Jurnal TAM *(Technology Acceptance Model)*
Jurnal TAM, Volume 16, Number 1, July 2025
E ISSN: 2579-4221; P ISSN: 2339-1103, pp. 34-41
Accredited SINTA 4 Number 225/E/KPT/2022
https://jurnal.ftikomibn.ac.id/index.php/JurnalTam/index

COMPARATIVE ANALYSIS OF SHOPEE AND TIKTOK SHOP USER SENTIMENT USING NAÏVE BAYES ALGORITHM

Putri Dwi Lestari[1], Agung Kharisma Hidayah[2], Surya Ade Saputera[3], Yetman Erwadi[4], RG Guntur Alam[5]
[1,2,3,4,5]Informatics Engineering Study Programme, Universitas Muhammadiyah Bengkulu
[1,2,3,4,5]Kampus I, Jl. Bali, Kampung Bali, Teluk Segara, Kota Bengkulu, 38119
E-mail : pdwilestari641@gmail.com[1], kharisma@umb.ac.id[2], adesurya2012@gmail.com[3], yetman@umb.ac.id[4], datuak73@yahoo.com[5]

Article history:
Received: February 27, 2025
Revised: March 22, 2025
Accepted: April 6, 2025

Corresponding authors
pdwilestari641@gmail.com

Keywords:
Analisis Sentimen;
E-Commerce;
Shopee;
TikTok Shop;
Naïve Bayes.

Abstract
The rapid growth of e-commerce has influenced changes in people's online shopping behaviour. Shopee and TikTok Shop are two popular e-commerce platforms in Indonesia, each offering unique features and shopping experiences. This research aims to analyse and compare user sentiment towards the two platforms by applying Naïve Bayes algorithm. User review data was obtained from Google Play Store through web scraping technique, then processed using Knowledge Discovery in Database (KDD) approach, which includes data collection, preprocessing, transformation, modelling, and evaluation stages. Naïve Bayes algorithm was used to classify the sentiment of the reviews into positive or negative categories. The results show that the majority of reviews for both platforms are positive, with Shopee having a higher proportion of positive sentiment than TikTok Shop. The model used shows good accuracy in classifying sentiment, although there is still a tendency to bias towards positive sentiment. The findings are expected to provide insights for e-commerce platform managers in improving service quality and better understanding user preferences.

I. INTRODUCTION

One of the government institutions that plays a role in formulating and enforcing policies at the regional level, especially in the field of libraries and archives, is the Bengkulu Provincial Library and Archives Service. Based on information obtained from interviews with one of the library staff, Mr. Aprizal, it is known that the Bengkulu Provincial Library has a collection of 34,559 book titles arranged in 308 main shelves and 8 additional shelves.

Rapid advances in information technology and the development of the internet have changed people's shopping behavior patterns. This phenomenon has also driven the growth of e-commerce, which is now increasingly dominating the market through various digital platforms that enable online purchasing transactions (Tania Puspa Rahayu Sanjaya et al., 2023). In Indonesia, Shopee is one of the e-commerce platforms that has strong market dominance, while TikTok Shop, a shopping feature introduced in the TikTok social media application, is increasingly getting attention from users (Supriyanto et al., 2023). These two platforms offer different shopping concepts, which can ultimately influence user sentiment and preferences for each service.

Shopee is designed as the main platform for buying and selling transactions with various supporting features, such as big discounts, fast delivery services, and a wide variety of product availability (Rahel Lina Simanjuntak et al., 2023). Meanwhile, TikTok Shop adopts a different approach by utilizing TikTok's entertainment features, especially through live streaming, which allows sellers to promote their products interactively and in real-time (Khab Sulaiman Dalam et al., 2023). The fundamental differences in the operational mechanisms of these two platforms make them attractive to various consumer segments. Therefore, user sentiment analysis towards Shopee and TikTok Shop is relevant in order to understand their

experiences and perceptions of the two platforms. In the digital context, sentiment analysis is a widely used approach to evaluate user opinions based on the reviews and comments they leave on a platform. This method allows the conversion of qualitative data in the form of text into quantitative information that is easier to analyze (Undamayanti et al., 2022). One technique that is often applied in sentiment analysis is the Naïve Bayes algorithm, which is known for its simplicity and effectiveness in text classification (Wibisono Informatika, 2023). However, studies that specifically compare user sentiment between Shopee and TikTok Shop using the Naïve Bayes approach are still limited (Amelia & Yustiana, 2024). Therefore, this study aims to explore how each platform can improve user experience based on the results of the sentiment analysis obtained.

The increasingly fierce competition between Shopee and TikTok Shop demands a deeper understanding of user perceptions of the services provided by each platform. Reviews and comments left by users on both platforms can provide valuable insights into the level of satisfaction, obstacles faced, and aspects of the service that are appreciated. In this case, the application of sentiment analysis is an appropriate approach to identify user response patterns to the two platforms (Hossain et al., 2022). Thus, this study not only contributes to the development of sentiment analysis methodology but also provides practical value for the e-commerce industry in improving the quality of their services.

Through the application of a systematic method with the Naïve Bayes algorithm, this study is expected to reveal user perceptions of Shopee and TikTok Shop in more depth. The resulting data can be used by platform managers to evaluate the strengths and weaknesses of their services, so they can design more effective improvement strategies to improve user experience in the future. In addition, the results of this study can also provide an overview of the competitive strategies that can be implemented by each platform in the rapidly growing e-commerce industry.

II. LITERATURE

2.1. Sentiment Analysis

In today's digital era, sentiment analysis has become a topic that is increasingly being studied by researchers, especially in an effort to extract information from unstructured data sets (Arsi & Waluyo, 2021). Sentiment analysis is a technique that aims to process data by filtering irrelevant words and symbols, and converting qualitative data into quantitative form. This process allows user reviews to be categorized to identify whether an opinion is positive or negative (Simanjuntak et al., 2023). In addition, sentiment analysis is also defined as a method for understanding public perception of a particular issue through digital text analysis, with the aim of identifying the emotional content of the message conveyed, whether it is positive or negative (Nandaresta & Warman, 2023).

2.2. E-Commerce

The growth of the e-commerce sector has experienced very rapid development in recent years. Along with the advancement of digital technology, e-commerce platforms are no longer limited to websites, but have also developed through social media as a means of marketing and online transactions (Thoyib et al., 2023). In today's digital era, e-commerce has an increasingly significant role in the trade sector, enabling businesses to market products and services online and expand market reach through the internet network. The rapid development of e-commerce is in line with technological innovation, so that research in this field continues to produce new findings, including in identifying the risks and challenges faced by e-commerce business actors.

2.3 Shopee

Shopee is currently one of the most popular marketplaces in Indonesia, with an average of 132.8 million monthly visits in the first quarter of 2022 (Iprace, 2022). Shopee is a mobile-based application that provides online buying and selling services and can be accessed via the Google Play Store. On the platform, users can provide ratings and reviews of available applications and products, allowing for an evaluation of the quality of the services provided (Sanjaya et al., 2023).

2.4 Tiktok Shop

TikTok, which was originally known as a video entertainment-based social media platform, has now introduced a new feature called TikTok Shop, which functions as an e-commerce platform for online buying and selling transactions. This feature provides various tools and mechanisms that support sellers in marketing products, interacting with customers, and managing business operations more effectively (Sulaiman et al., 2023). The main advantage of TikTok Shop compared to other e-commerce platforms lies in its video content-based marketing strategy and attractive discount offers given to users. In addition, the live streaming feature available in TikTok Shop allows direct interaction between sellers and consumers, thereby increasing sales potential and business profitability (Supriyanto et al., 2023).

2.5 Naïve Bayes

Naïve Bayes is one of the classification methods widely used in data analysis due to its speed and high level of accuracy. This method is based on Bayes' Theorem and is known to be effective in handling binary classification, such as distinguishing positive and negative sentiments in a dataset (Undamayanti et al., 2022). This method is considered to have great potential in the field of data classification, especially

in sentiment analysis. In this study, Naïve Bayes is used to evaluate its effectiveness in classifying user sentiments on two different e-commerce platforms. With its advantages in computational efficiency and accuracy of results, this method is one of the approaches widely applied in text processing and analysis.

III. RESEARCH METHODS

This study applies the Knowledge Discovery in Database (KDD) approach as the main method in data processing. This approach is used to ensure that the research process runs systematically, starting from the data collection stage to the analysis and evaluation of the results. In general, the KDD stages in this study include several main steps, namely data selection, preprocessing, transformation, data mining, and evaluation and interpretation of the results.

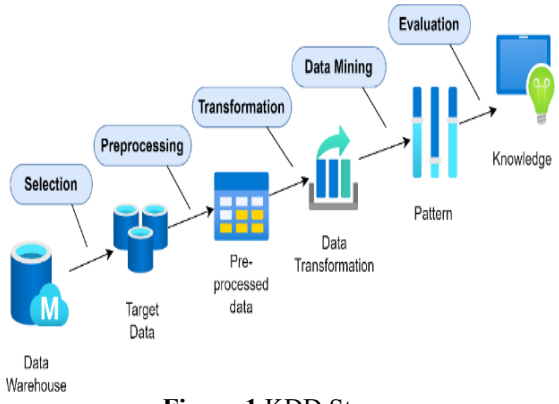


Figure 1 KDD Stages
Source: www.researchgate.net

The process depicted in Figure 1 is designed to systematically collect, process, and analyze user review data from the Shopee and TikTok Shop e-commerce platforms. In this study, the population and sample were obtained from user reviews of the Shopee and TikTok Shop applications available on the Google Play Store. Data were collected using web scraping techniques using the google-play-scraper library. The total sample used in this analysis was 2,000 reviews, with a balanced distribution, namely 1,000 reviews from the Shopee application and 1,000 reviews from TikTok Shop.

IV. RESULTS

4.1. Implementation

This study implements the Naïve Bayes algorithm as the main method in text sentiment classification. This algorithm was chosen because of its advantages in handling complex text data efficiently and has a high processing speed. The main focus of this study is to analyze user sentiment towards two leading e-commerce platforms, namely Shopee and TikTok Shop, based on reviews given by users.

To obtain user review data, a data collection process was carried out using the web scraping technique on the application page on the Google Play Store. This technique allows for automatic and systematic data retrieval, resulting in a dataset rich in information, such as review content, upload date, and ratings given by users. After the data was successfully collected, a pre-processing stage was carried out to ensure that the reviews used were in accordance with the research objectives and had high relevance.

The resulting dataset consisted of 2000 reviews, each of which was evenly divided between the two platforms, namely 1000 reviews for Shopee and 1000 reviews for TikTok Shop. Furthermore, this dataset was divided into two main groups, namely training data and test data, to ensure a balance between the model training process and its performance evaluation. With this division, the model can be objectively assessed to measure the extent to which the Naïve Bayes algorithm is able to predict user sentiment with an optimal level of accuracy. In addition, this study ensures that the quality of the data used is maintained, so that the results of the sentiment analysis obtained can provide accurate insights into user perceptions of Shopee and TikTok Shop.

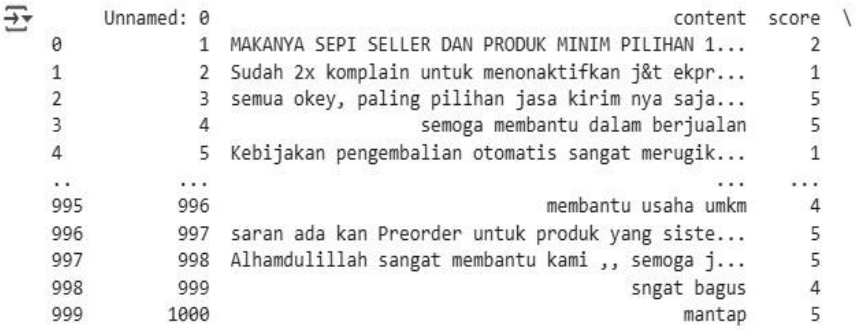
Scraping Data

The data in this study were collected using web scraping techniques by utilizing Google Colaboratory as a processing platform. Data retrieval was carried out through a tool called google-play-scraper, which allows the extraction of user reviews from the Shopee and TikTok Shop applications available on the Google Play Store. Data collection was carried out in the period from December 27, 2024 to January 7, 2025, with a total of 1000 reviews from each application, so that the total number of datasets reached 2000 reviews. This study adapts the approach that has been used in previous studies, such as that conducted by Rahel Lina Simanjuntak et al. (2023), which also used 1000 reviews as the basis for sentiment analysis. The following is an example of web scraping data obtained in this study:

Table 1 Example of web scraping data Tiktok Shop

Content	Score	At	Label
Application his Excellent Easy in usage his	5	12/27/2024	Positive
tiktok only pro to buyers. if There is buyer which submit return directly approved by tiktok without wait agreement seller. even though buyer No There is proof existence error seller.	1	12/27/2024	Negative
Actually his application his good. easy to observe, TPI unfortunately the VAT is expensive. moreover pack expedition his sometimes naughty in part scales, so income a bit down	3	12/27/2024	

Therefore There Are Few Sellers and There Are Minimal Product Choices 1. Too many Lots product QC rules and features. From the problem permission sell product even title, category, description and specify price just Lots blah blah blah his which make product	2	01/07/2025	Negative
Hopefully help in selling	5	01/07/2025	Positive

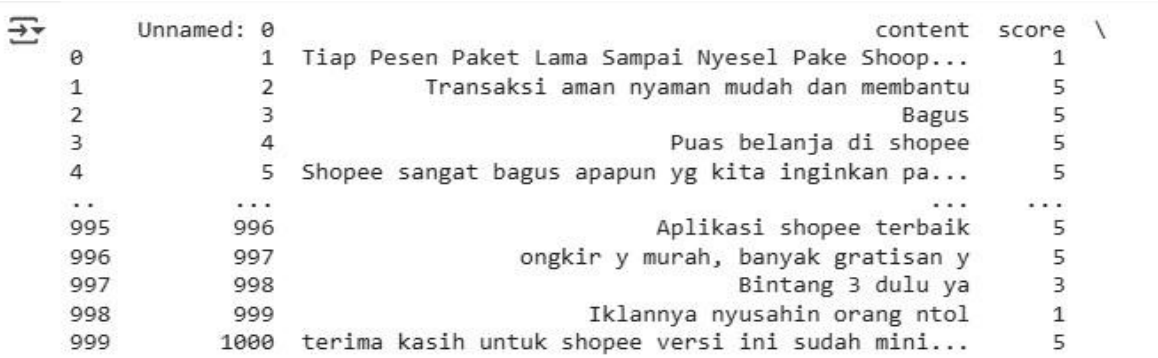


	Unnamed: 0	content	score
0	1	MAKANYA SEPI SELLER DAN PRODUK MINIM PILIHAN 1...	2
1	2	Sudah 2x komplain untuk menonaktifkan j&t ekpr...	1
2	3	semua okey, paling pilihan jasa kirim nya saja...	5
3	4	semoga membantu dalam berjualan	5
4	5	Kebijakan pengembalian otomatis sangat merugik...	1
..	...	...	...
995	996	membantu usaha umkm	4
996	997	saran ada kan Preorder untuk produk yang siste...	5
997	998	Alhamdulillah sangat membantu kami ,, semoga j...	5
998	999	sngat bagus	4
999	1000	mantap	5

Figure 2 Tiktok Shop web scrapping results

Table 2 Example of Shopee web scraping data results

Content	Score	At	Label
Really like shopping at shopee goods good and the price is also affordable	5	12/27/2024	Positive
The voucher Now indeed big, but ca n't got it, maybe lie. Better small but real.	3	12/27/2024	
More and more how come taking longer huh?address Already clear.all Already filled.but Why slow really? he said coming 25th. Why is this? until 27th didn't arrive? Want to? until When arrived? even delivery repeat .!	2	12/27/2024	Negative
Service fast and safe, thank you love.	5	01/07/2025	Positive
This Shopee make it easier right I For online shopping	5	01/07/2025	Positive



	Unnamed: 0	content	score
0	1	Tiap Pesen Paket Lama Sampai Nyesel Pake Shoop...	1
1	2	Transaksi aman nyaman mudah dan membantu	5
2	3	Bagus	5
3	4	Puas belanja di shopee	5
4	5	Shopee sangat bagus apapun yg kita inginkan pa...	5
..	...	...	...
995	996	Aplikasi shopee terbaik	5
996	997	ongkir y murah, banyak gratisan y	5
997	998	Bintang 3 dulu ya	3
998	999	Iklannya nyusahin orang ntol	1
999	1000	terima kasih untuk shopee versi ini sudah mini...	5

Figure 3 Shopee web scraping results

4.2. Preprocessing

Data preprocessing is a crucial stage in data analysis, especially in preparing text data so that it can be processed optimally. This stage aims to filter and clean elements that are irrelevant or do not have a significant contribution to sentiment analysis. In this study, user reviews from the Shopee and TikTok Shop platforms were systematically processed to have a more organized structure and ready to be used by the Naïve Bayes algorithm in sentiment classification.

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1000 entries, 0 to 999
Data columns (total 5 columns):
 #   Column       Non-Null Count  Dtype
---  ------       --------------  -----
 0   Unnamed: 0   1000 non-null   int64
 1   content      1000 non-null   object
 2   score        1000 non-null   int64
 3   at           1000 non-null   object
 4   Label        961 non-null    object
dtypes: int64(2), object(3)
memory usage: 39.2+ KB
```

Figure 4 Shopee Data Information

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1000 entries, 0 to 999
Data columns (total 5 columns):
 #   Column       Non-Null Count  Dtype
---  ------       --------------  -----
 0   Unnamed: 0   1000 non-null   int64
 1   content      1000 non-null   object
 2   score        1000 non-null   int64
 3   at           1000 non-null   object
 4   Label        966 non-null    object
dtypes: int64(2), object(3)
memory usage: 39.2+ KB
```

Figure 5 Tiktok Shop Data Information

The image above presents information about the structure of the dataset used in the study, namely a collection of user reviews from Shopee and TikTok Shop. Both datasets have an equal amount of data, consisting of 1000 rows with 5 main columns. Specifically, the unnamed: 0 column is an automatic index created by the system, while the content column contains the text of the review from the user. Furthermore, the score column represents the rating value in the form of numbers given by the user, while the at column records the time when the review was published. The last column, namely label, is used to categorize review sentiment into two groups, namely positive and negative. In the Shopee dataset, 961 data have clear sentiment labels, while 39 data still do not have labels (NaN). Meanwhile, in the TikTok Shop dataset, there are 966 data that have been given sentiment labels, while 34 other data do not have sentiment categories. This shows that some of the data in the dataset does not have complete sentiment annotations. Therefore, a data preprocessing stage is needed which aims to ensure that the data used in the analysis is clean, structured, and ready for further processing.

4.3. Case Folding

Case folding is a technique in text processing that functions to convert all characters in a text to lowercase. The main purpose of this process is to ensure that the model does not differentiate words based solely on differences in letter capitalization. For example, the words “Shopee” and “shopee” will be treated as the same entity after case folding is applied.

	Unnamed: 0	content	score	at	Label	cleaned_content
0	1	Tiap Pesen Paket Lama Sampai Nyesel Pake Shoop...	1	1/7/2025	Negatif	tiap pesen paket lama sampai nyesel pake shoop...
1	2	Transaksi aman nyaman mudah dan membantu	5	1/7/2025	Positif	transaksi aman nyaman mudah dan membantu
2	3	Bagus	5	1/7/2025	Positif	bagus
3	4	Puas belanja di shopee	5	1/7/2025	Positif	puas belanja di shopee
4	5	Shopee sangat bagus apapun yg kita inginkan pa...	5	1/7/2025	Positif	shopee sangat bagus apapun yg kita inginkan pa...

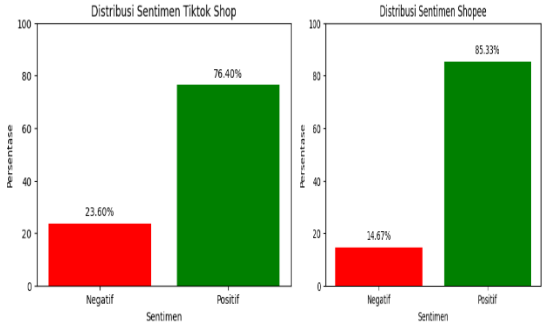
Figure 6 Results of the Shopee case folding process

	Unnamed: 0	content	score	at	Label	cleaned_content
0	1	MAKANYA SEPI SELLER DAN PRODUK MINIM PILIHAN 1...	2	1/7/2025	Negatif	makanya sepi seller dan produk minim pilihan 1...
1	2	Sudah 2x komplain untuk menonaktifkan j&t ekpr...	1	1/7/2025	Negatif	sudah 2x komplain untuk menonaktifkan j&t ekpr...
2	3	semua okey, paling pilihan jasa kirim nya saja...	5	1/7/2025	Positif	semua okey, paling pilihan jasa kirim nya saja...
3	4	semoga membantu dalam berjualan	5	1/7/2025	Positif	semoga membantu dalam berjualan
4	5	Kebijakan pengembalian otomatis sangat merugik...	1	1/7/2025	Negatif	kebijakan pengembalian otomatis sangat merugik...

Figure 7 Results of the Tiktok Shop case folding process

The image above shows the results of applying the case folding process to the Shopee and TikTok Shop user review datasets. Case folding is done to equalize the text format by converting all letters to lowercase, so that data analysis can be done more accurately without being affected by differences in letter capitalization. In the case folding results for Shopee, the content column contains the original user reviews, while the cleaned_content column shows the transformation results after all letters are converted to lowercase. For example, the review "Every Time I Order a Package, I Regret Using Shopee" is changed to "Every Time I Order a Package, I Regret Using Shopee". The same process is applied to the TikTok Shop dataset, where reviews such as "MAKANYA SEPI SELLER DAN PRODUK MINIM SELECTION" are converted to "Makanya sepi seller dan produk minim pilihan". The application of case folding plays an important role in increasing the efficiency of the sentiment analysis model, because the algorithm used does not need to distinguish between uppercase and lowercase letters. Thus, sentiment analysis, especially using the Naïve Bayes method, can be carried out more consistently and optimally.

Comparison of Shopee and Tiktok Shop Sentiment



Based on the results of sentiment analysis on two e-commerce platforms, TikTok Shop and Shopee, there is a significant difference in the level of user satisfaction. Most TikTok Shop users gave reviews with positive sentiment, which is 76.40%, while 23.60% gave negative sentiment. Although the majority of users are satisfied with the shopping experience on this platform, there are still a number of negative reviews indicating that there are aspects of the service that need to be improved.

On the other hand, Shopee showed a higher level of user satisfaction than TikTok Shop, with positive sentiment reaching 85.33% and only 14.67% negative reviews. This reflects that the service and shopping experience on Shopee better meet user expectations. The lower percentage of negative sentiment indicates that Shopee is more effective in providing a good experience in terms of service, product variety, and features available on its platform.

From this comparison, it can be concluded that Shopee has a higher level of customer satisfaction than TikTok Shop. Shopee's success in maintaining the majority of positive reviews and reducing the number of negative reviews shows the platform's effectiveness in meeting customer needs. On the other hand, TikTok Shop still faces challenges in increasing user satisfaction and reducing complaints about its services. Therefore, TikTok Shop needs to consider various improvements, such as improving service quality, system improvements, and developing features that better support user convenience in order to compete with Shopee in terms of customer satisfaction.

V. CONCLUSION

Based on sentiment analysis using the Naïve Bayes algorithm, it was found that both e-commerce platforms, Shopee and TikTok Shop, mostly have reviews with positive sentiment. However, there are differences in review patterns and sentiment distribution on the two platforms. Reviews on Shopee are more structured and focus on aspects of products, services, and shopping experiences. Meanwhile, reviews on TikTok Shop tend to be more emotional and are influenced by creator content and social trends. The Naïve Bayes model used in sentiment analysis showed quite good performance in classifying positive reviews on both platforms. For

Shopee, the model achieved an accuracy of 85.49% with high precision and recall in the positive sentiment class. However, the model has weaknesses in detecting negative reviews, which is reflected in the lower recall and f1-score values. Meanwhile, for TikTok Shop, although the accuracy is slightly lower (84.02%), the model has a better ability to identify negative sentiment compared to Shopee, although the bias towards positive sentiment is still quite high. The difference in sentiment classification model performance between Shopee and TikTok Shop is likely due to several factors, such as differences in language style in user reviews, imbalance in the amount of positive and negative review data, and the complexity of reviews on TikTok Shop which often include informal language and social expressions. Reviews on Shopee are more systematic and direct, while reviews on TikTok Shop are more spontaneous and influenced by social trends. The findings of this study can be utilized by Shopee and TikTok Shop managers to improve the quality of their services. Shopee can focus more on improving delivery speed and product quality, while TikTok Shop can optimize more emotional and interactive reviews to create a more enjoyable and personalized shopping experience for its users.

This research can be further developed by using a larger dataset or including reviews from other e-commerce platforms to expand the scope of the analysis. In addition, the use of other algorithms such as Support Vector Machine (SVM), Random Forest, or deep learning-based approaches can be considered to compare the performance of the model in sentiment analysis. Further research is also recommended to consider multilingual sentiment analysis or one that focuses on a specific geographic context in order to capture more diverse user perspectives. On the other hand, the integration of sentiment analysis with other aspects, such as consumer behavior analysis or product recommendation analysis, can provide added value for the Shopee and TikTok Shop platforms in improving customer experience. Finally, improving data quality, for example by cleaning data from noise and improving sentiment labels, can also improve model accuracy in future research. With these developments and improvements, research in the field of sentiment analysis on e-commerce can provide a more significant contribution to platform managers in improving service quality and customer satisfaction.

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