Applications Data Warehouse For Sales Analysis Based on Multidimensional Modeling (MDM) and Star Schema Design

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Abstract – **The data warehouse is a collection of the data used to support strategic decision-making process in an organization. This paper will discuss the design of the data warehouse in one of the industry in sales (distribution sales) of the start of the phase of data collection, analysis of business needs and information, data selection and design of data warehouse, data loading into data warehouse and the later displaying information to end user. By implementing a multidimensional modeling (MDM) of a data warehouse is built based on the method of OLAP (Online Analytical Processing) and can be displayed with the star schema design, to produce information that can analyze the sales data accurately, which can assist the company in taking decisions right appropriately and efficiently.**

Keywords – **Data warehouse, Multidimensional modeling (MDM), Star schema design.**

I. INTRODUCTION

Nowadays, the development of computer technology progress rapidly. Almost every year the company strives to optimize the function of the technology, with the hope these technologies provide an added value. Urged the need for proper information and is also increasing the amount of data that must be documented then this will require the development of a wide range of applications that can maximize data storage.

The reporting process in accordance with the wishes of the leadership of the company often takes quite a long time, this is because the reporting process to go through many stages, so as to produce an information, such as export the data from the application into excel, grouping information based on need, as well as making the visualization of the information that has been obtained. This resulted in the decision-making process conducted by the head of the company becomes less than the maximum.

The data warehouse is a collection of data that is subject-oriented, integrated, time-variant, and non-volatile are used to support the decision-making process [1]. The existing data on PT. Bloods Industries so great and much needed storage space allocation, will be helped and be efficient with their data warehouse.

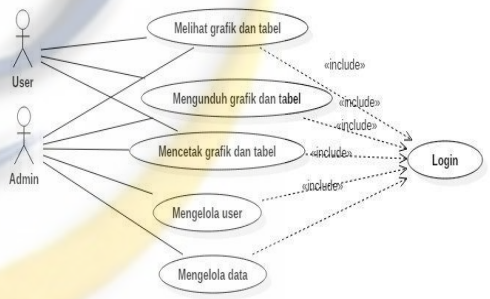
Use of the data warehouse to support the data management of the sale of goods has been widely used. Olivia Mia Sugiyono conduct research using snowflake schema that aims to be able to view and analyze purchases and sales at PT. Megah Jaya Pratama [2].

This paper will discuss the design of the data warehouse in PT. Bloods Industries that have a database that has not been well integrated. With a data warehouse system, it is hoped the company can organize owned sales data so that it can create a report that relatively faster [3].

II. DESIGN DATA WAREHOUSE

A. Analysis System

Figure 3 Use Case diagram is a draft on the dashboard that will be created. In such systems, there are two actors, namely, admin and user. Admin and User has askses such as charts and tables, as well as manage the users and data. While users can only view charts and tables, graphs and tables to download, and print graphs and tables.



Gambar 1 Use Case Diagram

B. Selection Process

The process that will be used in the data warehouse system is the process of selling goods made by PT. Bloods Industries, the necessary data is sales data in the form sweater, tshirt, bag, jacket, pants, shirt, polo shirt, wallet, boxer, and slippers.

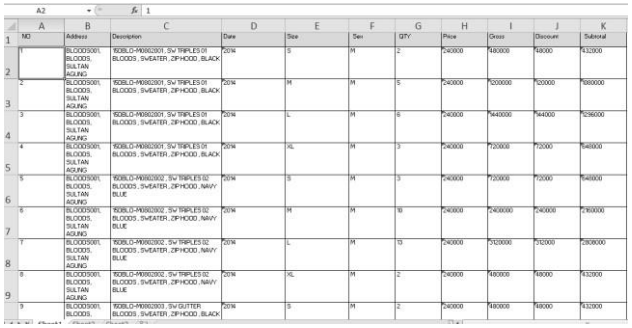


Figure 2 Source Data In Sheet File

C. Selection of Grain

Grain is, data from prospective facts that can be analyzed. Selection of grain is intended to get an idea of what will be represented by a record of the fact table. Grain in the design of data warehouse include: ratio of sales-type, the ratio of sales by type, ratio based on color, ratio based on the size, ratio based on per year, the category most in demand, sales category were less in demand, total sales, and the ratio of sales per item.

D. Identification and Adjustment

TABLE 1 GRAIN AND DIMENSIONS OF GOODS SALES

Grain	Dimension						
	Barang	Kategori	Size	Tipe	Toko	Waktu	Warna
Ratio of sales by type				X	X	X	
Ratio of sales by colour					X	X	X
Ratio of sales by size			X		X	X	
Ratio of sales by years					X	X	
The category most in demand		X			X	X	
Sales category were less in demand		X			X	X	
Total sales					X	X	
Ratio of sales per item		X			X	X	

E. The Selection of Facts

After going through the identification of dimensions, the next is to find facts that can be obtained in the selection process grain. Facts on PT. Bloods Industries is a fact of sales.

TABLE 2 THE SELECTION OF FACTS

Fact	Field
Penjualan	• KD_TOKO • KD_JENIS • KD_KATEGORI • KD_TIPE • KD_SIZE • KD_WAKTU • QTY • TOTAL_PENJUALAN

F. Completing the Table Dimensions

Provide a description of the dimensions as much as possible and the description should be intuitive and understandable by the user. The following text description of the dimension tables:

TABLE 3 ENSURE THE DIMENSION TABLE

Dimension	Field	Description
Dim_waktu	KD_WAKTU TAHUN	Report can be viewed by kode tahun or by tahun
Dim_toko	KD_TOKO ALAMAT_TOKO	Report can be viewed by kode toko, or alamat toko
Dim_kategori	KD_KATEGORI NAMA_KATEGORI	Report can be viewed by kode kategori or nama kategori
Dim_size	KD_SIZE NAMA_SIZE	Report can be viewed by kode size dan nama size
Dim_warna	KD_WARNA NAMA_WARNA	Report can be viewed by kode warna or nama warna.
Dim_barang	KD_JENIS NM_JENIS_BARANG	Report can be viewed by kode jenis or nama jenis barang

G. Selection of Duration and Time

TABLE 4 SELECTION OF DURATION DATABASE AND TIME UPDATES

Name of Data warehouse	Database	Database	Data from	Data of data warehouse
Dwh_ryan	General Sales	2014-2015	2014-2015	2 years

H. Stars Scheme

The following is a star schema design resulting from the process of designing the data warehouse :

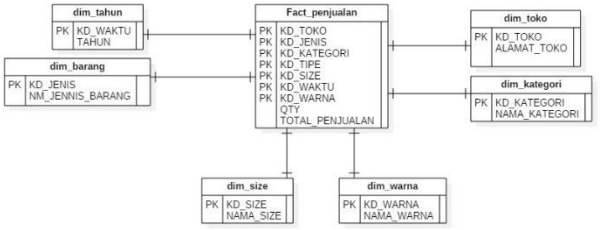


Figure 3 Star Schema Design

III. RESULTS

Data warehouse must have the capability to provide complete information to the user, therefore, needs a device interface that provides information to the user. The presentation to the user's web-based developed using PHP. DBMS is used as a data warehouse platform used is MySql.

Since the presentation of web-based data warehouse, then the user can access from any computer that has internet / intranet. The ability of a data warehouse, among others:

• Roll-up is the ability to display data in a lower-level details.
• Drill-down is the ability to display data in a higher level.
• The ability to create their own queries as needed.
• Ability to create a chart or graph in accordance with the desired report.
• Ability to be exported into Microsoft Excel and pdf format.

IV. DISCUSSION

Information displayed on the results of data warehouse design, these include the information concerning the sale of goods most in demand (Figure 3) are the details of the sales charts of top-selling items for 2 years. Figure 4 shows the information about the ratio of sales by category.

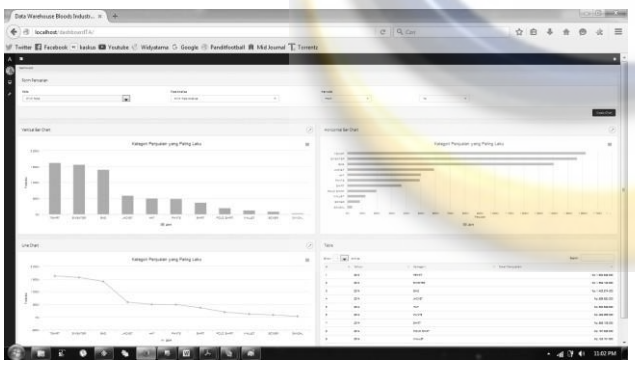


Figure 4 Sales Ratios Bestsellers

V. CONCLUSION

The design of the data warehouse in PT.Bloods Industries is able to integrate data from databse of sales operations, and resulted in the presentation of information to the management. The presentation of this data warehouse can also be accessed from any computer connected to the internet/intranet network because it was built using the web platform, and with the implementation of data warehouse dashboard can facilitate the leadership of the company in obtaining information and analysis of sales data. This research can be continued by using data mining techniques to dig information out of data into knowledge that can be used as a support in the decision process management.

ACKNOWLEDGMENT

The author would like to thank PT. Bloods Industries who has been willing to be a place where the writer doing research.

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