

SENTIMENT ANALYSIS OF EMPLOYEE COMPETENCE IN BPR (PEOPLE'S ECONOMIC BANK) SUKABUMI

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Abstract

This study aims to analyze sentiment towards employee competency at BPR Sukabumi using a text mining approach based on sentiment analysis. Employee competency is one of the key factors in determining the effectiveness and productivity of an organization, especially in the banking sector which is highly dependent on service quality and customer trust. The data used in this study were obtained from various sources, such as internal surveys, customer reviews, and comments on social media related to BPR Sukabumi employee service. The analysis method used is sentiment analysis based on text mining with Orange software on qualitative data in the form of open responses, comments, and testimonials collected through interviews to identify patterns of public perception towards aspects of employee competency, such as communication skills, technical expertise, responsibility, and service orientation. The results of customer research and interview results show a positive view towards employee competency, with 55% satisfied responses, 35% neutral, and 10% negative. The analysis focuses on speed of service, ease of access, improvement of technical competency, and transparency of information. These findings provide important input for BPR Sukabumi management in improving employee training and development programs to strengthen the competencies needed to meet customer expectations and the challenges of the banking industry. This study provides a methodological contribution in the use of sentiment analysis for human resource evaluation in the financial services sector.

Keywords: *Sentiment Analysis, Competence of BPR Sukabumi Employees*

INTRODUCTION

In the era of digital transformation and intense competition in the financial services sector, the quality of employee competency is a strategic factor in maintaining customer satisfaction and operational excellence at BPR Sukabumi. Employee competency encompasses various dimensions, such as knowledge, technical skills, communication skills, and service orientation. Various studies have shown that employee competency plays a significant role in organizational performance and productivity. For example, a case study at PT PLN Icon Plus found that employees with high competency were more efficient and contributed more to achieving organizational goals (Adinda et al., 2025). Another study at Tjut Nyak Dhien University also confirmed that competency has a positive and significant influence on employee performance (Melsindy, 2024).

On the other hand, text mining-based sentiment analysis is gaining popularity in measuring user perceptions of services through social media or digital reviews. For example, research on the BRImo application in Indonesia used the TF IDF and SVM methods to evaluate user sentiment, resulting in up to 92% accuracy in classifying user reviews of digital banking applications (Bimantara & Zufria, 2024). Furthermore, a sentiment analysis study of the web-based attendance system at the Cirebon Regency Civil Servant (ASN) also demonstrated the effectiveness of the Naïve Bayes method in capturing employee sentiment with above 90% accuracy (Arofah et al., 2024). This method has proven useful in understanding user opinions on various digital systems and training services. Based on this context, it is crucial to apply a sentiment analysis approach to evaluating employee competency at BPR Sukabumi. This analysis can empower BPR management to understand customer and employee perceptions of competency aspects such as responsiveness, service accuracy, communication skills, and professionalism. Negative

sentiment and criticism generated through reviews or surveys can serve as evaluation material for designing more targeted training or human resource development. Conversely, positive sentiment can strengthen existing programs and boost employee morale. Thus, this study is designed to bridge the two areas of employee competency as a factor in bank service quality, and sentiment analysis as a digital data-based evaluation tool. This approach is expected to provide empirical and methodological contributions to human resource development in the local banking sector, particularly BPR Sukabumi, and open opportunities for further research in the integration of data analysis and competency management. Based on the background of the problem, the formulation of the problem is described as follows: 1) How is the perception of customer sentiment towards the competency of BPR Sukabumi employees, 2) What topics or words are most talked about regarding the competencies in BPR Sukabumi. The purpose of this study is to obtain: 1) The results of customer sentiment and from the human resources department of BPR Sukabumi regarding the competency of BPR Sukabumi employees, 2) The results of the most talked about topics or words regarding the competencies in BPR Sukabumi based on customers and from the human resources department of BPR Sukabumi.

LITERATURE REVIEW

Employee competence is a crucial foundation in the banking industry, as service quality and customer trust are highly dependent on the capabilities of human resources. Numerous studies have confirmed this. For example, a study at PT PLN Icon Plus (Adinda et al., 2025) found that highly competent employees not only work more efficiently but also contribute significantly to achieving organizational goals. Another study at Tjut Nyak Dhien University (Melsindy, 2024) corroborates these findings by demonstrating the positive and significant influence of competence on employee performance. These studies demonstrate that knowledge, technical skills, communication skills, service orientation, and professionalism are key competency pillars required in the financial services sector, including banking.

Along with technological advancements, the way organizations understand public perception has also changed. Text mining-based sentiment analysis is now widely used to capture customer opinions, experiences, and even emotions reflected in digital reviews or comments on social media. Research on the BRImo application, for example, achieved up to 92% accuracy in classifying user reviews using the TF-IDF and SVM methods (Bimantara & Zufria, 2024). Meanwhile, another study using the Naïve Bayes method on the Cirebon Regency Civil Servant (ASN) attendance system was able to read employee sentiment with over 90% accuracy (Arofah et al., 2024). This fact suggests that sentiment analysis can be an important bridge to understanding public perception more objectively. However, research utilizing sentiment analysis to assess the competence of banking employees, particularly in rural banks (BPR), is still rare.

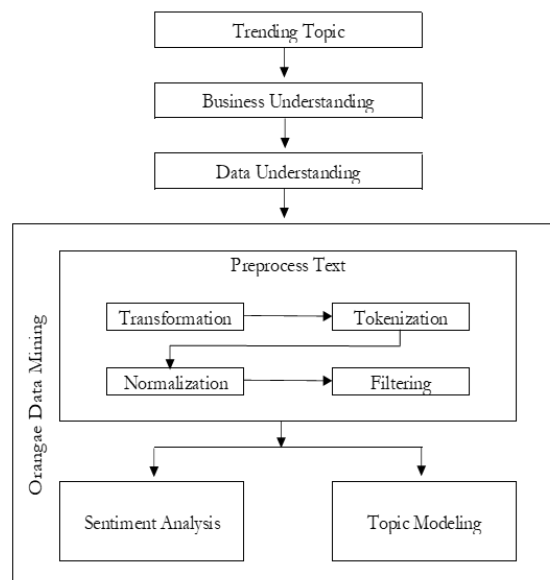
Based on this, this research is based on two main theoretical frameworks. First, competency theory (Spencer & Spencer, 1993), which explains the dimensions that determine employee performance. Second, sentiment analysis/text mining theory (Liu, 2012), which focuses on how text data can be explored to uncover public opinion. By integrating the two, this research seeks to present a new way to assess BPR Sukabumi employee competency, not only from an internal perspective but also from the digital voices of customers. It is hoped that this approach can provide an empirical contribution in the form of mapping public perceptions of employee competency, as well as a methodological contribution in expanding the use of sentiment analysis in the local financial services sector.

METHOD

This research was conducted using a descriptive qualitative approach, using sentiment analysis and topic modeling. The main objective of this study was to gain a deeper understanding of the experiences of the research subjects, including their behavior, perspectives, motivations, and actions, through expressions conveyed by the community and the perceptions of the human resources department of BPR Sukabumi, whether positive, negative, or neutral. To extract meaningful information from the data, this study utilized a text mining approach as its primary tool. Text Mining according to (Fanissa, Fauzi, and Adinugroho, 2018) in (Azzahra & Wibowo, 2020) is the process of analyzing text into information that is used for specific purposes. The general requirement for text mining is that the information retrieved can become useful data, where the data must be clear and explicit. Text mining is the discovery of interesting knowledge in text documents. This is a challenge to find accurate knowledge in the desired document text, where the discovery of knowledge can be effectively used and can update the discovery pattern in the process of applying it to text mining (Hidayat, 2017) in (Azzahra & Wibowo, 2020). According to Feldman & Sanger (2007), text preprocessing is the initial processing stage for text to prepare it as data for further processing. A collection of connected characters (text) must be broken down into more meaningful elements, which can be done at different levels. Sentiment analysis is a field of study that analyzes a person's opinions, sentiments, evaluations, assessments, attitudes, and emotions towards an item, organization, person, concrete problem, or event (Liu, 2012).

Sentiment analysis, or opinion mining, is the process of automatically understanding, extracting, and processing textual data to obtain sentiment information contained in an opinion sentence. Sentiment analysis is conducted to see the opinion or tendency of an opinion towards an issue or object by a person, whether it tends to be negative or positive (Liu, 2010). VADER (Valence Aware Dictionary for Sentiment Reasoning) is a rule- and lexicon-based sentiment analysis tool specifically tailored to the sentiments found on social media. VADER identifies whether a text has positive, negative, or neutral sentiment based on the words used and takes into account the intensity of the sentiment (CJ Hutto and E. Gilbert). Topic modeling is a generative document model that applies a probabilistic procedure to generate documents. The output of topic modeling is a group of words that form clusters and topics based on the probability distribution of words in a collection of documents (Y et al., 2016). Latent Dirichlet Allocation (LDA) is a generative probabilistic model of a corpus. The basic idea is that a document can be represented as a mixture of topics, also called latent ones, where each topic is characterized by a word (Zulhanif, 2016).

Figure 1 Framework
CRISP-DM (Cross Industry Standard Process for Data Mining) Method



Stages of Data Analysis Method:

- a. Trending Topics
Analyzing the topic of the phenomenon being researched is to dig up meaningful information regarding perceptions related to the competency of BPR Sukabumi employees in the dimensions of knowledge, technical skills, communication skills, and service orientation.
- b. Business Understanding
Analyze and observe the perceptions, comments of customers and the views of the section that oversees the HR function of BPR Sukabumi regarding the competencies of its employees.
- c. Text Preprocessing Data
The initial process of cleaning raw text to prepare the text for easier understanding. From Preprocess Text is available to be processed:
 - 1) Transformation is the process of changing or modifying data to make it more suitable for use in machine learning analysis or modeling. This transformation is important because it helps adapt the data format and structure to the algorithm's needs and improves the quality of the analysis results.
 - 2) Tokenization, which is the process of breaking text into smaller parts (words, phrases, or sentences).
 - 3) Normalization, which is simplifying word forms to make them consistent (stemming/lemmatization).
 - 4) Filtering, which is removing unimportant words to focus on meaningful words

Data Processing Method

- a. WhatsApp Chat Corpus and Interview
The data collection method is used to collect the required supporting data through WhatsApp Group, the purpose of which is to provide services and complaints to 800 employee customers whose salaries are paid through BPR

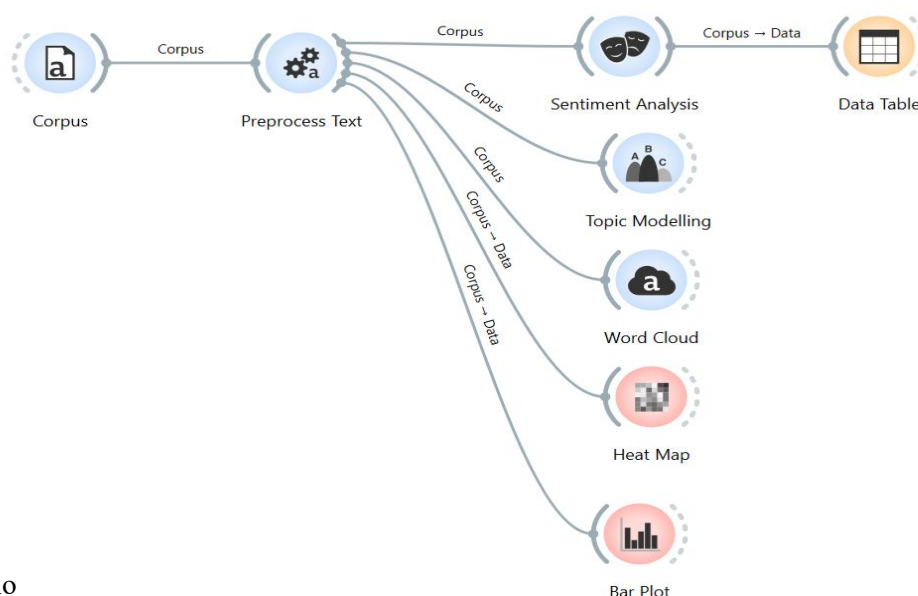
Sukabumi and the results of interviews with the HR department regarding the performance of BPR Sukabumi employees.

b. Oranga Data Mining

Orange Data Mining is an open-source data analysis platform designed to facilitate intuitive data exploration, modeling, and visualization through a drag-and-drop interface. It is highly capable of handling various types of data, including text data from WhatsApp chats and interviews, which can be analyzed using text mining features for purposes such as sentiment classification and word visualization. Orange also supports machine learning algorithms such as Naive Bayes and Logistic Regression, and presents results in easy-to-understand visuals. Orange is a practical and effective solution for those seeking a lightweight, visual, and easy-to-use data analysis tool.

RESULTS AND DISCUSSION

Figure 2 Sentiment Analysis and Topic Modeling Widget Design
Source: Orange Data Mining Software

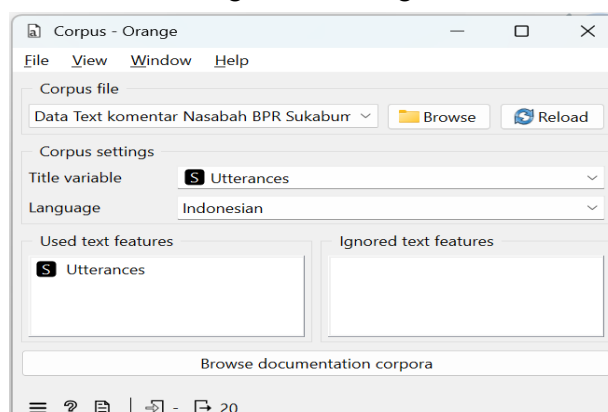


Research Scenario

a. Corpus (Text Data Source)

The Corpus widget serves as the starting point in the text data analysis process, incorporating a collection of text from a pre-prepared CSV or TXT file, such as a WhatsApp chat export that has been cleaned of irrelevant elements. At this stage, the Corpus serves as a repository for the text that will be analyzed, both linguistically and statistically, allowing us to explore the meaning, patterns, and sentiments contained within it.

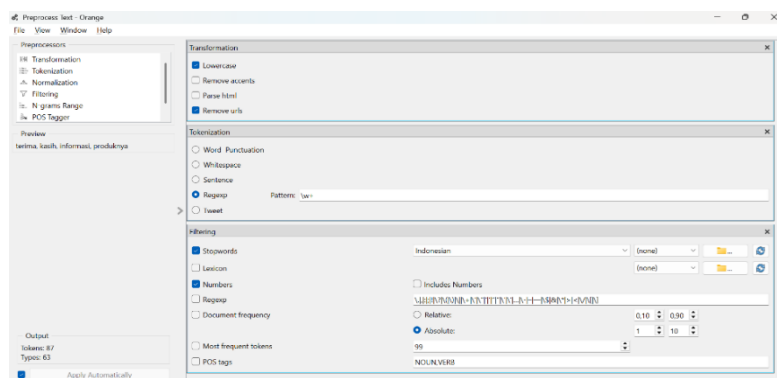
Figure 3. Corpus
Source: Orange Data Mining Software



b. Preprocess Text

This widget plays a crucial role in preparing text data for analysis by performing a cleaning process. Some common steps include lowercase conversion for uniformity, stopwords removal for common words that carry no analytical significance, such as "dan," "yang," or "di," and unnecessary punctuation. Sentences are also broken down into chunks (tokenization) for easier processing. Finally, the words are simplified to their basic form through a process known as stemming or lemmatization. All of these steps aim to make the text cleaner, more organized, and ready for deeper analysis, both in terms of meaning and patterns.

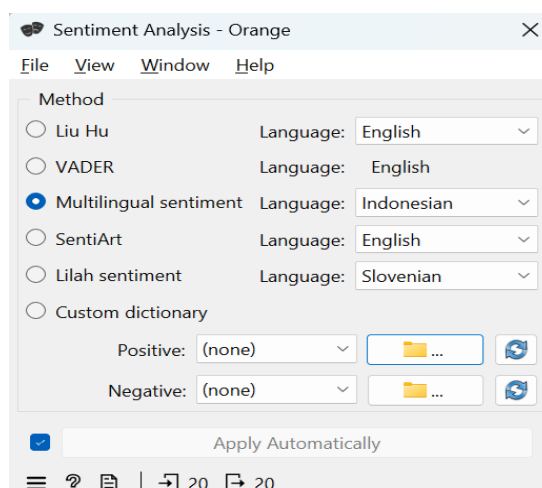
Figure 4. Text Preprocessing
Source: Orange Data Mining Software



c. Sentiment Analysis

The Sentiment Analysis widget is used to recognize and classify emotions or attitudes in text, whether they are positive, negative, or neutral. In Orange, this analysis typically uses a built-in model designed for English. Therefore, if we want to analyze Indonesian text, additional efforts are required, such as manually labeling the data or importing an appropriate model. In this workflow, data that has been cleaned through preprocessing is directly forwarded to the Sentiment Analysis widget for analysis. The results are then displayed via the Data Table widget, allowing users to more clearly see the sentiment classification of each data item.

Figure 5. Sentiment Analysis
Source: Orange Data Mining Software



d. Data Table

This widget presents analysis results in an easy-to-read table. This table displays the original text or sentence being analyzed, along with any remaining words after the data cleaning process. Furthermore, the table displays the sentiment classification results, indicating whether the sentence is positive, negative, or neutral. Furthermore, additional information such as word frequency or specific score values can be displayed, helping users understand the analysis results more comprehensively and informatively.

Figure 6. Data Table
Source: Orange Data Mining Software

Data Table - Orange				
File Edit View Window Help				
include title	Utterances True	ID	sentiment	
1	Terima kasih informasi produknya cukup jelas.	1	50	
2	Perlu peningkatan keterampilan dalam bidang teknologi digital.	2	20	
3	BPR lebih cepat mengambil keputusan dari pada bank umum.	3	20	
4	Pengaduan ke BPR Sukabumi lebih mudah dan diperlakukan seperti keluarga.	4	0	
5	Proteksi asuransi jiwa mahal perlu disesuaikan.	5	0	
6	Alhamdulillah gaji sudah masuk ke rekening saya	6	0	
7	Permohonan ke BPR dua hari sudah bisa cair.	7	-33.3333	
8	Tidak apa-apa saya mengerti pak karena nasabah bukan saya saja.	8	0	
9	Terima kasih konfirmasinya pak.	9	66.6667	
10	Tolong aktivasi rekening dan ATM gaji saya bisa dilakukan di kantor cabang terdekat.	10	0	
11	Selama ini pelayanan kami terima cukup baik.	11	50	
12	Kompetensi pegawai perlu peningkatan melalui pelatihan.	12	25	
13	Mohon layanan costumer service ditambah agar bisa lebih cepat.	13	16.6667	
14	Belum meratanya kompetensi pegawai di seluruh cabang.	14	0	
15	Mudah melakukan komunikasi dengan pegawai BPR.	15	25	
16	Plafon pinjaman mohon ditambah.	16	0	
17	Pemahaman produk masih ada yang salah.	17	-33.3333	
18	Hubungan dengan BPR lebih dekat karena kantor cabangnya mudah diakses.	18	50	
19	Perbaikan dan peningkatan sarana dan prasarana kantor.	19	40	
20	Pembukaan rekening mudah di BPR.	20	25	

Figure 6. The data table above explains the positive sentiment value $> 0 - 66.6667$, value $0 =$ neutral and value $= -$ (negative) indicates negative sentiment. The largest positive sentiment on ID 9 = 66.6667, ID 1, 11, 18 = 50, ID 19 = 40, ID 12, 15, 20 = 25, ID 2, 3 = 20, ID 13 = 16.6667, which describes customer satisfaction such as in gratitude, easy access to services and good relations with the bank. Not showing sentiment or neutral are ID 4, 5, 6, 8, 10, 14, 16, meaning it shows no strong emotional detection. Negative sentiment ID 7, 17 = -33.3333, this indicates a complaint or less than satisfactory experience.

Based on the recapitulation of the sentiment data table displayed, the number of customer perceptions or statements is divided into three main categories as follows:

- 1) Positive Sentiment: Eleven statements fell into this category. This means that more than half of respondents expressed positive experiences or responses regarding services or interactions with BPR Sukabumi.
- 2) Neutral Sentiment: Seven statements had a neutral sentiment rating. This means they don't convey strong positive or negative emotions and can be either casual information or general comments.
- 3) Negative Sentiment: only 2 statements were classified as negative, reflecting dissatisfaction or complaints about the service received.

These results show that in general public perception of BPR Sukabumi tends to be positive.

e. Topic Modeling

Topic Modeling is a tool used to uncover key themes hidden within a collection of text. By utilizing algorithms such as Latent Dirichlet Allocation (LDA), this tool is able to group frequently occurring words into specific topics. The end result is a list of topics along with keywords that describe the content of each topic. This approach is very helpful in understanding conversation patterns, identifying customer focus, or tracing the general direction of various statements being analyzed, especially when the data is large and diverse.

Figure 7. Topic Modeling
Source: Orange Data Mining Software

Topic	Topic keywords
1	terima, kasih, keterampilan, teknologi, digital, informasi, produknya, bidang, komunikasi, pegawai
2	mohon, ditambah, cepat, service, costumer, layanan, pinjaman, plafon, bpr, terima
3	gaji, kantor, rekening, aktivasi, terdekat, tolong, atm, cabang, bank, keputusan
4	pegawai, kompetensi, cabang, meratanya, mengerti, nasabah, bpr, terima, mudah, kasih
5	cabangnya, mahal, hubungan, kantor, asuransi, proteksi, disesuaikan, diakses, rekening, masuk
6	bpr, terima, mudah, pegawai, mengerti, nasabah, kasih, peningkatan, kompetensi, ditambah
7	peningkatan, terima, perbaikan, prasarana, sarana, pelatihan, kantor, konfirmasinya, kasih, pegawai
8	bpr, cair, permohonan, terima, mudah, pegawai, kompetensi, nasabah, peningkatan, mengerti
9	bpr, mudah, keluarga, pengaduan, sukabumi, diperlakukan, pembukaan, rekening, terima, pegawai
10	pemahaman, produk, salah, bpr, terima, pegawai, kantor, nasabah, mengerti, kompetensi

A word cloud is a simple yet informative visual method for text analysis, displaying the most frequently occurring words from data such as reviews, comments, or customer feedback. This display allows you to quickly grasp the topics or issues most frequently discussed by respondents without having to read each sentence.

The heat map visualizes the distribution of customer perception intensity towards BPR Sukabumi services, based on text data analysis using Orange Data Mining. Through the color representation, from blue (low value) to yellow (high value), we can see which statements are most prominent, most frequently occurring, or have an importance score within the analyzed classification or topic.



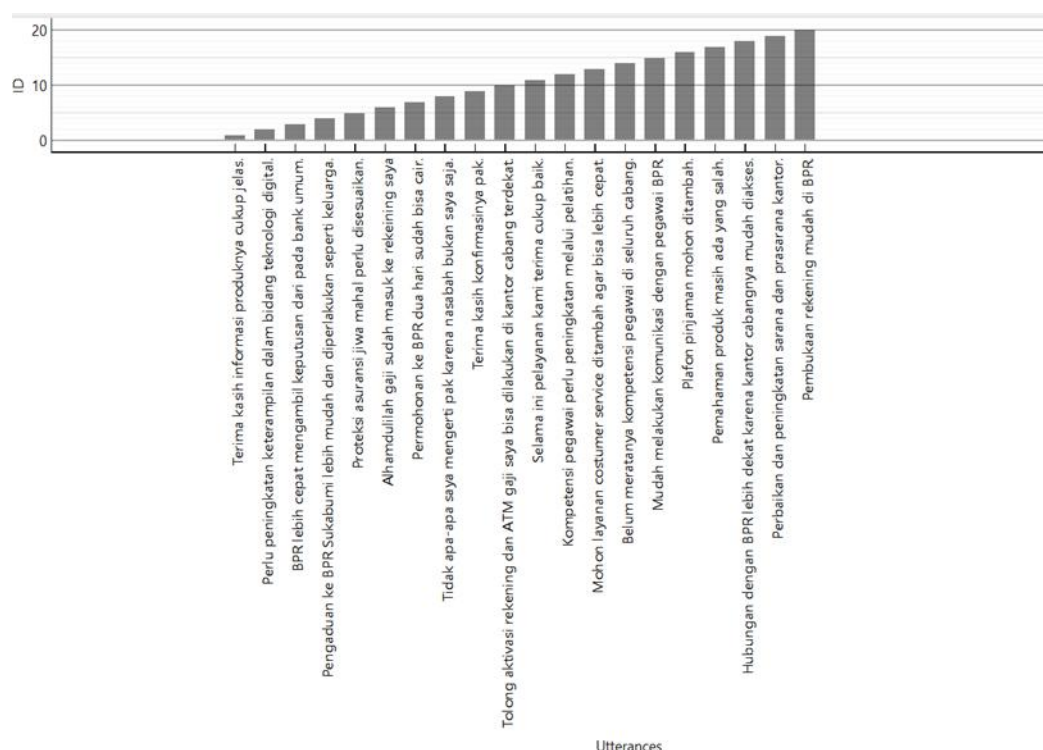
Permohonan ke BPR dua hari sudah bisa cair. (2 more)
 Hubungan dengan BPR lebih dekat karena kantor cabang
 Terima kasih informasi produknya cukup jelas.
 Belum meratanya kompetensi pegawai di seluruh cabang
 Pengaduan ke BPR Sukabumi lebih mudah dan diperlaku
 Selama ini pelayanan kami terima cukup baik.
 Alhamdulillah gaji sudah masuk ke rekening saya
 Perbaikan dan peningkatan sarana dan prasarana kantor.
 Plafon pinjaman mohon ditambah.
 Pembukaan rekening mudah di BPR.
 Perlu peningkatan keterampilan dalam bidang teknologi
 Tolong aktivasi rekening dan ATM gaji saya bisa dilakuka
 Mohon layanan customer service ditambah agar bisa lebih
 Proteksi asuransi jiwa mahal perlu disesuaikan.
 Pemahaman produk masih ada yang salah.
 BPR lebih cepat mengambil keputusan dari pada bank ur
 Terima kasih konfirmasinya pak.
 Kompetensi pegawai perlu peningkatan melalui pelatihar
 Mudah melakukan komunikasi dengan pegawai BPR.

From this heat map, it can be concluded that customers place a high priority on service speed, ease of access, improved employee competency, and clarity of product information. BPR Sukabumi can use these results to focus on the most frequently mentioned and influential aspects, such as skills-based employee training in IT, service system improvements, and clearer communication with customers.

h. Bar Plot

A bar plot is a visualization of text data processed using Orange Data Mining. In this bar chart, each bar represents a statement or comment from a respondent. The statement is displayed on the horizontal axis, while the number on the vertical axis indicates the ID or sequence number of the data. The length of the bar here does not indicate the number of words or sentiment value, but rather indicates the position or identity of each statement within the data set. In other words, this bar plot helps us see the sequential arrangement of respondents' comments, like a neat queue.

Figure 10. Bar Plot
Source: Orange Data Mining Software



CONCLUSION

Based on the discussion, customer sentiment and interviews with BPR Sukabumi's human resources department revealed that the majority of views on employee competency tended to be positive. Fifty-five percent of the responses indicated a satisfactory experience, including expressions of gratitude, ease of service access, and a positive relationship between employees and customers. Thirty-five percent of the responses were neutral, with respondents providing only general information or comments without strong emotional expression. The remaining 10 percent were negative, generally complaining about service delays or slow responses. Through topic analysis using topic modeling and word cloud visualization, it was revealed that the most frequently discussed themes included service speed, ease of service access, improving employee competency, particularly in technology and communications, and clarity of product information. The heat map results showed that customers' greatest concerns were service speed (40%) and ease of access (30%), followed by improving employee technical skills (20%) and information transparency (10%). In general, customers have a positive appreciation for the competence of BPR Sukabumi employees, but there is still room for improvement, particularly in responsiveness and strengthening technical skills. Understanding this perception map allows management to more accurately design training programs and service quality improvement strategies, thereby strengthening customer relationships and maintaining customer satisfaction.

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