



**Parahyangan Catholic University**  
**Faculty of Social and Political Sciences**  
**Undergraduate Public Administration Study Program**

*Accredited Excellent*

*SK BAN-PT No. 1844/SK/BAN-PT/Ak-PNB/S/V/2023*

**Sentiment Analysis: Public Perception of the Transjakarta  
Services Quality**

Undergraduate Thesis

Written By:

Raden Haris Kahfi Nugraha

6072001050

**BANDUNG**

**2024**



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**Faculty of Social Science and Political Science**  
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With this disclaimer, the author of this undergraduate thesis hereby states that this body of academic work is derived from his original idea and academic process. This undergraduate thesis is a result of his research process as elaborated within the body of work itself. It is written to fulfill the prerequisites needed to graduate from Parahyangan Catholic University's Public Administration Bachelor's Degree program. This body of work is original and cites sources as per the legal and academic standards of referencing other bodies of work expected of valid academic work.

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A 10000 Rupiah electronic stamp (METERAI ELEKTRONIK) with a QR code and a signature. The stamp is pink and white, featuring the Garuda Pancasila logo and the text 'METERAI ELEKTRONIK 10000'. A black ink signature is written over the stamp.

Raden Haris Kahfi Nugraha

### **Abstrak**

*Nama* : Raden Haris Kahfi Nugraha  
*Nomor Pokok Mahasiswa (NPM)* : 6072001050  
*Judul* : Analisis Sentimen: Persepsi Publik terhadap Kualitas Pelayanan Transjakarta

---

*Penelitian ini bertujuan untuk memahami sentimen publik terhadap kualitas layanan Transjakarta melalui analisis sentimen. Data diperoleh dari Twitter, mencakup komentar publik dari September 2023 hingga Mei 2024. Metodologi penelitian ini menggabungkan analisis sentimen berbasis pembelajaran mesin dengan pengkodean manual berdasarkan analisis manusia. Pengumpulan data difasilitasi oleh Google Colaboratory, dan visualisasi data dilakukan menggunakan Communalytic. Hasil analisis sentimen, baik yang menggunakan pembelajaran mesin maupun metode manual, sama-sama menunjukkan dominasi sentimen positif dalam tanggapan publik terhadap layanan Transjakarta. Namun, terdapat perbedaan persentase antara hasil yang dianalisis menggunakan pembelajaran mesin dan metode manual.*

*Ketidaksesuaian ini menyoroti keterbatasan pembelajaran mesin dalam menangkap konteks bahasa manusia secara akurat. Oleh karena itu, inspeksi manual menjadi sangat penting untuk memvalidasi hasil analisis sentimen otomatis. Penelitian ini menekankan pentingnya menggabungkan pendekatan pembelajaran mesin dan manual untuk mencapai analisis sentimen yang lebih akurat dan representatif, serta memberikan wawasan mendalam tentang persepsi publik terhadap kualitas layanan Transjakarta.*

---

**Kata Kunci:** Analisis Sentimen, Persepsi Publik, Machine Learning

## **Abstract**

Name : Raden Haris Kahfi Nugraha  
Student ID (SID) : 6072001050  
Title : Sentiment Analysis: Public Perception of the  
Transjakarta Services Quality

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This research aims to understand public sentiment towards the quality of Transjakarta services through sentiment analysis. Data were collected from Twitter, encompassing public comments from September 2023 to May 2024. The research methodology integrates machine learning-based sentiment analysis with manual coding based on human analysis. Data collection was facilitated by Google Colaboratory, and data visualization was performed using Commanalytic. The results of the sentiment analysis, both using machine learning and manual methods, indicate the same predominance of positive sentiment in public responses towards Transjakarta services. However, there are percentage differences between the results analyzed using machine learning and those obtained through manual methods.

This discrepancy highlights the limitations of machine learning in accurately capturing the nuances of human language. Therefore, manual inspection is crucial to validate the results of automated sentiment analysis. This study emphasizes the importance of combining machine learning and manual approaches to achieve more accurate and representative sentiment analysis, providing in-depth insights into public perceptions of Transjakarta service quality.

---

**Keywords: Sentiment Analysis, Public Perception, Machine Learning**

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Despite the doubts and “nay-sayers”, with Allah's blessing, I have succeeded. This accomplishment wouldn't have been possible without the support of my former self and the person I am today. Immense gratitude goes to myself for enduring this journey. Additionally, I am deeply thankful to everyone who assisted me throughout this journey, as their help was invaluable.

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## CHAPTER I

### PRELIMINARY

#### 1.1 Introduction

The province of DKI Jakarta serves as the capital region of Indonesia, playing a central role in various activities such as government affairs, industry, trade, education, and entertainment. Due to the multitude of activities taking place within its borders, DKI Jakarta is the most densely populated province in Indonesia (at least until the end of the year 2022). According to data obtained from the Central Statistics Agency (BPS), in the year 2022, DKI Jakarta topped the list as the most populous province in Indonesia, with a population of 10,679,951 people. The growth and population density in the DKI Jakarta region undoubtedly have significant impacts on various sectors within it, including the transportation sector.

The impact of population density in DKI Jakarta is reflected in the emergence of transportation issues and the mobility of the public, commonly referred to as 'traffic congestion.' Referring to data provided by the Dutch institution monitoring and analyzing global congestion levels, named '*Tomtom International BV*,' it is noted that in the year 2022, the DKI Jakarta region ranked 29th among cities worldwide with high levels of traffic congestion. The report also states that in 2022, residents of Jakarta needed to spend 22 minutes and 40 seconds just to cover a distance of 10 kilometers. This data indicates an increase of 2 minutes and 50 seconds (in covering a distance of 10 kilometers) compared to the year 2021.<sup>1</sup>

Referring to the data provided by '*Tomtom International BV*,' it also reveals information about the ideal travel time in countries with low congestion indices worldwide in the year 2022. The data indicates that the average ideal travel time,

---

<sup>1</sup> Tomtom Traffic Index: "Jakarta Traffic Report"

<https://www.tomtom.com/traffic-index/jakarta-traffic/> accessed 23 September 2023



extracted from the 10 countries with the lowest congestion levels in 2022 according to 'Tomtom International BV,' is 10 minutes and 15 seconds for a distance of 10 kilometers.<sup>2</sup>

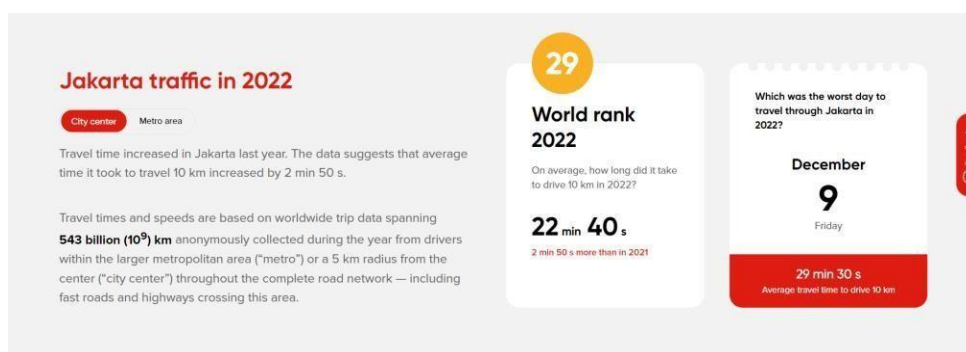


Figure 1.1 Traffic Congestion Data in DKI Jakarta in the Year 2022

Source: <https://www.tomtom.com/traffic-index/jakarta-traffic/>

340	528	Breda Netherlands	10 min 20 s	+10 s	93 hours	49 km/h
341	540	Cincinnati United States of America	10 min 20 s	-20 s	87 hours	54 km/h
342	544	Bruges Belgium	10 min 20 s	no change	90 hours	51 km/h
343	547	Charlotte United States of America	10 min 20 s	+30 s	95 hours	48 km/h
344	553	San Jose United States of America	10 min 20 s	+30 s	99 hours	46 km/h
345	557	Orlando United States of America	10 min 20 s	-30 s	94 hours	49 km/h
346	558	St. Louis United States of America	10 min 20 s	+10 s	84 hours	55 km/h
347	559	San Antonio United States of America	10 min 10 s	+10 s	93 hours	50 km/h
348	577	Taranto Italy	10 min 10 s	no change	84 hours	55 km/h
349	589	Louisville United States of America	10 min 10 s	+20 s	83 hours	55 km/h
350	598	Kansas City United States of America	10 min 10 s	+30 s	84 hours	55 km/h

Figure 1.2 Ideal Driving Time Data in DKI Jakarta in the Year 2022

Source: <https://www.tomtom.com/traffic-index/ranking/>

With the transportation issues lingering in the minds of the community in DKI Jakarta, the Provincial Government of DKI Jakarta collaborates with the Department of Transportation of DKI Jakarta Province to maximize the use of public transportation modes, hoping to assist in reducing the level of congestion in

<sup>2</sup> Tomtom International BV: "Traffic Index Ranking in 2022" <https://www.tomtom.com/traffic-index/ranking/> accessed 30 September 2023

the DKI Jakarta region. The presence of the Trans Jakarta as one of the public transportation modes is expected to reduce the use of private transportation, which contributes to the increasing traffic congestion in the Jakarta area.

The quality of public transportation in DKI Jakarta in the year 2023 can be considered quite good. According to research conducted by “*Litbang Kompas*” on August 8-11, 2023, a total of 75.1% (out of 510 respondents) assumed that they felt comfortable using public transportation for mobility in Jakarta.<sup>3</sup> With the development of new transportation modes (such as LRT and MRT) in the DKI Jakarta area, the public is increasingly inclined to prefer public transportation over using private vehicles.



Figure 1.3 Commuter Responses to the Quality of Public Transportation in DKI Jakarta in 2023

Source: Litbang Kompas/AYP/IWN

In previous research conducted by Litbang Kompas on the quality of Transjakarta services, the focus was solely on the experiences of users. This approach has a significant limitation, as it only captures the perspectives of those who are already using the service. Such user-focused research can lead to biased results, as it does not consider the opinions of non-users who may have valid reasons for not utilizing the service. Additionally, the sample is restricted to active users, which may not provide a comprehensive view of the overall population's perception.

Analyzing public perception on a broader scale involves gathering and evaluating opinions from a wide range of sources, including both users and non-users. This broader perspective is essential for several reasons. Firstly, it offers a more comprehensive and inclusive view of the service quality by incorporating the views of the entire community. Secondly, it helps identify issues that non-users

might have, which are critical for understanding barriers to service adoption. Lastly, it brings diverse perspectives to the forefront, uncovering criticisms and suggestions that might not emerge from user-only feedback.

Machine learning, particularly in the context of sentiment analysis, is a powerful tool for analyzing large, unstructured text data such as that found on Twitter. Twitter provides a rich source of textual data due to the high volume of daily tweets. The diversity of opinions expressed on Twitter encompasses a wide range of social, economic, and demographic backgrounds, offering a more varied set of insights. Moreover, the real-time nature of Twitter allows for immediate feedback, providing current and relevant opinions about Transjakarta services.

Considering public perception is more important than focusing solely on user feedback because it provides a comprehensive and holistic view of how the service is perceived by the entire population. It helps identify broader issues that may not be apparent from user-only surveys, such as reasons why some people choose not to use the service. Understanding these broader perceptions allows Transjakarta's management to develop more inclusive and responsive policies, ultimately enhancing the service for all potential users.

In line with the results of the public transportation quality survey in Jakarta above, that indicates that **the quality of the Transjakarta services has positive responses from the public**. The positive response from the public towards the quality of Transjakarta services indicates that the service quality is well-regarded by the public. The statement above is substantiated by three initial findings from Twitter, which will be discussed below.

---

<sup>3</sup> Kompas.id: “Peningkatan Layanan Transportasi Umum Atasi Kemacetan Ibu Kota”  
[https://www.kompas.id/baca/riset/2023/08/17/peningkatan-layanan-transportasi-umum-atasikemacetan-ibu-kota?status=sukses\\_login%3Fstatus\\_login%3Dlogin&loc=hard\\_paywall&status\\_login=login](https://www.kompas.id/baca/riset/2023/08/17/peningkatan-layanan-transportasi-umum-atasikemacetan-ibu-kota?status=sukses_login%3Fstatus_login%3Dlogin&loc=hard_paywall&status_login=login)  
accessed 13 November 2023

**First**, the public is highly enthusiastic about utilizing the newest service offered by Transjakarta, namely, the electric buses. The Chief Executive Officer of PT Transjakarta, Agung Wicaksono, acknowledges the significant enthusiasm among the public during the trial period of the operation of Transjakarta's electric buses. He noted that approximately 13,000 people were transported during the trial period since last May.<sup>4</sup> This is also evidenced by various opinions expressed by the public on the Twitter social media platform. The sampled opinions were gathered over the period from 2020 to 2023.

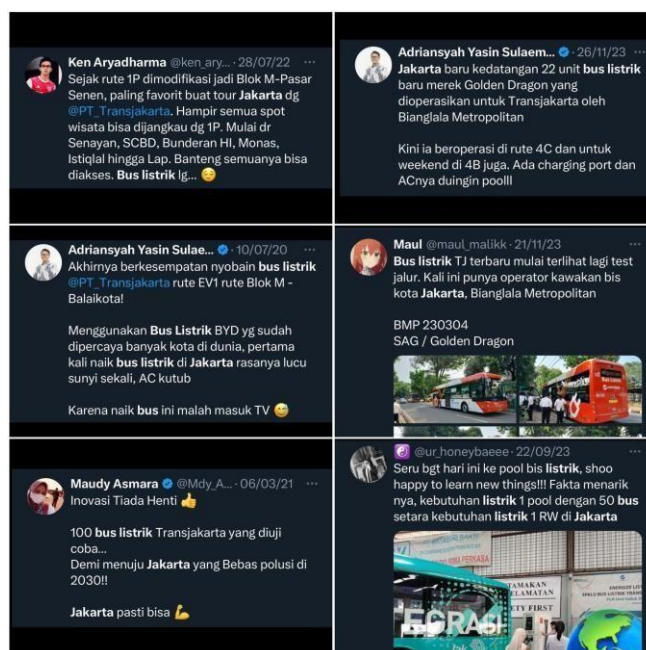


Figure 1.4 A snapshot of a public opinion sample on Twitter regarding the quality of Transjakarta's newest electric buses.

Source: Twitter

**Second**, the public is satisfied with the quality of Transjakarta services. Based on several sampled public opinions on their satisfaction with the quality of Transjakarta, gathered from Twitter between 2021 and 2023, it indicates that the public is generally satisfied with the services

<sup>4</sup> Merdeka.com: "Bos Transjakarta: 13.000 Masyarakat Antusias Coba Bus Listrik" <https://www.merdeka.com/uang/bos-transjakarta-13000-masyarakat-antusias-coba-bus-listrik.html> accessed 4 December 2023

provided by Transjakarta. One Twitter account, @musafir\_hidup, even expressed high satisfaction with the services provided by Transjakarta, spanning over 17 years.

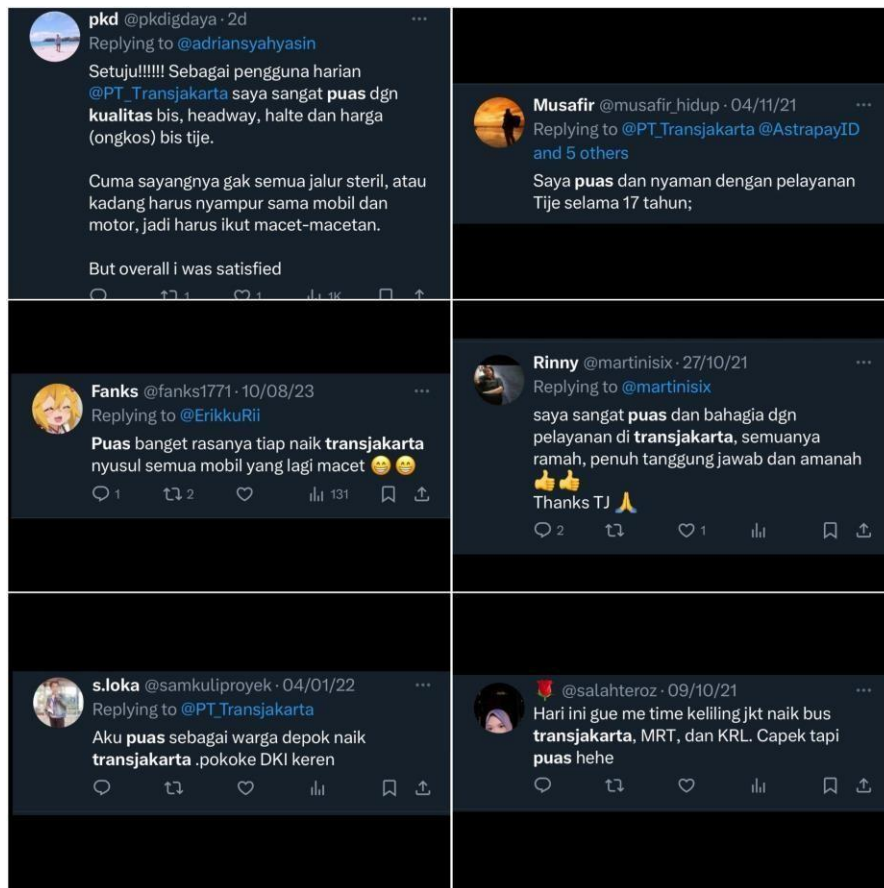


Figure 1.5 A snapshot of public opinion samples on Twitter regarding their satisfaction while using Transjakarta services.

Source: Twitter

**Third**, the public feels assisted with the services provided by Transjakarta. In addition to offering exclusive services within the scope of buses, Transjakarta has also integrated with various other modes of public transportation. This greatly assists the public in using Transjakarta for mobilization to various destinations. One form of integration for Transjakarta is the presence of "Halte Cakra Selaras Wahana (CSW)," connecting the Transjakarta CSW stop with the ASEAN MRT Station. With this integration, the public do not need to exit the station or stop to

transfer to another location. Additionally, “Halte CSW” will also have various facilities and shops to meet the needs of the community, including a prayer room (*musala*).



Figure 1.6 “Halte Cakra Selaras Wahana (CSW)”

Source: Personal Documentation, 2023

The statement above is supported by public opinions gathered by the researcher through Twitter. Several samples of tweets obtained from the year 2023 indicate that the public feels assisted by the services provided by Transjakarta, particularly the integrated services that facilitate the public in mobilizing using various available public transportation modes in Jakarta (such as MRT, LRT, etc).



Figure 1.7 A snapshot of public opinions on Twitter indicates that the public has been assisted by the services provided by Transjakarta.

Source: Twitter

Although research related to public perceptions of Transjakarta's service quality using sentiment analysis has been conducted, some using sentiment analysis, the research methods employed by the researchers differ from those in other studies or research, as explained by 'Density Visualization' and the table showing previous research below

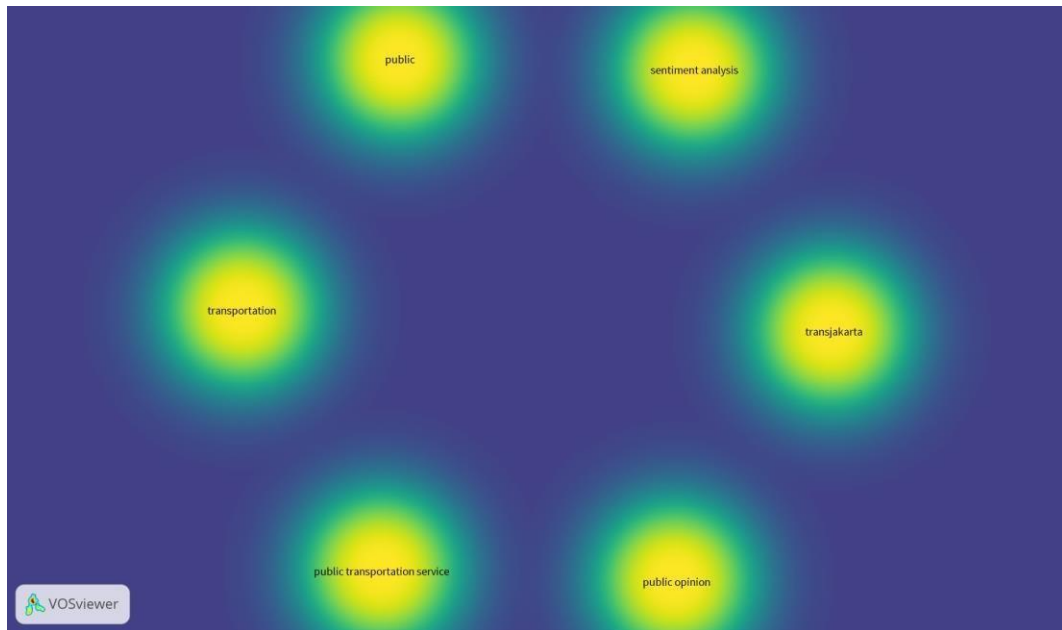


Figure 1.8 Density Visualization Result

Source: VOSViewer (in March 2024)

No	Author	Title	Method	Data	Results
1.	FF Rachman, R Nooraeni, L Yuliana	Public Opinion of Transportation integrated (Jak Lingko), in DKI Jakarta, Indonesia (2021) <b>Report</b>	This research are using sentiment analysis with Latent Dirichlet Allocation (LDA) method	The data in this research are retrieved based on the polarity of community sentiments on Twitter using Neural Networks method.	The result of this research shown that in 2019 KRL is the type of public transportation that receives the most negative sentiment when compared to other types of public transportation



2.	Z Nurthohari, D I Sensuse, S Lusa	Sentiment Analysis of Jakarta Bus Rapid Transportation Services using Support Vector Machine (2022) <i>Journal</i>	This research are using sentiment analysis with Vector Machine method	The sentiment of fresh data is being predicted using machine learning. The machine learning algorithms were then examined using a number of tests to discover which kernels and features provided the best accuracy	The result of this research shows 92.00 percent of accuracy, 91.00 percent of precision, 92.00 percent of recall, and 2123 of support. The majority of Jakartans, according to the data, have an unfavorable impression of bus rapid transit. The majority of customers were disappointed with the services.
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3.	BD Meilani, RK Hapsari, IF Novian	Classification of community opinion on the use of the Transjakarta bus based on twitter social network using naïve bayes method (2021) <i>Journal</i>	This Research are using sentiment analysis with “Naive Bayes” method	An application created for forecasting positive or negative sentiments utilizes the Naïve Bayes algorithm. The selection of the Naïve Bayes algorithm is based on its capability to	The system achieved a 73% accuracy, which can be attributed to the fact that only 62.5% of the total dataset (50 data points) was utilized for training. Additionally , the test set consisted of
				make predictions with minimal training data, as it estimates averages and variable variations effectively.	only 30 data points. The proportions of training and testing data play a significant role in determining accuracy levels. To achieve a higher accuracy, it is advisable to increase the volume of training data.

Table 1.1 Previous Research

With the indications of positive responses from the public mentioned above, the researcher is interested in conducting further research to understand the overall public sentiment towards the quality of Transjakarta services. Therefore,

this research is titled: “*Sentiment Analysis: Public Perception of the Quality of Transjakarta Services*”

## **1.2 Research Question**

According to what was said above, this research aims to answer *this following question: “How does the public respond to the quality of Transjakarta Services?”*

## **1.3 Purpose and Significance of Research**

### **1.3.1 Research Purpose**

With the research described above, this research aims to identify the public response to the quality of Transjakarta services in DKI Jakarta using Twitter as the data source and Machine Learning as the data collection tools.

### **1.3.2 Significance of Research**

Results from this research hold benefits and utility for both the researcher and other stakeholders. Therefore, this study serves the following purposes:

1. The results of this research are expected to be beneficial for all Public Administration students in understanding and conducting sentiment analysis within the Public Administration field, particularly in the course “*Governansi Digital*”. It is also hoped that all readers can comprehend the topics covered in this study.
2. Theoretically, the results of this research are anticipated to serve as an introduction or a reference material for sentiment analysis research within the field of Public Administration in the future.