Implementation Of Quality Function Deployment (QFD) Method and Kano Method on Iconnet Product PT. Indonesia Comnets Plus (ICON+) Jember as An Internet Service Provider Company in The Framework of Improving Product Quality

[1]Eka Bambang Gusminto, [2]Nyoto Axl Ramadhan, [3]Intan Nurul Awwaliyah

Management
University of Jember, Indonesia.

Abstract- **In an era of rapid technological advancement, the internet has become a primary necessity for people across all segments of society. The emergence of the Covid-19 pandemic in recent years has significantly transformed the need for the internet. The pandemic has led to various government policies, such as online learning activities, work from home, and large-scale social restrictions. One of the Internet Service Providers (ISPs) identified, particularly in Jember, is owned by PT. Indonesia Comnets Plus (ICON+), which has received consumer complaints about the quality of service. To address these issues, a research study is conducted using the Quality Function Deployment (QFD) and Kano methods. The QFD method aims to translate consumer needs and desires into design recommendations or improvement suggestions for the company. Meanwhile, the Kano method aims to assign weights to each attribute in product quality so that when both methods are combined, the QFD assessment is strengthened by the results of the Kano method analysis. Through the Voice of Customer (VoC), 7 consumer requirement attributes are identified and further analyzed using the QFD method. This analysis results in prioritized improvement recommendations for 4 attributes: Network Stability, Friendly Service, Internet Speed, and Employee Response Speed. Additionally, 6 technical requirements are identified to address consumer needs, with the company prioritizing 3 technical requirements: implementing Regular Feedback and Evaluation, Infrastructure Updates, and device maintenance and monitoring. The Kano method analysis reveals that there are 3 attributes classified as One-Dimensional and 4 as Indifferent. Consequently, the Kano assessment yields the highest better value for the Internet Speed attribute at 0.59 or 59%, and the highest worse value at 0.77 or 77% for the Network Stability attribute.**

Keywords: **ISP, Quality Function Deployment (QFD), Kano Method.**

I. INTRODUCTION

In the era of technology, the internet has become a primary necessity for people across all segments of society. The emergence of the Covid-19 pandemic in recent years has led to changes in the need for the internet due to various government policies such as online learning activities, work from home, large-scale restrictions, and other policies resulting from the pandemic. This is evident in the surge observed in a survey conducted by BPS, particularly in the early stages of the pandemic in 2019. Internet usage increased from 47.69% in 2019 to 66.48% in 2022. Considering the business landscape in Indonesia, especially in the field of internet service providers (ISPs), it presents a promising business opportunity. In Jember Regency itself, there are four relatively popular ISPs among the community, one of them being Iconnet owned by PT. Indonesia Comnets Plus (ICON+).

Based on the pre-research survey results, Iconnet consumers have raised diverse complaints regarding the quality of the products offered. These include issues related to employee response during internet problems, WiFi coverage area, network stability, promotional content, perceived high prices, network speed, and slow response. These challenges can be effectively addressed if the company understands the needs and desires of its consumers. In the face of intensifying business competition, a company may lose its reputation if it continues to neglect the quality of its products. In the worst-case scenario, consumers may switch to competitor products. Therefore, it is crucial for the company to enhance the quality of its products to ensure the strong retention of consumer loyalty.

Various methods are available for analyzing product quality deficiencies, particularly the Quality Function Deployment (QFD) and Kano methods. The QFD method is aimed at designing and developing products with a consumer-oriented approach, characterized by using the Voice of Customer (VoC). Reflecting on previous research conducted by Immanuel et al (2020), Mahendra (2021), and Primadasa et al (2022), these studies generally indicate the presence of attributes in

product quality that need improvement to enhance overall product quality. Additionally, the QFD method provides design or improvement recommendations that companies can implement to support product quality enhancement. In addition to the QFD method, the Kano method can also be employed to analyze product deficiencies. The Kano method categorizes product or service attributes based on how well they can satisfy consumer needs and desires, allowing companies to effectively maintain their product quality. This is evident in research conducted by Nurrahman (2019), Rhomadi (2020), and Pratama et al (2022). In general, the results of this research categorize product attributes into One-Dimensional, Attractive, Must-be, Indifferent, Reverse, and Questionable. These attributes are ranked to determine which ones need to be maintained, improved, or neglected to effectively preserve product quality.

In this research, the Quality Function Deployment (QFD) method and the Kano method are utilized based on the relevance of the phenomena faced by PT. Indonesia Comnets Plus (ICON+) in Jember. The QFD method focuses on consumer-oriented improvement or development, ensuring that the resulting enhancements are centered around consumer needs and desires. The Kano method categorizes consumer preferences in more depth, enabling the company to clearly understand what consumers need and want. Having this comprehension, the amalgamation of the QFD and Kano methods is anticipated to furnish an in-depth insight into customer contentment, focused innovation, and the evaluation and supervision of customer satisfaction. Furthermore, by combining the QFD and Kano methods, the company can validate the results of each analysis, as the final outcomes of these two methods will mutually reinforce each other, providing the company with a clear picture of quality improvement. Moreover, it is noteworthy that most prior research has predominantly used only one of these methods, either QFD or the Kano method. Furthermore, both methods are still infrequently employed in studies focusing on Internet Service Providers (ISP).

II. RESEARCH METHODOLOGY

Research Design

This research utilizes a method of quantitative description. Therefore, the research will evaluate how the needs and preferences of consumers regarding the quality of WiFi products owned by PT. Indonesia Comnets Plus (ICON+) in Jember, as well as how technical requirements can be met in accordance with the needs and preferences of consumers. This evaluation will serve as a guideline for the application of the Quality Function Deployment (QFD) and Kano methods.

Research Object

The subject of this research is the internet service provider company, PT. Indonesia Comnets Plus (ICON+) Jember.

Source Data

The data sources used in this research are divided into two types, primary data and secondary data. Primary data is obtained through interviews and questionnaire responses, while secondary data consists of information obtained indirectly from articles, previous research, and other publications related to product quality improvement.

Data Analysis Method

In this research, the analysis of data is segmented into four phases, which are:

1. Collecting The Voice of Customer

This phase will begin with research and surveys aimed at understanding consumer needs and desires by distributing Voice of Customer questionnaires.

2. Quality Function Deployment (QFD) Method Analysis

The QFD method analysis is conducted by creating a House of Quality. Within the HoQ, there are six crucial diagrams that need to be understood, including Customer Needs, Planning Matrix, Technical Measures, Relationship Matrix, Technical Correlation Matrix, and Technical Matrix.

3. Kano Method Analysis

In this phase, the analysis of the Kano method is carried out by defining the Kano method diagram, calculating a summary of responses regarding product attributes, and evaluating the Kano method using Blauth's Formula.

III. RESULT

Collecting The Voice of Customer

Table 1: Basic Attributes of Consumer Needs and Desires at Iconnet

Nu	Consumer Needs Attributes
1	Internet Speed
2	Network Stability
3	WiFi Coverage Area
4	Employee Response Speed
5	Friendly Service
6	Price and Product Varieties

Nu	Consumer Needs Attributes
7	Affordable Installation Areas

Source: Summary of Questionnaire Results

The collection of Voice of Customer is aimed at understanding the fundamental attributes of consumer needs and desires, which can be obtained through interviews or questionnaire completion. This process resulted in identifying 7 basic attributes of consumer needs.

Quality Function Deployment (QFD) Method Analysis

To analyze the QFD method, it is necessary to construct the House of Quality, which includes the following components:

Customer Needs

This section encompasses various Consumer Needs Attributes when using the product, along with the determination of consumer importance rankings as follows.

Table 2: Consumer Importance Level Attributes

Ranking	Consumer Needs Attributes	Consumer Importance Level
1	Network Stability	4,38
2	Internet Speed	4,24
3	Friendly Service	4,04
4	Employee Response Speed	3,91
5	Affordable Installation Areas	3,38
6	WiFi Coverage Area	3,37
7	Price and Product Varieties	3,17

Source: Data Processing Results, 2024

Based on the data analysis, it is revealed that the attributes with the highest level of consumer importance are Network Stability, Internet Speed, and Friendly Service.

Planning Matrix

This section details the company's plans regarding the improvement ratio and the outcome of the competitor product analysis survey. The resulting improvement ratio is as follows.

Table 3: Improvement Ratio

No	Consumer Needs Attributes	Target Value	Performance	Improvement Ratio
1	Internet Speed	4	3,31	1,20
2	Network Stability	5	3,26	1,53
3	WiFi Coverage Area	3	3,34	0,89
4	Employee Response Speed	4	3,21	1,24
5	Friendly Service	5	3,15	1,58
6	Price and Product Varieties	3	3,7	0,81
7	Affordable Installation Areas	3	3,57	0,84

Source: Data Processing Results, 2024

The table indicates that the attribute "Friendly Service" holds the highest value, underscoring the importance of prompt evaluation and attention.

Technical Measures

This part entails the company's actions to meet consumer needs and desires, resulting in technical requirement attributes such as the following.

Table 4: Technical Needs Attributes

No	Technical Needs Attributes	Explanation
1	Device Maintenance and Monitoring	Hardware maintenance is conducted to optimize configurations, and regular network monitoring is performed to effectively identify, detect, and respond to potential issues.
2	Employee Training	Training for employees is aimed at improving communication skills, ensuring friendliness, clarity, and informativeness.
3	Socializing SOPs and Job Descriptions for Employees	SOP socialization is implemented to ensure employees comprehend the operational standards that need to be followed and executed, allowing them to carry out their tasks more efficiently and in alignment with the established procedures.
4	Regular Feedback and Evaluation	Regular evaluations are performed by obtaining feedback from customers regarding the performance provided by employees.
5	Transparent Information	Offering consumers transparent information regarding the product, encompassing the promised speed, along with providing clear insights into the factors that may impact network performance.
6	Infrastructure Updates	Concentrating on updates to the infrastructure, particularly the network, to ensure a more optimal allocation of bandwidth for consumers.

Source: Interview Data Processing, 2024

Relationship Matrix

This section includes the correlation between consumer needs and desires, followed by the company's offering of solutions to meet those needs and desires.

Table 5: Correlation between Consumer Needs and Technical Requirements

No	Consumer Needs Attributes	Technical Requirements	Score
1	Internet Speed	Device Maintenance and Monitoring	9
		Infrastructure Updates	9
		Regular Feedback and Evaluation	3
		Transparent Information	3
2	Network Stability	Device Maintenance and Monitoring	9
		Infrastructure Updates	9
		Regular Feedback and Evaluation	3
3	WiFi Coverage Area	Device Maintenance and Monitoring	9
		Infrastructure Updates	9
		Regular Feedback and Evaluation	3
4	Employee Response Speed	Socializing SOPs and Job Descriptions for Employees	9
		Employee Training	9
		Regular Feedback and Evaluation	9
5	Friendly Service	Socializing SOPs and Job Descriptions for Employees	9
		Employee Training	9
		Regular Feedback and Evaluation	9
		Transparent Information	3
6	Price and Product Varieties	Regular Feedback and Evaluation	3
		Transparent Information	9
7	Affordable Installation Areas	Infrastructure Updates	9

No	Consumer Needs Attributes	Technical Requirements	Score
		Transparent Information	9
		Socializing SOPs and Job Descriptions for Employees	3
		Regular Feedback and Evaluation	3
		Employee Training	1

Source: Data Processing Results, 2024

Technical Correlation Matrix

This part covers the interrelation among technical requirements, subsequently assisting in determining whether these connections result in positive or negative responses among technical needs.

Table 6: Relationship Among Technical Requirements

No	Technical Requirements 1	Technical Requirements 2	Skor
1	Device Maintenance and Monitoring	Infrastructure Updates	+9
2	Device Maintenance and Monitoring	Regular Feedback and Evaluation	+3
3	Device Maintenance and Monitoring	Employee Training	+9
4	Employee Training	Socializing SOPs and Job Descriptions for Employees	+9
5	Employee Training	Regular Feedback and Evaluation	+3
6	Employee Training	Transparent Information	0
7	Socializing SOPs and Job Descriptions for Employees	Regular Feedback and Evaluation	+3
8	Socializing SOPs and Job Descriptions for Employees	Device Maintenance and Monitoring	+3
9	Regular Feedback and Evaluation	Infrastructure Updates	+3
10	Transparent Information	Infrastructure Updates	0

Source: Data Processing Results, 2024

Technical Matrix

This section includes the implications of implementing strategies, target values set for strategy implementation, and allows the company to identify which attributes need prioritization for improvement. The table below indicates the level of difficulty in fulfilling technical needs.

Table 7: Implications and Target Values of Technical Requirements

No	Technical Requirements	Target	Degree of Difficulty
1	Device Maintenance and Monitoring	4	3
2	Employee Training	4	2
3	Socializing SOPs and Job Descriptions for Employees	5	1
4	Regular Feedback and Evaluation	4	2
5	Transparent Information	4	2
6	Infrastructure Updates	4	3

Source: Summary of Questionnaire Results

Kano Method Analysis

The Kano method analysis involves categorizing each product attribute based on Kano method criteria. This is done by merging functional and dysfunctional response outcomes, followed by evaluating each attribute using Blauth's Formula to determine the possible impact on customer satisfaction, whether it decreases or increases. As a result, the obtained values are as follows:

Table 8: Assessment of the Kano Method

No	A	M	O	R	Q	I	Total	Grade	Better	Worse
1	18	28	42	0	0	13	101	O	0,59	0,69
2	10	37	41	0	0	13	101	O	0,50	0,77
3	17	3	2	0	2	77	101	I	0,19	0,05
4	18	12	13	0	1	57	101	I	0,31	0,25
5	21	16	41	0	1	22	101	O	0,62	0,57
6	3	4	4	0	1	89	101	I	0,07	0,08
7	16	3	4	0	9	69	101	I	0,22	0,08

Source: Data Processing Results, 2024

IV. DISCUSSION

Overview Consumer Needs and Technical Requirement

By utilizing Voice of Customer (VoC) and conducting QFD method analysis, 7 Consumer Needs Attributes were identified from 21 consumer respondents using Iconnet products. These attributes encompass Internet Speed, Network Stability, WiFi Coverage Area, Employee Response Speed, Friendly Service, Price and Product Varieties, as well as Affordable Installation Areas. Following this, a questionnaire was distributed to collect information on consumer needs and preferences, with a total of 101 respondents for both QFD and Kano method inquiries. Through the QFD method, 6 technical requirements were identified to address consumer needs and desires. These requirements include Device Maintenance and Monitoring, Employee Training, Socializing SOP and Job Descriptions for Employees, Regular Feedback and Evaluation, Transparent Information, and Infrastructure Updates. These 6 technical requirement attributes were then completed by 3 respondents from ICON+ as representatives.

Interpretation of QFD Method and Kano Method

Internet Speed

The data analysis results obtained through the QFD method, considering consumer importance scale and the normalization of that scale, indicated an attribute value of 7.63 and 17%. In the Kano method, this attribute showed a better value of 59%, suggesting that improving it could result in a 59% increase in consumer satisfaction. Conversely, the worse value for this attribute is 69%, signifying that neglecting it may lead to a 69% decrease in consumer satisfaction. Given these outcomes, addressing the internet speed attribute is crucial, as highlighted by both QFD and Kano method analyses emphasizing its high urgency. Moreover, competitor analysis reveals that consumers tend to opt for competitors' products due to their relatively faster internet speed compared to Iconnet. Therefore, addressing this critical point is essential for the company to prevent consumers from switching to competitor products.

Network Stability

Based on the data analysis for this attribute using the QFD method, including the consumer importance scale and its normalization, the attribute achieved a value of 10.05 and 22%. In the Kano method, this attribute has a better value of 50%, implying that improving this attribute can lead to a 50% increase in consumer satisfaction. Moreover, in the Kano method, a worse value of 77% is indicated, suggesting that without improvement, consumer satisfaction could decrease by 77%. Consequently, considering the analysis from both the QFD and Kano methods, this attribute emerges as the top priority for immediate improvement, as network stability is a crucial factor for ensuring consumer comfort while using internet services.

Wifi Coverage Area

Based on the data analysis using the QFD method, particularly on the consumer importance scale and its normalization, this attribute received values of 3.9 and 9%. In the Kano method, the attribute obtained a better value of 19%, indicating that if improvements are implemented, consumer satisfaction can increase by 19%. Moreover, the attribute also received a worse value of 5%, suggesting that without company interventions, consumer satisfaction might decrease by 5%. As this attribute has lower values compared to the previous two, it is not prioritized for improvement. In certain situations, consumers may use specialized devices to enhance wifi signal range, making it a non-critical point that requires improvement.

Employee Response Speed

The data analysis results reveal that this attribute obtained values of 7.27 and 16% on the consumer importance scale and its normalization, respectively. In the Kano method data analysis, this attribute has a better value of 31%, indicating that if the company addresses this attribute, consumer satisfaction could increase by 31%. Moreover, the attribute also holds a worse value of 25%, signifying that without company improvements, there might be a 25% decline in satisfaction. This attribute ranks fourth-highest after internet speed attributes, highlighting the need for scheduling improvements. Considering that the speed of employee response can make consumers feel acknowledged and prioritized during difficulties or complaints, addressing this aspect is crucial for enhancing customer satisfaction.

Friendly Service

The attribute of friendly service, as the QFD method data analysis, specifically in determining the consumer importance scale and its normalization, attained values of 9.57 and 21%. Subsequently, in the Kano method analysis, this attribute received a better value of 62%, suggesting that if the company addresses this attribute, consumer satisfaction can see a significant increase of 62%. Additionally, the attribute also recorded a worse value of 57%, indicating that without improvement, there could be a decrease in consumer satisfaction by as much as 57%. Hence, this attribute can be prioritized for improvement after addressing network stability. Friendly service plays a crucial role in creating a positive image for the company, building a good reputation, nurturing positive relationships with consumers, and even attracting new customers while fostering increased customer loyalty.

Price and Product Varieties

The data analysis results from the QFD method, specifically in determining the consumer importance scale and its normalization, show values of 3.34 and 7%. Subsequently, in the Kano method analysis, this attribute obtained a better value of 7%, indicating that improvements by the company could lead to a 7% increase in consumer satisfaction. Additionally, the attribute also received a value of 8%, suggesting that without improvements, there might be an 8% decrease in consumer satisfaction. Based on the analyses of the QFD and Kano methods, it is concluded that there is no high urgency for improvement in this attribute. The values obtained for the Consumer Importance Scale, Normalized Consumer Importance Scale, better value, and worse value are smaller compared to other attributes. Hence, it can be inferred that consumers are already content with the price and product variety offered by ICON+.

Affordable Installation Areas

The QFD data analysis results show that in the consumer importance scale section, the consumer importance scale value is 3.69, and the normalized consumer importance scale is 8%. Meanwhile, the Kano method analysis yielded a better value of 22%, indicating that improvements by the company could result in a significant 22% increase in consumer satisfaction. Furthermore, this attribute also received a worse value of 8%, implying that without improvements, there could be an 8% decline in consumer satisfaction. According to the analyses of the QFD and Kano methods, this attribute doesn't necessitate immediate prioritization due to a lack of high urgency. However, making improvements could lead to a substantial increase in consumer satisfaction, making it a consideration for enhancement to elevate consumer satisfaction, foster customer loyalty, and attract new customers from the consumer's perspective.

V. CONCLUSIONS

From the discussions conducted through the QFD analysis method, it was determined that the consumer needs requiring urgent improvement are Network Stability, Friendly Service, Internet Speed, and Employee Response Speed. This conclusion is reinforced by the Kano method analysis results, categorizing Network Stability, Friendly Service, and Internet Speed under the One Dimensional category. In this category, there exists a proportional relationship between performance and the level of satisfaction achieved.

REFFERENCES:

1. Husada S. W., Handriyanto. Awwaliyah I. N. 2020. Six Sigma DMAIC Application on Small Business Performance: A Case Study on Indonesian's Tobacco Company. Emerging Markets: Business and Management Studies Journal.
2. Immanuel N. B. et al. 2020. Analysis of New Product Development by Using Quality Function Deployment (QFD): a Study of Kombucha. The 4th International Conference on Family Business and Entrepreneurship. Malaysia: Universiti Teknikal Malaysia Melaka.
3. Mahendra R. 2021. "Peningkatan Kualitas Layanan Jasa Dengan Menggunakan Metode QFD (Quality Function Deployment) Pada Kementerian Agama Kota Dumai". Riau: Universitas Riau
4. Nurrahman, P. I. 2019. Analisis Kualitas Layanan Kereta Api Jayakarta Kelas Ekonomi dengan Metode Kano. Yogyakarta: Universitas Islam Indonesia.
5. Pratama R. S. A. et al. 2022. Analisis Kepuasan Pengguna E-Learning Di Perguruan Tinggi Menggunakan Model Kano. JUTISI: Jurnal Ilmiah Teknik Informatika dan Sistem Informasi. Vol. 11. No. 2.
6. Primadasa R. et al. 2022. Integrasi Model Kano dan Quality Function Deployment (QFD) Untuk Merancang Perbaikan Kualitas Layanan Jasa Pengiriman (Studi Kasus Ninja Express Margoyoso). Journal of Industrial Engineering and Technology (Jointech) Universitas Muria Kudus. Vol. 3 No. 1.
7. Rhomadi F. 2020. Analisis Atribut Kualitas Layanan Bank BRI Muntilan dengan Metode Kano. Yogyakarta: Universitas Islam Indonesia
8. Safitri R. N., Gusminto E. B., Awwaliyah I. N. 2022. The Implementation of Continuous Review System Method on Blood Inventory Control at Indonesian Red Cross Jember. IOSR Journal of Business and Management (IOSR-JBM). Volume 24 Issue 11.