

# Quality Analysis of Website E-Commerce XYZ Service Using Webqual 4.0 and Importance Performance Analysis (IPA) Methods

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**Abstract:** Website is an entity which is not separated in e-commerce industry, quality and reliability of website needs to be concerned by stakeholders in e-commerce industry. WebQual 4.0 is a method of quality measurement of website through user perceptions based on three dimensions includes usability, information quality, and service interaction quality. The population of this research are the active users who access website e-commerce XYZ amounted 100 respondents which are selected using purposive sampling. The research method used in this research is survey with WebQual 4.0 based questionnaire which is analyzed using IPA (Importance Performance Analysis) to find out the level of user satisfaction which is comparison or GAP between interest and performance. The results of the validity and reliability test showed that the whole questionnaire items were valid and reliable because they had fulfilled the requirements and were understood by the respondents. The results showed that of the 22 items analyzed by the IPA method were grouped into quadrant I (6 items), quadrant II (4 items), quadrant III (5 items) and quadrant IV (7 items). The items that are considered important and need to be improved are located in quadrant I, which are the provision of accurate, detailed information, appropriate format, security when making transactions, ease of communication with parties of e-commerce XYZ, and compatibility of products to be delivered.

Keywords: E-Commerce, WebQual 4.0, Importance Performance Analysis

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## 1. INTRODUCTION

Internet which presents in society has changed system and arrangement in all life aspects, one of which is business world. The presence of internet has provided new ideas in business world with the system of online transaction through e-commerce. E-commerce as new, easy and fast transaction media provides great benefits for many parties such as sellers and buyers where the process of buy and sell can be conducted without facing the people directly and it is not wasting time.

In general, e-commerce transaction process is conducted through internet media such as website. E-commerce really depends on the amount of people who visit website, conduct transaction, and website use intensity. If website has attractive displays and easy to use, the consumers will feel comfortable when visiting website to see the products and more often conduct transactions. Concerning the importance of website for e-commerce, then need the service quality measurement of website to fulfill users expectations.

At present there aren't many online buying and selling sites that measure the quality of their websites. Measurement of website quality is very important to do to increase the level of website usage [1]. Website quality measurement which based on perception and expectation of the users needs to be conducted to maintain the existence and success of website. In order to maintain existence and fulfill user expectations, an analysis of service quality is needed for website e-commerce XYZ to find out the level of user satisfaction towards website e-commerce XYZ. Website service quality analysis is conducted based on user point of view using WebQual 4.0 method. WebQual 4.0 method is compiled based on three variables as benchmark

which are usability, information quality, and service interaction [2]. The data obtained is analyzed using Importance Performance Analysis (IPA) to get indicators that need improvement or needs to be maintained based on perception and expectation of users.

## 2. LITERATURE REVIEW

The research about website service quality analysis entitled "Quality Analysis of Website E-commerce Berrybenka Service Towards Visitors Satisfaction Using WebQual 4.0 and Importance Performance Analysis (IPA) Methods". The analysis result shows the compatibility value of Berrybenka website for 94,91% and average result of discrepancy analysis (GAP) -0,0901 which shows that Berrybenka website has fulfilled user expectation. Based on IPA method, Berrybenka website is still has main priority to be conducted improvement on website which is indicator 11 concerning accuracy of the given website information [3].

Analysis of website service quality using the WebQual 4.0 method has also been conducted by Robby Yuli Endra and Deni Hermawan in a journal entitled "Analysis and Testing of Tokopedia.com Website Users Using the WebQual Method". The results of the research on the Tokopedia.com website using the Likert scale, three variables in the WebQual 4.0 method, which are usability indicating quality scale, quality information variables addressing quality scales, and quality interaction variables showing sufficient quality scales [4].

Ike Putri Kusumawijaya and Cut Maisyarah Karyati in their journal entitled "Quality Measurement of Website fashion E-commerce Using WebQual 4.0 Method", conducted research related to quality of website with case study of Tokopedia E-commerce towards its user satisfactory. Respondents in the

study were 100 students of the Department of Information Engineering at Gunadarma University. The analysis result of the dimensions of quality assessment questions for the highest category obtained is the usability dimension. Based on the analysis of the question subcategory, the subcategory that has the highest value is design, while the empathy subcategory has the smallest value have two different kinds of platform types, such as Android and web [5].

### 3. RESEARCH METHODS

This research uses descriptive analysis with quantitative methods. The determination of the number of samples using the Slovin formula and obtained a minimum of 100 respondents. Data collection was conducted using a questionnaire distributed online. After the data is collected, the data is tested using a validity test of product moment and alpha cronbach reliability test to prove that the data are reliable and valid. The data that have been tested then processed using WebQual 4.0 and Importance Performance Analysis (IPA) method to be analyzed if the website performance has compatible with users expectations and find out indicators that needs improvement. The next step is was conduct conclusion taking and improvement suggestion.

### 4. CONCEPTS AND THEORIES

#### 4.1 Website

Website is a system with universally accepted protocols for storing, retrieving, formatting, and displaying information through architecture client/server. The common protocol is HTTP, which stands for hypertext transport protocol. Website in its development is used as a media provider of information, promotion and sale of a product. This makes it easy for businesses to market products and make website as part of customer relationship management process.

#### 4.2 Website Quality

Website quality is divided into five dimensions [6] includes information which is dimensions which includes of content, usage, completeness, accuracy, and relevance of content in the website. Security is dimensions that are given trust, privacy, and security guarantee. Convenience, which is the dimension that contains trust, privacy and security guarantee. Related to it, wich is dimensions that contain visual appeal, emotional attraction, creative and attractive design of online service and customer service.

#### 4.3 Electronic Commercial (E-Commerce)

Electronic Commerce (e-commerce) is purchasing, sale, or exchange of products, service and information through computer systems [7]. E-commerce can also be interpreted as a business process using electronic technology that connects companies, consumers and the public in the form of electronic transactions and the exchange / sale of goods, services, and information electronically.

#### 4.4 WebQual 4.0

WebQual is method measures quality of a situs based on user perception developed by Stuart Barnes. WebQual uses basis of Quality Function Development (QFD). WebQual 4 consists of 3 main components includes usability, information quality, interaction and service [8]. The following are question indicators of these 3 variables.

1.	Usability	Find the site easy to learn to operate
2.		My interaction with the site is clear and understandable
3.		I find the site easy to navigate
4.		I find the site easy to use
5.		The site has an attractive appearance
6.		The design is appropriate to the type of site
7.		The site conveys a sense of competency
8.		The site creates a positive experience for me
9.	Information Quality	Provides accurate information
10.		Provides believable information
11.		Provides timely information
12.		Provides relevant information
13.		Provides easy to understand information
14.		Provides information at the right level of detail
15.		Presents the information in an appropriate format
16.	Service Interaction Quality	Has a good reputation
17.		It feels save to complete transaction
18.		My personal information feels secure
19.		Creates a sense of personalization
20.		Convey a sense of community
21.		Makes it easy to communicate with the organization
22.		I feel confident that goods/services will be delivered as promised

### 4.5 Importance Performance Analysis (IPA)

Importance Performance Analysis is a technique used to identify the attributes of the product or service most needed by users [9]. Analysis used in IPA are three which are, analysis of compatibility level, analysis of discrepancy level (GAP), and analysis of IPA quadrant.

#### A. Compatibility Analysis

Conformity analysis is the result of comparing the percentage of performance level assessment with expectation level assessment. Compatibility analysis is used to find out whether the website performance results are in line with the expectations or interests of its users. Assessment of suitability analysis will later be a priority scale of improvement in the IPA quadrant analysis (Cartesian quadrant) with equation 1 as follows.

$$Tki = (\sum xi) / (\sum yi) \times 100\% \quad (1)$$

Information:

$Tki$  = suitability level of the respondent

$\sum xi$  = performance rating score

$\sum yi$  = scoring of interest

Table 1 WebQual 4.0 Indicator

No	Category	WebQual 4.0 Questions
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## B. Discrepancy Analysis (GAP)

Discrepancy analysis is difference between performance value with interest value or user expectation. Discrepancy analysis is used to find out the quality level of website studied that is, between the quality that is felt right now and the quality that users expect. This gap analysis will be used as an evaluation of what actions are needed to reduce the gap or improve the performance expected in the future. Quality level of website or system is said to be good showed by great discrepancy value of 0 ( $Q_i \geq 0$ ). This means that the quality expected by the user is in accordance with the current quality. Conversely, if the gap value is less than 0 ( $Q_i < 0$ ), then system or website is said to be deficient or have not fulfilled users expectations. Discrepancy analysis is obtained by using these two equations.

$$Q_i(\text{Gap}) = \text{Perf}(i) - \text{Imp}(i) \quad (2)$$

Information:

$Q_i$  (Gap) = gap level

$\text{Perf}(i)$  = value of performance

$\text{imp}(i)$  = value of importance

## C. Analysis of Importance Performance Analysis (IPA) Quadrant

The interpretation of the IPA quadrant chart is divided into four quadrants based on the results of measurements of importance and performance. Performance attributes are drawn along the X-axis and importance attributes are drawn along the Y-axis [9]. IPA quadrants consists of 4 quadrant includes quadrant I (concentrate here), quadrant II (keep up the good work), quadrant III (low priority), and quadrant IV (possible overkill).



Figure 1 Quadrant IPA

## 5. RESULT AND DATA ANALYSIS

Characteristics of the respondents contained in this study indicate the number of female respondents is greater than the number of male respondents, where the percentage obtained for women is 69% and the percentage of men is 31%. Based on current job segmentation, 87% are students, 6% are private employees, 2% are civil servants, 2% are entrepreneurs and other jobs are 3%. Based on usage time segmentation of website e-commerce XYZ, from 100 respondents, 17% are new users of e-commerce XYZ with period of 3 months when the filling of this research questionnaire. 17% respondents are users with time span of 3-6 months, 12% users has used e-commerce XYZ in period of 6-11 months, 37% respondents are users with period of 1-2 months, and 17% respondents are old users of e-commerce XYZ which has accessed website for more than 2 years.

### 5.1 Validity Test

Validity test is used to measure the validity level of a questionnaire. The questionnaire is valid if the value of  $r$  table  $> r$  is calculated with the value of  $r$  table that is 0.1966. Based on the validity test using the SPSS program, 22 indicators of

questions about the level of performance and user interest of the XYZ e-commerce website are valid and the respondent intentions and purposes are understood.

### 5.2 Reliability Test

A questionnaire is said to be reliable or trusted of respondents answer towards statements is are consistent or stable continuously. Reliability test is seen showed by Alpha Cronbach value is greater than 0,7 [2]. Based on reliability test using program of SPSS, Alpha Cronbach value in question indicator of performance level and user expectation towards website e-commerce XYZ is  $> 0,7$  so that it can be concluded that the question instruments are reliable and respondent answers consistency is achieved.

Table 2 Results Reliability Test

Variable	Alpha Cronbach	
	Performance	Importance
Usability	0,814	0,923
Information Quality	0,881	0,939
Interaction Quality	0,760	0,883

### 5.3 WebQual Index (WQI)

WebQual Index is used to determine the standard (benchmark) of the overall website. WebQual Index website value is obtained from the average value of interest value (Mean of Importance), Weighted Score (Wgt. Score), and maximum score (Max. Score).

Table 3 Results WebQual Index (WQI)

#	Question	MoI	MoP	Max Scr	Wgt. Scr	WQI
1	Find the site easy to learn to operate	4,25	4,04	21,25	17,17	0,81
2	My interaction with the site is clear and understandable	4,22	3,85	21,1	16,25	0,77
3	I find the site easy to navigate	4,24	3,84	21,2	16,28	0,77
4	I find the site easy to use	4,32	3,91	21,6	16,89	0,78
5	The site has an attractive appearance	4,26	3,72	21,3	15,85	0,74
6	The design is appropriate to the type of site	4,24	3,75	21,2	15,90	0,75
7	The site conveys a sense of competency	4,22	4,04	21,1	17,05	0,81
8	The site creates a positive	4,25	3,92	21,25	16,66	0,78

	experience for me					
9	Provides accurate information	4,28	3,71	21,4	15,88	0,74
10	Provides believable information	4,27	3,7	21,35	15,80	0,74
11	Provides timely information	4,26	3,95	21,3	16,83	0,79
12	Provides relevant information	4,26	3,6	21,3	15,34	0,72
13	Provides easy to understand information	4,41	3,95	22,05	17,42	0,79
14	Provides information at the right level of detail	4,29	3,72	21,45	15,96	0,74
15	Presents the information in an appropriate format	4,28	3,65	21,4	15,62	0,73
16	Has a good reputation	4,29	3,93	21,45	16,86	0,79
17	It feels save to complete transaction	4,39	3,7	21,95	16,24	0,74
18	My personal information feels secure	4,44	3,88	22,2	17,23	0,78
19	Creates a sense of personalization	4,18	3,94	20,9	16,47	0,78
20	Convey a sense of community	3,89	3,68	19,45	14,32	0,74
21	Makes it easy to communicate with the organization	4,35	3,79	21,75	16,49	0,76
22	I feel confident that goods/services will be delivered as promised	4,4	3,72	22	16,37	0,74
Total				469,95	358,86	0,76

Table 3 is result of data processing using WebQual Index (WQI). Total value of Max Score calculation and Wgt. Score value overall are 469,95 and 358,86 so that the result is WQI for 0,76 or 76%. This shows that the quality service of website e-commerce XYZ based on user final perception is in index 76% with interpretation of “Good”.

#### 5.4 Analysis of Website Compatibility Level

Conformity analysis is obtained by using the formula in equation 1 with an average index yield of 89%. The average results show that the performance level of XYZ e-commerce

website is quite good and quite compatible with the expectations of its users.

#### 5.5 Analysis of Discrepancy Level (GAP)

The results of the gap level analysis show that all indicators are valued negative. This shows that the quality of website e-commerce XYZ is not yet compatible with user expectation. The GAP average value for usability variable is -0,37, information quality variable is -0,54, interaction quality is -0,47.

Table 4 GAP Results

No	Question	Yi	Xi	GAP
1	Find the site easy to learn to operate	4,25	4,04	-0,21
2	My interaction with the site is clear and understandable	4,22	3,85	-0,37
3	I find the site easy to navigate	4,24	3,84	-0,4
4	I find the site easy to use	4,32	3,91	-0,41
5	The site has an attractive appearance	4,26	3,72	-0,54
6	The design is appropriate to the type of site	4,24	3,75	-0,49
7	The site conveys a sense of competency	4,22	4,04	-0,18
8	The site creates a positive experience for me	4,25	3,92	-0,33
9	Provides accurate information	4,28	3,71	-0,57
10	Provides believable information	4,27	3,7	-0,57
11	Provides timely information	4,26	3,95	-0,31
12	Provides relevant information	4,26	3,6	-0,66
13	Provides easy to understand information	4,41	3,95	-0,46
14	Provides information at the right level of detail	4,29	3,72	-0,57
15	Presents the information in an appropriate format	4,28	3,65	-0,63
16	Has a good reputation	4,29	3,93	-0,36

17	It feels save to complete transaction	4,39	3,7	-0,69
18	My personal information feels secure	4,44	3,88	-0,56
19	Creates a sense of personalization	4,18	3,94	-0,24
20	Convey a sense of community	3,89	3,68	-0,21
21	Makes it easy to communicate with the organization	4,35	3,79	-0,56
22	I feel confident that goods/services will be delivered as promised	4,4	3,72	-0,68

### 5.6 Analysis of Importance Performance Analysis (IPA) Quadrant

Based on the calculation of performance level and user expectation is obtained result of IPA quadrant analysis as in Figure 2.

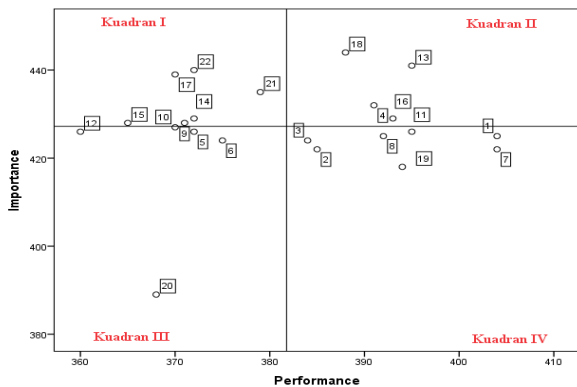


Figure 2 Quadrant (IPA)

Figure 2 is the quadrant of the Importance Performance Analysis (IPA) results. Analysis of each quadrant is explained as follows

#### A. Quadrant I (Concentrate Here)

Quadrant I is indicator that needs improvement, because in that quadrant, the website performance is not yet satisfied the users. Several changes or improvements of performance must be conducted to increase user satisfaction.

Table 5 Quadrant I Indicator

Quadrant	No.	Question
I	9	Provides accurate information
	14	Provides information at the right level of detail
	15	Presents the information in an appropriate format
	17	It feels save to complete transaction
	21	Makes it easy to communicate with the organization
	22	I feel confident that goods/services will be delivered as promised

Indicator of question 22 “I feel the products sent are as promised” is main priority to conduct improvement because user expectation value is higher than website performance this time.

#### B. Quadrant II (Keep Up The Good Work)

Quadrant II is an indicator that needs to be maintained, because in the quadrant the performance of the website is in accordance with user expectations.

Table 6 Quadrant II Indicator

Quadrant	No	Question
II	4	I find the site easy to use
	13	Provides easy to understand information
	16	Has a good reputation
	18	My personal information feels secure

Question indicator 13 "Information provided by the website is easy to understand" is an indicator with the highest level of performance and user expectations for these indicators are also high. Website performance is currently in accordance with the user expectation and performance needs to be maintained.

#### C. Quadrant III (Lower Priority)

Quadrant III is indicator that has low performance and low expectation.

Table 7 Quadrant III Indicator

Quadrant	No	Question
III	5	The site has an attractive appearance
	6	The design is appropriate to the type of site
	10	Provides believable information
	12	Provides relevant information
	20	Convey a sense of community

The existence indicator is considered not too important by the user, so the e-commerce party does not need to make improvements and pay special attention.

#### D. Quadrant IV (Possible Overkill)

Quadrant IV is indicator that has high performance but the user expectation is low. Quadrant IV is considered as excessed by the user.

Table 8 Quadrant IV Indicator

Quadrant	No.	Question
IV	1	Find the site easy to learn to operate
	2	My interaction with the site is clear and understandable
	3	I find the site easy to navigate
	7	The site conveys a sense of competency
	8	The site creates a positive experience for me
	11	Provides timely information
19	Creates a sense of personalization	

Excessive performance on this indicator can be allocated to other indicators that require high performance due to high user expectations.

## 6. CONCLUSION

Based on analysis result of website e-commerce XYZ performance quality which is focused on three dimensions based on WebQual 4.0, users feel that website e-commerce XYZ overall in in category good and satisfied for the users. WebQual index shows website e-commerce XYZ is in good scale with percentage of 76%.

The highest percentage is in indicator of usability website which valued 78%. Based on analysis of importance performance analysis (IPA) quadrant, indicator of question number 22 “I feel the products sent are as promised” is main priority to conduct improvement because the user expectation value is higher than website performance this time.

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