Website Quality for E-Commerce using Sentiment Analysis (Case Studies in Tokopedia and Shopee)

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Abstract

Rapid development makes various activities easy to do, such as online transactions. Tokopedia and Shopee are e-commerce which have dominated the market in Indonesia in recent years by becoming the top e-commerce ranking based on high website visits. The competition is quite competitive, so companies must be able to increase customer trust by providing the best service. One form of building a customer trust model is a factor that must be considered, one of which is the quality of the website. Therefore, the Tokopedia and Shopee websites require analysis for website quality based on the user's point of view whether the website has fulfilled the wishes and is satisfactory or not. The purpose of this study is to find out the sentiment or feedback given by users regarding the quality of the Tokopedia and Shopee websites based on the webqual dimensions obtained from User Generated Content (UGC) in the form of tweets and reviews on the Google Play Store. The results obtained based on sentiment analysis and the word cloud method to find out the dominant words that appear show that the quality of the websites from Tokopedia and Shopee is dominated by positive sentiment which according to data from users on Twitter social media and overall Google Play Store reviews are good. but still need improvement so that the quality can be maximized such as Usability or ease of use of the website and Information Quality or the quality of the website information submitted is still not good.

Keywords
E-Commerce, Sentiment Analysis, Webqual, Word Cloud

1. Introduction
The rapid development of technology makes various daily activities easier to do. The development of technology encourages us to use it very wisely. The convenience is felt by the community, one of which is to carry out buying and selling transactions that can be done flexibly. The place to make buying and selling transactions online is called e-commerce. E-commerce is a transaction carried out electronically in the absence of physical contact which includes buying, selling, marketing of goods and services through electronic systems such as the internet (Prasetio et al. 2021). Based on the Iprice.co.id survey data from Q4 2019 to Q4 2020 Shopee still ranks first for the highest website visits and Tokopedia is still ranked second. However, there was a change in position where in Q1 to Q2 2021 Tokopedia became the first rank in the highest website. visitors. The quality of the number of customers who will decide to shop online on the e-commerce (Fauziah & Wulandari 2018).

The competition is quite competitive, making e-commerce companies must be able to maintain customer loyalty by increasing customer trust in e-commerce services. In building a model of customer trust in e-commerce services, there are several factors that must be considered, namely website quality, product prices, promotions, site reliability and other factors (Prasetio et al. 2021). One of the supporting factors for e-commerce is a website where consumers can interact with companies (Fauziah & Wulandari 2018). Therefore, it is necessary to analyze the quality of the Tokopedia and Shopee websites obtained from customers or users to find out whether the website is in according to (Fatmala et al., 2018). Website quality measurement can use the webqual method. Webqual is a method that can be used to measure website quality based on perceptions of end users (Andry et al. 2019).So, in this study, the sentiment analysis method will be used to find out how end users perceive the quality of the Tokopedia and Shopee websites and to find out the dominant words that appear based on the webqual dimension, the word cloud method can be used.

2. Literature Review

Marketing is not only about selling, but knowing and understanding customers carefully so that they produce product or services that suit customers and will sell by themselves (Hery 2019). In addition, marketing includes a process that relates to individuals and groups to obtain what they need and want by creating, offering, and exchanging product or services that have value with others (Astuti & Amanda 2020). CRM is a wide area of practice to manage existing customers, new customers, or customer candidates. Many experimental, analytical, or numerical methodologies have been suggested so far trying to seek responses to defined research questions. This study focuses on the segmentation of customers and the prediction of research customers. Therefore, the literature of relevant methodologies has been reviewed in this section.

Customer satisfaction is a feeling experienced by someone, either happy or disappointed, which is obtained from a comparison between the perceived performance of a product/service and the expected results according to Kotler and Keller (2012) in (Nuralam 2017).

Quality is a dynamic condition associated with products services, people, processes and the environment that can meet or exceed expectation (Prasetio et al. 2021). The website is a collection of pages related to interrelated files that have one starting page called the Home page (Setyawan & Atapukan 2018). Website quality can be measured by the webqual method where, webqual is a method for measuring website quality based on perceptions from end users. The webqual dimensions include Usability, Information Quality, and Interaction Quality (Andry et al. 2019).
a. Usability (ease of use) related to ease of operation, clear and easy to understand interactions, easy to navigate, easy to use, attractive appearance, appropriateness of content, positive experience and accurate information.
b. Information Quality related to the content of reliable information, timely information, relevant information, easy to understand, detailed information
c. Interaction Quality relates to a good reputation, security in transactions, secure information, personalization space, community space, suitability of delivery of products or services that have been agreed upon.
The quality of a website is quite important for companies to be a to market their products or services. But not only that, the quality of the website is also important to attract customers by providing an attractive appearance related to the available information (Ardi & Yulisetiarini 2018).

E-commerce is the distribution, purchase, sale, marketing of products or services carried out by someone electronically using the internet, WWW (World Web Web) or other computer networks (Listianto et al. 2017).

UGC is content or data written on social media by users where the uploaded data can be viewed and retrieved by other users, the content or data is bases on creativity created by users who do not have to be professionals in this regard (Ignatio et al. 2018).

Big data is a large collection of data that requires tools to retrieve and analyze it. Big data can usually be distinguished from ordinary data by having 3 main key elements known as the three V, which include volume (amount of data), velocity (speed in processing data), and variety (various types of data) (Salsabila & Trianasari 2021). In processing the data, there are techniques and methods, namely sentiment analysis and word cloud. Sentiment analysis, also known as opinion mining, is part of data mining and text mining that can be used to process opinions or opinions given by customers or an expert through media related to products, services or companies (Romadloni et al. 2019). After conducting a sentiment analysis, the dominant word processing that is often discussed and discussed by users will be carried out using the word cloud method (Alamsyah & Zuhri 2017).

3. Methods.

3.1 Variable Operationalization

Variable operationalization are a limitation and method of measuring variables to be used in research, which aims to maintain consistency in data collection, avoid different understandings and limit the scope of variables (Surahman et al. 2016).
In this study, we will briefly describe the operationalization of the variables used and their indicators as shown in Table 1 below.

Table 1. Variable Operationalization

Variable	Dimensions	Indicator
Webqual	Usability	Easy to learn to operate
		Interaction with the site is clear and understandable
		The site easy to navigate
		The site easy to use
		Attractive appearance
		Appropriate to the type of site
		Positive experience
	Information Quality	Provides accurate information
		Provides believable information
		Provides timely information
		Provides relevant information
		Easy to understand information
		Information at the right level of detail
		Information in appropriate format
	Interaction Quality	Good reputation
		Safe to complete transaction
		Information feels secure
		Sense of personalization
		Sense of community
		Communicate with the organization
		Confident that goods/services will be delivered as promised

Table 1 is a table of variables operationalization that will be used in this study where, there are dimensions of the webqual variables namely Usability, Information Quality, and Interaction quality. The webqual dimension has indicators that are used for keywords in classifying review data based on the webqual dimension.

3.2 Population and Sample

The population used in this study is Twitter users who tweet with the keywords "@Tokopedia", "@TokopediaCare", "@ShopeeID", and "@ShopeeCare". As well as reviews from Tokopedia and Shopee users on the Google Play Store. The sample used in this research is tweets containing keywords as well as Google Play Store Tokopedia and Shopee reviews that are relevant to the webqual dimension uploaded in the period from September 01, 2021 to December 25, 2021.

3.3 Data Collection

The data used in this research is secondary data. The data taken are tweets containing the keywords

"@Tokopedia", "@TokopediaCare", "@ShopeeID", and "@ShopeeCare" which are relevant to the webqual dimension uploaded in the period from September 01, 2021 to December 25, 2021. The data is taken by crawling technique on Twitter social media using Application Programming Interfaces Twitter and Google Colab, as well scraping technique on Google Play Store review data using the Python language on Google Colab.

Data Analysis Techniques

Step 1: Data Pre-Processing

The data that has been collected still needs to be done in the data pre-processing stage in order to produce clean and understandable data so that it can perform data analysis. Columns in the dataset used are only text data that are relevant to this research. This process will be assisted with the RapidMiner Studio. At the pre-processing stage, several activities are carried out, including:

Tokenization: This stage includes the process to separating several characters based on space or character deletion can be done.

Transform Cases: At this stage to change the uppercases to lowercases.

Stopword Removal: This stage includes the process of eliminating some sentences or tweets and review that are not relevant to the object and are not in accordance with the corpus dictionary.

Stemming: At this stage, namely checking with and making words withs affixes into basic words that are in accordance with the language, uniform words or sentences in tweets and correct Indonesian reviews.

Step 2: Classification Based on The Dimensions of Webqual

Data that has gone through the pre-processing stage will be classified based on webqual. The data classification is carried out by machine learning with the Naïve Bayes algorithm which will use the help of the RapidMiner Studio application. In the machine learning processing, the data will be divided into training data and testing data with a ratio 70:30, of which 70% of the dataset will be training data and 30% of the dataset will be testing data. However, to conduct data training and data testing, a labeling process is needed, which is to determine the data based on the characteristics of the data that will be related to the indicators of each webqual dimensions. The results to be obtained are datasets that have been classified based on the webqual dimensions. In table 2, the following is a data labeling process based on the webqual dimension.

Table 2. Labelling Process Based on Dimensions of Webqual

Text	Dimensions Webqual
Kurang suka tampilan web-nya sih.	Usability
Kalau di web tolong dong cantumin info produknya lebih detail soalnya beberapa toko ada yang tidak sama dengan di apk.	Information Quality
Belanja lewat web sangat the best saya belanja perlengkapan gaming disini aman pastinya.	Interaction Quality

Step 3: Sentiment Analysis

Sentiment analysis can be used to analyze sentiment in a text data that can determine the text with a positive, negative or neutral sentiment pattern (Masrury et al. 2019). Sentiment analysis is useful for companies evaluating related products or services obtained from customer feedback. One of the services provided in e-commerce is providing a good quality website to meet customer wants and needs when visiting an e-commerce website. Sentiment analysis is conducted to find out how many positive and negative sentiments are contained in tweets and reviews submitted by customers regarding the quality of the Tokopedia and Shop websites. The classification process based on sentiment will be processed on machine learning with the help of the RapidMiner Studio application using the Naïve Bayes algorithm. Datasets that have been classified based on the dimensions of webqual will be labeled with positive and negative sentiments. The following is the process of labeling training data which can be seen in Table 3 below.

Table 3. Labeling Process of Sentiment Analysis

Text	Sentiment
Kurang suka tampilan web-nya sih.	Negative
Belanja lewat web sangat the best saya belanja perlengkapan gaming disini aman pastinya.	Positive

Step 4: Word Cloud
Word cloud is a method in the text mining that will display a graphic of the frequency of word that further highlight the word that appear more dominant in a text source. The larger the size of the word in the visual, the more common the word will be in the document (Alamsyah & Zuhri, 2017). The word cloud process will be carried out with the help of the Orange Application.

4. Results and Discussion

1.1 Data Characteristics

The data collection process is carried out by crawling Twitter and scraping Google Play Store review data using Google Colab software. Data will be collected in the form of CSV. The data collection process is carried out in the period from September 01, 2021 to December 25, 2021. The combined data of Twitter and Google Colab is obtained as much as 4.211 Tokopedia data and 4.227 Shopee data which has not been pre-processed.

1.2 Data Pre-processing

Pre-processing is the initial stage carried out in classification to prepare text data before the data is used in other processes, where this stage will convert the text into a form of better quality information and can be used in the next process (Khairunnisa et al. 2021). The results of pre-processing can be seen in Table 4 below.

Table 4. Pre-processing Data Result

E-Commerce	Before Pre-processing	After Pre-processing
Tokopedia	4.211	400
Shopee	4.227	332

In Table 4 shows that the results of the data obtained before doing the pre-processing and after. It can be seen in Table 4 that the data obtained after pre-processing is not enough from the data that has been collected from the results of crawling and scrapping data. This is because the data on Twitter and the Google Play Store regarding Tokopedia and Shopee discusses promos, advertisements and spam more.

1.3 Classification Based on The Dimensions of Webqual

At this stage, the data will be classified based on the webqual dimension, where the previously labeled data will be processed to be classified based on the webqual dimension. The dimensions of webqual are Usability, Information Quality, and Interaction Quality.

E-Commerce	Dimension Webqual			Total
	Usability	Information Quality	Interaction Quality	
Tokopedia	175	99	126	400
Shopee	186	52	94	332

The result of data classification based on webqual dimensions can be seen in Table 5.

Table 5 Result of Webqual Dimensions Classification

E-Commerce	Dimension Webqual			Total
	Usability	Information Quality	Interaction Quality	
Tokopedia	175	99	126	400
Shopee	186	52	94	332

E-Commerce	Dimension Webqual			Total
	Usability	Information Quality	Interaction Quality	
Tokopedia	175	99	126	400
Shopee	186	52	94	332

Based on the results of data classification based on the webqual dimensions, it can be seen in Table 5 that the dimensions on Tokopedia and Shopee show similarities to the dominant dimension, namely the Usability dimension with data on Tokopedia as many as 175 tweet data and reviews from users and Shopee as many as 186 where, the Usability dimension is related with ease of use on the Tokopedia and Shopee websites. The Usability dimension is related to the ease of use of the website where many users discuss the ease of operating the website, the convenience of transactions on the website, the experience gained when visiting or making transactions on the website to how the website looks on Tokopedia and Shopee. Based on the results of data classification, the dominant dimension discussed by Tokopedia and Shopee users is the Usability dimension.

1.4 Sentiment Analysis

The result of sentiment on the quality of the Tokopedia and Shopee websites as a whole show that positive sentiment dominates the two e-commerce sites. The following can be seen in Table 6 below.

Table 6. Result of Sentiment

Commerce	Sentiment		Total
	Positive	Negative	
Tokopedia	232	168	400
Shopee	199	133	332

In addition to the overall sentiment classification results on website quality, further sentiment classification is based on the webqual dimension which can be seen in the bellow visualization. It can be seen that Figure 1. And Figure 2. Are visualizations of the results of positive and negative sentiments on Tokopedia.

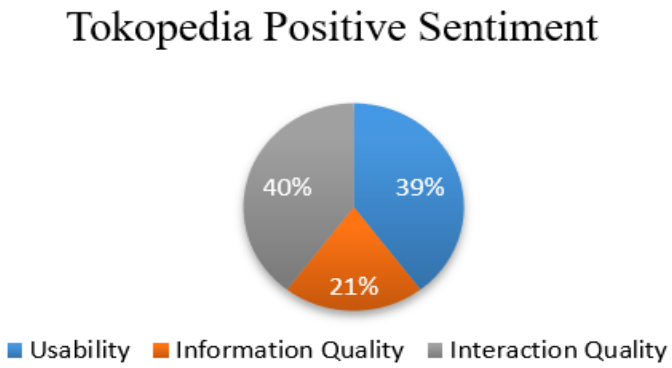

Figure 1. Result Tokopedia Positive Sentiment

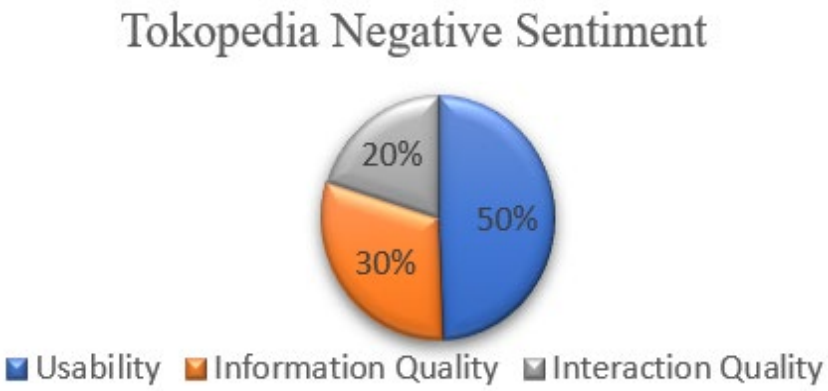

Figure 2. Result Tokopedia Negative Sentiment

Based on Figure 1. Shows the positive sentiment results are dominated by the Interaction Quality dimension with a percentage of 40% and Figure 2. Shows the negative sentiment results are dominated by the Usability dimension with a percentage of 50%. Furthermore, the results of sentiment classification based on the webqual dimensions on Shopee which can visualized in Figure 3. And Figure 4. are the results of positive and negative sentiments.

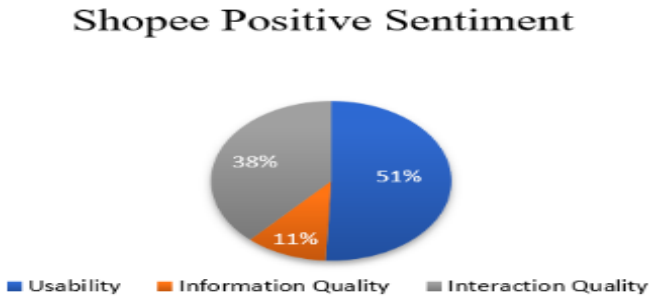

Figure 3. Result Shopee Positive Sentiment

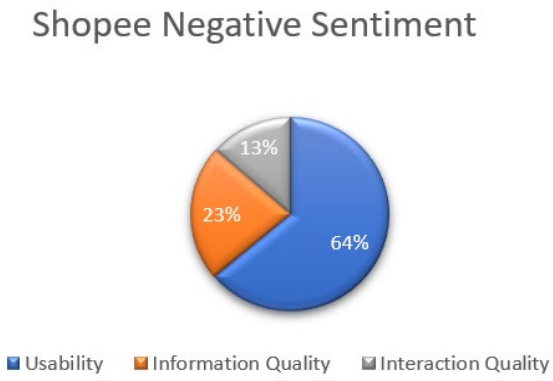

Figure 4. Result Shopee Negative Sentiment

Based on Figure 3. show the positive sentiment results are dominated by the Usability dimension with a percentage of 51% and Figure 4. also shows the negative sentiment results are dominated by the Usability dimension with a percentage of 64%.

4.5 Word Cloud

The word cloud used in this research is to find out the dominant words that appear in each webqual dimension which is to measure the quality of the Tokopedia and Shopee websites. The word cloud process in this study was carried out with the help of the Orange application. The following is the overall word cloud based on the webqual dimensions, which can be seen in Figure 5. below.

Figure 5. Tokopedia Word Cloud Result

Figure 5. shows the results of the overall word cloud of Tokopedia, which the data cleaning process has carried out. It can be seen that the dominant words that appear are “mudah”, “gk”, “banget”, “kurang”, “bagus”, “menarik”, “aman”, “website”, “susah”. This can be interpreted that the words that appear still contain words that have a negative connotation which indicates that the quality of the Tokopedia website has not fully met the needs of users.

Figure 6. Shopee Word Cloud Result

Figure 6. shows the results of the overall word cloud of , which the data cleaning process has carried out. It can be seen that the dominant words that appear are “aman”, “website”, “banget”, “gk”, “tolong”, “kurang”, “update”, “menarik”, “transaksi”, “shopee”. It can be interpreted that the words that appear still contain words that have a negative connotation which indicates that the quality of the Shopee website has not fully met the needs of users.

5. Conclusions and Future Research

Based on the analysis results from research on the quality of the Tokopedia and Shopee websites using the sentiment analysis method and doing a word cloud to get the dominant word that appears, it can be concluded that the answer to the problem formulation is as follows:
The results of sentiment analysis on the quality of the e-commerce websites of Tokopedia and Shopee show that Tokopedia gets a percentage of 58% positive sentiment and 42% negative sentiment from a total of 400 datasets that have been processed previously. Meanwhile, Shopee gets a percentage of 60% positive sentiment and 40% negative sentiment from a total of 332 datasets that have been processed.

The results of sentiment on the quality of the Tokopedia e-commerce website based on the webqual dimension show that the dimension that dominates the highest positive sentiment is the Interaction Quality dimension with a percentage of 40%, while the dimension that dominates the highest negative sentiment is the Usability dimension with a percentage of 50%. Therefore, it can be interpreted that Tokopedia has a website quality with Interaction Quality or good website interaction quality with users where this Interaction Quality includes security in transactions on the website, security in maintaining users' personal data to ease of communicating on Tokopedia. However, Tokopedia has a quality website with poor usability or ease of use on a website. This is in line with Meyliana research in 2018 which stated that the quality of the Tokopedia website had a slow access speed.

The results of the sentiment on the quality of the Shopee e-commerce website based on the webqual dimension show that the dimension that dominates the highest positive sentiment is the Usability dimension with a percentage of 51%, while the dimension that dominates the highest negative sentiment is also the Usability dimension with a percentage of 64%. Therefore, it can be interpreted that Shopee has a quality website with good Usability or ease of use on the Shopee website but still needs to be improved because there are still many reviews with negative sentiments. This is also in line with Abdu'a & Wasiyanti's research in 2019 which stated that there are still users who are not accustomed to using the Shopee website because the operation is not very easy to use and the display also needs to be improved.
Based on points A and B above, it can be concluded that from the two e-commerce sites that have better website quality, namely Shopee, the percentage of Shopee's positive sentiment is higher than Tokopedia. In addition, in each dimension, the positive percentage is also more dominated by Shopee compared to Tokopedia.

Based on the word cloud that has been carried out, it is found that the dominant words that appear in each dimension are divided based on positive and negative sentiments on Tokopedia and Shopee indicating that the positive dominant words that appear in all dimensions are "mudah", "menarik", "jelas", "sesuai", "aman" which interprets that the quality of the website is quite good. While the dominant negative words that appear are "update", "penipu", "gk", "mengecewakan" which can be interpreted that there are also dimensions that need improvement and improvement so that the quality of the Tokopedia and Shopee websites can be better.

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