Analysis of Public Opinion on the Jakarta Metro as a Solution to Congestion in Jakarta

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Article Info	Abstract
	The Indonesian government has taken various steps to overcome congestion in the city of Jakarta, including efforts to improve existing public transportation and the construction of new transportation systems such as Mass Rapid Transportation (MRT) Jakarta. The development of public transportation, such as the Jakarta MRT, has an effect on the level of satisfaction and social quality of its users, creating perceptions that reflect satisfaction and loyalty. Nowadays, people express their opinions and perceptions about products or services not only directly but also through social media. Therefore, it is important to understand public perceptions regarding the quality of MRT Jakarta services, especially with the existence of e-WOM which is spread on social media and can be a determining factor in decisions to use MRT Jakarta services. The data used for this analysis comes from public opinion on Twitter social media in March-April 2019, namely the first month of the release of MRT Jakarta. The data processing method used is *Sentiment Analysis* with Orange software. The results of this research show that from all the data, there were 1045 positive tweets, 110 negative tweets and 1430 neutral tweets. This shows that opinions regarding MRT Jakarta at the start of its release were dominated by positive and neutral e-WOM, thus depicting public satisfaction with MRT Jakarta as higher than their dissatisfaction.

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1. INTRODUCTION

The problem of chronic congestion in the city of Jakarta has become a serious concern for the Indonesian government, requiring strategic steps to overcome its negative impact on mobility and the quality of life of the community [1]. One of the solutions adopted by the government is the development of a public transportation system, and among these initiatives, Jakarta's Mass Rapid Transportation (MRT) has become a major highlight[2]. The Indonesian government has responded to the challenge of congestion by implementing improvements to the existing public transport system as well as launching new projects, including the Jakarta MRT. With the construction of the Jakarta MRT entering an ongoing phase, there is a need for an in-depth understanding of the level of satisfaction and public perception of public transportation services [3]. Even though it is important, there has been no research that specifically explores the analysis of public satisfaction regarding the Jakarta MRT.

Realizing the significance of identifying customer views regarding public transportation for decision makers, researchers intend to conduct research focused on the level of public satisfaction with MRT Jakarta, with special emphasis on data on social media. The aim of this research is to find out what public opinion was at the start of MRT Jakarta operations, so that we can find out how satisfied the public was with the services provided [4].

2. RESEARCH METHOD

This research begins with problem formulation, where along with the existence of the Jakarta MRT, there are positive and negative sentiments regarding MRT transportation

conveyed by the public via social media, which then describes the public's perception of the quality of the MRT which has been operated in March 2019. Therefore, this research aims to analyze the quality perceived by the people of Jakarta towards the MRT. So, the government can know what needs to be improved. Then, the researcher conducted a literature study to understand the theories used as reference and related previous research. The theories used as reference consist of two major theories, namely Electronic Word of Mouth. E-Wom, or electronic word of mouth, is defined as positive or negative comments made by customers about products or services via the internet [5]. With the spread of e-WOM, the interpretation and sharing of information by word of mouth has become more effective in the decision-making process [6][7].
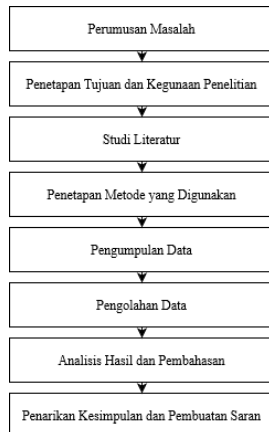

Figure 1. Research Flow

Next, the research carried out measurements in this study using samples in the form of tweets with the keyword "MRT Jakarta" in 2019. This data was taken by scraping using Phantom Buster Software.

Figure 2. Examples of Obtained Data

The data obtained then enters the cleaning stage. In the tweets data, there is some content that is not relevant to the desired data. Therefore, the irrelevant data is deleted. In this cleaning stage, the author cleaned data that was not relevant to the quality of MRT Jakarta services.

Figure 3. Process example *Data Cleaning*

Next, the data enters the pre-processing stage which consists of transformation, tokenization and filtering. In the transformation step, various actions are carried out, such as changing the sentence structure to lowercase, removing HTML code, and removing URLs

from the text. The next stage, Tokenization, involves breaking the text into smaller units, generally words, and this process of separating words is carried out through word punctuation techniques, which basically break sentences into words. After tokenization, the text undergoes filtering to exclude stop words, numbers, and regular expressions. The specific stop words used are adjusted to the dataset being analyzed.
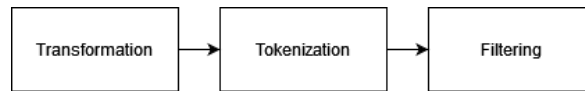

Figure 4. Pre-Processing Stages

Next, the data that is ready will enter the data processing stage with Orange software. The Sentiment Analysis module used in this research is a module available in Orange software, using the lexicon (multilingual sentiment) method. The sentiment classification process using the lexicon method involves comparing the words in the dataset with the words in the lexicon dictionary previously configured in Orange software [8]. The use of Sentiment Analysis in the process of determining customer satisfaction has been carried out in various fields, such as in the field of e-Commerce [9], Education [10], and even in the field of telecommunications [11].

Figure 5. Data processing with Orange software

3. RESULTS AND DISCUSSION

From all MRT Jakarta data during the first month of MRT Jakarta operation on March 24 - April 24 2019, there were 2585 tweets, there were 1045 positive sentiments, 110 negative sentiments and 1430 neutral sentiments. This means that the feedback received by MRT Jakarta from the public during 1 month of MRT Jakarta operation was dominated by neutral sentiment, followed by positive sentiment and negative sentiment. This shows a large difference between positive sentiment and negative sentiment obtained, namely with a total percentage of 41% positive sentiment, 4% negative sentiment and 55% neutral sentiment.
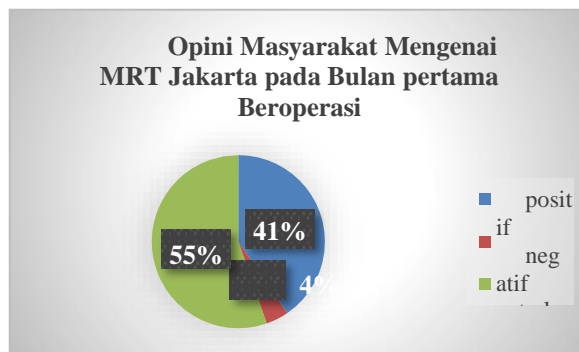
Figure 6. Jakarta MRT Sentiment Classification Results

Next, to see the development of sentiment from day to day, researchers present a dynamic visualization as shown in Figure 7.
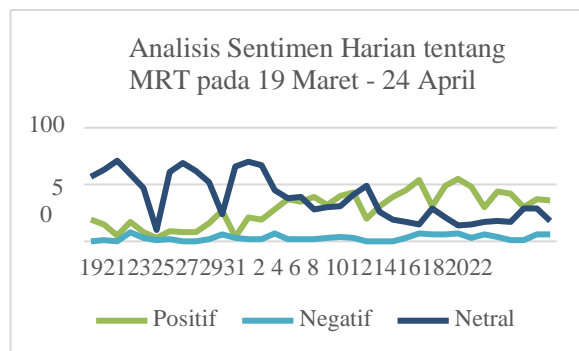

Figure 7. Dynamic Sentiment Classification Results for MRT Jakarta

The sentiment results consist of 1045 positive sentiments, 110 negative sentiments and 1430 neutral sentiments from a total of 2585 data. In the dynamic sentiment image above, positive sentiment is symbolized in green, negative sentiment in turquoise blue, and neutral sentiment in dark blue. From the visualization results, we can see that positive sentiment regarding MRT Jakarta has increased every day after operation. Positive sentiment is always higher than negative and neutral sentiment every year. This shows a good response from the public to the presence of MRT Jakarta.

4. CONCLUSION

From the research results of 2585 tweets regarding MRT Jakarta in the first month of operation, there were 1045 positive sentiments, 110 negative sentiments and 1430 neutral sentiments. This means that MRT Jakarta has received a good reception from the people of Jakarta, where the positive sentiment that exists is very different from the negative sentiment that is obtained both cumulatively and according to daily trends.

5. SUGGESTION

In future research, it can be combined with other text mining methods such as Topic Modeling to find out what people are discussing regarding MRT Jakarta, so that they can analyze service satisfaction better.

6. ACKNOWLEDGEMENT

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