

# Implementation of Business Intelligence In Analyzing Data Using Tableau at PT Global Bintan Permata

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*Abstract*

PT Global Bintan Permata is member group Yafindo (Batam, Indonesia) which is engaged in the distribution and import goods consumption and goods consumption throughout Indonesia . one \_ business being run is distributing sugar \_ throughout modern market and delivery some are via transportation and some are done in a manner independent . The target market namely the big modern market like Alfamart , Alfamidi , Indomarco , Indogrosir , Tiptop, and there is also a small modern market like Totalfruits , Grandlucky , etc. \_ Of the many transactions made by the company this company \_ This Still Not yet own Dashboard application for monitoring activity operations and transactions . So from it is needed something deep data visualization dashboard shape . Method used to data warehouse design is use method kimball nine-step technology. For the Extract, Transform and Load (ETL) process for data warehouse design using tools in the Pentaho Data Integration application , meanwhile For dashboard visualization is done with use the Tableau Public app . Result of application Tableau Public app is form generated data visualization dashboard reports containing information in form the data visualization it consists of from transaction and marketing data in 2021. Dashboard provides information For know How development sale both product and sales are also developing transactions with customers in 2021 later will become base in taking decisions required by management within PT Global Bintan Permata for help in the process of taking decision.

## I. INTRODUCTION

A very valuable source of assets for companies in the era of the industrial revolution 4.0 is data, so its existence requires good management so that it can be put to good use[1]. Data must be well documented [2]. Therefore the data will be very useful in the future [3]. Data that is processed in such a way can be very useful information, making it easier to make decisions [4]. Business Intelligence (BI) is a solution in answering the need to answer questions related to existing problem analysis, and the results of this analysis can be used in the process of making a decision [5]. The Business Intelligence system is designed to be able to visualize sales and marketing data at PT Global Bintan Permata which is expected to be a solution in helping companies to collect data and process business information that has been processed and can help companies make better decision-making processes and achieve results. what you want faster.

As a business grows, so does the complexity of the information needed to make decisions. Businesses and companies must use technology that enables them to collect, process, and also present this information to authorized parties such as supervisors, administrators, or others. A useful tool to improve the quality of decision making.

This need allows business people and entrepreneurs to use the concept of business intelligence, which enables optimizing decision making through the availability of available information, creating quality information and presenting information in a timely manner, in its simplest form, this technology allows decision makers to obtain up-to-date insights into ongoing business performance.

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PT Global Bintan Permata is a member of the Yafindo group (Batam, Indonesia) engaged in the distribution and import of consumer goods and consumer goods throughout Indonesia. PT Global Bintan Permata is a trading company, we hold several brands to be distributed throughout Indonesia, especially in Java and Sumatra. Our brands such as: GMP and PSM sugar, Garemin salt, MOMOGI, MILANO, Gomi, Super Coffe Instant & Cereal and K.B.Food. The data source used is sales data at PT Global Bintan Permata which will be built as needed, so it is possible that this information system will continue to develop according to existing needs so that new opportunities will open up for information retrieval and analysis that was not previously available.

## II. METHODS

### A. Business Intelligence

Business intelligence or Business Intelligence (BI) combines methodologies, platforms, database systems, applications, analysis tools, and architectures [6]. Business Intelligence itself is activities such as in the process of presentation and analysis of the information that has been collected and will then be processed into the data warehouse so that it is easy to use in the decision-making process as well as possible [7]. BI consists of architecture and operational operations that are connected and integrated with each other, and are tools to support decision making [8].

The implementation of a business intelligence system can be used as a way to be able to analyze, extract information, and learn from cases of the corona virus that have occurred. Furthermore, with the implementation of the Business Intelligence system for the corona virus case, the learning process and decision making can be easily carried out [4]. In developing a business intelligence within a company there are 4 main phases or stages that must be carried out, which include analysis, design, planning, and finally implementation and control [9].

### B. Tableau

Tableau is a tool that can be used to visualize data in the form of a dashboard, so that data can be more interactive and easy to analyze. Visualization is carried out by transforming transactional data periodically in tabular form into graphical form, geographic mapping, so that data can be easier to read and more interactive [10]. The Tableau platform has the ability to connect and retrieve data from various data sources, has the ease of creating dashboards, accesses information anywhere using mobile devices and can export data analysis results [11].

Tableau combines SQL on databases with a descriptive language to create graphs and creates a database visualization language called VizQL [12]. The version used by the author is Tableau Public which is free.

### C. Dashboard and Data Visualization

Dashboard and data visualization are terms to help organizations, companies, people or individuals understand the significance and connectivity of data, by placing transactional data that was originally in tabular form into a visual form [13]. Dashboards and data visualization have become an integral and inseparable part in the world of business intelligence, and are increasingly needed in managing case studies in everyday life [14].

Dashboard and data visualization aim to understand history, program, and context, analyze various forms of data, assist data collection, so that it can communicate with stakeholders. Dashboards and visualization of data in BI are also very useful for increasing the value of the librarian's work, as well as providing additional, more detailed and in-depth knowledge of the work to the librarian [15].

### D. ETL (Extract, Tranform and Load)

Extraction, Transformation and Loading (ETL) is the process of extracting, transforming and loading data from a variety of data sources, where the main function of ETL is to transform data from several data sources into useful strategic information [16]. This process consists of Extraction, Transformation, Loading, and several processes that are carried out before being published to the data warehouse. So, ETL or extract, transform, loading is the data processing phase from the data source into the data warehouse. The purpose of ETL is to collect, filter, process and combine relevant data from various sources to be stored in a data warehouse. ETL can also be used to integrate data [8].

#### 1. Dimensional Modeling

A popular data model for the data warehouse is the multidimensional model. Some of the well-known concepts of data warehouse modeling in multidimensional models are star schema, snowflake and fact constellation schema [17].

#### 2. Staging Data

Not all data from data sources will be used, only data that supports the information needed by the user will be used. The place to select the necessary information and prepare the data for further processing to the data warehouse is the staging area and the data is called staging data [18].

#### 3. Business Intelligence Roadmap

The Business Intelligence Roadmap is divided into 2 methods, namely the analysis method and the design method [19]. The explanation of the Business Intelligence Roadmap is as follows:

1. Justification  
The first step should be seen as the progress of Business Intelligence. The research carried out is to analyze the data contained in PT Global Bintan Permata and then understand similar research journals.
2. Planning  
This stage develops a BI project plan that will be designed which will then select the data sources to be used and the tools they need.
3. Business Analysis  
This stage examines additional detailed information to gain an inside and outside understanding of existing information sources, data requirements for information sources, and expands the logical data model..
4. Design  
This stage, the data warehouse planning is completed through the creation of a data warehouse consisting of a fact table and a dimension table. Then the ETL configuration as an outline of the implementation of the role in the ETL process that will be carried out following the data warehouse plan.
5. Construction  
This stage is the construction of a data warehouse on the xampp database, the ETL process for each dimension table and fact table and the application of the Tableau tools in making dashboard visualization reports.
6. Report  
This stage, the preparation of the final report from start to finish is carried out by combining ideas.

#### **E. Nine-step Technology**

According to Ralph Kimball, quoted from the journal Ganda Wijaya [20], known as the nine-step design methodology that is carried out systematically, it can build a good data warehouse. The following is an overview of the nine steps, namely:

1. Choose The Process, which is to be more specific in choosing the interactions that determine the main subject. The main subject is in organizational business exercises that can answer very significant business questions.
2. Choose the Grain, which is to find out what the fact table will cover. Next define the dimension table associated with the fact table. Specifying items in the fact table also defines items in the dimension table. For this situation, Grain can be obtained from the exchange of information.
3. Identify and Conform the Dimensions, which is to be more specific the most common way to distinguish and relate dimension tables to fact tables. Dimensions are various perspectives that are important to describe a reality.
4. Choose the Facts, which is Grain selection from the fact table to find out which facts can be used. At this stage, decide on the actions to be used and required in the fact table.
5. Store Pre calculations in the Fact Table, in this stage the consequences of calculating a trait are viewed as stored in the data set. This is valuable for reducing errors in the program when calculating this quality.
6. Round Out the Dimension Tables, on the dimensions that have been identified then a drawing is made containing organized data about the characteristics of the dimension table. The dimension table is made to make sense in depth so that it is effectively known by the user.
7. Choose the Durations of the Database, The selection of the information period to be placed into the information is still determined at this stage. For example, organizational information for more than one year or more is retrieved and placed into a fact table.
8. Determine the Need to Track Slowly Changing Dimensions, which is dimensions can go through slow changes and become problems. There are three basic types of slow layered changes, specifically fixing a changed characteristic, creating another record in a dimension, or creating a optional property to retain another value.
9. Decide Physical Design, At this stage, do the physical design of the data warehouse. In addition, determine the problems that might occur in the physical design of the data warehouse.

### **III. RESULTS**

The source of the data was obtained from PT Global Bintan Permata, the data was in the form of transaction data from January 2021 to December 2021 and marketing data on PT Global Bintan Permata.

Transaction and marketing data in xls format with a total of 2 files with a total of as many (transaction data) and 4 (marketing data) records data.

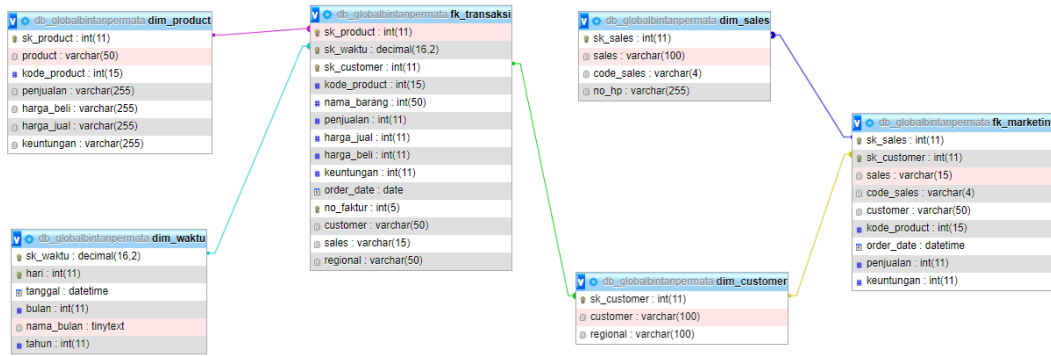


Fig. 1 Data Warehouse Schema

Fig. 1 is the ETL Schema of the Table Relationship which contains 4 Dimension Tables and 2 Fact Tables. 4 dimension tables are Product Dimension, Time Dimension, Customer Dimension and Sales Dimension while 2 Fact Tables are Transaction Facts and Marketing Facts. In making this table, it is done in the Pentaho Data Integration software which is connected to MySQL Localhost

**A. Data Warehouse Visualization**

In part This containing explanation about analysis to data visualization through appearance chart or table related to transaction data and marketing data.

1) Visualization on the Transaction Dashboard

Visualization This produce various type the information displayed in form graphs and tables . Following is results from visualization with use the Tableau application.

a) Time Information

Results in visualization This display information the time in the transaction data diperiod in 2021, on research This information time display in form month for 1 year from January to December . Appearance information time can seen as in Fig. 2.

Visualisai Infomasi Waktu

Month of O..	
January	2021
February	2021
March	2021
April	2021
May	2021
June	2021
July	2021
August	2021
September	2021
October	2021
November	2021
December	2021

Fig. 2 Time of month visualization

b) Sales Trend Information

Result of visualization This is displays information How the sales trend chart in 2021 is displayed in every the month . In January there are sale 2,940,179 in February 3,036,735 , in March 4,815,866 , in April 4,542,647, in May 4,040,712 , in June 2,557,032 July 3,233,548, in August 2,952,997, in September 3,096,952, in October 3,284,780, in November 3,336,722 and in December 3,193,520. Appearance sales trend information can seen as in Fig. 3.

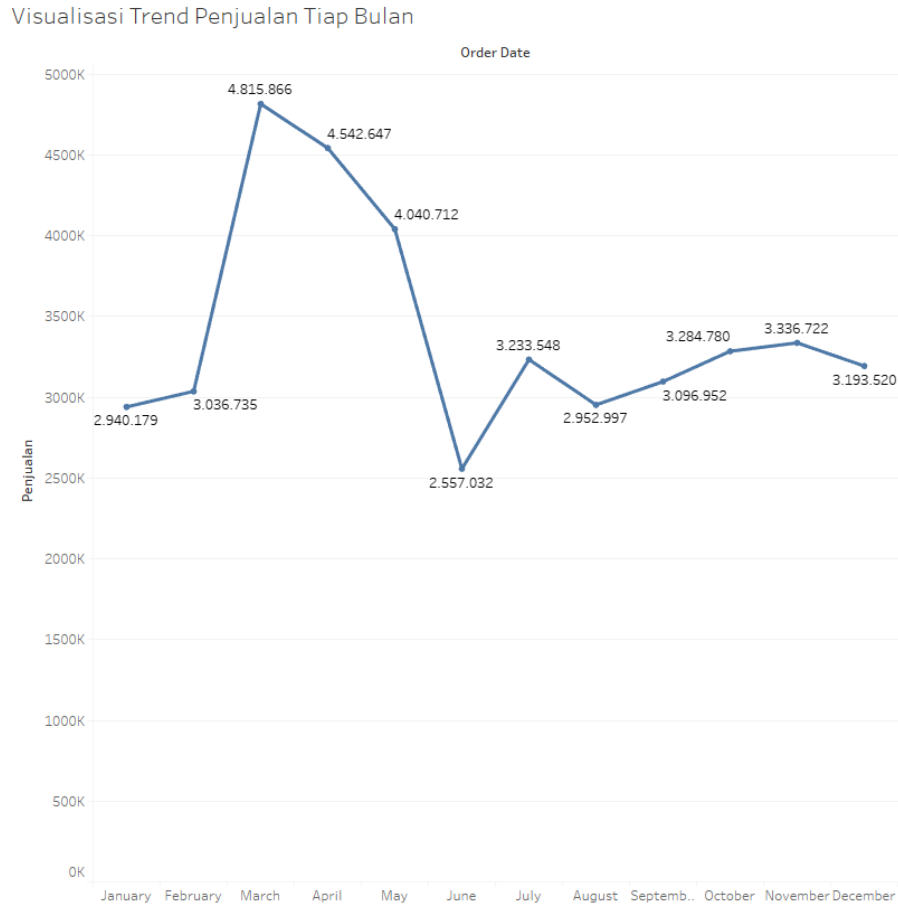


Fig. 3 Visualization of Sales Trends

c) Regional Information

Result of visualization This is display regional information or any area \_ sale This done . Appearance regional information can be seen as in Fig. 4.

### Visualisasi Regional

Regional	z
Kota Tangerang Selatan	Abc
Kota Tangerang	Abc
Kota Sorong	Abc
Kota Serang	Abc
Kota Semarang	Abc
Kota Pontianak	Abc
Kota Pasuruan	Abc
Kota Mataram	Abc
Kota Manado	Abc
Kota Karawang	Abc
Kota Jakarta pusat	Abc
Kota Jakarta Utara	Abc
Kota Jakarta Timur	Abc
Kota Jakarta Selatan	Abc
Kota Jakarta Barat	Abc
Kota Depok	Abc
Kota Cirebon	Abc
Kota Cimahi	Abc
Kota Bogor	Abc
Kota Bekasi	Abc
Kota Banjarmasin	Abc
Kota Bandung	Abc
Kabupaten Tangerang	Abc
Kabupaten Sleman	Abc
Kabupaten Sidoarjo	Abc
Kabupaten Rembang	Abc
Kabupaten Minahasa Utara	Abc
Kabupaten Malang	Abc
Kabupaten Magelang	Abc
Kabupaten Klaten	Abc
Kabupaten Jember	Abc
Kabupaten Gorontalo	Abc
Kabupaten Gianyar	Abc
Kabupaten Deli Serdang	Abc
Kabupaten Cirebon	Abc
Kabupaten Cilacap	Abc
Kabupaten Cianjur	Abc
Kabupaten Ponorogo	Abc

Fig. 4 Regional Visualization

d) Information Regional Sales

Result of visualization This is displays information How level regional sales in 2021 in each the month . Appearance information regional sales can seen as in Fig. 5.

Visualisasi Penjualan Regional Tahun 2021

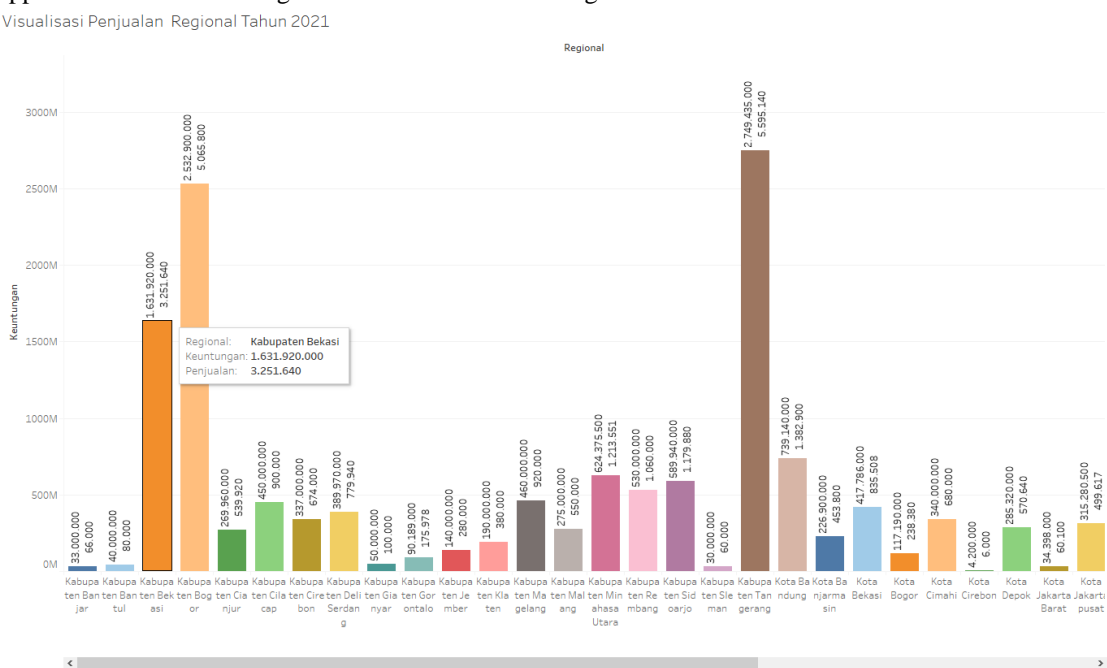


Fig. 5 Visualization Regional Sales

e) Information Sale Product

Result of visualization is displays information about sale product in period year 2021 with each the month . Visualization this is also given coloring as sign If blue the more concentrated signify that sale the more big and vice versa If color blue the more fading It means sale his decrease or low . Appearance visualization sale product can seen like display Fig. 6 & 7.

Informasi Penjualan Product

Nama Barang	Order Date											
	January	February	March	April	May	June	July	August	September	October	November	December
GMP GULA PREMIUM (20x...)	2.866.671	2.904.475	4.483.242	3.916.166	3.295.560	2.154.640	2.920.064	2.700.140	2.685.540	3.013.120	3.036.172	2.678.060
PSM GULA PREMIUM (20x...)	73.508	132.260	332.624	626.481	745.152	402.392	313.484	252.857	411.412	271.660	300.550	515.460

Fig. 6 Visualization Sale Product

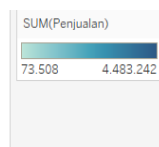


Fig. 7 Visualization Sale Product

f) maps

Result of visualization This is displays regional mapping against sale product . Featured through openstreetmap . Appearance visualization this regional map can seen as in Fig. 8.



Fig. 8 Regional Map

**B. Visualization on the Marketing Dashboard**

Visualization This produce various type the information displayed in form graphs and tables. Following is results from visualization with use the Tableau application.

a) Sales Information

Result of visualization This is displays sales information such as sales name and sales code respectively. Appearance visualization sales information can seen like Fig. 9.

Informasi Sales

Sales	Kode Sales	
CUI ING	TM01	■
ELLA	TM02	■
FITRI	TM05	■
IMAS	TM03	■
LEONARDO	TM04	■
OFFICE	TM10	■
SLS DK	TM11	■
SLS LK	TM09	■
SLS MTKA	TM06	■
SLS MTLA	TM07	■
SLS OLN	TM08	■

Fig. 9 Visualization Sales Information



b) Sales Sales Trend Information

Result of visualization This is displays information what are the sales trends to sales in the period in 2021 on each the month . Appearance visualization of sales trends This can seen as in Fig. 10.

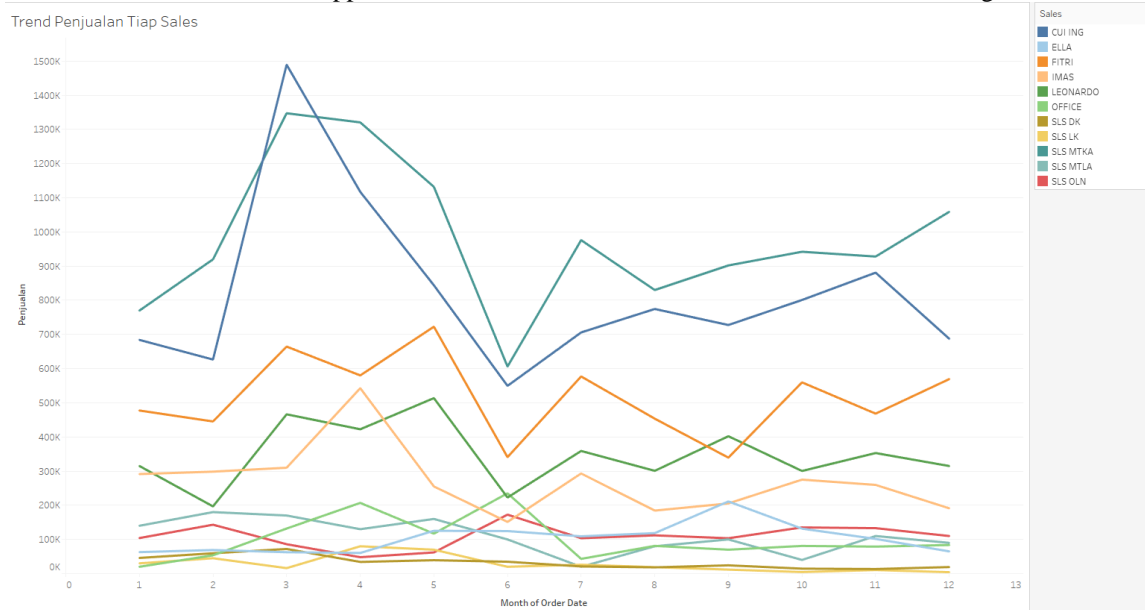


Fig. 10 Visualization of Sales Sales Trends

c) Information Profit Sales Sales

Result of visualization This is displays information magnitude profit from sales on each sales with add customer dimension or the name of the customer handled by each sales and display time in form month from january to December . Appearance visualization information profit sales sales can seen as in Fig.11.

Informasi Keuntungan Penjualan Tiap Sales

Sales	Nama Barang	Order Date											
		January	February	March	April	May	June	July	August	September	October	November	December
CUI ING	GMP GULA PREMIUM (20x...	335.319.500	310.456.000	730.990.000	552.230.000	410.230.000	268.744.000	352.290.000	386.052.000	357.630.000	399.900.000	439.686.000	338.160.000
	PSM GULA PREMIUM (20x...	6.690.000	2.802.000	13.690.000	6.440.000	11.720.000	6.014.000	630.000	1.192.000	6.160.000	510.000	710.000	5.470.000
ELLA	GMP GULA PREMIUM (20x...	30.516.000	33.338.000	30.416.000	26.088.000	56.282.000	60.960.000	54.340.000	58.970.000	105.080.000	64.870.000	50.390.000	31.220.000
	PSM GULA PREMIUM (20x...	944.000	1.146.000	902.000	4.134.000	6.398.000	1.280.000	220.000	290.000	490.000	898.000	380.000	1.270.000
FITRI	GMP GULA PREMIUM (20x...	236.370.000	208.170.000	327.290.000	278.163.000	316.610.000	160.400.000	277.290.000	226.300.000	167.954.000	279.040.000	231.570.000	274.680.000
	PSM GULA PREMIUM (20x...	2.310.000	14.480.000	4.930.000	11.881.000	44.740.000	10.030.000	11.200.000	410.000	1.750.000	810.000	2.520.000	9.980.000
IMAS	GMP GULA PREMIUM (20x...	141.854.000	144.870.000	145.810.000	255.060.000	103.890.000	73.100.000	146.012.000	91.000.000	101.180.000	136.690.000	127.990.000	93.440.000
	PSM GULA PREMIUM (20x...	3.834.000	4.320.000	7.150.000	16.330.000	23.650.000	2.500.000	522.000	1.230.000	1.530.000	820.000	1.800.000	2.110.000
LEONARDO	GMP GULA PREMIUM (20x...	155.550.000	95.730.000	229.670.000	203.580.000	237.260.000	110.210.000	178.086.000	149.820.000	198.430.000	149.064.000	174.650.000	154.070.000
	PSM GULA PREMIUM (20x...	1.970.000	2.606.000	3.430.000	7.644.000	19.568.000	1.140.000	1.400.000	580.000	2.610.000	1.144.000	1.780.000	3.360.000
OFFICE	GMP GULA PREMIUM (20x...	5.000.000	23.450.000	60.450.000	3.900.000	22.500.000	23.030.000	21.850.000	32.080.000	36.000.000	36.600.000	40.400.000	31.200.000
	PSM GULA PREMIUM (20x...	5.000.000	5.250.000	6.000.000	100.000.000	38.000.000	95.010.000		11.310.000	5.000.000			10.850.000
SLS DK	GMP GULA PREMIUM (20x...	27.278.000	33.450.000	41.794.000	19.650.000	20.290.000	21.434.000	12.234.000	12.307.000	14.818.000	8.726.000	8.948.000	8.950.000
	PSM GULA PREMIUM (20x...	1.308.000	700.000	1.236.000	6.748.000	3.144.000	1.736.000	3.078.000	2.281.000	1.456.000	2.614.000	1.851.000	5.290.000
SLS LK	GMP GULA PREMIUM (20x...	12.000.000	15.000.000	3.600.000		12.000.000		3.600.000		5.820.000	2.160.000	3.060.000	1.500.000
	PSM GULA PREMIUM (20x...	6.000.000	12.000.000	6.000.000	48.000.000	30.000.000	12.000.000	12.000.000		1.200.000	600.000	3.180.000	1.020.000
SLS MTKA	GMP GULA PREMIUM (20x...	384.842.000	449.887.500	561.689.000	563.290.000	385.000.000	230.000.000	360.000.000	305.000.000	260.000.000	347.000.000	330.000.000	330.000.000
	PSM GULA PREMIUM (20x...		10.000.000	111.970.000	96.999.500	180.986.000	72.986.000	128.000.000	109.958.500	190.976.000	123.990.000	136.170.000	217.090.000
SLS MTLA	GMP GULA PREMIUM (20x...	47.625.000	61.875.000	58.312.500	33.375.000	47.625.000	40.500.000	7.125.000	28.500.000	40.500.000	19.125.000	40.500.000	26.250.000
	PSM GULA PREMIUM (20x...	7.620.000	7.620.000	7.620.000	19.050.000	15.224.760						3.810.000	5.430.000
SLS OLN	GMP GULA PREMIUM (20x...	52.790.000	71.330.000	44.300.000	24.400.000	32.178.000	90.850.000	49.770.000	56.970.000	52.940.000	73.100.000	67.700.000	51.200.000
	PSM GULA PREMIUM (20x...		7.000.000	1.500.000			1.200.000	2.000.000					5.000.000

Fig. 11 Visualization Profit Sales Sales

#### IV. CONCLUSIONS

Based on results application Tableau app for do visualization of data owned by PT Global Bintan Permata in processing transaction data and marketing that started with the Extract, Transform and Load (ETL) process up to making dashboard visualization then can concluded that :

1. Business intelligence development in manage data with using Tableau has produce good information \_ in form visualization graphics , text and tables.
2. The resulting dashboard containing information in form the data visualization it consists of from transaction and marketing data in 2021. Dashboard give information For know How development sale Good product and sales are also developing transactions with customers in 2021 later will become base in taking decision.
3. Management of PT Global Bintan capable apply business intelligence dashboard- based for more easy in produce Transaction data reports are also capable help in analyze problem , take right decision \_ as well as enhancement quality and service

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