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QUALITY IMPROVEMENT OF THE E-COMMERCE WEBSITE USING INTEGRATION OF KANO MODEL-IPA WITH QFD APPROACH

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Research paper

Abstract: *This study was conducted to analyze the quality of e-commerce websites, find out which items need improvement, and make improvement design e-commerce websites. This study uses the kano model and Importance Performance Analysis approach based on 7 dimensions with 39 attributes. This study used the survey results from 103 respondents who regularly use the e-commerce website Tokopedia.com. The results of the questionnaire through the validity and reliability tests were used to analyze the reliability of items and the feasibility of the results of the questionnaire. After that, the results of the questionnaire through the corellation and hypothesis tests were used to know the relationship between variables. The findings show that 7 attributes influence customer satisfaction. However, the findings are still nowhere near the expectations. Thus, it requires being the focus of improvement. Improvements in design of 7 attributes in the form of House of Quality with 6 technical features needed to improve the quality of e-commerce website Tokopedia.com. Therefore, effective management strategies can be applied to overcome the intense competition in the e-commerce industry.*

Key words: *Website quality, Kano model, Importance Performance Analysis, E-commerce, QFD, Customer satisfaction*

1. Introduction

Technology has rapidly developed along with the times, which allows people to be able to work more easily and effectively (Wilson & Keni, 2018). One of the examples is the increase in internet development. The internet is a global network system that allows people to communicate globally, get information easily, as well as buy and sell products and services online. The internet has a big influence on how people work, shop, make payments, travel, and socializes (Kaur, 2011). The development of the internet in recent years has changed the way people do business for they are starting to do it in a digital manner rather than the traditional way.

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Technological advances and developments make life easier for human beings by making online business as well as buying and selling a trend in the future. In traditional trade, the seller and buyer have to meet each other in the same place, negotiate, and conduct transactions, which require both parties to agree on the prices. Meanwhile, in e-commerce or online trading, there is no need for buyers and sellers to meet each other. Instead, they meet through a website that acts as an intermediary that connects the two parties and facilitates the transaction. Therefore, buyers can buy products or services from sellers, while sellers can do business even if they do not have a place or shop (Wilson et al. 2019). E-commerce can be defined as a commercial transaction between two parties, organizations, and individuals which is carried out through a network or website (Psaila & Wagner, 2007). E-commerce covers several types of activities, such as retail shopping, banking, ordering food, ticketing, and others. Most people use the website as e-mail, looking for information, social media, and a place for online transactions. This makes buying and selling things online a trend in the future. Buying and selling online in the e-commerce industry is defined as the efforts made to market a product or service as well as to rebuild relationships between sellers and buyers through internet media (Kotler & Amstrong, 2014). Hence, a website quality assessment is needed based on several criteria and items to describe things expected of a website (Rondovic et al, 2017). Website quality can affect repurchase intentions. On e-commerce sites, repurchase intentions have been underlined by several researchers or actors (Wilson et al. 2019; Wilson & Keni 2018; Wilson 2018; Wilson & Christella 2019). In this case, the quality of website appearance is known as a factor that can build repurchase intentions to consumers. It is an advantage for the company when a consumer or customer has the intention to rebuy things from the same e-commerce company. There is a possibility that customers will buy products or services from other companies in the same industry. Moreover, some researchers have underlined that the relationship between customer loyalty and the success of e-commerce companies is the key to achieving success in the e-commerce industry since it can indirectly retain customers (Lee et al, 2009).

One of the important things in repurchase in e-commerce is the website user interface features that are well designed that enable a positive impression on customers who will do a repurchase (Fan & Tsai, 2010). The quality of the website's appearance has a considerable effect in influencing customer trust to shop on the site (Gregg & Walczak 2010). The quality of website design is related to the customer's initial online buying behavior (Zhou et al., 2009). Online shopping websites are very important for businesses, retailers, and consumers where the features on the website are designed innovatively. For that reason, the e-commerce industry has to develop high-quality websites that provide a better online experience to attract and retain their customers in e-commerce (Stuart, 2003). The main challenges for e-commerce organizations are understanding the users' needs and developing them. E-commerce companies with websites that are difficult to use will protect a bad image on the Internet and weaken the company's position in the e-commerce business (Barnes & Vidgen, 2002). This study aims to find out the extent of the satisfaction level of Tokopedia.com e-commerce web users through measurement between the current level of quality (perception) and the desired quality (expectations). The next goal is to be able to describe the position of the Tokopedia.com e-commerce website quality items to enable seeing which items are by the user's expectations and which ones need improvement. Therefore, it can be designed to propose improvements on the

Tokopedia.com e-commerce website. This study differs from previous studies. Previous studies only reached the stage of e-commerce website quality analysis, while this study proposed improvements on the results of e-commerce website quality analysis based on kano model and importance performance analysis methods using improvement scales Quality Function Deployment (QFD). Kang et al (2016) studied the evaluation of e-commerce websites based on the E-S-Qual method. A study conducted by Ilbahar and Cebi (2017) analyzed and classified design parameters according to customer expectations for evaluating the usefulness of e-commerce websites. Mohd and Zaaba (2019) argue on usability and security factor analysis on e-commerce websites.

2. Literature Review

In general, quality is a characteristic of a product or service that reflects how well the product or service meets customer satisfaction (Negash et al. 2003). According to a study, customer perceptions on the quality of a website are based on features on the website that meet customer needs and impress the total excellence of the website. The previous researchers also mentioned that various dimensions of website quality which can be categorized as security, information quality, ease of use, and service quality. Customer perceptions of the quality of the website are based on features on the website that meet the needs and impressions of customers towards the website (Mona et al., 2013). Attractive website designs on e-commerce websites motivate consumers to engage in online shopping (Ganesh et al., 2010). According to some researchers, the features on the website have an important influence on online purchase intentions (Mansori et al., 2012). Another study argues that informative websites allow customers to compare and evaluate product alternatives thereby increasing customer satisfaction and thus influencing online purchase intentions (Hausman & Siekpe, 2009). The quality of information offered by a brand on online shopping sites is also an important factor. A specific study revealed that information quality has the highest influence on customer satisfaction among all dimensions of website quality (Kim & Jones, 2009).

2.1. Kano Model

Kano model is used to determine how effective an indicator plays a role in improving service quality. The Kano's attributes are divided into several categories. The first category is Must be (M) or basic needs, the customer simply accepts when it is fulfilled. However, if the product or service fails to satisfy the customer's basic needs, the customer will be very dissatisfied. For instance, although having unfriendly waiters causes customer dissatisfaction, having friendly service does not increase customer satisfaction since having a friendly waiters is a basic need (Garibay et al, 2010). The second category is One dimensional (O) or performance needs. The level of customer satisfaction is related to one-dimensional performance; thus, the higher the perceived service quality, the higher the customer satisfaction, and vice versa. When attributes are fulfilled, customers are satisfied; if they are not fulfilled, customers are dissatisfied. The level of customer satisfaction increases in accordance with the level of such attributes. Therefore, the categories of must be and one dimensional are conditions needed to achieve customer satisfaction (Basfirinci

et al, 2015). The third category is Attractive (A) or excitement needs, which shows a high level of customer satisfaction when fulfilled, but does not cause dissatisfaction when it is not fulfilled because it is not expected by the customer who may not know the product features. The fourth category is Reserve (R), which indicates that if an indicator in this category exists, the customer is dissatisfied, while if the opposite is true, the customer is highly satisfied. The fifth category is Indifferent (I), which indicates that the existence of indicators in this category seems to have no impact on customer satisfaction. The sixth category is Questionable (Q), which involves indicators that are still questionable since the possibility of customers being satisfied or dissatisfied is unclear (Dewi et al, 2018). The next step is determining the Kano's category for each indicator. If (M + O + A)> (I + R), then the Kano's category for the x-indicator is max {M, O, A), otherwise (M + O + A) <(I + R) then the Kano's category for the x-indicator is max {I, R} (Kuo et al, 2012). The researcher will then use Importance Performance Analysis to process the attributes that fall into the M, O, and A categories.

2.2. Importance Performance Analysis (IPA)

Importance Performance Analysis (IPA) has been one of the most extensively acknowledged systematic methods for measuring which items demand improvement. The research focused on the Importance Performance Analysis (IPA), Evans and Chon (1989) examined the capability of the IPA to control tourism strategies in two different places in the US. The investigation showed that local business workers were not content with the company's performance. The next researcher used IPA to compare business competitiveness in Hong Kong with its main competitors in the Asia Pacific region. In analyzing the data, they used IPA for it can provide a basis for their business development strategies (Enright & Newton, 2004). Sorensson's (2013) research results comparing national and international tourists using IPA revealed that national tourists place a higher level of importance on sustainable tourism than international tourists. Meanwhile, there are significant differences between national and international tourists in subsequent tourism. The results from the IPA consist of four quadrants. Quadrant I included the high importance but low performance. The items included in this quadrant represent the main items that need to be improved with top priority. Quadrant II involved high importance with a high level of performance. Thus, it does not need enhancement and the items recorded on this quadrant are meet expectations. Quadrant III is of low importance with low performance as well labeled as a low priority. Therefore, the items included in this quadrant are unimportant and do not pose a threat to the company. Quadrant IV means low importance with a high level of performance. Quadrant IV is labeled as possibly excessive. This shows items that are too much emphasized by the organization. Hence, organizations have to minimize these items. However, rather than focus in this quadrant, companies are obliged to allocate more resources to focus on items that are in quadrant I (Wong et al., 2011).

2.3. Quality Function Deployment (QFD)

Quality Function Deployment is a way to make the needs and desires of customers as part of the design and production of a product or service. QFD is used by companies to identify customer needs in technical languages (Goetsch & Davis, 2014). QFD originated from Japan in 1972. It has been successful as a tool to help

systematic quality improvement teams translate market research and customer needs into technical characteristics to satisfy customer desires. In QFD, customer needs are reflected in the planning matrix or so-called 'quality home' or HOQ (Cohen, 1995).

3. Methodology

This study is a survey study that used a quantitative approach by involving samples directly from the existing population. The purpose of this study was to determine the extent of user satisfaction on the quality of e-commerce Tokopedia.com websites, items that need to be improved and also suggestions for improvements on the quality of Tokopedia.com e-commerce websites. Variables measured to determine the quality of the website was to use seven dimensions including Website Design (WD), Product Quality (PQ), Security Quality (SQ), Delivery Quality (DQ), Delivery Accuracy (DA), Customer Service (CS), Customer Perception and Satisfaction (PS). Each dimension consisted of several question items as the basis for compiling the questionnaire. The sampling technique used in this study was simple random sampling where sampling was done randomly from the existing population. In general, based on the theory that sampling for factor analysis requires a minimum of 100 respondents (Kline, 1994). Thus, this study used a 90% confidence level with a 10% error margin where the sample size was 103 respondents. The e-commerce website used as a sample of this study was the Tokopedia.com e-commerce website. The data collection technique used was a questionnaire with a Likert scale and Kano scale. Likert scale consisting of 5 points, from strongly disagree (score 1) to strongly agree (score 5). Kano scale consisting of 5 points, that is M (Must be), O (One dimensional), A (Atractive), I (Indifferent), R (Reserve) dan Q (Questionable).

After the questionnaire was distributed, validity and reliability tests were performed to determine whether the results of the questionnaire were suitable for analysis. An item that had a positive correlation with criteria (total score) and a high correlation showed that the item had high validity as well. Based on this, if the calculated r count value was smaller than the r table value, then then the question item became unvalid. Moreover, it was said to be valid if the calculated value was greater than the r table value. After testing the validity of the questions used in the study, the reliability test was then performed. The reliability test was carried out to find out whether the data collection tool showed the level of accuracy, stability or consistency. Thus, the data can be used for further analysis. An item is considered to be reliable if the value of Cronbach Alpha is bigger than the critical value. The specified critical value is 0.6. If the Alpha value is greater than 0.6 then it is reliable and if the Alpha value is less than 0.6 then it is not reliable (Sugiyono, 2016). After that, the results of the questionnaire through the corellation and hypothesis tests were used to know the relationship between variables. After the correlation and hypothesis testing, the data can be processed using the Kano model and also the importance performance analysis for further analysis. Variabel and attribut of the questionnaire is presented in Appendix 1.

After the questionnaire data had been obtained, validity and reliability tests were performed to test the eligibility of the items and the accuracy of the questionnaire

results. After that, the results of the questionnaire through the corellation and hypothesis tests were used to know the relationship between variables. After being declared valid, reliable and passed hyphotesis, the result of questionnaire quality of the Tokopedia website was analyzed using kano model and Importance Performance Analysis. After getting the results from the kano model, then performed data processing Importance Performance Analysis which showed which indicators need improvement, the design of the improvement of the Tokopedia.com e-commerce website was improved by using the Quality Function Deployment. The design of the improvement was described in the House of Quality where there were several technical characteristics needed for improvement.

4. Results

Based on the result of the questionnaire, the user of the Tokopedia.com website who became the respondents by gender involved in this study were 63% or 65 respondents were female, and the remaining 37% or 38 respondents were male. Meanwhile, seen from the age of respondents, 78% or 81 respondents were 20-30-year-old, 15% or 15 respondents were 31-40-year-old, and 7% or 7 respondents were 41-50-year-old. The types of work of the respondents were private employees 83% or 86 respondents, civil servants 9% or 10 respondents, students 4% or 4 respondents, and housewives 4% or 3 respondents. Based on the frequency of use of e-commerce websites, 19% or 20 respondents regularly used e-commerce website, 50% or 52 respondents frequently used e-commerce websites, and 31% or 31 respondents quite often used e-commerce websites.

4.1. Validity and Reliability Analysis

The following are the results of the validity and reliability tests of the questionnaire results from 103 respondents involved in this study.

Table 1. Validity Test

Questions	R Count Value	R Table Value	Decision
			R Count > R Table
WD1	0.437	0.1638	Valid
WD2	0.716	0.1638	Valid
WD3	0.511	0.1638	Valid
WD4	0.536	0.1638	Valid
WD5	0.320	0.1638	Valid
WD6	0.616	0.1638	Valid
PQ1	0.637	0.1638	Valid
PQ2	0.652	0.1638	Valid
PQ3	0.726	0.1638	Valid
PQ4	0.491	0.1638	Valid
PQ5	0.272	0.1638	Valid
SQ1	0.633	0.1638	Valid
SQ2	0.579	0.1638	Valid
SQ3	0.632	0.1638	Valid
SQ4	0.524	0.1638	Valid
SQ5	0.738	0.1638	Valid
DQ1	0.615	0.1638	Valid
DQ2	0.342	0.1638	Valid

Table 1. Validity Test (Continue)

Questions	R Count Value	R Table Value	Decision
			R Count > R Table
DQ3	0.731	0.1638	Valid
DQ4	0.726	0.1638	Valid
DA5	0.387	0.1638	Valid
DQ6	0.208	0.1638	Valid
DQ7	0.487	0.1638	Valid
DA1	0.544	0.1638	Valid
DA2	0.632	0.1638	Valid
DA3	0.404	0.1638	Valid
DA4	0.685	0.1638	Valid
DA5	0.466	0.1638	Valid
CS1	0.251	0.1638	Valid
CS2	0.210	0.1638	Valid
CS3	0.265	0.1638	Valid
CS4	0.251	0.1638	Valid
CS5	0.716	0.1638	Valid
CS6	0.670	0.1638	Valid
PS1	0.618	0.1638	Valid
PS2	0.526	0.1638	Valid
PS3	0.620	0.1638	Valid
PS4	0.684	0.1638	Valid
PS5	0.562	0.1638	Valid

Table 1 presents the results of the SPSS 25.0 calculation regarding the overall value of *r* count which is greater than the r table value of 0.1638 for 103 questionnaires. Consequently, it can be concluded that the whole question items in the questionnaire are valid. After that, a reliability test was made to measure the reliability of respondents' responses to the general items of the questions asked. According to Santoso (2010), the questionnaire is deemed to be reliable if the value of the Cronbach Alpha is above 0.60. The following are the results of the reliability test of 39 question items in the questionnaire.

Table 2. Reliability Test

Question Items	Alpha Cronbach	Description
39	0.931	Reliable

Based on the calculation using SPSS 25.0 presented in Table 2 above, it can be inferred that the Cronbach Alpha coefficient value is 0.931. Thus, it can be concluded that the question items in the Tokopedia.com e-commerce website quality questionnaire had a good level of consistency. Therefore, the findings of this study can be accounted for and can be used for further data processing to provide solutions for improving the quality of e-commerce websites.

4.2. Corelation Analysis

The relationship between each variable is referred to as correlation. Correlation refers to how a change in one variable causes a change in the direction of another

variable. The higher the correlation, the closer the absolute value is to one. As a result, "+" indicates a positive change direction, while "-" indicates a negative change direction. The following is a correlation test between variables where all the dimensions of the tested variables are correlated or have a relationship between variables, since the value of the correlation test results is <0.05 or there are ** and * signs appeared in Table 3.

Table 3. Correlations Test

	WD	PQ	SQ	DQ	DA	CS	PS
WD	1						
	103	103					
PQ	.680**	1					
	0						
	103	103	103				
SQ	.529**	.577**	1				
	0	0					
	103	103	103	103			
DQ	.608**	.705**	.707**	1			
	0	0	0				
	103	103	103	103	103		
DA	.487**	.588**	.858**	.683**	1		
	0	0	0	0			
	103	103	103	103	103		
CS	.200*	.228*	0.19	.233*	.249*	1	
	0.043	0.021	0.055	0.018	0.011		
	103	103	103	103	103	103	
PS	.739**	.637**	.748**	.718**	.743**	.294**	1
	0	0	0	0	0	0.003	
	103	103	103	103	103	103	103

** Correlation is significant at the 0.01 (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

4.3. Hypothesis Analysis

Hypothesis testing aims to test the effect of the quality of the Tokopedia.com website on customer satisfaction. The hypothesis was tested using regression analysis by determining seven sub-factors as independent variables, with customer satisfaction as the dependent variable. The regression analysis hypothesis test results, which are attached in Table 4, are as follows.

Table 4. Hypothesis Test

	Unstandardized Coefficients		Standardized Coefficients			Adj R2
	B	Std. Error	Beta	T	Sig.	
(Constant)	-2.156	1.141		-1.889	0.062	0.996
WD	1.193	0.056	0.226	21.435	0.000	
PQ	1.034	0.060	0.173	17.128	0.000	
SQ	0.933	0.078	0.160	12.029	0.000	
DQ	1.144	0.055	0.225	20.968	0.000	
DA	1.185	0.082	0.191	14.398	0.000	
CS	1.235	0.071	0.115	17.329	0.000	
PS	0.957	0.078	0.159	12.250	0.000	

Hypothesis 1 predicts that the Website Design (WD) positively influences consumen satisfaction. The regression analysis of Hypothesis 1 has P=0.000<0.05, indicating a statistically significant correlation. Thus, Hypothesis 1 is accepted. Hypothesis 2 predicts that the Product Quality (PQ) positively influences consumen satisfaction. The regression analysis of Hypothesis 2 has P=0.000<0.05, indicating a statistically significant correlation. Thus, Hypothesis 2 is accepted. Hypothesis 3 predicts that the Security Quality (SQ) positively influences consumen satisfaction. The regression analysis of Hypothesis 3 has P=0.000<0.05, indicating a statistically significant correlation. Thus, Hypothesis 3 is accepted. Hypothesis 4 predicts that the Delivery Quality (DQ) positively influences consumen satisfaction. The regression analysis of Hypothesis 4 has P=0.000<0.05, indicating a statistically significant correlation. Thus, Hypothesis 4 is accepted. Hypothesis 5 predicts that the Delivery Accuracy (DA) positively influences consumen satisfaction. The regression analysis of Hypothesis 5 has P=0.000<0.05, indicating a statistically significant correlation. Thus, Hypothesis 5 is accepted. Hypothesis 6 predicts that the Customer Service (CS) positively influences consumen satisfaction. The regression analysis of Hypothesis 6 has P= 0.000<0.05, indicating a statistically significant correlation. Thus, Hypothesis 6 is accepted. Hypothesis 7 predicts that the Customer Perception and Satisfaction (PS) positively influences consumen satisfaction. The regression analysis of Hypothesis 7 has P=0.000<0.05, indicating a statistically significant correlation. Thus, Hypothesis 7 is accepted.

4.4. Kano Model and Importance Performance Analysis

The Kano model was analyzed to determine the attributes that customers need as well as those that have the potential to become a source of innovation for the Tokopedia.com website. Each respondent's questionnaire was categorized into M (Must be), O (One dimensional), A (Attractive), I (Indifferent), R (Reserve), and Q (Questionable). After collecting 103 respondents, then the results of the number of each service attribute are calculated. Data processing in the Kano model for each attribute is determined by the following rules, namely if (M+O+A)>(I+R), then the service attribute category is max (O, A, M) and if (M+O+A)<(I+R), then the Kano's category for the service attribute is max (I, R). Table 5 summarizes the results of the Kano model calculation.

Table 5. Kano Model

No	Code	M	O	A	I	R	Q	M+O+A	I+R	Kano Category
1	WD1	61	29	12	0	0	1	102	0	M
2	WD2	73	18	10	2	0	0	101	2	M
3	WD3	41	7	52	1	0	2	100	1	A
4	WD4	37	45	21	0	0	0	103	0	O
5	WD5	42	50	9	1	0	1	101	1	O
6	WD6	28	59	16	0	0	0	103	0	O
7	PQ1	51	37	12	2	0	1	100	2	M
8	PQ2	59	33	11	0	0	0	103	0	M
9	PQ3	40	18	44	1	0	0	102	1	A
10	PQ4	32	31	39	0	0	1	102	0	A
11	PQ5	37	25	41	0	0	0	103	0	A
12	SQ1	46	53	4	0	0	0	103	0	O
13	SQ2	35	67	1	0	0	0	103	0	O
14	SQ3	31	48	15	2	0	7	94	2	O
15	SQ4	20	52	31	0	0	0	103	0	O
16	SQ5	48	41	6	4	1	3	95	5	M
17	DQ1	62	37	4	0	0	0	103	0	M
18	DQ2	59	12	30	1	0	1	101	1	M
19	DQ3	47	50	6	0	0	0	103	0	O
20	DQ4	36	21	39	3	0	4	96	3	A
21	DQ5	42	39	19	2	0	1	100	2	M
22	DQ6	38	55	10	0	0	0	103	0	O
23	DQ7	49	31	22	1	0	0	102	1	M
24	DA1	41	58	4	0	0	0	103	0	O
25	DA2	40	43	19	0	0	1	102	0	O
26	DA3	28	47	26	0	0	2	101	0	O
27	DA4	55	38	10	0	0	0	103	0	M
28	DA5	59	41	3	0	0	0	103	0	M
29	CS1	51	26	25	1	0	0	102	1	M
30	CS2	63	19	21	0	0	0	103	0	M
31	CS3	57	28	17	0	0	1	102	0	M
32	CS4	40	53	10	0	0	0	103	0	O
33	CS5	31	49	23	0	0	0	103	0	O
34	CS6	34	52	17	0	0	0	103	0	O
35	PS1	59	40	4	0	0	0	103	0	M
36	PS2	41	11	43	5	0	3	95	5	A
37	PS3	38	9	51	5	0	0	98	5	A
38	PS4	42	31	19	11	0	0	92	11	M
39	PS5	35	20	33	12	1	2	88	13	M

According to Table 5, there are 17 attributes that are categorized as Must be (M), 15 attributes are categorized as One dimensional (O), and 7 attributes are categorized as Attractive (A) which means that all attributes are included in the categories M, O, and A which are tested, affect consumer satisfaction of e-commerce website users, while there are no attributes that fall into category I or R, which means that there is not a single attribute that does not affect customer satisfaction.

Therefore, in the next IPA processing, all attributes will be analyzed. The results of the IPA analysis, as shown in Figure 1, are as follows.

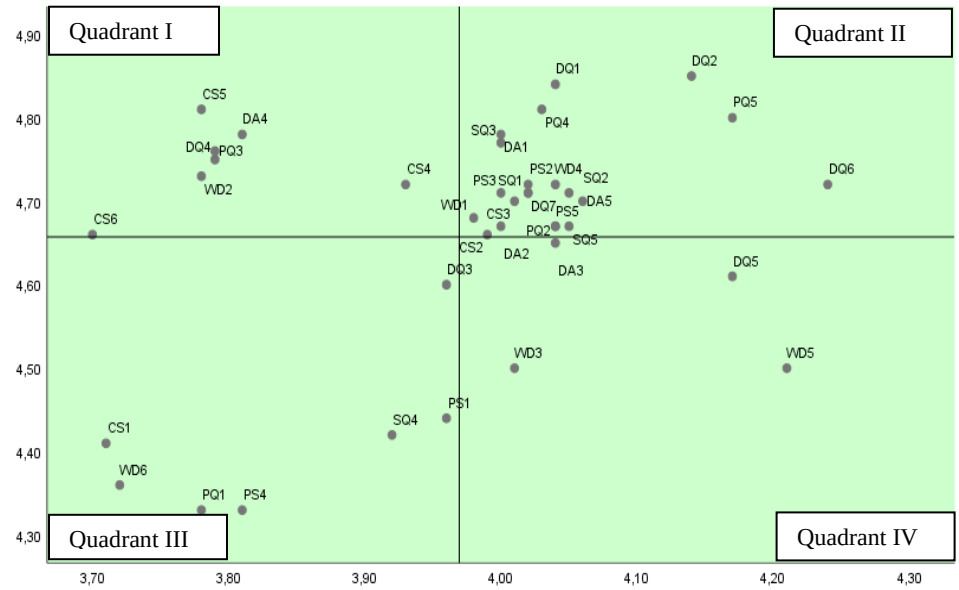

Figure 1. Importance-Performance Analysis

The items included in quadrant I were item WD2 with indicator the information on the website is effective, item PQ3 with indicator all products on the website are available, item DQ4 with indicator the websites offers discount or free shipping, item DA4 with indicator delivers products in accordance with the set conditions, item CS4 with indicator it provides me with convenient options for returning items, item CS5 with indicator this site handles products returns well, and item CS6 with indicator return policy is simple. After analyzing the questionnaire using the kano model and Importance-Performance Analysis (IPA) so that it is known which items need to be repaired (quadrant I), an improvement design using Quality Function Deployment (QFD) by arranging House of Quality.

4.5. Quality Function Deployment

The first phase in preparing QFD was the matrix of consumer needs or Voice of Customer which was a list of items that were important to consumers. In this study, the results of Importance Performance Analysis (IPA) were used in determining the Voice of Customer by placing the items in quadrant I like the focus of improvement. Phase 2 was determining the ratio of improvement of each quality indicator on the Tokopedia.com website. To achieve desirable and measurable results, targets were measured as well. The following is the formula for calculating the value of the improvement ratio.

$$IR = \frac{Expectation\ (Target\ Value)}{Perception\ (Performanse)} \quad (1)$$

Using this formula, the determination of the improvement ratio was done by comparing the expected value with the perception obtained from the results of the questionnaire. The calculation of the improvement ratio in quadrant I items was as follows.

Table 6. Improvement Ratio

Code	Indicator	Expectation	Perception	Improvement Ratio (IR)
WD2	The information on the website is effective	4.73	3.78	1.25
PQ3	All products on the website are available	4.76	3.79	1.26
DQ4	The website offers discount or free shipping	4.75	3.79	1.25
DA4	Delivers products in accordance with the set conditions	4.78	3.81	1.25
CS4	It provides me with convenient options for returning items	4.72	3.93	1.20
CS5	This site handles product returns well	4.81	3.78	1.27
CS6	Return policy is simple	4.66	3.70	1.26

The third phase was determining the technical characteristics. Technical characteristics are the response given by the company to user desires that need to be revised. Determination of the technical characteristics was conducted by benchmarking, discussion, and interviews with interested parties. Determination of technical characteristics included various features of the website, standards for completeness of information, consistency in implementing SOPs, refund policies, Labor qualifications, and availability of assurance products. The fourth phase was the benchmarking stage which was conducted by comparing Tokopedia.com e-commerce with similar companies. The fifth phase was the relationship analysis of what's and How's Matrixes. In this section, the researchers described the relationship between customer needs and the technical characteristics needed to meet customer needs. This section was marked with number 3 which means it had a positive correlation and number 9 which means strong positive. The analysis of the relationship between what and how matric is presented in Appendix 2.

The sixth phase was determining the correlation of technical characteristics drawn on the roof of the House of Quality. Characteristic correlations were described by four symbols, including the black circle symbol that represented a strong positive relationship and the white symbol that represents a positive relationship. Additionally, a negative relationship was depicted by a black triangle symbol which means strong negative and white triangle which means negative. Further, the seventh phase was setting goals or targets for each technical characteristic which means the steps or strategies needed for the organization to achieve the specified technical features. The following were the targets or stages that have to be carried out to achieve the required technical characteristics.

Table 7. Target or Limit Value

Technical Characteristic	Target
Variety of Website Features	There are features about product info, shipping refunds, payment, and expedition tracking features
Completeness of Information	Providing direction to the seller in the procedure of providing information in marketing their product
Consistency in SOP Implementation	Providing strict standards and consequences for parties related to customer sevice or the seller in carrying out duties or regulations in selling products
Refund Policy	The website provides a good refund policy
Labor Qualification	Providing training to customer service websites
Assurance Availability	Providing a guarantee of products purchased by customers if something goes wrong

Next, the final phase was determining the priority level. The priority level was used to determine which Target or Limit Value had the highest priority level and the lowest priority level. Technical Priorities is the result of multiplying the values contained in the technical characteristics with the value of importance to customer. The results of the technical characteristic values can be used to calculate the percentage value for total priorities. The greater the value, the greater the priority for improvement. The results of the House of Quality (HOQ) design to improve the quality of e-commerce websites, in the Tokopedia Company is presented in Appendix 3.

5. Discussions

Value of technical priorities is obtained by multiplication between the values of the technical characteristics with the value of importance to customer. Example for calculate Technical Priorities of Variety of Websites Features =(9×5)+(9×5)+(9×5)+(9×5)+(9×5)+(9×5)+(9×5)=315. Example for calculate Percent Total Priorities of Variety of Websites Features=(315/(315+315+315+285+225+285)=18%. Others Technical Priorities and Percent Total Priorities can be calculated as above formula. Based on Appendix 3, determining the top priority in improving website quality based on the value technical priorities became the technical focus of improving the quality of e-commerce websites that have to be done immediately. The technical characteristic with the highest weight was variety of website features, completeness of information and consistency in the implementation of SOP. A variety of website features is various features found on a website designed for marketing needs. Thus, the intended website can meet the desires of the user. Variety of website features where the website must provides features that can accommodate all information related to the product with all its policies. This includes features of the information that is accurate, reliable, timely, and also detailed. The website must provide tracking features for product shipments as well as by phone interaction with the customer service website. The standard of completeness of information in which the seller is most responsible for these characteristics. The standard of completeness of information including websites must provides accurate, reliable, timely, and also detailed information. Additionally, the website has to provide information on

product return policies, information on compensation in the event of an internal problem, and also information about the customer service website telephone number.

In case SOP implementation, SOP must was made with strict standards. Moreover, there were consequences if the SOP was not carried out according to the standard. The strict standard was to give obligations to related parties both customer service and seller in complying with the rules in the applicable SOP. SOP on customer service including the ability of customer service website as a good mediator in the event of the return of goods between the seller and buyer, the ability of customer service in resolving the problem immediately, the ability of customer service in providing a solution in the form of compensation in the event of an internal problem, and interacting directly with the users. Meanwhile, according to the SOP, the seller is required to provide accurate, reliable, up to date, and detailed information.

The second-highest weighted technical characteristic was refund policy and assurance availability. Refund policy was in effect for the product received which was not following the expectation of the buyer, such as a product in a defective condition, inadequate quantity, wrong color, and so on. The indicators included in the refund policy were product returns according to applicable regulations, immediately handled by the customer service, the existence of compensation, and the ease of communication between the user and the customer service website. The indicator required to be reviewed to prevent refunds was the website. In this case, the seller has to provide accurate and reliable information to minimize product returns. An assurance on the website is a guarantee given by the Tokopedia.com website when things go wrong. The indicators included in this regard are the website handling product returns well, as well as being able to provide compensation in the event of an internal problem. Indicators that also need to be reviewed were if the website does not provide accurate, reliable, and timely information, in addition to that if the customer service does not resolve the problem immediately and is also difficult to contact.

The third-highest weighted technical characteristic was labor qualifications. Employees were the spearhead of the website quality delivery system. For employees to be able to meet the expectations of website users effectively, it requires support from the main management functions. This support can be in the form of equipment, information, and training in service standards. Indicators included in terms of workforce qualifications were handling product returns properly, addressing problems immediately, and also the ease of communicating with customer service websites wither through chat or by phone features.

6. Conclusion

Based on the results of the integration of the Kano and IPA models, it has been proven effective in knowing which attributes need to be improved in enhancing the quality of the e-commerce website Tokopedia.com. Furthermore, there are seven attributes that need to be improved out of the 39 attribute studied. The Kano and IPA models' results for these seven attributes have a significant effect on customer satisfaction, but they are not as expected.

The seven attributes are the information on the website is effective, all products on the website are available, the website offers discount or free shipping, delivers products in accordance with the set conditions, it provides me with convenient options for returning items, this site handles product return well, and return policy is simple. The seven attributes that do not meet customer expectations are then evaluated with QFD, which results in a technical analysis that needs to be improved, including a variety of website quality, standard of completeness of information, consistency of SOP implementation, refund policy, workforce qualifications, and assurance availability. The integration of the Kano and IPA models can be used for future research with a larger sample size. Furthermore, additional research must be capable of analyzing two or more related e-commerce websites.

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Appendix 1. Dimensions & Items

Dimension	Code	Attributes	Reference
Website Design (WD)	WD1	The website adequately meets my information needs	Blut, M. (2016)
	WD2	The information on the website is effective	Blut, M. (2016)
	WD3	The website is visually pleasing	Blut, M. (2016)
	WD4	The display pages within the website are easy to read	Blut, M. (2016)
	WD5	The text on the website is easy to read.	Blut, M. (2016)
	WD6	The website loads quickly	Blut, M. (2016)
Product Quality (PQ)	PQ1	This website has a good selection products	Blut, M. (2016)
	PQ2	The site has a wide variety of products that interest me	Blut, M. (2016)
	PQ3	All products on the website are available	Blut, M. (2016)
	PQ4	The website offers discount product	Blut, M. (2016)
	PQ5	The website has lower prices than offline stores	Blut, M. (2016)
Security Quality (SQ)	SQ1	I feel safe in my transactions with the website	Blut, M. (2016)
	SQ2	The website has adequate security features	Blut, M. (2016)
	SQ3	This site protects information about my credit card	Blut, M. (2016)
	SQ4	I trust the website to keep my personal information safe	Blut, M. (2016)
	SQ5	It protects information about my web-shopping behavior	Blut, M. (2016)
Delivery Quality (DQ)	DQ1	The product is delivered by the time promised by the seller	Blut, M. (2016)
	DQ2	This website makes items available for delivery within a suitable time frame	Blut, M. (2016)
	DQ3	It quickly delivers what I order	Blut, M. (2016)
	DQ4	The website offers discount or free shipping	Blut, M. (2016)
	DQ5	Seller provides delivery at low cost	Vasic, et al. (2020)
	DQ6	Seller delivers products in accordance with the set conditions	Vasic, et al. (2020)
	DQ7	The website offers the shipment tracking option	Vasic, et al. (2020)
Delivery Accuracy (DA)	DA1	You get what you ordered from this website	Blut, M. (2016)
	DA2	The website is truthful about its offerings	Blut, M. (2016)
	DA3	The ordered products arrived in a good condition	Blut, M. (2016)
	DA4	Delivers products in accordance with the set conditions	Vasic, et al. (2020)
	DA5	Shipment content is seldom liable to complaints	Vasic, et al. (2020)
Customer Service (CS)	CS1	This site provides a telephone number to reach the company	Blut, M. (2016)
	CS2	This site has customer service representatives available online	Blut, M. (2016)
	CS3	It offers the ability to speak to a live person if there is a problem	Blut, M. (2016)
	CS4	It provides me with convenient options for returning items	Blut, M. (2016)
	CS5	This site handles product returns well	Blut, M. (2016)
	CS6	Return policy is simple	Vasic, et al. (2020)

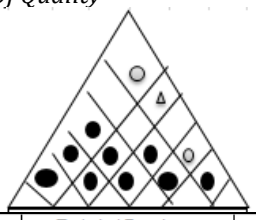
Appendix 1. Dimensions & Items (Continue)

Dimension	Code	Attributes	Reference
Customer Perception and Satisfaction (PS)	PS1	I am satisfied with this online retailer	Blut, M. (2016)
	PS2	The online retailer always meets my needs	Blut, M. (2016)
	PS3	I consider this online retailer to be my first choice for next transactions	Blut, M. (2016)
	PS4	I say positive things about this online retailer to other people	Blut, M. (2016)
	PS5	I recommend this online retailer to someone who seeks my advice	Blut, M. (2016)

Appendix 2. How and What Matrix

Code	Primary / Technical Charasteristic	1 Variety of Website Features	3 Completeness of Information	4 Consistency in SOP Implementation	5 Refund Policy	6 Labor Qualification	7 Assurance Availability
WD2	The information on the website is effective	9	9	9	9	9	3
PQ3	All products on the website are available	9	9	9	9	3	9
DQ4	The website offers discount or free shipping	9	9	9	3	3	9
DA4	Delivers products in accordance with the set conditions	9	9	9	9	3	9
CS4	It provides me with convenient options for returning items	9	9	9	9	9	9
CS5	This site handles product returns well	9	9	9	9	9	9
CS6	Return policy is simple	9	9	9	9	9	9

Appendix 3. House Of Quality



			Technical Descriptors (HOWs)										
	Code	Primary / Technical Charasteristic	1 Variety of Website Features	3 Completeness of Information	4 Consistency in SOP Implementati	5 Refund Policy	6 Labor Qualification	7 Assurance Availability					
Customer Requirements (WHATs)	WD2	The information on the website is effective	9	9	9	9	9	3	4	4	5	1.3	1.5
	PQ3	All products on the website are available	9	9	9	9	3	9	4	4	5	1.3	1.5
	DQ4	The website offers discount or free shipping	9	9	9	3	3	9	4	4	5	1.3	1.5
	DA4	Delivers products in accordance with the set conditions	9	9	9	9	3	9	4	4	5	1.3	1.5
	CS4	It provides me with convenient options for returning items	9	9	9	9	9	9	4	4	5	1.3	1.5
	CS5	This site handles product returns well	9	9	9	9	9	9	4	4	5	1.3	1.5
	CS6	Return policy is simple	9	9	9	9	9	9	4	4	5	1.3	1.5
Technical Competitive		Tokopedia	4	4	4	4	3	4	Tokopedia	Competito			
		Competitor	4	4	4	4	4	4					
Degree of Technical Difficulty			7	7	9	7	7	7	Customer Competitive		Importance to Customer	Improvement Ratio	Sales Point
Target Value			5	5	5	5	5	5					
Absolute Weight and Percent			315	315	315	285	225	285					
% Total Priorities			18	18	18	16	13	16					
			Prioritized Technical Descriptor										