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Ghancaran: Jurnal Pendidikan Bahasa dan Sastra Indonesia
Volume 6, Nomor 2, 2025
Halaman: 347—361

GHÂNCARAN: JURNAL PENDIDIKAN BAHASA DAN SASTRA INDONESIA
http://ejournal.iainmadura.ac.id/ghancaran
E-ISSN: 2715-9132; P-ISSN: 2714-8955
DOI *10.19105/ghancaran.v6i2.15432*

Sentiment Analysis of Netizen's Comments on YouTube about IKN (Capital City) Development in Indonesia

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Keywords:
sentiment analysis; Indonesian IKN development; python analysis; YouTube comments

Abstract

The National Capital City (IKN) of the Archipelago is located in North Penajam Paser Regency and Kutai Kartanegara Regency, East Kalimantan Province. The transfer and development of IKN does not only have an impact on moving the country's capital from Jakarta to Kalimantan, but also on the future development of IKN which includes social, economic, cultural and environmental aspects. This impact created sentiment in society. For this reason, this research was conducted to identify public sentiment towards IKN development in Indonesia through comments on YouTube. Data in the form of sentiment from public comments on YouTube which comes from data sources in the form of videos selected based on the highest total comments regarding IKN. Data was collected and analyzed using the Python system with stages of Web scraping, pre-processing, sentiment analysis, and classification methods. Based on the data analysis that has been carried out, positive sentiment, neutral sentiment and positive sentiment are distinguished. Meanwhile, positive sentiment can be seen from the words good and prosperous, negative sentiment can be seen from the words debt, corruption and pessimism, while neutral sentiment is related to prices, investors and toll money. This overall sentiment leads to rejection and acceptance of IKN development by the government. The reason is that the impact caused after the construction was a trigger for the emergence of comments on YouTube videos which led to public sentiment. The results of this analysis can be used as hope for the government to anticipate IKN development that will have a negative impact.

Kata Kunci:
analisis sentimen; Pembangunan IKN Indonesia; analisis python; komentar YouTube;

Abstrak:

Ibu Kota Negara (IKN) Nusantara terletak di Kabupaten Penajam Paser Utara dan Kabupaten Kutai Kartanegara, Provinsi Kalimantan Timur. Pemindahan dan pengembangan IKN tidak hanya berdampak pada perpindahan ibu kota negara dari Jakarta ke Kalimantan, namun juga terhadap perkembangan IKN ke depan yang mencakup aspek sosial, ekonomi, budaya, dan lingkungan hidup. Dampak ini menimbulkan sentimen di masyarakat. Untuk itu penelitian ini dilakukan untuk mengetahui sentimen masyarakat terhadap perkembangan IKN di Indonesia melalui komentar di YouTube. Data berupa sentimen dari komentar masyarakat di YouTube yang berasal dari sumber data berupa video yang dipilih berdasarkan total komentar tertinggi mengenai IKN. Data dikumpulkan dan dianalisis menggunakan sistem Python dengan tahapan metode Web

scraping, preprocessing, analisis sentimen, dan klasifikasi. Berdasarkan analisis data yang telah dilakukan dibedakan sentimen positif, sentimen netral, dan sentimen positif. Sedangkan sentimen positif terlihat dari kata baik dan sejahtera, sentimen negatif terlihat dari kata utang, korupsi dan pesimisme, sedangkan sentimen netral terkait dengan harga, investor dan uang tol. Sentimen menyeluruh ini berujung pada penolakan dan penerimaan pembangunan IKN oleh pemerintah. Pasalnya, dampak yang ditimbulkan pasca pembangunan menjadi pemicu munculnya komentar di video YouTube yang berujung pada sentimen masyarakat. Hasil analisis ini dapat dijadikan harapan bagi pemerintah untuk mengantisipasi pembangunan IKN yang berdampak negatif.

Terkirim: 15 September 2024; Revisi: 10 November 2024; Diterbitkan: 15 Januari 2025

INTRODUCTION

The relocation of the National Capital City (IKN) is feasible if it has a solid development foundation in terms of political, social, economic, or state financial systems, culture, and national security and resilience. The new National Capital (IKN) of the Unitary State of the Republic of Indonesia, known as the National Capital (IKN) of the Archipelago, has been established in the North Penajam Paser Regency and Kutai Kartanegara Regency, East Kalimantan Province. As the new National Capital (IKN) (which will not only support its functions as the center of government administration) the population of the city is certain to increase (Carolina, 2022). The following components were used to evaluate the initial selection of approximately one area (Hariati & Saputri, 2022): 1) Natural capital, or the carrying capacity of natural resources (SDA). 2) human capital, which includes employees in the production of products as well as skills and competencies. 3) Physical capital includes all of the company's tangible assets, such as cash, securities, receivables, inventories, land, machinery, equipment, furniture, fixtures, and vehicles.

The new capital will have infrastructure in the form of high-rise buildings, offices, well-maintained roads, crossing facilities such as bridges, and other necessities that will help the capital city's survival and life. 4) Social capital, which includes: a) social capital as a capacity derived from widespread belief in a specific group of people or a subset of them; and b) social capital as a set of values or informal norms shared by many people between one individual in a group with the potential for cooperation (Permana, Sudarma, & Ariastina, 2019).

This social media platform allows users to access various types of images, news, videos, and other media, as well as interact with other users indirectly. Depending on the features available, users can pour various types of expressions into social media. The

comments feature is one feature that can be used to express one's thoughts and opinions. Many social media platforms allow users to share their thoughts via the comment feature. YouTube is one of the world's largest video-sharing platforms, and it includes a comment feature. The comments left by YouTube users on specific videos can be used for analysis. The analyzed comments can help determine whether the comment expresses an opinion about the video, whether that opinion is positive, negative, neutral, or even critical.

YouTube is a popular video sharing website where users can upload and watch various video clips for free. According to YouTube CEO, Susan Wojcicki, it was revealed that there were 1.8 billion registered YouTube users who watched videos on the platform every month in 2019. This figure does not include viewers who watched videos on YouTube without creating an account (Rahman, Rahmat, Fariqi, & Adi, 2020). One of the features provided by YouTube for its users is the comments feature, where users can comment on a video clip that they open on the condition that the user must log in first. In the comments column on the YouTube site there are often comments containing hate speech aimed at the video creator, the people in the video, and so on.

Television shows also adapt to technological developments along with the advent of the internet. One of the popular audio-visual based broadcasting services is YouTube. YouTube users make up 95% of internet users. The content available on YouTube is in 80 different languages. More than 2 billion new users visit YouTube every month and more than one billion hours of video are watched every day. Apart from being a broadcast media, YouTube is also a social media that allows communication between its users. YouTube is one of the platforms that many TVs use to publish their broadcasts (Hudha, Supriyati, & Listyorini, 2022).

The Application Programming Interface (API) is a set of commands and protocols that help programmers create software for a specific operating system. YouTube, in particular, allows developers to access YouTube video statistics and channel data via two types of calls (namely, REST and XML-RPC) (Saputra, Subhi, & Winatama, 2019). YouTube API resources are defined by Google as APIs and tools that allow you to bring the YouTube experience to your webpage, app, or device. The Youtube API functions and commands are essentially system calls that are directly related to the operating system.

Sentiment analysis is a type of natural language processing and processing which is classified into various textual levels in the form of documents, paragraphs, sentences, clauses, phrases or lists of phrases to obtain sentiment information contained therein

(Saputra et al., 2019) (Giovani, Ardiansyah, Haryanti, Kurniawati, & Gata, 2020). Sentiment analysis is a process for determining someone's sentiment or opinion which is expressed in text form and can be categorized as positive or negative sentiment (Nurrun Muchammad Shiddieqy, Paulus Insap, & Wing Wahyu, 2016). Sentiment analysis is used to find opinions or opinion tendencies from several reviews that are positive, negative, or neutral. Sentiment analysis is very useful in understanding a person's interests and tendencies in expressing themselves on the Internet.

In modern times, sentiment or opinion Society is becoming wider and freer expressed in various media. Sentiments can be huge potential for companies who want to know feedback (Gunawan, Pratiwi, & Pratama, 2018). On a sentiment analysis, training process is carried out tends to be more difficult when compared to fields other machine learning. This is because the data used in the sentiment analysis training process is subjective data, such as opinions, which do not have concrete value. Plus, this data comes from humans and every human being has different ways or tastes in expressing his opinion (Ferdiana, Jatmiko, Purwanti, Ayu, & Dicka, 2019).

YouTube sentiment analysis aims to extract opinion polarity from a dataset of user comments. Comments on YouTube videos show positive and negative sentiments, represented by feelings of happiness to sadness or dislike. In general, the stages of the sentiment analysis model from comment data include text-cleaning, word feature extraction, and sentiment classification. Word feature extraction is an important stage because this process determines the accuracy of the classification model in the next stage (Khomsah, 2021).

There are various types of comments on a specific topic that can be analyzed in the YouTube application. The IKN (Capital of the Archipelago) project is one of the comments on a recent topic that has gotten a lot of attention. We can analyze the comments on the video to see what kinds of responses people gave, and then classify it based on the types of comments that users make about the IKN videos.

The analysis is carried out using sentiment analysis, and we can obtain data in the form of responses from people who comment on the platform using this analysis. Sentiment analysis is a type of natural language processing in which sentiment information is extracted from various textual levels such as documents, paragraphs, sentences, clauses, phrases, or lists of phrases. The basic idea is that sentiment analysis techniques group texts, sentences, or documents into positive, negative, or neutral

categories (Afdhal et al., 2022).

Research on sentiment analysis has previously been conducted by researchers using public comments on YouTube social media. The first study, titled "Sentiment Analysis of YouTube Comments: Potential Indonesian Presidential Election Candidates," differs in terms of the video topic selected for analysis but is similar in the sentiment analysis method used, which involved Python (Ardhi & Sari, 2022). This study found that public sentiment tended to be positive and neutral, with very few negative sentiments.

The second study was conducted by (Kadewandana & Cahyadiputra, 2023) under the title "Public Opinion Analysis on Social Media about the Establishment of Indonesia's New Capital City." The difference lies in the data source, which in this case is Twitter, using comments under the hashtag #MovingCapitalCity. The data was processed by categorizing comments as pro, con, or neutral. Public opinion was also mapped based on type, including social opinions, political opinions, and satirical opinions (Kadewandana & Cahyadiputra, 2023).

Meanwhile, the third study, conducted by Tussa'diyah, is titled "Critical Discourse Analysis on Linguistic Ideology of the Netizens Comments" (Halimah Tussa'diah & Kartika, 2022). This study differs in its research method, using critical discourse analysis grounded in linguistic ideology, where data collection and analysis were performed manually.

Based on this, the present study demonstrates novelty in the theme of the comments chosen as research data, specifically the development of Indonesia's new capital city (IKN). Therefore, this study aims to identify netizen comments on IKN development, which could serve as recommendations for the government. Sentiment analysis is designed to assess a person's opinions, feelings, evaluations, attitudes, judgments, and emotions about a particular topic, product, service, organization, individual, or other specific activities (Mailoa & Lazuardi, 2021).

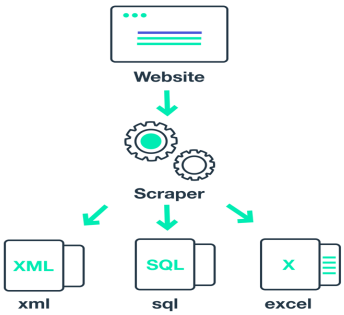
METHODS

Several approaches, such as the text mining method with public (netizen) sentiment analysis, can be applied. Text mining that used was web scraping process. Web scraping is a technique that involves using bots to gather specific information from a target website. It utilizes web crawlers to scan and save all content from a webpage (or multiple pages), after which a web scraping tool or script extracts the desired data from this content. This process is also referred to as data harvesting or data extraction. Web crawlers access

the target URLs to scan and save the HTML code. The scraping tool or script then employs locators to find the required data within the HTML code and processes the data string containing the information to be extracted. Finally, the web scraper converts the extracted data into the desired format and transfers it to a specified storage location.

Figure 1. Web Scraping Process Source: (Whelan, 2024)

This approach aims to understand how people describe and express their feelings



about the issue of obesity, whether in positive, negative, or neutral terms (Mailoa & Lazuardi, 2021). Sentiment analysis or opinion mining is a part of text classification that involves natural language processing, computational linguistics, and text mining to analyze opinions, sentiments, evaluations, attitudes, judgments, and emotions of a speaker or writer regarding a specific topic, product, service, organization, individual, or activity. This study is designed using a cross-sectional method (Liu & Young, 2019).

The following flow chart (Figure 2) depicts the stages of research that will be conducted in this study.

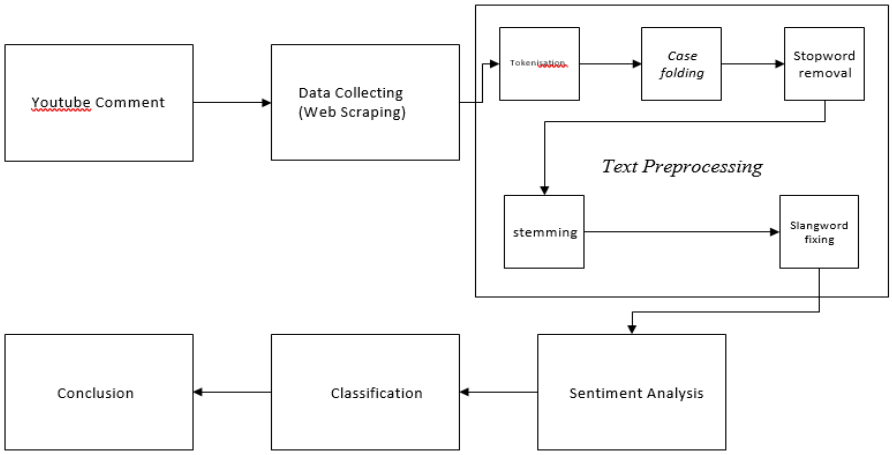


Figure 2. Research Methodology

In this study, the videos analyzed for comments came from 3 different channels, namely KOMPASTV, Narasi Newsroom, and Tribun Kaltim Official with each video title being "Ternyata Pembangunan IKN Sudah Secepat Ini! | Liputan Khusus IKN Nusantara

(It turns out that the IKN Development is Already This Fast! | Special Coverage for IKN Nusantara)", Investor "Mundur Pembangunan IKN Bisa Stop? | Aiman (5) (Investors "Retreat IKN Development Can Stop? | Aiman [5])", and "Jokowi Minta Rakyat Bersiap Hadapi Resesi Global: Proyek IKN Masih Mau Lanjut Pak? | Narasi Daily (Jokowi Asks People to Prepare for Global Recession: IKN Project Still Wants to Continue, Sir? | Daily Narrative)". The selection of the three videos was based on the highest number of views and the most comments. This makes it easier for researchers to obtain sufficient data.

From the Figure 2., data collection for this research begins with extracting comment data then storing it in a database. The dataset for this sentiment analysis was obtained through a scraping method from netizen comments on YouTube about the development of new IKN in Kalimantan. The data retrieval process is carried out using the Application Programming Interface (API) facility. The API itself is a facility provided by YouTube. The Application Programming Interface (API) itself takes raw comment data from the YouTube server. To be able to access the YouTube API, user cannot just use it, as a developer you are required to register first to get the Access Rights Key, where the Key is obtained after registering with the official YouTube Developer.

To improve the validity and reliability in data collection for research through web scraping, researcher anticipated errors in the code, misidentifying elements, or improper parsing that can cause the data to become invalid. However, the accuracy data of the web scraping script is properly designed and extracts the correct data. The data will be valid. Web scraping data was reliable because the structure of the target website remains stable. Quality data was reputable and reliable because data was taken from Youtube comments.

When preprocessing text, the first step is to split the comment into tokens (words), a process known as tokenization. The text should then be case-folded or changed to lowercase (Fig 3). The stopword in the comment is then removed, and all words with affixes are changed to the basic lemma, as is done during the stemming stage. Stemming improved accuracy slightly, but not significantly (Mulyani & Novita, 2022). Following stemming, all words are compared with the basic Indonesian dictionary in the KBBI-adapted coding system (Indonesian big dictionary). If there are non-standard or slang words that are not in accordance with the KBBI, then the word needs to be defined according to the words in the KBBI. Slang word fixing (changing non-standard words) can improve classification accuracy while also reducing data size. Slang substitution is used to make sense of incoming data. Non-standard words (slang words) are checked again

during stop word removal and stemming after slang has been defined. If non-standard words are still found, the process of correcting them is repeated; otherwise, text preprocessing is performed.

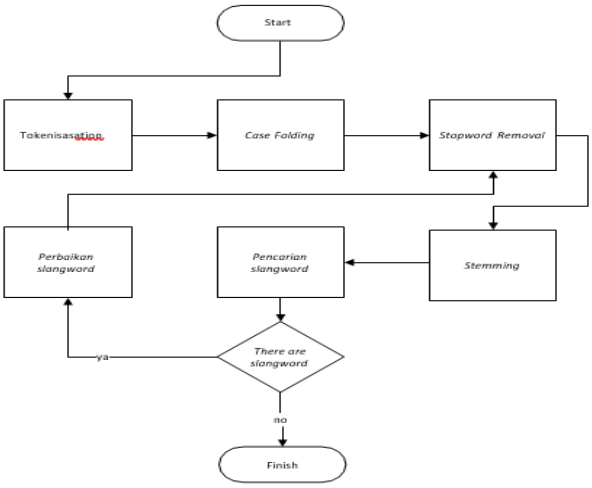


Figure 3. Text Preprocessing Procedure

The word cloud module, which displays the frequency of words based on data collection results, is used during the sentiment analysis stage. The Python programming language can be used to access the word cloud module directly by calling the word cloud library. The programming is used to obtain the frequency of words from the word cloud module.

After the sentiment analysis stage, the next step is to move on to the word frequency classification stage, which is obtained by instructing the machine to recognize existing documents in order to classify data into three classes: positive, negative, and hate speech (Buntoro, 2017). Provide sufficient detail to allow your work to be reproduced. Methods already published should be indicated by a reference: only relevant modifications should be described.

RESULT AND DISCUSSION

The following are the research findings on public sentiment in YouTube comments on the development of new cities in Indonesia based on the study's findings

The Process of Sentiment Analysis Web Scrapping

The results of web scrapping carried out on 3 Youtube videos using the syntax below are then stored in a variable. In this section the API is also used to help web scrapping.

```
from googleapiclient.discovery import build
youtube = build('youtube', 'v3', developerKey=api_key)

import pandas as pd

box = [['Name', 'Comment', 'Time', 'Likes', 'Reply Count']]

#Eudereka, Programming with Mosh, freeCodeCamp
code_lang = [
    {"id":"PSlLsvryHkY"} #link youtube4vbDFu0PUew
]

# sql_vids = pd.DataFrame([])

for id_code in code_lang:
```

Figure 4. Youtube Comment Scrape Process

Text Preprocessing

Preprocessing is done in this section so that the scraped data can be analyzed for sentiment. Tokenizing is done in preprocessing with the goal of breaking sentences into words, changing affixes into basic words, removing emotes, deleting unnecessary words, removing punctuation marks, and case folding (Aribowo, Basiron, Yusof, & Khomsah, 2021).

Sentiment Analysis

At this stage, sentiment analysis is carried out using Wordcloud using the syntax below. The way Wordcloud works is that the more words that appear, the bigger the words that appear. From the results of the programming above we can find out the wordcloud in each different video. The result is shown in the following image.

Figure 5. WordCloud Video

The wordcloud results from the video show a high frequency of words that elicit positive responses. The wordcloud results in the second video show a variety of words that are critical of the video. In the third video, the word cloud shows a large number of users who make hateful comments.

Classification

Classification is required as part of an analysis of the comments from the three IKN-related YouTube videos, so that we can determine what types of comments users leave on the videos.

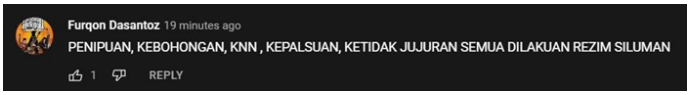


Figure 6. Comments 1

There are some comments with negative and positive sentiments found in @fadlizon's youtube comments, namely comments containing hate speech, critical comments, and positive comments. On figure 6, comments fraud, lies, KNN, the lies of dishonesty are all carried out by the stealth regime (penipuan kebohongan kmn Kepalsuan ketidakjujuran semua dilakukan rezim siluman). The use of the word stealth contains a vocabulary of sarcasm.

Sarcasm is a style of expression marked by bitterness and biting critique (Sarli, Nurhadi, & Sari, 2023). In comparison to irony and cynicism, sarcasm is usually more intense. It can be ironic, though it doesn't have to be, but it almost always comes across as hurtful and unpleasant in its usage.

A key factor behind netizens' use of sarcasm is the desire to assert their presence (Saadillah, Haryudi, Reskiawan, & Amanah, 2023). Social media provides a platform where anyone can freely share and view photos and videos, as well as offer critiques and comments on others' posts. This openness can encourage the use of sarcasm when sharing opinions or comments. Netizens who frequently comment on others' posts often seek recognition, aiming to make their presence known and visible to a larger audience. This recognition helps them gain attention and fulfills their personal desire for acknowledgment.

Some of the classified comments take the form of a critical response, which means that users respond to the video by providing sentences that can be corrected as well as responses that do not agree but with sharp sentences, resulting in the emergence of questions as problems to be solved. There is hate speech in the category of comments; it can be sarcastic or directly expressed. This demonstrates that users are dissatisfied with the video, prompting them to leave negative comments in the comments section. Sarcastic comments cannot be filtered on social media due to the aspect of freedom of

expression. There is, however, a classification of comments from various videos, where the video shows Youtube users commenting well and expressing comments that support what is discussed in the video. Figure 7 shows an example of positive comments.

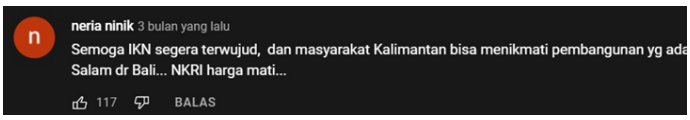


Figure 7. Comments 2

Everyone who makes a comment among the three has the goal of providing suggestions so that the development of the Indonesian capital can run smoothly and according to expectations. Even though the comments contain sarcasm and negative comments, the purpose of improvement must be considered in the comments.

Sentiment Analysis

After collecting data using web scrapping techniques, public responses & opinions regarding IKN development on YouTube social media were obtained, namely 2583 comments with the keyword "IKN development". The types of comments retrieved are the same comments that will appear when a keyword search is carried out in the 'search' column in the YouTube application using the same keywords. YouTube provides an Application Programming Interface (API) so that anyone can access web information data from the website. However, YouTube's API limits users from accessing comment data to a certain amount. This is an obstacle for researchers who want to use comment data in conducting their research.

Sentiment	Total	Percentage
Positive	567	21.95
Neutral	34	1.3
Negative	1982	76.73

Table 1. The Percentage of Sentiment Analysis

Data filtering activities are carried out with the aim of only capturing responses & opinions that come purely from the public, not mixed with opinions originating from non-public accounts such as institutional accounts, companies, news portals, and so on. An institution, of course, will only post a post about its company from the good side, it is impossible for an institution to send a post that badmouths its own institution. In this condition, society is in a 'middle' position, that is, it does not take sides in bad-mouthing or good-naturedness, but only gives aspirations according to what they know & feel. After data filtering activities, the number of comments ready for preprocessing and analysis

was 2583 comments.

Preprocessing or data preparation stage is the most important and crucial stage in research that uses text mining methods. Raw data from the results of text mining activities must be prepared first according to analysis needs so that it can produce good analysis results. For example, in this research, one of the stages in the preprocessing activity is the stage of changing all letter sizes to lowercase. This is very important to do because words consisting of the same letters will be read by the system as different words if the letters have different letter sizes. For example, the words 'happy' and 'happy'. If this is left unchecked, it will have an impact on increasing the computer's time to process data. However, the most important thing is that the results obtained will be ambiguous or unclear.

In this research, the sentiment value for each comment is obtained from counting the number of positive & negative words contained in a comment. On average, the negative sentiment value obtained for the overall community response to IKN development was 21.95. These results indicate that people tend to give responses with negative sentiments compared to responses with positive sentiments (Farikhah, Firdaus, & Yuwono, 1995).

In Table 1 above, it can be seen that more people gave responses with negative sentiments compared to responses with negative sentiments, namely 76.73% versus 21.95%. This can be interpreted as the public giving more negative responses to IKN development issued by the government compared to positive responses. The existence of public responses/comments with a neutral sentiment means that the public comments obtained do not only consist of public comments stating whether they are pro or against the IKN development, but also many other public responses such as their knowledge, hopes or general opinions (Aribowo et al., 2021).

Table 2 below shows that the community's response to IKN development is very diverse. In line with previous results, people tend to give more words that have negative sentiments compared to words that have positive sentiments. The public's negative response was dominated by statements that did not support the government's efforts for development that would be implemented because they were related to the environmental impacts that would be faced.

No	Negative Sentimet		Positive Sentiment	
	Indonesian	English	Indonesian	English
1	*Terburu-buru*	hasty	*bijak*	wise

2	*resesi*	recession	*maju*	proceed
3	*Miskin*	Poor	*hiduo*	live
4	*Bencana ekonomi*	Economic disaster	*kerja*	Work
5	*mahal*	expensive	*sejahtera*	prosperous
6	*bodo*	stupid	*Rela*	Willing
7	*Hutang*	Debt	*Terima kasih*	Thank You
8	*srilanka*	Sri Lanka	*Masuk akal*	Makes sense
9	*kadrun*	kadrun	*urgensi*	urgency
10	*hambur*	scattered	*yes*	yes
11	*undur*	retreat	*bangun*	get up
12	*banteng*	bull		
13	*boncos*	boncos		
14	*tipu*	hoax		
15	*korupsi*	corruption		
16	*siluman*	stealth		
17	*nyungsep*	stumble		
18	*ngotot*	insistent		
19	*paksa*	forced		

Table 2. The Word Majority that Shown the Sentiment about IKN

In terms of negative sentiments that are often expressed by the public, it can be seen that there is concern about the IKN development that will be carried out by the government. It can be seen from the words that often appear, namely *tergesa-gesa,* 'hasty', *terburu-buru*, 'hasty', *takut*, 'scared', and *meragukan,* 'doubtful'. People are worried that the IKN development that will be given will have side effects that will actually be detrimental to society. Apart from that, the public also associates it with the current government profile. This can be seen from the word that appears, namely "kadrun". In fact, the public is worried that the projects being implemented tend towards attitudes of corruption, *korupsi,* "corruption", *resesi,* "recession", *palsu,* "fake", and *hambur,* "wasteful". Wasteful in this case means wasting state money.

All of those words stem from the writer's emotions. Emotions are strongly connected to sentiment, with the intensity of a sentiment often reflecting the depth of an emotion (Mohammad, 2016). For instance, the emotion of being “very happy” signifies a highly positive sentiment, while “very angry” suggests an intensely negative one. Examining emotions within text—whether in news articles or social media posts—helps reveal users' emotional reactions to specific topics and provides insight into how emotions influence human behavior.

CONCLUSION

YouTube was the world's largest video provider platform, with a comment feature that allowed users to provide feedback on a video. Some videos have a variety of

comments, some positive, some negative, and neutral. A wordcloud is generated using webscraping, preprocessing, and sentiment analysis methods, which provides insight in the form of comments provided by users of the three videos. The three videos chosen have various types of comments that differ from one another. Positive, critical, and hate speech are the classification results for each comment from the three videos. So, we know that each user can respond differently to the same topic in each video. More people gave responses with negative sentiments compared to responses with negative sentiments, namely 76.73% versus 21.95%. This can be interpreted as the public giving more negative responses to IKN development issued by the government compared to positive responses.

ACKNOWLEDGEMENT

We would like to thank the research and community service institutions for the funds provided so that we could finance the publication of this article.

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