

PERANCANGAN DATA MART UNTUK MENGOPTIMALKAN PENJUALAN PAKAIAN DI TOKO C

DESIGNING A DATA MART FOR OPTIMIZING CLOTHING SALES AT C STORE

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ABSTRACT

Data plays a crucial role in supporting strategic decision-making, particularly in the retail sector like C Store. This research aims to design and implement a data mart to analyze sales data at C Store, with the goal of enhancing sales performance and understanding purchasing trends. The methodology employed is the kimball nine-step approach for data mart design. To enhance sales performance and understand purchasing trends, an effective system such as a data mart is needed. This study aims to design a data mart that can be used to analyze sales data at C Store to support data-driven decision-making. The methodology used is the nine-step Kimball approach in data mart design. The ETL (Extract, Transform, Load) process is used to manage sales transaction data collected from the period of 2021 to 2024. The result of this study is a data mart with a star schema, consisting of fact and dimension tables, enabling the analysis of sales performance based on product categories and time. The implementation of this data mart is expected to assist C Store in managing data efficiently, supporting strategic decision-making, and improving business operational effectiveness.

Keywords: Data Mart, Kimball's Nine-Step Process, Clothing Sales.

ABSTRAK

Data berperan penting dalam mendukung pengambilan keputusan strategis, terutama di sektor ritel seperti C Store. Penelitian ini bertujuan untuk merancang dan mengimplementasikan data mart untuk menganalisis data penjualan di C Store, dengan tujuan meningkatkan kinerja penjualan dan memahami tren pembelian. Metode yang digunakan adalah pendekatan sembilan langkah Kimball untuk desain data mart. Untuk meningkatkan kinerja penjualan dan memahami tren pembelian, diperlukan sistem yang efektif seperti data mart. Studi ini bertujuan untuk merancang data mart yang dapat digunakan untuk menganalisis data penjualan di C Store guna mendukung pengambilan keputusan berbasis data. Metode yang digunakan adalah pendekatan Kimball sembilan langkah dalam desain data mart. Proses ETL (Extract, Transform, Load) digunakan untuk mengelola data transaksi penjualan yang dikumpulkan dari periode 2021 hingga 2024. Hasil penelitian ini adalah data mart dengan skema bintang, yang terdiri dari tabel fakta dan dimensi, memungkinkan analisis kinerja penjualan berdasarkan kategori produk dan waktu. Implementasi data mart ini diharapkan dapat membantu C Store dalam mengelola data secara efisien, mendukung pengambilan keputusan strategis, dan meningkatkan efektivitas operasional bisnis.

Kata Kunci: Data Mart, Kimball's Nine-Step Process, Penjualan Pakaian.

INTRODUCTION

The retail industry operates in a highly competitive environment where data-driven decision-making is crucial for success. This is particularly true for clothing stores like toko cleo, where understanding sales trends is key to maintaining a competitive edge. The

importance of this research is rooted in the increasingly urgent needs within the retail sector, particularly for Toko Cleo, which focuses on clothing sales. In the context of a competitive retail industry, the management and analysis of sales data in a quick and accurate manner are crucial to support more effective and efficient

decision-making (Tiatri & Jap, 2015). This can assist management in determining more appropriate business strategies that are responsive to market dynamics (Kusnardi et al., 2023; Madyatmadja et al., 2019; Nazuli et al., 2021).

However, there are currently challenges in managing sales data that affect the quality of decision-making. The manual processing and analysis of sales data create a gap with the existing system's capacity. Delays in obtaining relevant information, as well as difficulties in accessing detailed sales data, are major issues that hinder the operational efficiency of Toko Cleo. Therefore, a solution is needed that can address these problems quickly and accurately. As a solution to these issues, this research proposes the design of a dashboard that can monitor and analyze monthly sales data with clear and interactive visualizations. This dashboard concept is based on the application of ETL (Extract, Transform, Load) technology using SQL Server Management Studio (SSMS) for data processing, along with Microsoft Power BI for visualization (Ayuningsing et al., 2022; Jayadinata et al., 2024; Sandi & Trisnawarman, 2024; Alfiansyah & Arisandi, 2023). Previous studies have shown that interactive dashboard solutions have been effective in enhancing decision-making efficiency in retail companies. By utilizing this technology, processed sales data can be presented more quickly and in a manner that is easier for management to understand, ultimately accelerating the decision-making process (Anggraini et al., 2021; Mulyani & Kartini, 2023).

The objective of this research is to design and implement a dashboard that facilitates the monitoring and analysis of Store C sales on a monthly basis, as well as to provide management with ease in making data-driven decisions. The benefits of this research are expected to enhance operational efficiency, accelerate responses to market changes, and assist in formulating more precise marketing strategies. The

implementation of this dashboard is anticipated to make a significant contribution to improving the performance and competitiveness of Store C in the retail market.

METHODS

Data Collection

The data collection method is highly suitable for this research as it focuses on processing and analyzing existing data to develop a more efficient and effective system. The data used consists of sales transaction records collected by Store C's internal system and provided in .xlsx format. This raw data includes information on products, customers, and transaction times, which are essential elements in sales analysis.

In addition to using existing data, this research also involves interview methods to gather additional information. The interviews were conducted orally with Store C's management and data management team.

Interview Objectives:

- Identify the company's needs regarding the sales dashboard.
- Understand the challenges faced in managing sales data.
- Gather input on desired dashboard features, such as product performance reports, customer preference analysis, and sales trends.

Based on the interview results, Store C expressed a desire for a data visualization tool to help monitor store performance in real-time and provide strategic insights into sales. Therefore, this research designs a star schema-based data warehouse to enhance the efficiency and effectiveness of data analysis and support the creation of a dashboard tailored to the company's business needs.

Nine-Step Kimball Methodology

This research employs the Nine-Step Kimball methodology to design the data warehouse for Store C, utilizing the ETL

(Extract, Transform, Load) process that leverages sales data in Excel (.xlsx) (Kimball & Ross, 2013; Kimball & Caserta, 2004; Pratama & Raharja, 2023) format. The data is processed to meet analytical needs and loaded into the data warehouse, which is designed using SQL queries. SQL Server Management Studio 2022 is used to build the table structure, including DIM_CODE, DIM_PRODUCT, DIM_ORDER, DIM_TIME, and FACT_SALES. This data warehouse is designed to integrate with the clothing sales dashboard, thereby supporting efficient data processing while providing clearer visualizations for analyzing the sales performance of clothing at Toko Cleo. Below is the appearance of the data warehouse, as shown in **Figure 1**.

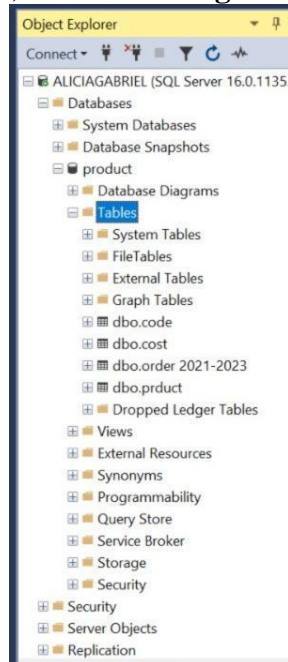


Figure 1. Appearance of the Sales Data Warehouse.

Source : Personal documentation

RESULT AND DISCUSSION

The sales dashboard design for Store C leverages a star schema to optimize data analysis and enhance efficiency in data management and retrieval. This structure ensures that sales transaction data can be accessed quickly and accurately to support data-driven decision-making. In its implementation, software such as Microsoft SQL Server Management Studio

2022 and Visual Studio 2019 is used to manage and process data in a structured manner. The development of the data warehouse follows the Nine-Step Kimball methodology, resulting in an organized system that supports optimal query performance.

The Nine-Step Kimball approach begins with selecting the primary business process, which, in this case, is clothing sales at Store C, the main focus of this research. With significant transaction growth, the data grain is set at the individual transaction level, where each row in the fact table represents a single sales transaction. This data includes customer ID, purchased products, transaction amounts, and purchase times.

This structure is implemented using a star schema that links the main fact table, FACT_PENJUALAN, with several dimension tables to support in-depth analysis.

1. **FACT_PENJUALAN**: The core fact table that records all transaction data, such as date, product, order, code, total sales, and revenue.
2. **DIM_TIME**: A time dimension table providing daily, monthly, and yearly data to facilitate period-based analysis.
3. **DIM_PRODUCT**: Contains product data, including name, price, and code, enabling sales analysis by product category.
4. **DIM_CODE**: Stores classification codes for grouping transactions, supporting more structured analysis.
5. **DIM_ORDER**: Contains detailed order information, such as date, price, quantity, and total revenue, supporting in-depth analysis of order performance.

With this design, Store C can identify sales trends, understand customer preferences, and evaluate product performance more comprehensively. The star schema-based approach provides a robust foundation for data analysis and strategic decision-making at Store C. The layout of the Star Schema can be seen in **Figure 2**.

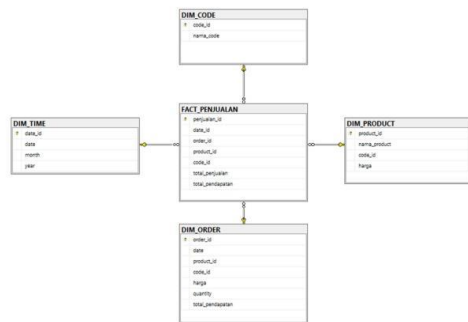


Figure 2. Star Schema Layout

Source : Personal documentation

CONCLUSION

The interactive dashboard developed for Store C has successfully achieved its primary objective, which is to provide clear, accurate, and relevant visualizations of sales and revenue data. Testing results indicate that this dashboard effectively integrates historical data, facilitating the monitoring of sales trends, analyzing customer consumption patterns, and evaluating product performance based on specific categories and time periods. Features such as time filters, sales quantity analysis, profit by subcategory, and sales KPI indicators enable Store C management to make strategic decisions more quickly and based on valid data.

In addition to enhancing operational efficiency, this dashboard provides a competitive advantage by allowing for quicker responses to market changes. The flexibility in filtering and grouping data supports in-depth analysis that can be utilized for various business purposes.

Moving forward, further development could include the integration of external data, such as regional market information or competitor data, to expand analytical insights. Additionally, the application of technologies such as machine learning-based predictions could provide more prescriptive automated recommendations, which would support the optimal growth of Store C business.

Furthermore, the design and implementation of the underlying data warehouse using the Nine-Step Kimball

methodology have created a solid foundation for data-driven strategies. The star schema structure simplifies data relationships and enhances query execution efficiency, while the ETL process ensures systematic processing of sales transaction data, resulting in accurate and reliable information for decision-making.

In conclusion, with these enhancements and ongoing developments, Store C can maximize the potential of its data warehouse and dashboard to support more efficient operations and informed strategic decision-making, ultimately driving business growth and competitiveness in the retail market.

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