material data analysis needs is carried out or components that can meet the design target standards in the first iteration of the QFD Method (planning phase). This happens by carrying out the process of translating technical characteristics or design characteristics be a design requirement or critical part (Cohen, 1995; Ginting et al., 2020). Determination critical part based on discussions with the company (voice of the organization) and experts (Ginting et al., 2020).

Research Framework

The research carried out included case study research with quantitative and qualitative data collection (Sekaran and Bougie, 2020; Creswell and Creswell, 2023). The following is the research framework used in this research.

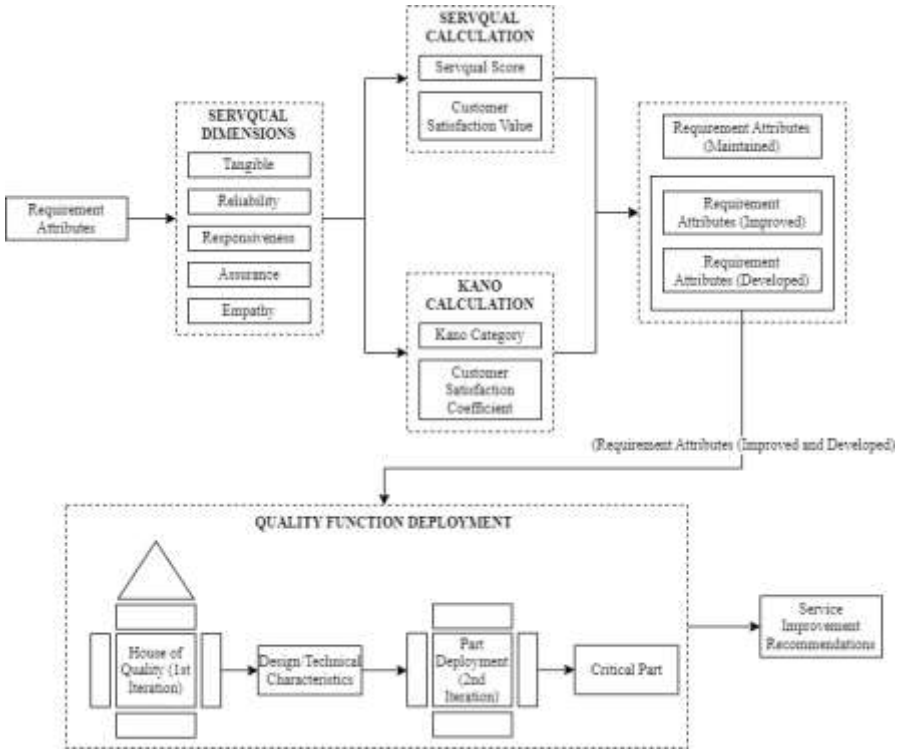


Figure 1. Research Framework

This research uses a combination of marketing disciplines and operations management science, using three main theories, namely Servqual (Service Quality), Kano, and Quality Function Deployment (QFD). In order to achieve the research objectives, a structured questionnaire was used in this research based on the development of Kano's theory by Kano et al. (1994) integrated with the dimensions of Servqual developed by Parasuraman et al. (1988). The results of the questionnaire will be analyzed further using the integration theory Servqual and Kano, which will later produce customer needs that need to be improved and developed to improve the quality of service.

The selected customer needs will then be analyzed using the theory of Quality Function Deployment (QFD) developed by Cohen (1995). The analysis uses two iterations of QFD, namely the planning phase (First Iteration) and the design phase (second iteration). The final results of the QFD will be developed into recommendations for improving the quality of health services.

The development of recommendations is carried out using a combined analysis of the integration of three main theories, namely Servqual, Kano, and Quality Function Deployment. There is previous research that examines service quality using a combination of three theories Servqual, Kano, and QFD. First, research conducted by Tan and Pawitra (2001), where this research discusses developing service quality using the integration Servqual, Kano Model, and QFD. Second, research conducted by Lizarelli et al. (2021), where this research develops service quality in companies starting the field of education using integration Servqual, Kano, and QFD via approach fuzzy. The gap between the previous research and this research is the previous research didn't use the second iteration of QFD and their research object is not the health service area.

METHOD

Quantitative data collection was carried out by using a questionnaire instrument. Questionnaires were distributed to 150 patients in a private hospital in Bandung City (that was used as the research object), as research samples, by giving written questionnaires and being guided directly by researchers. The results obtained as many as 61 male respondents and 89 female respondents. Filling out the questionnaire was dominated by 145 respondents in the outpatient respondent category. This research measures the quality of services provided by the hospital through questions according to the following requirement attributes.

Table 1. Requirement Attributes

Dimension	Code	Requirement Attributes
Tangible	TN1	The cleanliness of the hospital
	TN2	The tidiness of the hospital
	TN3	The comforts of the hospital
	TN4	Adequate hospital ventilation
	TN5	Modern medical equipment
	TN6	Completeness of hospital medical equipment
	TN7	A sufficient number of medical personnel
	TN8	Ample hospital parking
	TN9	Ease of access of the hospital location
	TN10	The appearance of the entire hospital workforce
Reliability	RL1	Completeness of hospital service information
	RL2	Provide service as promised
	RL3	The service hours provided are according to the specified schedule
	RL4	Patient privacy is well-maintained
	RL5	Knowledge of hospital personnel who respond to patient needs
	RL6	24 hour hospital service
Responsiveness	RP1	The willingness of hospital personnel to help patients
	RP2	The speed of hospital personnel in serving patients
	RP3	The willingness of hospital personnel to accept advice
	RP4	Accuracy in providing information on hospital services
	RP5	The willingness to provide information on hospital services from various media
Assurance	AS1	Good behaviour of hospital personnel in serving patients
	AS2	Guarantee patient safety
	AS3	Guarantee of patient trust in the hospital
Empathy	EM1	Sensitivity in identifying patient needs
	EM2	Good communication between hospital personnel and patients
	EM3	Affordable prices for hospital health services

Source: Lacerda et al., 2022; Gavahi et al., 2023

Next, qualitative data collection was carried out by using interview techniques with health service experts. According to Saaty, someone can be said to be an expert if they have one of the criteria, namely experts, previous performance, experience, persuasive ability, and efforts towards a problem (Hendayani et al., 2012). Two health service experts are used as sources in the research, namely a health management expert who is also a doctor and the director of a hospital in Jakarta, Indonesia, and the management of the hospital in Bandung, Indonesia, which is the object of research. This qualitative data collection is needed to support the results obtained in the analysis using QFD theory First Iteration and second iteration.

RESULTS

Validity and Reliability Data

This research validity used the Pearson Correlation Test by correlating item scores with the total item scores on each variable. This validity test uses a two-tailed test with a confidence value used is 95%. The instrument (questionnaire) can be concluded to be valid if the **r**-count ≥ **r**-table, which the **r**-table used is 0.361 (Priyatno, 2018). This research also used the Cronbach Alpha Test to do the

reliability test. The instrument (questionnaire) can be concluded to be reliable if Cronbach Alpha's Value is greater than 0.6, with the maximum value is +1 (Creswell and Creswell, 2023). Validity and reliability tests were carried out using 30 respondents (Creswell and Creswell, 2023). After the calculation, the results state that all variables are valid (**r**-count ≥ 0.361) and reliable (Cronbach Alpha's Value > 0.6). So that, the instrument can be used for the data collection.

Servqual and Kano Integration

As previously mentioned, the questionnaire results will be analyzed using the integration Servqual and Kano. The result is the identification of customer or patient needs that need to be improved, developed or maintained. The first identification process is to calculate the gap value of the services provided by the hospital on the satisfaction of patients or customers who visit by using the formula Servqual, customer satisfaction scores, and Kano analysis.

The results of the analysis can be seen in Table 2. Based on the results of the analysis Servqual, it can be seen that several attributes fall into the categories of strong attributes and weak attributes. Need attributes that are categorized as the strong category have a positive CSV value. Meanwhile, attributes that are categorized as the weak category have a negative CSV value (Mansur et al., 2019).

Next, each attribute is transformed into a Kano category. Results Kano's transformation can be seen in Table 2. When each attribute has been transformed, 18 requirements attributes are categorized as one-dimensional (O), 6 requirements attributes are categorized as must-be (M), and 3 requirements attributes are categorized as attractive (A). Then, using combined integration analysis Servqual and Kano by looking at the CSV value, attribute category, and Kano category (Tan and Pawitra, 2001; Ishak et al., 2020; Lizarelli et al., 2021). The attribute that is maintained is the requirement attribute that has a positive CSV value, categorized as the strong attribute category, and the O-M-A Kano category. An improved requirement attribute whose CSV value is positive but close to zero, is categorized as the strong attribute category, and the O-M-A Kano category. Meanwhile, the requirement attribute that is developed is those with a negative CSV value, which is categorized as the weak attribute category, and the O-M-A Kano category (Tan and Pawitra, 2001; Ishak et al., 2020; Lizarelli et al., 2021). The results obtained 16 requirement attributes that need to be maintained, 2 requirement attributes that need to be improved, and 9 requirement attributes that need to be developed.

Table 2. Results of Integration Data Processing Servqual and Kano

Code	Servqual Score	Gap	CSV	Attribute Category	Kano Category	Information
TN1	0.09	0.09	0.28	Strong	O	Maintained
TN2	-0.09	-0.09	-0.28	Weak	O	Developed
TN3	-0.22	-0.22	-0.71	Weak	M	Developed
TN4	0.09	0.09	0.28	Strong	O	Maintained
TN5	0.15	0.15	0.47	Strong	O	Maintained
TN6	0.02	0.02	0.06	Strong	A	Improved
TN7	-0.01	-0.01	-0.02	Weak	M	Developed
TN8	-0.13	-0.13	-0.40	Weak	A	Developed
TN9	0.22	0.22	0.67	Strong	O	Maintained
TN10	0.08	0.08	0.25	Strong	O	Maintained
RL1	-0.07	-0.07	-0.20	Weak	M	Developed
RL2	0.14	0.14	0.40	Strong	O	Maintained
RL3	-0.15	-0.15	-0.48	Weak	O	Developed
RL4	0.15	0.15	0.47	Strong	M	Maintained
RL5	-0.07	-0.07	-0.23	Weak	O	Developed
RL6	0.18	0.18	0.57	Strong	M	Maintained

RP1	0.11	0.11	0.34	Strong	M	Maintained
RP2	-0.15	-0.15	-0.47	Weak	O	Developed
RP3	0.23	0.23	0.73	Strong	O	Maintained
RP4	-0.05	-0.05	-0.14	Weak	O	Developed
RP5	0.03	0.03	0.10	Strong	A	Improved
AS1	0.16	0.16	0.48	Strong	O	Maintained
AS2	0.19	0.19	0.57	Strong	O	Maintained
AS3	0.14	0.14	0.40	Strong	O	Maintained
EM1	0.09	0.09	0.28	Strong	O	Maintained
EM2	0.14	0.14	0.40	Strong	O	Maintained
EM3	0.23	0.23	0.73	Strong	O	Maintained

Note: O= One-dimensional; M= Must-be; A= Attractive.

Source: Developed by the Authors

Quality Function Deployment (First Iteration)

The second stage is to transform customer requirement attributes into design or technical characteristics. This process uses the theory of Quality Function Deployment (QFD: planning phase or First Iteration). The initial data used in this process are 2 improved requirements attributes and 9 developed requirements attributes, based on the results of integration calculations Servqual and Kano. Technical characteristics were obtained using qualitative data collection with interviews as the instrument used for data collection. Based on the results of interviews with health service experts, from a total of 11 requirements attributes, 13 technical characteristics were obtained (Ministry of Indonesian Health, 2020; Ministry of Internal Affairs, 2022; Expert of Health Service, 2024). Then the weight value of these technical characteristics is calculated based on their relationship with the requirement attributes. This weight value describes how much influence technical characteristics have when implemented in a service. The probability value is the value of the company's ability to implement existing technical characteristics (Cohen, 1995; Ishak et al., 2020).

The existing technical characteristics of the research object (come from hospital) will be compared with the technical characteristics of competitive data (come from health service experts and other supporting data). If they have the same value, then the technical characteristics can be assumed to have optimal values. Meanwhile, if there is a gap value, then these technical characteristics need to be optimized by improving or developing these technical characteristics. Technical characteristics that need to be developed further are technical characteristics that have a value column weight the largest and have a gap value with competitive data characteristics (Cohen, 1995; Ginting et al., 2020; Gavahi et al., 2023). As a result, there are 7 out of 13 technical characteristics that need to be developed and improved. The result can be seen in Figure 2.

Quality Function Deployment (Second Iteration)

The third stage is to develop technical characteristics into critical parts. This process uses theory Quality Function Deployment (QFD: design phase or second iteration). The initial data from this process are the technical characteristics that need to be developed based on the results of the QFD process analysis (planning phase or first iteration), namely 7 technical characteristics. Likewise with technical characteristics, critical parts were obtained based on the results of qualitative data collection using interviews as a data collection instrument. Based on the results of interviews with health service experts, 29 critical parts were obtained from a total of 7 technical characteristics (Ministry of Indonesian Health, 2020; Ministry of Internal Affairs, 2022; Expert of Health Service, 2024). The result can be seen in Figure 3.

DISCUSSION

The aim of this research is to improve the quality of health services at a private hospital in the city of Bandung, Indonesia, based on the value of the hospital's customer requirements. This research found that of the 27 patient requirement attributes, 11 main patient requirement attributes were concluded to have not been able to be met by the hospital as a health service provider. These unmet patient requirement attributes are included in the dimensions tangible, responsiveness, and reliability, where these three needs are included in the Kano category one-dimensional, must-be, and attractive. Based on research conducted by Lacerda et al. (2022) stated that the requirement attributes included in these Kano categories are crucial requirement attributes that can influence the level of quality of service. Research conducted by Altuntas and Kansu (2020) also revealed that there are unmet requirement attributes that are categorized into the dimensions of tangible, responsiveness, and reliability. These requirement attributes should be met immediately by improving the quality of the products or services provided to customers. So, based on this, the hospital management is strongly advised to improve its health services to meet the unmet requirement attributes of patients.

In order to answer patient requirement attributes regarding hospital neatness and comfort, several service sections need to be developed. In essence, neatness is closely related to comfort, where things that are very neat will create very good comfort, and vice versa (Ministry of Indonesian Health, 2020; Ministry of Internal Affairs, 2022). Based on the results of the critical part obtained, which can be seen in Figure 3, there are six recommendations for developing health services regarding hospital neatness and comfort. The development of health services involves the need for additional public facilities (children's play areas and dining areas), changes to more efficient spatial layouts, additional maintenance periods for public facilities, additional customer evaluation forums regarding the facilities they receive, additional area and lighting for several spaces, and additional evaluation reports (Bandung City Regional Regulations, 2018; Ministry of Indonesian Health, 2019; Ministry of Indonesian Health, 2020; Ministry of Internal Affairs, 2022; Expert of Health Service, 2024).

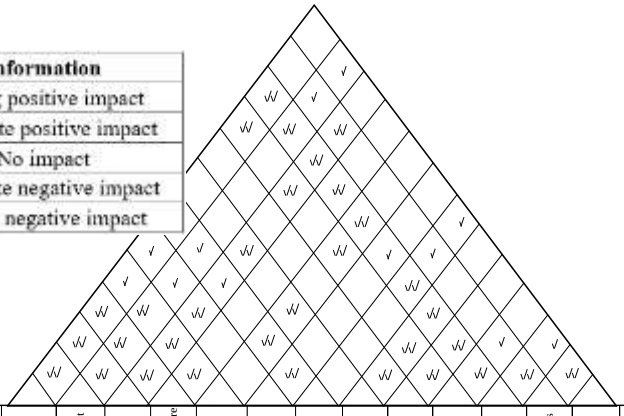
The need for a large parking space is also something that can influence the comfort value of a facility (Ministry of Indonesian Health, 2020; Ministry of Internal Affairs, 2022). Developing service facilities so that this requirement attribute can be met, namely by increasing the size of the parking area (especially car parking), adding lighting in the parking area, and rearranging the layout of the parking position for each vehicle that comes. Based on the research results, this requirement attribute is one of the attributes that has a fairly large level of negative satisfaction value. So, if the hospital can meet these requirements, at least most of the problems with the requirements of customer or patient that visiting, have been sufficiently resolved (Ministry of Indonesian Health, 2020; Ministry of Internal Affairs, 2022; Expert of Health Service, 2024).

The requirement attribute for complete hospital medical equipment will be met if several health services are developed. Service development includes adding medical equipment to each specialist unit that does not yet have special medical equipment, increasing the maintenance period for medical equipment, adding lighting to each area of medical equipment, as well as providing free space to store unused medical equipment (Ministry of Indonesian Health, 2019; Ministry of Indonesian Health, 2020; Ministry of Internal Affairs, 2022; Ministry of Indonesian Health, 2023; Expert of Health Service, 2024).

Patients' requirement attributes regarding sufficient numbers of medical personnel will be met if the hospital develops services such as increasing the number of specialist medical personnel and increasing the number of general nursing staff. This leads to activities for recruiting new hospital personnel and activities in managing existing human resources within the hospital. Adding the types of qualifications and competency values for each hospital personnel is something that also needs to be developed. Meanwhile, improving the management of hospital personnel requires activities that can increase the competency value of each individual (Tan et al., 2019). These activities include certification training, workshops, and seminars. The addition of customer evaluation forums on the performance of hospital personnel, and the addition of evaluation periods for hospital personnel is also one way to improve the management of hospital personnel (Ministry of Indonesian Health, 2023; Expert of Health Service, 2024). Ministry of Indonesian Health (2023) states that good management of hospital personnel will increase the competency of all hospital personnel and increase the requirement attributes of patients who receive hospital personnel services. Apart from that, Nottingham et al. (2018) stated that good

hospital staff performance will influence waiting service times that are getting smaller, so that patients will get more satisfaction with the services provided.

Symbol	Information
√√	Strong positive impact
√	Moderate positive impact
blank	No impact
x	Moderate negative impact
xx	Strong negative impact



Design Charachteristics / Customer Requirements	Standards of Hospital Neatness	Standards of Hospital Facility Management	Standards of Hospital Service Evaluation	Media Monitoring of Hospital Infrastructure	Standards Hospital Comfort	Standards of Hospital Medical Equipment Management	Quality Standards for Hospital Medical Equipment	Standards of Hospital Personnel Management	Standards of Hospital Personnel Qualifications	Standards of Hospital Personnel Competency	Standards of PRIMA Services	Standards of Hospital Information Services	Media Information of Hospital Service	Adjusted Importance Percentage	Ranking
	K1	K2	K3	K4	K5	K6	K7	K8	K9	K10	K11	K12	K13		
TN2	10	9	7	7	3	0	0	0	0	0	0	0	0	0.086	5
	0.864	0.778	0.605	0.605	0.259	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
TN3	3	9	7	7	10	0	0	0	0	0	0	0	0	0.111	4
	0.332	0.997	0.776	0.776	1.108	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
TN6	0	0	0	0	0	9	9	0	0	0	0	0	0	0.039	9
	0.000	0.000	0.000	0.000	0.000	0.351	0.351	0.000	0.000	0.000	0.000	0.000	0.000		
TN7	0	0	9	0	0	0	0	10	9	9	7	0	0	0.003	11
	0.000	0.000	0.029	0.000	0.000	0.000	0.000	0.032	0.029	0.029	0.022	0.000	0.000		
TN8	0	9	0	5	0	0	0	0	0	0	0	0	0	0.252	1
	0.000	2.272	0.000	1.262	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
RL1	0	0	0	0	0	0	0	0	0	0	9	10	9	0.032	10
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.289	0.321	0.289		
RL3	0	0	9	0	0	0	0	0	0	0	10	9	7	0.151	2
	0.000	0.000	1.355	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.506	1.355	1.054		
RL5	0	0	9	0	0	0	0	10	9	10	7	7	0	0.073	6
	0.000	0.000	0.658	0.000	0.000	0.000	0.000	0.731	0.658	0.731	0.512	0.512	0.000		
RP2	0	0	9	0	0	0	0	10	7	10	9	0	0	0.148	3
	0.000	0.000	1.332	0.000	0.000	0.000	0.000	1.480	1.036	1.480	1.332	0.000	0.000		
RP4	0	0	9	0	0	0	0	0	0	0	9	10	7	0.044	8
	0.000	0.000	0.398	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.398	0.443	0.310		
RP5	0	0	0	0	0	0	0	0	0	0	9	10	10	0.060	7
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.540	0.600	0.600		
Probability	5	4	5	4	5	3	3	3	3	3	4	4	5		
Unit	Element	Element	Element	Media	Element	Element	Element	Element	Element	Element	Element	Element	Media		
Current Situation	13	7	8	5	10	9	6	10	7	7	9	5	4		
Competitive Data	13	10	13	5	10	12	6	14	7	10	9	9	10		
Target	13	10	13	5	10	12	6	14	7	10	9	9	10		
Column Weight	1.196	4.047	5.153	2.642	1.367	0.351	0.351	2.243	1.723	2.240	4.600	3.231	2.253	31.400	
Percentage Column Weight	0.038	0.129	0.164	0.084	0.044	0.011	0.011	0.071	0.055	0.071	0.147	0.103	0.072		
Ranking	11	3	1	5	10	12	12	7	9	8	2	4	6		

Note: Adjusted Importance Percentage = CSV × Kano Multiplier Value (A: 4; O:2; M:1)

Figure 2. Result of QFD First Iteration (House of Quality)
Source: Developed by Authors

Technical Requirements / Critical Part		K2	K3	K6	K8	K10	K12	K13	Probability	Unit	Current Situation	Competitive Data	Target	Column Weight	Percentage Column Weight	Ranking
C1	Public Facility Criteria	9 1.160							5	Criteria	10	10	10	1.160	0.055	5
C2	Type of Public Facility	7 0.902							4	Unit	19	24	24	0.902	0.043	10
C3	Public Facility Maintenance Criteria	10 1.289							5	Criteria	7	7	7	1.289	0.062	4
C4	Frequency of Maintenance on Public Facility	9 1.160							5	Periode	2	4	4	1.160	0.055	5
C5	Criteria for the Location of Public Facility	7 0.902							3	Criteria	5	8	8	0.902	0.043	10
C6	Hospital Service Evaluation Criteria		9 1.477						4	Criteria	9	9	9	1.477	0.071	2
C7	Types of Hospital Service Evaluation		9 1.477						5	Element	5	8	8	1.477	0.071	2
C8	Frequency of Hospital Service Evaluation		10 1.641						5	Periode	2	4	4	1.641	0.078	1
C9	Medical Equipment Criteria			7 0.078					5	Criteria	7	7	7	0.078	0.004	27
C10	Type of Medical Equipment			10 0.112					3	Unit	33	36	36	0.112	0.005	24
C11	Number of Medical Equipment			7 0.078					3	Unit	9	12	12	0.078	0.004	27
C12	Medical Equipment Meintenance Criteria			7 0.078					4	Criteria	8	8	8	0.078	0.004	27
C13	Frequency of Medical Equipment Maintenance			9 0.101					5	Periode	1	3	3	0.101	0.005	25
C14	Criteria for Storage Locations for Medical Equipment			9 0.101					4	Criteria	8	10	10	0.101	0.005	25
C15	Qualifications of Hospital Personnel				10 0.714				5	Criteria	14	16	16	0.714	0.034	13
C16	Types of Hospital Personnel				9 0.643				5	Types	10	10	10	0.643	0.031	17
C17	Number of Hospital Personnel				9 0.643				4	People	8	10	10	0.643	0.031	17
C18	Criteria of Activities to Increase the Hospital Personnel Capacity				7 0.500				4	Criteria	0	7	7	0.500	0.024	20
C19	Types of Activities to Increase the Hospital Personnel Capacity				7 0.500				4	Types	0	7	7	0.500	0.024	20
C20	Frequency of Activities to Increase the Hospital Personnel Capacity				7 0.500				3	Periode	0	3	3	0.500	0.024	20
C21	Criteria of Assessing Hospital Personnel Competency					10 0.713			5	Criteria	6	6	6	0.713	0.034	14
C22	Types of Hospital Personnel Competency Assessment					7 0.499			4	Element	6	9	9	0.499	0.024	23
C23	Types of Hospital Personnel Competency					9 0.642			5	Element	7	10	10	0.642	0.031	19
C24	Criteria of Delivering Information on Hospital Services						10 1.029		5	Criteria	8	10	10	1.029	0.049	7
C25	Types of Hospital Service Information						7 0.720		4	Element	18	21	21	0.720	0.034	12
C26	Frequency of Hospital Service Information Delivery						9 0.926		4	Periode	4	4	4	0.926	0.044	9
C27	Procedures of Conveying Information on Hospital Services						10 1.029		4	Procedure	3	4	4	1.029	0.049	7
C28	Criteria of Hospital Information Media							9 0.646	4	Criteria	5	8	8	0.646	0.031	15
C29	Types of Hospital Information Media							9 0.646	3	Element	5	10	10	0.646	0.031	15
Percentage Column Weight		0.129	0.164	0.011	0.071	0.071	0.103	0.072						20.908		

Note: Percentage Column Weight = Percentage Column Weight of Technical Characteristics from first iteration

Figure3. Results of QFD Second Iteration (Part Deployment)

Furthermore, regarding patient requirement attributes for the completeness of hospital service information. Some developments that can be carried out by hospital management are adding information related to public facility service information (such as floor plans and directions for hospital rooms) (Expert of Health Service, 2024). Apart from that, the information given to all patients must be distributed accurately and quickly. So that this can be carried out well, the hospital is advised to create an integrated information system with various

media, such as a website, hospital service applications, social media, and more. When a hospital has information services that are systematically integrated across various media, the information needed and obtained by patients and all hospital personnel will be distributed quickly, accurately, effectively and efficiently (Nottingham et al., 2018; Ministry of Internal Affairs, 2022; Sefnedi and Alfarizi, 2022). These requirement attributes include a requirement of service hours provided according to the specified schedule, a requirement of accuracy in providing information on hospital services, and a requirement of willingness to provide information on hospital services in various media (Ministry of Indonesian Health, 2019; Ministry of Indonesian Health, 2020; Ministry of Internal Affairs, 2022; Ministry of Indonesian Health, 2023; Expert of Health Service, 2024).

CONCLUSION

This research aims to improve the quality of health services at a private hospital in the city of Bandung, Indonesia, based on the value of the hospital's customer requirement attributes. Based on integration results Servqual and Kano, there are 11 main requirement attributes of patients regarding health services that have not been fully met. If the hospital continues to ignore this, it could become a big problem. So, a plan to improve health services is needed. The eleven-patient health service requirement attributes were then developed into 13 technical characteristics. Through QFD analysis, the first iteration produces 7 technical characteristics that are not yet optimal. These seven technical characteristics were then developed into 29 critical parts. Through the second iteration, QFD analysis resulted in 21 results critical parts that are considered not optimal. Then, these 21 critical parts will become recommendations to improve the quality of health services. These recommendations are part of the critical part which was obtained from the results of an interview with a health service expert who also served as management director of a public hospital. It is hoped that the results of this research can help the private hospitals improve their health services quality.

This research supports several studies conducted to improve the quality of health services using Servqual, Kano, and Quality Function Deployment (QFD) theories. Researchers recommend combining the three main theories, because they are in line with the research objectives and objectives of the three combined theories, namely determining recommendations for improving service quality based on customer requirements. These theories can be applied by hospitals in improving the quality of their health services. The practical impact on hospitals is that some of the hospital health services quality can be improved according to what patients need and what the hospital’s capabilities are.

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