

Real Time Sales Data Visualization at Agung Wastra Using Looker Studio

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ABSTRACT

Agung Wastra is a company that operates in the field of facilities and infrastructure for Hindu religious ceremony activities. The company uses Microsoft Excel in processing sales data. The weakness of the data or information produced is that it is still in table form and does not display more interactive information in graphic form, making it difficult for companies in a short time. Therefore, this research aims to build a sales data visualization system using Looker Studio. This visualization helps companies process table data into information in the form of graphs so that it doesn't take a long time to see the company's sales development. The research method used in this research is Kimball's nine steps method. This research goes through the stages of company data analysis, data warehouse design, extract transform load process, implementation of data visualization, and system testing. This system was tested using the user acceptance test method and obtained results with a percentage of 92.5% or strongly agree, which means that the sales data visualization is in accordance with the needs of the Agung Wastra company. The results of this research are seven pages displaying company information in the form of graphics to assist in decision making

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1. Introduction

Human life is getting easier because of the rapid development of technology. With the entry of technological information into business, competition between business people is increasing. A person or business organization must be able to adjust to changes. The targets that have been set can be achieved by obtaining important information about the supervision and control of the company. This data can be obtained from business activities, but with unstructured data it is often difficult to understand. Therefore, tools are needed to process and visualize data so that it becomes information that is easily understood by users.

Agung Wastra is one of the businesses engaged in the field of facilities and infrastructure in Hindu ceremonial activities. Agung Wastra has several types of wastra in production such as plain wastra, wastra singapur, wastra jagoar, wastra wajik, wastra kaloke, plain ider-ider, ider-ider wajik, ider-ider singapur, and ider-ider kaloke. Agung Wastra business records sales data at the end of each month with average sales, namely plain wastra reaching 50 pcs per month, wastra singapur reaching 35 pcs per month, wastra jagoar reaching 40 pcs per month, wastra wajik reaching 40 pcs per month, wastra kaloke reaching 35 pcs per month, plain ider-ider reaching 24 pcs per month, ider-ider wajik reaching 20 pcs per month, ider-ider singapur reaching 18 pcs. per month, ider-ider kaloke reaches 19 pcs per month. With wastra sales information data on the company used as decision material for the next sales target, but the information data on Agung Wastra is still not well organized and is still in tabular

form so it is difficult to understand, this can hinder the business in making decisions for the sustainability of its business.

Agung Wastra manages wastra sales data using Microsoft Excel. This wastra sales data is used as a business evaluation material every month. Where the data contains sales and expenditure data. In addition, the company faces several problems such as manual recording which is prone to errors, as well as difficulties in analyzing sales trends over time to find out which products sell best. Therefore, data visualization is taken as a solution to improve the presentation of this information by using data visualization tools such as looker studio, data can be presented in the form of graphs and dashboards that are easy to understand, so that companies can make better and faster decisions.

According to Heru Stiawan et al (2022) the dashboard design makes users interested in reading and it will be much easier to understand the information provided in graphical form. With the Data Warehouse and Dashboard, the decision-making process in the project management business process becomes easier and faster and with the design of dashboard visualization based on the Data Warehouse that is built can help analyze business opportunities and evaluate work in previous years (I Dewa Bagus Gde Khrisna Jayanta Nugraha et al., 2022).

In order to make the information data owned by the company easier to understand, data is designed in the form of graphs or data visualization. Data visualization can be defined as the use of visual representations to explore, understand, and communicate data. Visualization is a proven method to communicate the findings of data exploration to decision makers. In other words, data visualization is an important tool for conducting data analysis, when the meaning has been found and understood, it will be communicated to others (Andriansyah, 2022). Therefore, data visualization is a solution to the problem in this research, by converting data into a graphical format it can make data easier to understand and manage a business more easily. The data visualization that will be made at Agung Wastra uses Google Looker Studio and has 7 menus, namely the sales dashboard menu, sales menu by customer, sales menu by category, sales menu by product, sales menu by city, company expense menu, sales and expense comparison menu.

Based on the problems found in Agung Wastra, the authors conducted this research with the title "Real Time Sales Data Visualization at Agung Wastra using Looker Studio" which is expected that the application of data visualization can analyze sales data to view company information, and facilitate the company's decision making process.

2. Literature Review

Arfandi et al. (2024) used Looker Studio with the Exploratory Data Analysis (EDA) method to facilitate real-time evaluation of monthly sales and customer satisfaction. This data visualization helps companies monitor the sales performance of each product and understand the factors that affect the level of customer satisfaction, so that it can be used as a consideration in formulating a more targeted business strategy. Wibowo (2022) also utilized EDA in analyzing sales data of PT Telkominfra. The data visualization process was able to accelerate the analysis of monthly revenue and identify best-selling products, which previously took a long time due to the manual use of Excel. With more interactive visualization, companies can see sales trends more clearly, so that decision making becomes faster and more accurate. Furthermore, Saputra and Trisnawarman (2023) designed an inventory dashboard for Anicca e-commerce using Microsoft Power BI. This dashboard is designed to facilitate the monitoring of stock items and sales results, so that companies can know the availability of stock in real-time and avoid the risk of shortages or excess inventory. Data visualization presented in the form of graphs makes it easier for management to monitor sales performance in various regions, so that decision making related to sales strategy and stock management becomes more efficient. Meanwhile, Azizah et al. (2022) developed an OLAP-based Data Warehouse system to help the principal of Mutiara IT Kindergarten analyze new student admission data. With the visualization. With easy-to-understand report visualizations, the school can monitor the number of applicants, graduation rates, and student distribution based on various criteria. The system allows principals to identify enrollment trends each year and plan more effective admission strategies. In addition, data visualization also helps in monitoring school administration performance and improving the efficiency of the enrollment process. Finally, Bagaskara and Bangkalang (2023) applied Market Basket Analysis

(MBA) with the Apriori algorithm to MSME Culture Coffee to identify customer purchasing patterns. Data visualization of the results of this analysis provides information on products that are often purchased together, so that it can be used as a basis for developing promotional strategies and offering product packages. By understanding customer purchasing patterns, MSMEs can increase sales and strengthen customer loyalty through offers that are more in line with consumer preferences.

3. Research Methods

The sales data visualization system developed in this research uses Kimball's Nine Steps as the main method in building a data warehouse. This method was chosen because it provides a systematic structure in data management and ensures more accurate and efficient information to analyze. The stages carried out in the system design and development process include:

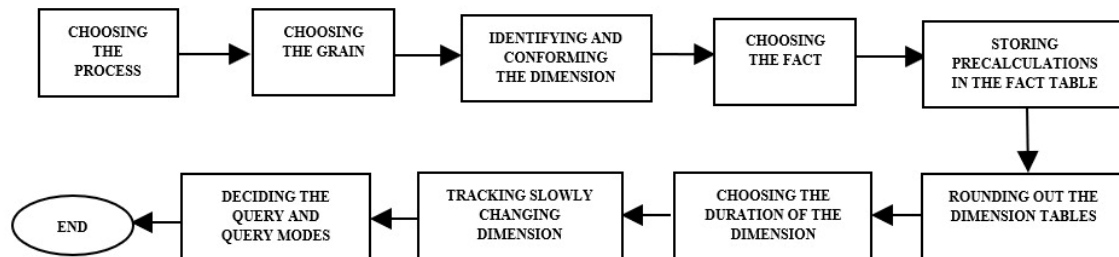


Fig.1. Data Warehouse Processes

1. Choosing the Process: Determination of the main business activities to be analyzed, namely sales and expenses in the Agung Wastra company. Focus on processes that have a significant impact on company performance.
2. Choosing the Grain: Specifying the level of data detail, i.e. sales and expense data per transaction, which enables detailed analysis down to the product and customer level.
3. Identifying the Dimensions: The collection of key data elements includes the dimensions of time, product, customer, city, and product category to provide context to the sales data.
4. Choosing the Fact: Determination of key metrics such as sales amount, total revenue, and expense amount used as key performance indicators.
5. Storing Pre-calculations: Storage of initial calculation results, such as total monthly sales and average sales per product, to speed up the data analysis process.
6. Rounding Out the Dimensions: Adjustment of attributes in the dimension table, such as customer name, product category, and city name, to clarify data interpretation.
7. Choosing the Duration: Determination of the historical data period for the last five years (2020-2024) to analyze long-term sales trends.
8. Tracking Slowly Changing Dimensions: Monitoring attribute changes to dimensions, such as changes to customer addresses or product names, to maintain historical data accuracy.
9. Deciding the Query Priorities: Optimization of query performance to ensure speed and efficiency in answering frequently used analysis questions, such as monthly sales per product and sales performance per city.

Data Collection Technique

Data was obtained through documentation methods and interviews with company owners to obtain sales and expense information. Documentation includes transaction data recorded in Excel files, while interviews were conducted to understand business needs and relevant information for data visualization.

Data Processing Method

The data processing is done using Extract, Transform, Load (ETL) techniques implemented through the Pentaho Data Integration (PDI) application. Each stage in this process has an important

role in ensuring data integrity and cohesiveness before being visualized in Looker Studio. The following is an explanation of each stage:

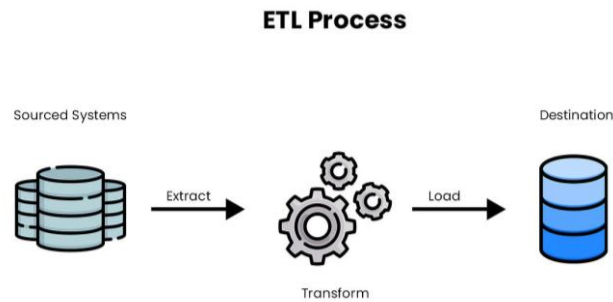


Fig.2. ETL Process

1. **Extract:** The first process in ETL is to extract data from data sources which will then create a data warehouse. In the table to be extracted, there is no change in adding or subtracting attributes, the table remains the same as the data source. The following is the process of extracting data from data sources to the data warehouse.
2. **Transform:** In the transform process, the cleaning process is carried out to clean or eliminate unnecessary data from the tables that have been extracted previously and the cleaning process can adjust the writing format of the data. With data cleaning, it is hoped that there will be no duplication or redundancy of data so that it becomes consistent and achieves the desired data standardization.
3. **Load:** In the load process, the data that has been extracted and transformed and has gone through data cleaning will then be directly stored in the data warehouse and will not change the existing data. The data will be updated.

4. Results and Discussions

Data Visualization

This research produces a data visualization system at Agung Wastra using Looker Studio that successfully transforms sales and expense data from a tabular format into an interactive visualization that is more easily understood by management. The system consists of seven main pages, each of which displays aspects of sales and expenses separately to provide a comprehensive overview of the company's performance. This visualization not only makes it easier to understand the data, but also supports faster and more informed decision-making. Each page is designed with a clear structure and appropriate graphics to illustrate patterns, trends, and data distribution, so that information can be presented in a comprehensive and easy-to-understand manner.

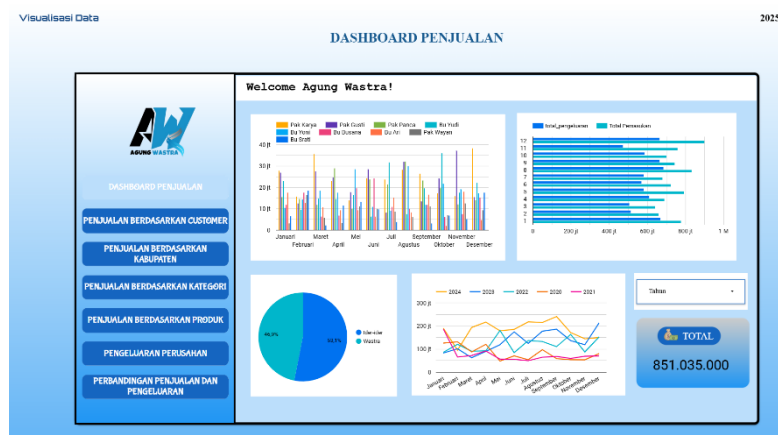


Fig.3. Sales Dashboard

On the sales dashboard page, you can see several graphs of product sales at Agung Wastra or Busana Pelinggih. The graph used on the sales dashboard page is a bar graph visualizing the names of customers along with the amount of their purchases, helping companies identify the most active customers. In addition, a bar graph comparing total sales and expenses within a certain period makes it easier to monitor profit ratios and identify the period with the largest difference. A pie chart shows the proportion of sales by product category, giving an idea of each category's contribution to total sales. By knowing the most and least in-demand categories, the company can prioritize its marketing strategies. While line graphs visualize the company's expense trends from month to month and year to year facilitating the prediction of future costs.

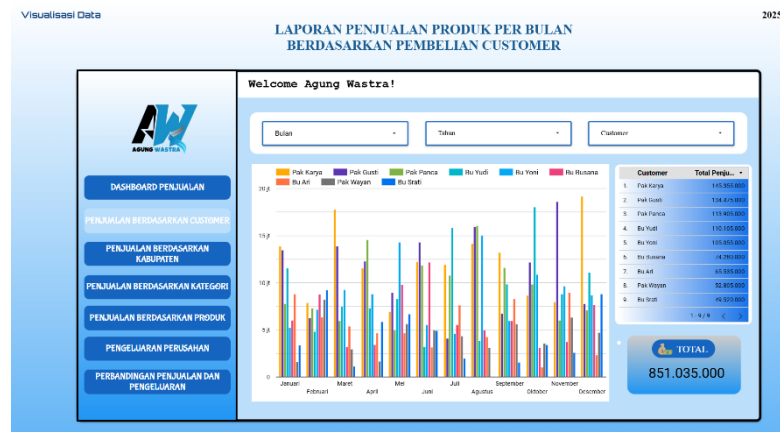


Fig.4. Sales Page by Customer

On the sales page by customer displays a graph of total sales based on customers who buy wastra and ider-ider products at Agung Wastra. The graph used on the sales page by customer is a bar graph where the bar graph by looking at the length of the bar can show the number of purchases, so that companies can identify key customers and monitor their purchasing patterns. This information is useful for designing loyalty programs or special offers for customers with large sales contributions.

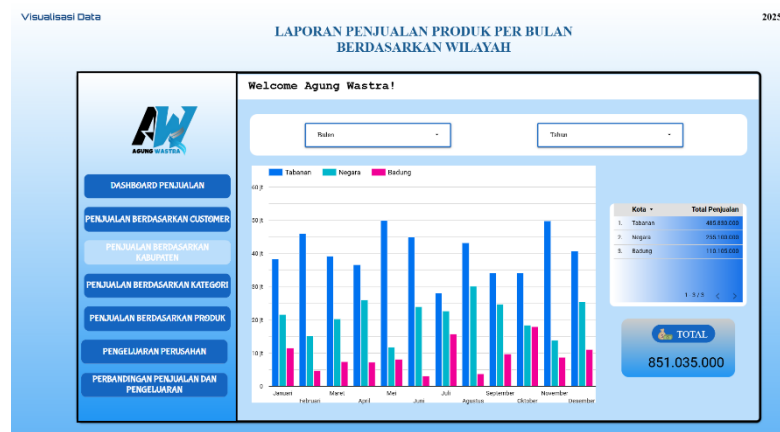


Fig.5. Sales Page by District

The sales page by district or region is a page containing a bar graph that displays the number of sales in various regions in a monthly or annual period. Using bar graphs can be more easily used to compare sales between regions, help companies understand geographic sales distribution, and plan more targeted marketing strategies. By monitoring sales in each region, companies can prioritize promotions in regions with low sales and strengthen market penetration in regions that have great potential.

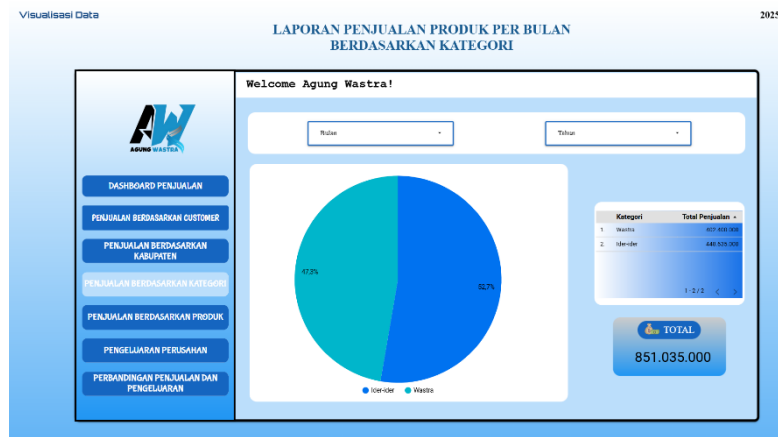


Fig.6. Sales Page by Category

The sales page by category is a page that contains a pie chart of sales by category. Using a pie chart can display the contribution of each category proportionally, helping companies identify the most popular product categories and categories that need further promotional strategies. By knowing the lowest category sales, companies can take strategies to further promote or offer products based on these categories.



Fig.7. Sales Page by Product

On the sales page by product is a page that contains a bar graph of sales at the company based on 9 products from the company, namely plain wastra, wastra singapur, wastra kaloke, wastra wajik, wastra jagoar, plain ider-ider, ider-ider wajik, ider-ider singapur, and ider-ider kaloke. On this page you can see a comparison of total sales between products from month to month. With this graph, the company can determine decisions to stock ingredients from the products that sell best every month.



Fig.8. Company Expenses Page

On the company's expenditure page is a page that contains a line graph or line chart, of expenses at the company. Using a line graph or line chart can be more effective in displaying changes in expenses over time, can see trends from the increase or decrease in company expenses per year between 2020, 2021, 2022, 2023, and 2024 expenses. The line on the display represents the total expenditure for each month, making it easier for management to monitor changes in operational costs and plan budgets to avoid cost overruns.

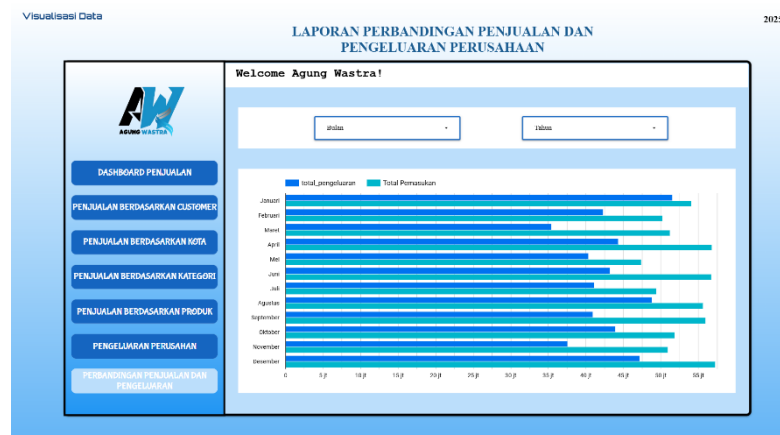


Fig.9. Sales and Expenses Comparison Page

The sales and expenses comparison page is a page containing a bar graph that visualizes the comparison of the company's total sales and total expenses. Each time period is represented by two bars, each reflecting the value of sales and expenses. The difference between the two bars illustrates the company's level of profitability, so management can easily monitor financial performance and ensure that revenue is able to cover operating costs.

5. Conclusion

This research has successfully created a sales and expense data visualization system for xyz company using Looker Studio. With this system, sales and expenditure data that was previously only available in tabular form can be displayed more interestingly and easily understood in the form of interactive graphics. This makes it easier for management to analyze sales and expense information in making faster and more precise decisions. Data processing using the Extract, Transform, Load (ETL) method with Pentaho Data Integration (PDI) ensures that data taken from various sources is processed accurately and efficiently. User Acceptance Testing (UAT) results show a user satisfaction level of 92.5%, which indicates that this system is easy to use, functions well, is efficient, and reliable. In addition, the system also managed to speed up the sales and expense analysis process from several

days to just a matter of minutes, providing great benefits for xyz company in sales and expense planning.

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