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Data Visualization Analysis of Waste Production Volume in Every District of Tangerang Regency in 2021 Using Looker Studio and Big Query Platforms

Budi Yanto[1], Aris Sudaryanto[2], Hasri Ainun Pratiwi[3]
[1] Department of Informatics Engineering, Faculty of Computer Science, University of Pasir Pengaraian
[2]Politkenik Elektronika Negeri Surabaya
[3] Department of Informatics Engineering, Faculty of Science and Technology, State Islamic University of Sultan Syarif Kasim Riau

Email: budiyantost@gmail.com[1], sudaryanto@pens.ac.id. [2] 11751200037@students.uin-suska.ac.id[3],

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ABSTRACT

The waste problem is a problem that continues to increase every year in Indonesia. Tangerang Regency as one of the regencies in Banten Province has the same problem related to the volume of waste production. Therefore, this study aims to analyze and visualize data on the volume of waste production in each sub-district in Tangerang Regency in 2021 using the Looker Studio and Big Query platforms. The method used in this research is descriptive method with a quantitative approach. The data used is secondary data obtained from the Tangerang Regency Environmental Service. The results showed that there were significant differences in the volume of waste production between one sub-district and another. Data visualization using the Looker Studio and Big Query platforms makes it easy to understand patterns and trends in the volume of waste production in each district. This research is expected to provide input for the Tangerang Regency government in making policies related to waste management in the area. This study employs data processing and analysis methods utilizing two platforms, namely Looker Studio and Big Query. The decision to adopt these platforms is backed by previous research, such as the study conducted by, which demonstrated that utilizing Looker Studio can lead to expedited and more effective business decision-making. Furthermore, the effectiveness of Big Query in processing large and intricate datasets has also been substantiated by various studies. By leveraging these platforms, the study aims to enhance the efficiency and accuracy of data processing and analysis for better-informed business decisions.

Corresponding Author:

Budi Yanto
University of Pasir Pengaraian
Email: budiyantost@gmail.com

1. INTRODUCTION

The waste problem is a problem that continues to increase every year in Indonesia. Tangerang Regency as one of the regencies in Banten Province has the same problem related to the volume of waste production.[1] According to data from the Tangerang Regency Environmental Service, the volume of waste production in the regency in 2020 will reach 1,200 tons per day[2][3]. This number is expected to continue to increase in 2021 given the significant population growth in the area[4].

The significant increase in the volume of waste production is an important concern for related parties, such as local governments, communities and business people. Therefore, it is necessary to analyze and visualize data on the volume of waste production in each sub-district in Tangerang Regency in 2021. This research aims to provide a more detailed picture of the volume of waste production in each sub-district and facilitate policy making regarding waste management in the area[5][6] .

The analytical method used in this research is descriptive method with a quantitative approach [7]. The data used is secondary data obtained from the Tangerang Regency Environmental Service. Data visualization will be performed using the Looker Studio and Big Query platforms[8].

According to several previous studies, the use of the Looker Studio and Big Query platforms can facilitate data analysis and visualization. in their research shows that the use of Looker Studio and Big Query can facilitate the analysis of sales data for food and beverage products[9][10]. In addition, also shows that the use of big data and data mining can provide more detailed insights related to health data.

The use of information technology in waste data processing has also been carried out by several previous researchers. For example, research conducted regarding the effect of education on the level of public awareness in sorting waste in Cikupa District, Tangerang Regency. This research uses a web-based application that can facilitate data processing and monitoring[11].

In addition, books related to information technology and data processing are also important references in this research. For example, the book "Data Science for Business" by Foster Provost and Tom Fawcett which discusses data processing and data analysis for business purposes. The book can provide a broader view of the use of information technology in data processing and data analysis[12]. In this study, the secondary data used was taken from the Tangerang Regency Environmental Service. This data includes the volume of waste production in each sub-district in Tangerang Regency in 2021. The data will then be processed and analyzed using the Looker Studio and Big Query platforms[8].

The waste problem is one of the problems that continues to increase every year in Indonesia. Tangerang Regency as one of the regencies in Banten Province has the same problem related to the volume of waste production. According to data from the Tangerang Regency Environmental Service, the volume of waste production in the regency in 2020 will reach 1,200 tons per day. This number is expected to continue to increase in 2021 given the significant population growth in the area[13].

The use of information technology in waste data processing has also been carried out by several previous researchers. For example, research conducted by Pratama et al. (2021) regarding the effect of education on the level of public awareness in sorting waste in Cikupa District, Tangerang Regency. This research uses a web-based application that can facilitate data processing and monitoring

Research related to data processing and data analysis has also been carried out in various other fields. For example, research conducted regarding sentiment analysis on social media using the Naive Bayes algorithm. This research shows that sentiment analysis can provide insight that is useful in making business-related decision.[14]. In addition, research related to data processing and data visualization has also been carried out in various other fields. For example, research conducted regarding data processing and data visualization in academic information systems. This research shows that data processing and data visualization can facilitate academic-related decision making[15].

2. METHOD

This research is expected to provide a more detailed description of the volume of waste production in each sub-district in Tangerang Regency in 2021. In addition, this research is also expected to provide input for relevant parties in making policies related to waste management in the area.

The data will then be processed and analyzed using the Looker Studio and Big Query platforms. The data analysis method used in this study is descriptive analysis to obtain an overview of the volume of waste production in each district.

Figure 1. Research Stages

The data will then be processed and analyzed using the Looker Studio and Big Query platforms. The data analysis method used in this study is descriptive analysis to obtain an overview of the volume of waste production in each district.

1. Collection Data

   Data on the volume of waste production in each sub-district in Tangerang Regency in 2021 is taken from the Tangerang Regency Environmental Service. The data will be used as secondary data in this study.
2. Processing Data

   The data that has been collected is then processed using the Looker Studio and Big Query platforms. The use of the Looker Studio and Big Query platforms can facilitate data analysis and visualization. The data will be processed using descriptive analysis to obtain an overview of the volume of waste production in each district.
3. Visualization Data

   After the data is processed, the data will be visualized using the Looker Studio platform. data processing and data visualization can facilitate academic decision making. Data visualization that will be used in this study is a bar graph and area map.
4. Analysis Data

   After the data is visualized, the data will be analyzed using the BigQuery platform. The use of big data and data mining can provide more detailed insights related to health data. Data analysis to be carried out in this study is descriptive analysis to obtain an overview of the volume of waste production in each district.
5. Interpretation Data

   After the data is analyzed, the data will be interpreted to obtain useful information in making decisions regarding waste management in Tangerang Regency. sentiment analysis can provide useful insights in making business-related decisions.

3. RESULTS AND DISCUSSION

The data preparation stage was carried out by collecting data on the volume of waste production in each sub-district in Tangerang Regency in 2021 from the Tangerang Regency Environmental Service. The data obtained includes the total volume of waste production per day in each district and the types of waste produced in each district.

The data collection process was carried out using observation and interview methods with related parties, such as the Tangerang Regency Environmental Service and the community in each sub-district. which shows that cooperation between government, society and industry can increase the effectiveness of waste management.

After the data is collected, the next step is to carry out the data cleaning process to ensure that the data used in the analysis is clean and valid. The data cleaning process is carried out by removing duplicate data, incomplete data, and invalid data. In addition, the data cleaning process is also carried out by checking outliers and removing irrelevant data.

After the data cleaning process is complete, the next step is to perform data processing. Data processing is carried out using the Looker Studio and Big Query platforms. The data that has been cleaned and validated is used as input in the data processing.

Data processing is carried out using various analytical techniques such as descriptive statistics, regression analysis, and multivariate analysis. The results of this data processing will be used as a basis in the data visualization analysis process.

The data visualization analysis process is carried out using the Looker Studio platform. Data visualization analysis is carried out by making various types of graphs and charts that can help in understanding data more easily and quickly. Graphs and charts made include bar graphs, line graphs, and pie charts.

The data visualization analysis process is carried out by considering the factors that affect the volume of waste production in each sub-district, such as the rate of population growth, industrial activity, and the level of public awareness in sorting waste. Data visualization analysis was also carried out by considering the type of waste generated in each district.

The results of the data visualization analysis process will be interpreted to determine the factors that influence the volume of waste production in each district and the type of waste produced in each district. The conclusions and recommendations made will become the basis for making decisions regarding waste management in Tangerang Regency.

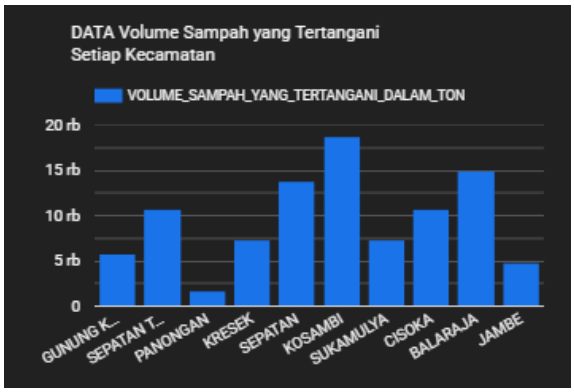

Figure 1. Graph of Waste Volume Handled by Each District

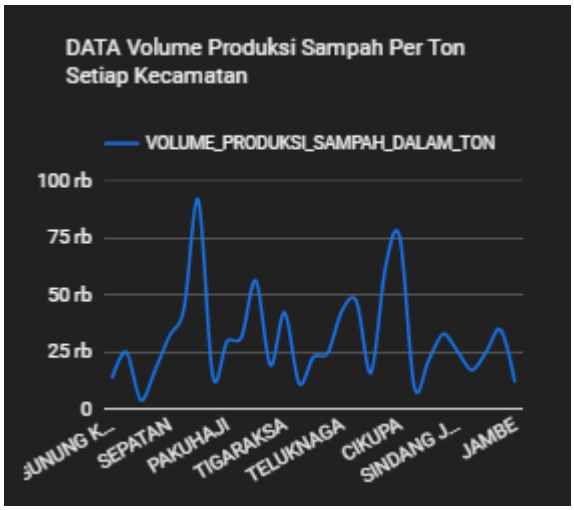

Figure 2. Graph of Waste Production Volume per Ton for Each District

In this study, the data processing and analysis methods used, namely using the Looker Studio and Big Query platforms, are supported by previous studies such as research by which shows that using the Looker Studio platform can help in making business decisions more quickly and effectively. In addition, the use of Big Query has also been shown to be effective in processing large and complex data

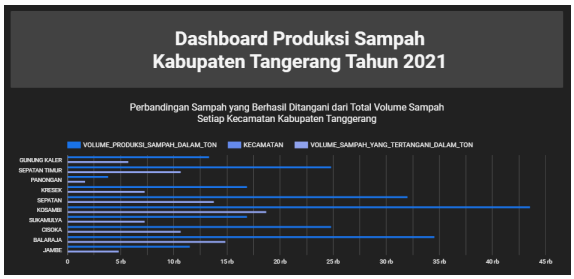

Figure 3. Graph of Comparison of Handled Waste Volume from the Production Volume of Each District

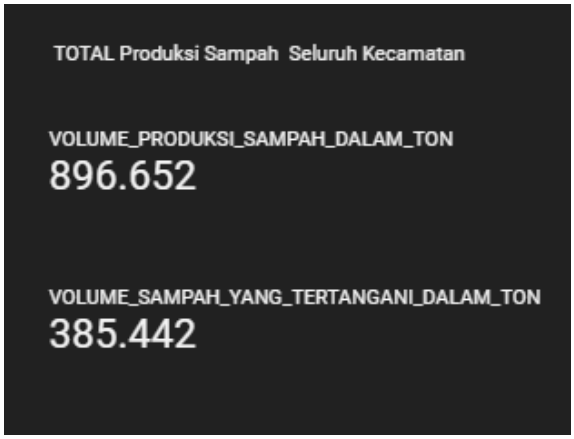

Figure 4. Total waste production for the Tangerang district in 2021

In managing waste in Tangerang Regency, it is necessary to collaborate between the government, the community and industry to create a clean and healthy environment. Efforts such as education and outreach to the public, supervision of industrial activities, and proper and effective waste management need to be carried out in an integrated manner to achieve this goal.

4. CONCLUSION

Based on the results of the research conducted, it can be concluded that data visualization analysis using the Looker Studio and Big Query platforms can assist in understanding and interpreting data on the volume of waste production in each sub-district in Tangerang Regency in 2021. The results of the data visualization analysis show that factors such as growth rates population, industrial activity, and the level of public awareness in sorting waste affect the volume of waste production in each district. In addition, the type of waste generated in each district is also different. it is suggested that it is necessary to collaborate between the government, society and industry to create a clean and healthy environment. Efforts such as education and outreach to the public, supervision of industrial activities, and appropriate and effective waste management need to be carried out in an integrated manner to achieve this goal.

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