

# Unraveling Insights from User Reviews of Sapawarga – Jabar Super Apps Through Topic Modeling

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## ABSTRACT

This study conducted topic modeling on user reviews of the Sapawarga – Jabar Super App application on the Google Play Store. The dataset comprised user reviews submitted since the date application released until January 7, 2026 yielded 5.082 user reviews. Collected data processed through a series of data processing pipeline namely case folding, remove punctuation, normalization, tokenization, stop word removal and stemming. Topic modeling was conducted using Latent Dirichlet Allocation (LDA) algorithm grouped based on year of data. Topic distribution was visualized using the PyLDAvis to facilitate analysis and interpretation. This study found there are 9 topic after analysing year by year data namely Appreciation of the usefulness of the application in helping residents (1), Technical issues in terms of how to log in to the application (2), Application improvement proposal (3), Ease of information and citizen empowerment (4), General expressions of appreciation and criticism from citizens towards the application (5), Technical issues with payment features (6), Application error problem (7), User appreciation for the ease of vehicle tax payments from the application (8) and Criticism of application constraints in vehicle tax payments (9). The interpretation results indicate that the application is widely used by residents for online tax payments, particularly vehicle tax services, compared to other features or uses of the application. The findings of this study are expected to serve as a valuable insight for relevant stakeholders to improve the quality, performance, and overall effectiveness of the application as a public service platform.



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## I. INTRODUCTION

Digital transformation in the public service sector has now become a very important and strategic need in the era of globalization, since digital technologies enhance the efficiency, transparency, and accessibility of government services while improving citizen satisfaction and engagement [1]. Today's society requires easy, fast, and accessible access to public services anywhere. The West Java Provincial Government, in an effort to facilitate public access to public services, has launched the Sapawarga app - Jabar Super Apps [2]. This app is an all-in-one digital public service application that covers population administration, health, taxation, and citizen complaints [3].

In its implementation, there have been diverse responses from the public regarding the use of the Sapawarga – Jabar Super Apps application. Citizen responses can be seen on various social media platforms or app reviews on the Google Play Store. Some residents have found this system beneficial, but others have encountered difficulties in using and adapting to it. As a continuously evolving public service application, analyzing public opinion on the application is necessary to gain insight about its lacknesses or weaknesses.

To gain insight related to the application from user reviews, topic modeling can be implemented. Topic modeling is a data mining technique that applies machine learning algorithms to uncover hidden patterns within large volumes of unstructured text [4]. It processes a set of documents and groups words into clusters, commonly referred to as bags of words, identifying

topics through similarity analysis. This approach enables the organization, interpretation, and summarization of extensive text collections. Various methods have been developed for topic modeling, with the most widely used being Latent Semantic Indexing (LSI), Latent Dirichlet Allocation (LDA), and Non-Negative Matrix Factorization (NMF) [5].

LDA is a powerful method for data mining and the discovery of hidden topics within textual datasets. Since its introduction, LDA has been extensively utilized in both academic and practical domains due to its capability to explore and identify latent thematic structures embedded in corpora derived from various sources, including research articles, patents, Wikipedia entries, and blogs. In comparison to narrative reviews, the analytical outcomes produced by LDA provide greater objectivity and validity, as they are grounded in data-driven analysis rather than subjective interpretation [6].

In reviewing this research, there is previous research in conducting modeling by applying the LDA algorithm, such as research conducted by Nabila and Chaniah's [7] which applied LDA to model topics in user comments about skincare products on the Female Daily website. The research modeling results with 10 topics showed an optimum value with a coherence value of 0.418738. Then research by Khadijah and Cahyono [8] that did topic modeling about tourism discussions on social media. The study used LDA and tested the model's performance by looking at the perplexity and coherence values. The best coherence value was found in topic number 1 at 0.331047 and the best perplexity value was found in topic number 3 at -8.830172565520245.

Research by Sari and Purnomo identified topics related to Covid-19 by applying the LDA algorithm to Wikipedia data. The effective number of topics was set at 5 after 100, 500, 1000, 1500, and 2000 iterations. The best coherence value was 0.5528 within 3 number of topics. The study also concluded that the most discussed topic according to the data used was health topic.[9].

Yuri Pamungkas' research applied LDA to determine research topic trends in the biomedical field. The study used 700 articles from PubMed. The best number of topics was 7 with a coherence value of 0.52 in 75% of the corpus. Meanwhile, at 100% of the corpus, the best number of topics was 10 with a coherence value of 0.51. Based on the topic modeling results, research trends included disease diagnosis, patient care, and genetic or cell research [10].

Next, Pratiwi and Tania's research [11], conducted a comparison of BERTopic, LDA, and NMF in topic modeling on GoPartner user reviews. 15000 reviews were collected for this study. The results showed that BERTopic had the best coherence value for original text, namely 0.6904775079537018, and LDA had the best coherence value for stemming text, namely 0.6262973633020125. Knowledge that discovered from this study is the driver of gojek encounter operational constraints when assessing or using the application.

There are several previous studies have specifically examined the Sapawarga – Jabar Super Apps app from a user sentiment perspective. One such study by Shafa and Herliana examined sentiment analysis of the Sapawarga – Jabar Super Apps app using the Support Vector Machine (SVM) algorithm. Sapawarga app review data was collected on March 19, 2025. From more than 1,000 reviews, only 229 considered met the criteria, which having full text content. This study found 166 negative sentiments, 47 positive sentiments, and 16 neutral sentiments. The model achieved a high accuracy of 86%, with a 90:10 training and test data distribution [12].

Furthermore, sentiment analysis study conducted by Faiza Tri Sanudin et al. applied the Naïve Bayes algorithm to sentiment analysis of Sapawarga app reviews on the Play Store. 2417 raw data was collected from user review on Google Play Store. This study found that positive sentiment dominated Sapawarga reviews, with model accuracy of 83%, precision of 86%, recall of 95%, and an F1-Score of 90%. The results of this evaluation demonstrate the model's ability to accurately classify reviews, particularly in identifying positive reviews. This study provides important guidance for application improvement and development to further enhance user satisfaction and the effectiveness of sentiment analysis [13].

Based on previous studies, the application of topic modeling in various case studies is still dominated by the Latent Dirichlet Allocation (LDA) algorithm. Previous studies have widely used the LDA model due to its effectiveness in extracting latent topics from large text datasets and its ease of interpretation. In line with this trend, this study uses LDA as the main algorithm to model opinion-based topics derived from user reviews of the Sapawarga – Jabar Super Apps application on the Play Store. Several previous studies have discussed Sapawarga – Jabar Super Apps in different contexts, but research that specifically focuses on the application of topic modeling techniques to analyze user reviews and uncover insights from user perceptions is still limited. Therefore, this study is relevant to fill the gap in previous research.

The primary objective of this research is to explore and extract meaningful knowledge through topic modeling by applying the Latent Dirichlet Allocation (LDA) algorithm to user reviews of the Sapawarga – Jabar Super Apps available on the app store. Therefore, the research question of this study is “What topics emerge from user review on google playstore regarding Sapawarga – Jabar Super App?”

By answering this research question, this study is able to capture users' concerns, expectations, and experiences related to the application. The findings of this study are expected to serve as a valuable foundation for understanding key issues perceived by users and to provide actionable insights for the government and relevant stakeholders in formulating strategies to improve the quality, performance, and overall effectiveness of the application as a public service platform.

## II. METHOD

The following steps are carried out to implement LDA based topic modeling related to Sapawarga – Jabar Super Apps reviews.

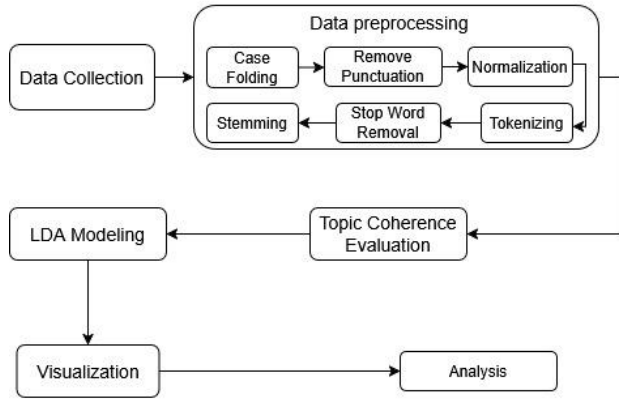


Figure 1. Research Stages

### A. Data collection

The first stage of the research involved data collection, which was conducted by scraping user reviews of the application from the Google Play Store [14]. Data retrieval took place on January 7, 2026. The dataset comprised user reviews submitted since the date application released until January 7, 2026. This timeframe was selected to ensure that the collected all reviews accurately represent the application's condition time by time based on user perceptions. The data scraping process was carried out using the Google Play Scraper library within the Google Collaboratory environment. In total, 5082 user reviews were successfully collected and stored in Excel file format.

### B. Data Preprocessing

Data preprocessing is conducted to transform raw data into a structured format that can be effectively processed by machine learning or deep learning algorithms. This stage involves multiple sequential steps aimed at improving data quality, consistency, and suitability for model training and analysis[15]. This stage include six sub steps, namely case folding; a step to convert all text into lowercase, remove punctuation; a process to remove punctuation symbols such as commas, periods, question marks, and quotation marks, making text becomes cleaner and more consistent, normalization; this process identifies and converts informal, non-standard, or abbreviated words (slang) into their formal or standardized form so the text can be processed accurately by implemented models, this process is conducted using indoNLP library in python, tokenization; converting sentences into words or tokens, stop word removal; removing words that do not add meaningful information, stemming; converting each word into their base or root form to handle

inflectional variations. The outcomes of the processing pipeline are described through sample data shown in Table 1.

TABLE I  
DATA PROCESSING

| Steps              | Processing result                                                   |
|--------------------|---------------------------------------------------------------------|
| Original           | Aplikasi Sangat Bermanfaat Untuk Pengaduan Warga.                   |
| Case Folding       | aplikasi sangat bermanfaat untuk pengaduan warga.                   |
| Remove Punctuation | aplikasi sangat bermanfaat untuk pengaduan warga                    |
| Normalization      | aplikasi sangat bermanfaat untuk pengaduan warga                    |
| Tokenization       | ['aplikasi', 'sangat', 'bermanfaat', 'untuk', 'pengaduan', 'warga'] |
| Stop Word Removal  | ['aplikasi', 'sangat', 'bermanfaat', 'pengaduan', 'warga']          |
| Stemming           | ['aplikasi', 'sangat', 'manfaat', 'adu', 'warga']                   |

### C. LDA Modeling

The large number of user reviews of the Sapawarga – Jabar Super Apps makes the exploration of user opinions a challenging task. Traditional quantitative approaches are frequently shaped by researchers' assumptions, resulting in only selected application-related topics being involved in survey instruments for relational analysis. As a result, these methods may fail to capture other relevant topics that have not yet been recognized or taken by researchers. As an alternative, topic modeling offers a more objective approach by allowing key topics to be identified and abstracted directly from large volumes of unstructured data [16].

This study applies Latent Dirichlet Allocation (LDA) to analyze user reviews in order to gain insights into the topics that are of concern to application users. LDA is a generative and unsupervised statistical algorithm used to uncover latent themes from a collection of documents using a Bayesian approach [4]. LDA modeling is conducted using the Python packages scikit-learn and Gensim. To determine the number of topics that most represent the overall review dataset, model fit is compared across different numbers of topics based on coherence scores.

### D. Topic Coherence Evaluation

In topic modeling, particularly in Latent Dirichlet Allocation (LDA), coherence is a metric used to assess the degree of semantic relatedness among words within a generated topic. Coherence measurement aims to evaluate how well the extracted topics represent the underlying semantic structure of the dataset. In the context of LDA evaluation, coherence scores play a crucial role in determining whether the generated topics are meaningful, consistent, and interpretable [15].

Several approaches can be employed to measure topic coherence, including the  $c_v$  and  $u\_mass$  coherence metrics, among others. Higher coherence scores indicate stronger semantic relationships among the words that constitute a



Next, for the 2020 data, there were a total of 1,302 review data points. Based on topic modeling, the best coherence score with the best topic distribution was found at 0.5485, within two topics. The topics in this data are visualized in Figure 4.

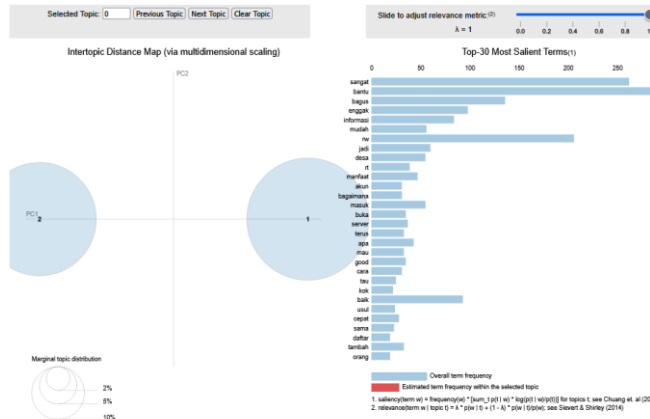


Figure 4. Topic visualization for 2020 data

The bubble in this simulation result quite balanced. The most dominant group consist of words “bantu”, “sangat”, “bagus”, “warga”, “aplikasi”, “informasi”, “baik”, “rw”, “lebih”, and “sapawarga”. The top 10 words for each topic in 2020 data group was presented in Table 3.

TABLE III  
LDA TOPIC MODELING RESULT FOR 2020 DATA

| Word      | topic_id | importance  | word_count |
|-----------|----------|-------------|------------|
| Bantu     | 1        | 0,080479078 | 309        |
| Sangat    | 1        | 0,07554093  | 272        |
| Bagus     | 1        | 0,039169334 | 141        |
| Warga     | 1        | 0,037608672 | 212        |
| Aplikasi  | 1        | 0,028838329 | 195        |
| Informasi | 1        | 0,023262205 | 87         |
| Baik      | 1        | 0,022397907 | 96         |
| Rw        | 1        | 0,019296408 | 216        |
| Lebih     | 1        | 0,016959932 | 79         |
| Sapawarga | 1        | 0,016839489 | 124        |
| Rw        | 2        | 0,047426276 | 216        |
| Enggak    | 2        | 0,032538906 | 103        |
| Aplikasi  | 2        | 0,029777788 | 195        |
| Warga     | 2        | 0,025185164 | 212        |
| Sapawarga | 2        | 0,02076756  | 124        |
| Jadi      | 2        | 0,018161207 | 63         |
| Mantap    | 2        | 0,017746987 | 84         |
| Desa      | 2        | 0,016994355 | 58         |
| masuk     | 2        | 0,015683766 | 57         |
| data      | 2        | 0,015633922 | 65         |

Figure 5 shows a visualization of 2021 data, comprising a total of 218 review data points. The best coherence score for the model was 0.4008, with 3 topics.

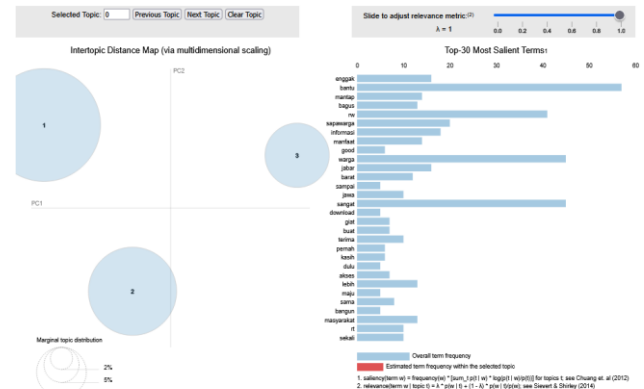


Figure 5. Topic visualization for 2021 data

The largest bubble which indicate the most common issue was consist of words “bantu”, “warga”, “sangat”, “aplikasi”, “sapa”, “lebih”, “masyarakat”, “rw”, “rt”, and “dapat”. The top 10 words for each topic in 2021 data group was presented in Table 4.

TABLE IV  
LDA TOPIC MODELING RESULT FOR 2021 DATA

| word       | topic_id | importance  | word_count |
|------------|----------|-------------|------------|
| bantu      | 1        | 0,157442689 | 59         |
| warga      | 1        | 0,113568991 | 47         |
| sangat     | 1        | 0,108946197 | 47         |
| aplikasi   | 1        | 0,075051561 | 39         |
| sapa       | 1        | 0,044642549 | 20         |
| lebih      | 1        | 0,035938263 | 13         |
| masyarakat | 1        | 0,034643099 | 13         |
| rw         | 1        | 0,028864643 | 43         |
| rt         | 1        | 0,027732648 | 10         |
| dapat      | 1        | 0,027709285 | 10         |
| rw         | 2        | 0,141673654 | 43         |
| informasi  | 2        | 0,081953526 | 19         |
| jabar      | 2        | 0,058854427 | 16         |
| manfaat    | 2        | 0,058174156 | 14         |
| barat      | 2        | 0,046244539 | 13         |
| sapawarga  | 2        | 0,038655967 | 22         |
| jawa       | 2        | 0,03691218  | 11         |
| aplikasi   | 2        | 0,035470031 | 39         |
| sangat     | 2        | 0,032517236 | 47         |
| giat       | 2        | 0,031693619 | 7          |
| enggak     | 3        | 0,136963904 | 19         |
| mantap     | 3        | 0,118468091 | 16         |
| bagus      | 3        | 0,108799346 | 15         |
| sapawarga  | 3        | 0,099699549 | 22         |
| good       | 3        | 0,053487647 | 7          |
| Sampai     | 3        | 0,036968399 | 5          |
| Download   | 3        | 0,035335641 | 5          |
| Aplikasi   | 3        | 0,031757046 | 39         |
| Pernah     | 3        | 0,029081229 | 6          |
| Sama       | 3        | 0,026029496 | 8          |

Figure 6 illustrates the distribution of topics emerging from the 2022 data modeling results. The LDA simulation on this dataset involved a total of 282 rows. The best number of

topics was found with a coherence score of 0.3903, with a total of 7 topics.

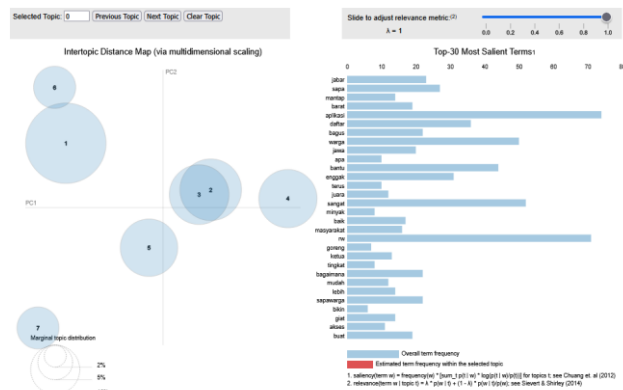


Figure 6. Topic Visualization for 2022 data

Topic with largest bubble from 2022 corpus was consist of words “bantu”, “daftar”, “enggak”, “sangat”, “bagaimana”, “aplikasi”, “login”, “masuk”, “jadi”, “rw”. The top 10 words for each topic in 2022 data group was presented in Table 5.

TABLE V  
LDA TOPIC MODELING RESULT FOR 2022 DATA

| Word        | topic_id | importance | word_count |
|-------------|----------|------------|------------|
| Bantu       | 1        | 0,102527   | 47         |
| Daftar      | 1        | 0,088451   | 39         |
| Enggak      | 1        | 0,063019   | 33         |
| Sangat      | 1        | 0,058585   | 55         |
| Bagaimana   | 1        | 0,053419   | 23         |
| Aplikasi    | 1        | 0,049002   | 80         |
| login       | 1        | 0,03502    | 17         |
| masuk       | 1        | 0,033733   | 16         |
| jadi        | 1        | 0,032865   | 17         |
| rw          | 1        | 0,030359   | 76         |
| sapa        | 2        | 0,114644   | 29         |
| warga       | 2        | 0,110376   | 53         |
| aplikasi    | 2        | 0,07318    | 80         |
| rw          | 2        | 0,073121   | 76         |
| sangat      | 2        | 0,032145   | 55         |
| lebih       | 2        | 0,032029   | 15         |
| moga        | 2        | 0,032024   | 11         |
| apk         | 2        | 0,027575   | 8          |
| ada         | 2        | 0,027498   | 7          |
| program     | 2        | 0,027072   | 8          |
| rw          | 3        | 0,120113   | 76         |
| masyarakat  | 3        | 0,06516    | 17         |
| sapawarga   | 3        | 0,06045    | 23         |
| ketua       | 3        | 0,056012   | 14         |
| aplikasi    | 3        | 0,050557   | 80         |
| akses       | 3        | 0,047461   | 12         |
| warga       | 3        | 0,042805   | 53         |
| orang       | 3        | 0,038309   | 8          |
| penting     | 3        | 0,027918   | 7          |
| silaturahmi | 3        | 0,024464   | 8          |
| jabar       | 4        | 0,113937   | 23         |
| barat       | 4        | 0,091282   | 19         |
| jawa        | 4        | 0,089414   | 20         |

|            |   |          |    |
|------------|---|----------|----|
| juara      | 4 | 0,063112 | 12 |
| warga      | 4 | 0,050429 | 53 |
| se         | 4 | 0,045175 | 12 |
| informasi  | 4 | 0,045104 | 17 |
| sangat     | 4 | 0,031412 | 55 |
| terima     | 4 | 0,027034 | 10 |
| jelas      | 4 | 0,026671 | 6  |
| sangat     | 5 | 0,099313 | 55 |
| aplikasi   | 5 | 0,089362 | 80 |
| bagus      | 5 | 0,089193 | 23 |
| rw         | 5 | 0,07796  | 76 |
| baik       | 5 | 0,066116 | 18 |
| giat       | 5 | 0,054928 | 15 |
| sering     | 5 | 0,030386 | 7  |
| sulit      | 5 | 0,026392 | 8  |
| komunikasi | 5 | 0,026131 | 7  |
| guna       | 5 | 0,024175 | 13 |
| mantap     | 6 | 0,128546 | 15 |
| aplikasi   | 6 | 0,121396 | 80 |
| apa        | 6 | 0,099573 | 11 |
| bikin      | 6 | 0,056482 | 6  |
| enggak     | 6 | 0,048672 | 33 |
| pis        | 6 | 0,047388 | 5  |
| buat       | 6 | 0,042031 | 20 |
| mudah      | 6 | 0,038114 | 13 |
| layan      | 6 | 0,037014 | 7  |
| rw         | 6 | 0,033871 | 76 |
| terus      | 7 | 0,083012 | 10 |
| minyak     | 7 | 0,072129 | 8  |
| goreng     | 7 | 0,061479 | 7  |
| tingkat    | 7 | 0,060869 | 8  |
| lebih      | 7 | 0,044444 | 15 |
| update     | 7 | 0,043875 | 7  |
| good       | 7 | 0,040965 | 6  |
| mohon      | 7 | 0,037868 | 13 |
| mudah      | 7 | 0,03735  | 13 |
| buat       | 7 | 0,036929 | 20 |

Figure 7 visualizes the topic distribution for the 2023 data. There is a total of 427 rows of data in this group. Based on the LDA application, the best coherence score was found at 0.3828 with a total of 6 topics.

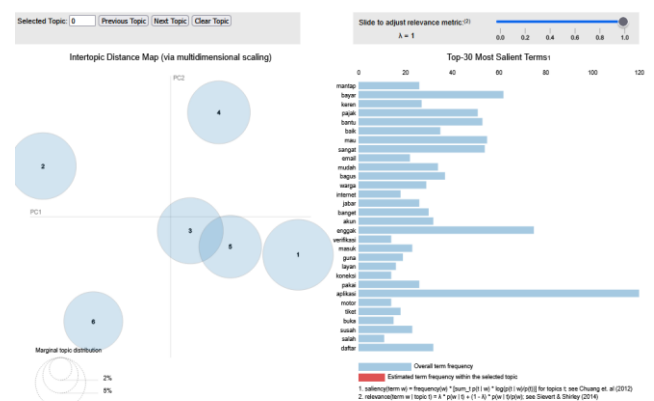


Figure 7 Topic visualization for 2023 data



The most dominant topic from this corpus was consist of words “email”, “banget”, “aplikasi”, “enggak”, “masuk”, “daftar”, “akun”, “pas”, “verifikasi”, and “baru”. The top 10 words for each topic in 2023 data group was presented in Table 6.

TABLE VI  
LDA TOPIC MODELING RESULT FOR 2023 DATA

| word       | topic_id | importance  | word_count |
|------------|----------|-------------|------------|
| email      | 1        | 0,047770601 | 23         |
| banget     | 1        | 0,046523798 | 32         |
| aplikasi   | 1        | 0,044395484 | 127        |
| enggak     | 1        | 0,038813669 | 80         |
| masuk      | 1        | 0,03861988  | 24         |
| daftar     | 1        | 0,036513746 | 34         |
| akun       | 1        | 0,035018414 | 34         |
| pas        | 1        | 0,029196018 | 25         |
| verifikasi | 1        | 0,029192539 | 14         |
| baru       | 1        | 0,02353395  | 24         |
| bantu      | 2        | 0,085332006 | 54         |
| sangat     | 2        | 0,076952092 | 56         |
| mudah      | 2        | 0,063973367 | 35         |
| bayar      | 2        | 0,054223344 | 65         |
| warga      | 2        | 0,049264606 | 29         |
| aplikasi   | 2        | 0,046550274 | 127        |
| jabar      | 2        | 0,037786737 | 26         |
| pajak      | 2        | 0,033102531 | 54         |
| tiket      | 2        | 0,026206683 | 18         |
| informasi  | 2        | 0,023890199 | 17         |
| mau        | 3        | 0,080279469 | 59         |
| aplikasi   | 3        | 0,053090766 | 127        |
| terus      | 3        | 0,044482347 | 50         |
| enggak     | 3        | 0,032277867 | 80         |
| bagaimana  | 3        | 0,027725015 | 16         |
| bayar      | 3        | 0,027127678 | 65         |
| susah      | 3        | 0,025229171 | 24         |
| kasih      | 3        | 0,024527237 | 17         |
| terima     | 3        | 0,022955034 | 12         |
| bantu      | 3        | 0,021782417 | 54         |
| baik       | 4        | 0,068002649 | 37         |
| enggak     | 4        | 0,048061203 | 80         |
| internet   | 4        | 0,042034239 | 19         |
| pakai      | 4        | 0,036763936 | 27         |
| aplikasi   | 4        | 0,034659456 | 127        |
| jadi       | 4        | 0,03083341  | 34         |
| koneksi    | 4        | 0,030291265 | 15         |
| jabar      | 4        | 0,02611834  | 26         |
| terus      | 4        | 0,024579177 | 50         |
| padahal    | 4        | 0,023781881 | 21         |
| aplikasi   | 5        | 0,109382764 | 127        |
| enggak     | 5        | 0,066824563 | 80         |
| bagus      | 5        | 0,063899629 | 39         |
| guna       | 5        | 0,036718644 | 20         |
| akun       | 5        | 0,035849229 | 34         |
| sangat     | 5        | 0,031256903 | 56         |
| buka       | 5        | 0,029368073 | 16         |
| sapawarga  | 5        | 0,027339868 | 32         |
| susah      | 5        | 0,021410486 | 24         |
| cek        | 5        | 0,020895656 | 8          |
| bayar      | 6        | 0,086273439 | 65         |

|          |   |             |     |
|----------|---|-------------|-----|
| mantap   | 6 | 0,08072637  | 28  |
| keren    | 6 | 0,076760493 | 29  |
| pajak    | 6 | 0,076490156 | 54  |
| kendara  | 6 | 0,046389628 | 36  |
| mau      | 6 | 0,032042131 | 59  |
| motor    | 6 | 0,030009538 | 14  |
| layan    | 6 | 0,028535955 | 16  |
| aplikasi | 6 | 0,025803683 | 127 |
| sapa     | 6 | 0,024003647 | 9   |

Figure 8 illustrates the topic distribution from the LDA application on the 2024 data. There was a total of 1,752 review data in that year. The number of reviews in 2024 was the highest ever. The best coherence score for the LDA application was 0.5678, with 5 topics.

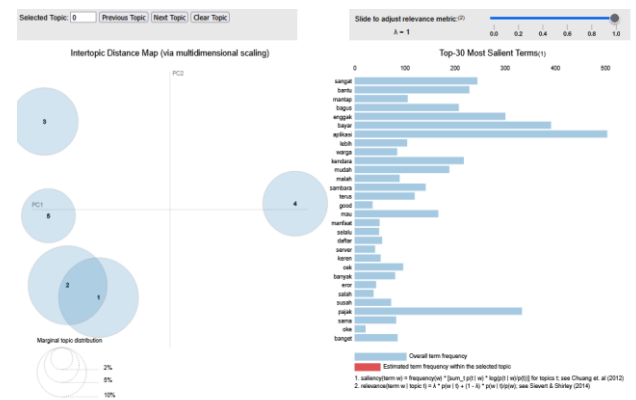


Figure 8. Topic visualization for 2024 data

The largest bubble that indicate the most dominant topic was consist of words “bayar”, “aplikasi”, “pajak”, “bagus”, “kendara”, “samsat”, “enggak”, “padahal”, “motor”, and “milik”. The top 10 words for each topic in 2024 data group was presented in Table 7.

TABLE VII  
LDA TOPIC MODELING RESULT FOR 2024 DATA

| word     | topic_id | importance  | word_count |
|----------|----------|-------------|------------|
| bayar    | 1        | 0,051827624 | 407        |
| aplikasi | 1        | 0,046859331 | 520        |
| pajak    | 1        | 0,03518416  | 346        |
| bagus    | 1        | 0,027927386 | 216        |
| kendara  | 1        | 0,025788445 | 225        |
| samsat   | 1        | 0,017041197 | 86         |
| enggak   | 1        | 0,016821872 | 308        |
| padahal  | 1        | 0,014292207 | 71         |
| motor    | 1        | 0,013733322 | 75         |
| milik    | 1        | 0,012836404 | 51         |
| pajak    | 2        | 0,05271098  | 346        |
| bayar    | 2        | 0,052693933 | 407        |
| kendara  | 2        | 0,033884358 | 225        |
| enggak   | 2        | 0,033354085 | 308        |
| sambara  | 2        | 0,031214146 | 146        |
| lebih    | 2        | 0,029393898 | 108        |
| mau      | 2        | 0,025552882 | 172        |

|          |   |             |     |
|----------|---|-------------|-----|
| cek      | 2 | 0,023618016 | 100 |
| baik     | 2 | 0,018356649 | 115 |
| mudah    | 2 | 0,017620869 | 195 |
| aplikasi | 3 | 0,069188356 | 520 |
| enggak   | 3 | 0,056275584 | 308 |
| malah    | 3 | 0,025904635 | 91  |
| banyak   | 3 | 0,023100697 | 82  |
| sama     | 3 | 0,022705168 | 84  |
| buat     | 3 | 0,020701407 | 140 |
| apk      | 3 | 0,01725903  | 84  |
| eror     | 3 | 0,016948301 | 43  |
| apa      | 3 | 0,016698468 | 70  |
| terus    | 3 | 0,014869497 | 124 |
| sangat   | 4 | 0,117693447 | 255 |
| bantu    | 4 | 0,104756519 | 238 |
| aplikasi | 4 | 0,063561544 | 520 |
| bagus    | 4 | 0,047599111 | 216 |
| mudah    | 4 | 0,042043045 | 195 |
| warga    | 4 | 0,028573442 | 88  |
| banget   | 4 | 0,021843059 | 89  |
| manfaat  | 4 | 0,0194901   | 51  |
| sekali   | 4 | 0,017390812 | 59  |
| good     | 4 | 0,017193763 | 37  |
| mantap   | 5 | 0,056400809 | 112 |
| bayar    | 5 | 0,033389069 | 407 |
| terus    | 5 | 0,025640771 | 124 |
| mau      | 5 | 0,022602513 | 172 |
| aplikasi | 5 | 0,019850789 | 520 |
| server   | 5 | 0,018988609 | 43  |
| salah    | 5 | 0,01851126  | 40  |
| susah    | 5 | 0,016705109 | 75  |
| daftar   | 5 | 0,016281093 | 57  |
| selalu   | 5 | 0,015630813 | 51  |

Figure 9 visualize the topic distribution for 2025 data. There are total 1591 lines of data in this group. Based on LDA implementation the best coherence score was achieved at 0.4737 within 3 topics.

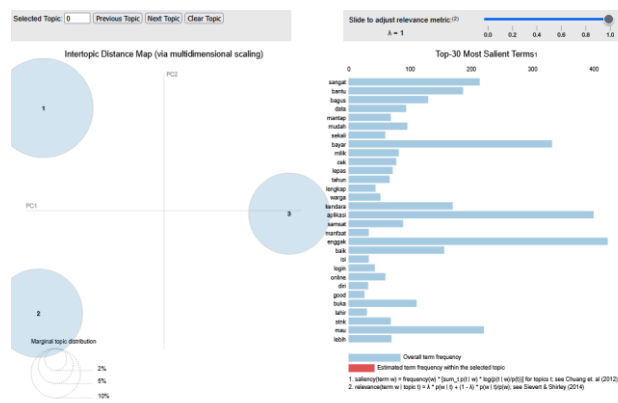


Figure 9. Topic visualization for 2025 data

The largest bubble represents the main issue concerned by user was consist of words “enggak”, “mau”, “pajak”, “kendara”, “aplikasi”, “terus”, “milik”, “baik”, “cek”, and

“lepas”. The top 10 words for each topic in 2025 data group was presented in Table 8.

TABLE VIII  
LDA TOPIC MODELING RESULT FOR 2025 DATA

| word     | topic_id | importance    | word_count |
|----------|----------|---------------|------------|
| enggak   | 1        | 0.06268335134 | 430        |
| mau      | 1        | 0.03666295484 | 224        |
| pajak    | 1        | 0.02970071696 | 325        |
| kendara  | 1        | 0.02834357321 | 175        |
| aplikasi | 1        | 0.023759      | 417        |
| terus    | 1        | 0.02161735296 | 136        |
| milik    | 1        | 0.01831211336 | 82         |
| baik     | 1        | 0.01748665236 | 164        |
| cek      | 1        | 0.01741763204 | 78         |
| lepas    | 1        | 0.01616860367 | 72         |
| aplikasi | 2        | 0.05298909172 | 417        |
| bayar    | 2        | 0.04197958857 | 349        |
| enggak   | 2        | 0.03598282859 | 430        |
| data     | 2        | 0.02707870677 | 94         |
| pajak    | 2        | 0.02141242474 | 325        |
| samsat   | 2        | 0.02009606175 | 90         |
| tahun    | 2        | 0.01664728299 | 67         |
| online   | 2        | 0.01464728266 | 61         |
| stnk     | 2        | 0.0146277491  | 69         |
| mau      | 2        | 0.01418621652 | 224        |
| sangat   | 3        | 0.07455341518 | 239        |
| bantu    | 3        | 0.06483657658 | 209        |
| bayar    | 3        | 0.04595141858 | 349        |
| bagus    | 3        | 0.04440697655 | 145        |
| aplikasi | 3        | 0.04339348525 | 417        |
| pajak    | 3        | 0.04006852582 | 325        |
| mudah    | 3        | 0.02616177872 | 105        |
| baik     | 3        | 0.02419325896 | 164        |
| mantap   | 3        | 0.0235884767  | 77         |
| sekali   | 3        | 0.01923715323 | 66         |

Figure 10 visualize the topic distribution for 2026 data. Total data in this group is 68 data, this is the lowest amount of data for this study and the most recent data. Based on LDA implementation the best coherence score was found amounting at 0,4229 within 4 topics.

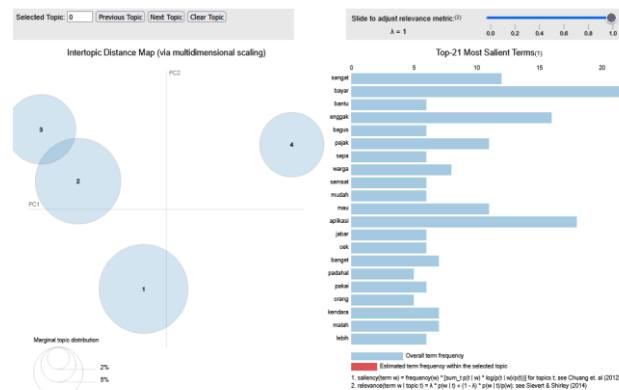


Figure 10. Topic visualization for 2026 data



The most dominant topic was described as largest bubble consist of words “enggak”, “mau”, “aplikasi”, “jabar”, “cek”, “pakaia”, “banget”, “lebih”, “kendara”, and “malah”. The top 10 words for each topic in 2026 data group was presented in Table 9.

TABLE IX  
LDA TOPIC MODELING RESULT FOR 2026 DATA

| word     | topic_id | importance  | word_count |
|----------|----------|-------------|------------|
| enggak   | 1        | 0,225010335 | 18         |
| mau      | 1        | 0,118746392 | 12         |
| aplikasi | 1        | 0,11841663  | 20         |
| jabar    | 1        | 0,081931725 | 6          |
| cek      | 1        | 0,073853247 | 6          |
| pakai    | 1        | 0,069254063 | 6          |
| banget   | 1        | 0,068598345 | 7          |
| lebih    | 1        | 0,045577768 | 6          |
| kendara  | 1        | 0,043877557 | 7          |
| malah    | 1        | 0,038382266 | 7          |
| bayar    | 2        | 0,158288777 | 24         |
| aplikasi | 2        | 0,103056438 | 20         |
| samsat   | 2        | 0,10098201  | 6          |
| mudah    | 2        | 0,093343794 | 6          |
| padahal  | 2        | 0,068712041 | 5          |
| mau      | 2        | 0,064726852 | 12         |
| warga    | 2        | 0,064484529 | 8          |
| kendara  | 2        | 0,062101319 | 7          |
| malah    | 2        | 0,061566599 | 7          |
| orang    | 2        | 0,050521929 | 5          |
| bayar    | 3        | 0,342475116 | 24         |
| pajak    | 3        | 0,185563147 | 12         |

|          |   |             |    |
|----------|---|-------------|----|
| sapa     | 3 | 0,113153607 | 6  |
| warga    | 3 | 0,103066817 | 8  |
| enggak   | 3 | 0,049921818 | 18 |
| malah    | 3 | 0,028761053 | 7  |
| cek      | 3 | 0,028722357 | 6  |
| banget   | 3 | 0,02849305  | 7  |
| aplikasi | 3 | 0,022774771 | 20 |
| kendara  | 3 | 0,019092545 | 7  |
| sangat   | 4 | 0,334561676 | 13 |
| bantu    | 4 | 0,187052086 | 7  |
| bagus    | 4 | 0,162014455 | 6  |
| aplikasi | 4 | 0,137278333 | 20 |
| banget   | 4 | 0,041996505 | 7  |
| lebih    | 4 | 0,032702819 | 6  |
| mau      | 4 | 0,008737586 | 12 |
| enggak   | 4 | 0,008670368 | 18 |
| pajak    | 4 | 0,007226194 | 12 |
| warga    | 4 | 0,007039629 | 8  |

### C. Topic Analysis

To understand the topic structure more deeply, then a year-by-year topic analysis was conducted. This analysis aimed to identify overlapping and interrelated topics discussed year after year. The word groups which showcase topic similarity either textual or conceptual in different year was grouped as the same topic interpretation. An explanation of the year-by-year topic analysis is presented in Table 10.

TABLE IV  
YEAR-BY-YEAR TOPIC ANALYSIS

| Topic ID | Year             | Similar Keywords                                           | Interpretation Code | Topic Interpretation                                                    | Description                                                                                                                                                                               |
|----------|------------------|------------------------------------------------------------|---------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | 2019, 2020, 2021 | warga, sangat, bantu, aplikasi, masyarakat, bagus,         | IC01                | Appreciation of the usefulness of the application in helping residents. | This topic explains about positive appreciation in the form of praise from users towards the application, because it is considered to help residents and provide real benefits.           |
| 2        | 2023             |                                                            |                     |                                                                         |                                                                                                                                                                                           |
| 4        | 2024             |                                                            |                     |                                                                         |                                                                                                                                                                                           |
| 5        | 2022             |                                                            |                     |                                                                         |                                                                                                                                                                                           |
| 1        | 2022, 2023       | Aplikasi, enggak, masuk, daftar, verifikasi, susah         | IC02                | Technical issues in terms of how to log in to the application           | This topic contains a group of words that describe the difficulties faced by citizens when registering and logging in to the application.                                                 |
| 2        | 2020             |                                                            |                     |                                                                         |                                                                                                                                                                                           |
| 3        | 2019             |                                                            |                     |                                                                         |                                                                                                                                                                                           |
| 5        | 2024             |                                                            |                     |                                                                         |                                                                                                                                                                                           |
| 2        | 2019, 2022       | Aplikasi, program, usul, moga, lebih, jadi                 | IC03                | Application improvement proposal                                        | This topic represents a conversation containing suggestions for application development, hopes for the program to run better and suggestions for improving the application in the future. |
| 2        | 2021             | rw, warga, masyarakat, jabar, informasi, giat, silaturahmi | IC04                | Ease of information and citizen empowerment                             | This topic explains the ease of access to information that citizens obtain with the help of applications, which has an impact on empowering citizen activities and citizen relationships. |
| 3        | 2022             |                                                            |                     |                                                                         |                                                                                                                                                                                           |
| 4        | 2022             |                                                            |                     |                                                                         |                                                                                                                                                                                           |
| 3        | 2021             | aplikasi, mantap,                                          | IC05                | General expressions of appreciation and criticism                       | This topic contains an overview of general expressions of positive and negative                                                                                                           |
| 6        | 2022             |                                                            |                     |                                                                         |                                                                                                                                                                                           |

|   |      |                                                                   |      |                                                                              |                                                                                                                                                       |
|---|------|-------------------------------------------------------------------|------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7 | 2022 | <i>bagus, enggak, mudah, good, bagus, susah.</i>                  |      | from citizens towards the application                                        | sentiments from application users, characterized by words of praise and criticism of the application.                                                 |
| 5 | 2023 |                                                                   |      |                                                                              |                                                                                                                                                       |
| 3 | 2023 | <i>bayar, aplikasi, enggak, malah</i>                             | IC06 | Technical issues with payment features                                       | This topic explains the challenges faced by citizens specifically related to payment features.                                                        |
| 2 | 2026 |                                                                   |      |                                                                              |                                                                                                                                                       |
| 4 | 2023 | <i>aplikasi, enggak, malah, padahal, eror, koneksi, internet</i>  | IC07 | Application error problem                                                    | This topic describes citizen reviews about problems or errors in the application such as problems with connection and failure to use the application. |
| 3 | 2024 |                                                                   |      |                                                                              |                                                                                                                                                       |
| 1 | 2026 |                                                                   |      |                                                                              |                                                                                                                                                       |
| 6 | 2023 | <i>Bayar, pajak, kendaraan, baik, mudah, bagus, mantap, bantu</i> | IC08 | User appreciation for the ease of vehicle tax payments from the application. | This topic contains an overview of positive user experiences in making vehicle tax payments via the application.                                      |
| 2 | 2024 |                                                                   |      |                                                                              |                                                                                                                                                       |
| 3 | 2025 |                                                                   |      |                                                                              |                                                                                                                                                       |
| 4 | 2026 |                                                                   |      |                                                                              |                                                                                                                                                       |
| 1 | 2024 | <i>enggak, bayar, pajak, kendaraan</i>                            | IC09 | Criticism of application constraints in vehicle tax payments                 | This topic contains an overview of unpleasant user experiences in using the application for vehicle tax payment purposes.                             |
| 2 | 2025 |                                                                   |      |                                                                              |                                                                                                                                                       |
| 1 | 2025 |                                                                   |      |                                                                              |                                                                                                                                                       |
| 3 | 2026 |                                                                   |      |                                                                              |                                                                                                                                                       |

From the results of the final synthesis analysis, 9 overall topic interpretations were found from 2019 to 2026 as labeled with codes IC01 to IC09. The cross-year topic analysis reveals that the Sapawarga – Jabar Super App has received significant support from West Java residents, as evidenced by the topic interpretation code IC01. This topic group was found quite frequently in LDA modeling data in its early years. This is reflected in the dominance of words like "*warga*", "*bantu*", "*bagus*", "*sangat*", indicating that the application was perceived as providing tangible benefits and addressing residents' needs. During this phase, the application's image tended to be positive and it was well-received as a digital public service innovation.

Entering the 2020–2023 period, topics related to technical issues began to emerge, particularly in the registration and login processes. This can be seen from the topic interpretation code IC02. Furthermore, there were also discussions about application errors, internet connection issues, and technical issues with the payment feature. This indicates that as usage increases, technical challenges are becoming a primary concern for users, as can be seen from the topic interpretation codes IC06 and IC07.

On the other hand, the analysis also identified topics reflecting active community participation in providing suggestions and hopes for application development, characterized by the words "*usul*", "*moga*", "*lebih*", "*jadi*". This indicates that users not only criticize but also have expectations for service quality improvement, as reflected in

topic interpretation code IC03. Themes regarding ease of access to information, neighbourhood association activities, and citizen empowerment also emerged, demonstrating the app's social function in strengthening community communication in West Java, as reflected in topic interpretation code IC04.

Based on the interpretation results, it was found that the Sapawarga – Jabar Super Apps application is widely used by residents for online tax payments, especially vehicle taxes. This is evident from the interpretations in topics interpretation with code IC08 and IC09, which describe the use of the application for vehicle ownership administration and vehicle tax payments in the last recent years. This view is also in line with the opinions of application users in the study [19]. This view is forming two side of opinion, both are expression of user positive experience and user unpleasant experience in terms of vehicle tax payment. In general, public opinion from both side of positive and negative also captured in the interpretation topic code IC05.

As a multi-functional application, the results of topic modeling interpretation show that public attention is still lacking in using the application for other functions instead of vehicle tax payment. From this perspective, the government can optimize application usage by increasing the public's digital literacy regarding the Sapawarga – Jabar Super Apps application, particularly through outreach activities that emphasize the use of all available features. This finding aligns with the views expressed in the study [20]. Since the issue of

vehicle tax payments has become a concern for many users in reviews over the last recent years, the relevant authorities could consider this issue as an object for future application enhancement projects.

#### IV. CONCLUSION

This study aims to gain insights from user reviews of the Sapawarga – Jabar Super Apps app on the Google Play Store. The review postings collected are spanned from 2019 to 2026. Modeling was performed using the Latent Dirichlet Allocation (LDA) algorithm and using coherence scores to determine the optimal number of topics. The topic distribution was visualized using the PyLDAvis library facilitate analysis and interpretation.

The overall interpretation results 9 group of topics which interpreted as Appreciation of the usefulness of the application in helping residents (IC01), Technical issues in terms of how to log in to the application (IC02), Application improvement proposal (IC03), Ease of information and citizen empowerment (IC04), General expressions of appreciation and criticism from citizens towards the application (IC05), Technical issues with payment features (IC06), Application error problem (IC07), User appreciation for the ease of vehicle tax payments from the application (IC08) and Criticism of application constraints in vehicle tax payments (IC09).

The overall interpretation of the results revealed that the Sapawarga-Jabar Super App is appreciated for its usefulness and ease of use, particularly in providing information and paying vehicle taxes. Throughout its development, the application faced recurring technical challenges, particularly with login, connection, and the payment system. The application received active user participation in the form of suggestions and expectations for development, demonstrating public engagement in digital public service innovation. Therefore, public perception of the application can be categorized as positive-constructive, where appreciation for the application's benefits coexists with criticism of technical aspects that need improvement.

In recent years, analysis has shown that users' greatest focus has been on utilizing the application for vehicle tax payments. Both appreciation and criticism or input have been received regarding vehicle tax payments through the application. Therefore, relevant authorities can consider these insights for future project development. Since the application is designed as a multi-functional platform, the modeling results for last recent years indicate that users tend to focus primarily on the vehicle tax payment feature, with comparatively less attention given to its other functions. Therefore, the relevant authorities should consider enhancing users' digital literacy and awareness of the full range of services provided by the Sapawarga Jabar Super App in order to optimize its overall utilization.

This research contributes to the development of text mining studies in the topic modeling domain of public service applications. Furthermore, the results provide a valuable foundation for understanding key issues perceived by users and to provide actionable insights for the government and relevant stakeholders in formulating strategies to improve the quality, performance, and overall effectiveness of the application as a public service platform.

This research limited to analyse data from 2019 to 2026, future work could do similar analysis for future time frame. This study is limited by constraints in time and access, which prevented the conduct of a more in-depth analysis through validation with experts or relevant stakeholders. Therefore, future research is recommended to involve such parties in order to obtain a more comprehensive and deeper understanding of the subject under investigation. Future research is also encouraged to incorporate alternative analytical methods to generate comparative insights alongside Latent Dirichlet Allocation (LDA).

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