BIKESTORE DATA ANALYSIS CASE STUDY

Americo Marcos

Ask

Introduction

Business Task

I am asked to create a comprehensive sales dashboard for the executive team at the theoretical bicycle retail company, first by pulling out the relevant data from the company's database using SQL and then designing a well-structured and dynamic dashboard using Excel. I will be following the five steps involved in all data analytics projects when putting together this portfolio.

A brief overview of what the end results will look like at the end, but first thing I'm going to do is tap into the company's relational database by writing an SQL script to generate a detailed data set that provides me with all the data and information I need to put together a comprehensive and dynamic sales dashboard for the executive team. Next, I am going to import the SQL generated data set into Excel. And then use pivot tables to generate a dynamic dashboard.

and then I am going to connect the excel data sheet that contains the SQL generated datasets to tableau and use the information the data to SQL generated data set to Tableau and use the information the data to generate this visually pleasing and dynamic dashboard. For management. Let's begin.

Data analysis follows a rigorous step by step process that involves understanding the problem:

- Defining the business or project goals laying out a plan to find a solution. 2. Collecting and gathering data from various sources based on set priorities.
- Cleaning the data to remove unwanted, redundant, and missing values that may impede analysis.
- Exploring and analyzing the data using business intelligence tools, data visualization, data mining techniques and or predictive modeling.
- Knowing what exactly management wants

Having determine what their needs and goals are needed to figure out how to provide that information in the most organized and digestible way. I figured that a simple report will be too long and unmanageable for them to use. My job is to make your life as easy as possible after all. So, the best course of action is to provide them with a comprehensive dashboard with Excel.

One that clearly based on all the metrics they require and can easily access. Before everything I had to understand what to do, and the next step was to deliver what I understood.

In this case, Management wants to know the condition of the sales activities within the company and gain insights into the various trends happening in the sales volume over the 2016 to 2018. They probably also want to know the revenues per region, per store, per product category and per brand. A list of the top customers and sales reps could also prove insightful.

Prepare

I used the public dataset called BikeStore available at the following link https://docs.google.com/spreadsheets/d/1ESMiCguVJjUzjVNxLffngDrHsQcMFHrt/edit?gid=1194135803#gid=1194135803

This dataset contains 9 separated but relatable tables. I am going to perform a series of direct and indirect table joins to generate the Required Dataset. I will get the order ID and order dates from the **sales.orders** table, the customer's name, city, and state from the **sales.customers** table, and the revenue and sales volume from the **sales.order_items** table. But I can't simply add them to the query randomly. Some tables can't be directly connected to others, but instead can only be added after certain tables are included in the query. This will make more sense as I write the script.

ROCCC analysis

Reliable: high, the data collected from a user with a demographic information.

Originality: high, the data was collected from a second-party.

Comprehensive: high — the data contained personal a data actual corporate which allowed me to answer business questions.

Current: low, the respondents were generated during 2018.

Cited: high, the data source was well-documented.

Process

In this project, I will make use of SQl by puling relevant data and construct a well and dynamic dashboard using excel, the first step is tapping Into the company relational database by writing a SQL script to generate a detail dataset that will provide the data necessary to put together a dynamic sales dashboard for the executive team. Next I will import the SQL generated dataset into excel and use pivot table to generate dynamic dashboards

Table 1

```
SELECT
    ord.order_id,
    CONCAT(cus.first_name,' ',cus.last_name) AS 'customers',
    cus.city,
    cus.state,
    ord.order_date,
    SUM(ite.quantity) AS 'total_units',
    SUM(ite.quantity * ite.list_price) AS 'revenue',
    pro.product_name,
    cat.category_name,
    sto.store_name,
    CONCAT(sta.first_name, '', sta.last_name) AS 'sales_rep'

FROM sales.orders ord
JOIN sales.customers cus
ON ord.customer_id = cus.customer_id
JOIN sales.order_items ite
ON ord.order_id = ite.order_id
JOIN production.products pro
ON ite.product_id = pro.product_id
JOIN  production.categories cat
ON pro.category_id = cat.category_id
JOIN sales.stores sto
ON ord.store_id = sto.store_id
join SALES.staffs sta
on ord.staff_id = sta.staff_id

GROUP BY
    ord.order_id,
    CONCAT(cus.first_name,' ',cus.last_name),
    cus.city,
    cus.state,
    ord.order_date,
    pro.product_name,
    cat.category_name,
    sto.store_name,
    CONCAT(sta.first_name, '', sta.last_name);
```

I started by retrieving the information about order from sales database and select the order id as a unique identifier each order, and the concatenated the customer's first name and las names into a single string labelled as customers. I also selected the city, state and order_date in which the order was placed, I calculated the total qualities of items in the order and also calculated the total revenue from the order by summing the product of item quantities and their list prices. I also selected the name of the product, the name of the category to which the product belongs and the name of the store the order was placed and concatenated the first and the last name of sales representative into a single string labelled as sales_rep.

From And Joins Clauses

I used the JOIN function to Join the customer's table on the condition that the customer id in the order_id table matches the customer_id In the customer's table. Also joined the order_items table on the condition that the order_id in the orders table matches the order_id in the order_items table.

Joined the order_items table on the condition that the order_id in the orders table matches the order_id in the order_items table. Joins the categories table on the condition that the category_id in the products table matches the category_id in the categories table.

Joined the stores table on the condition that the store_id in the orders table matches the store_id in the stores table. Also joined the staffs table on the condition that the staff_id in the orders table matches the staff_id in the staffs table.

This query aims to generate a report detailing each order, including the customer's name and location, order date, total units sold, revenue generated, product and category details, store name, and the sales representative's name. The use of aggregation functions like SUM provides summary statistics for each order.

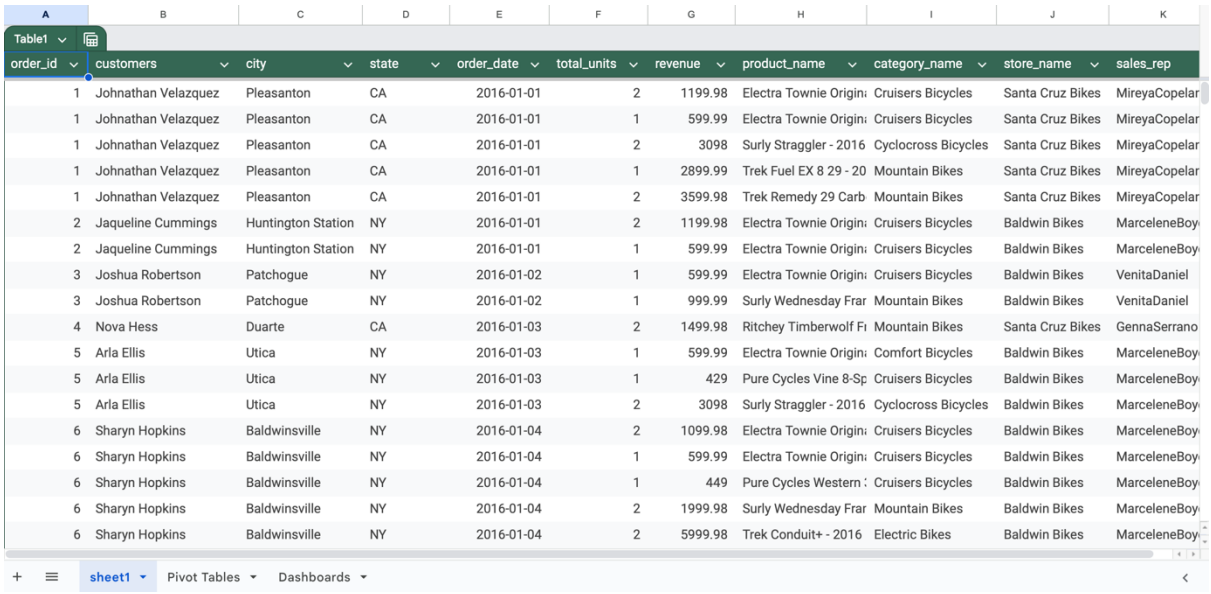
The following is a result of the query above

Table 2

order_…	customers	city	state	order_date	total_uni…	revenue	product_name	category_name	store_name	sales_rep
1	Johnathan V…	Pleasanton	CA	2016-01-01	2	1199.98	Electra Townie …	Cruisers Bicycles	Santa Cruz Bikes	MireyaCopeland
1	Johnathan V…	Pleasanton	CA	2016-01-01	1	599.99	Electra Townie …	Cruisers Bicycles	Santa Cruz Bikes	MireyaCopeland
1	Johnathan V…	Pleasanton	CA	2016-01-01	2	3098.00	Surly Straggler…	Cyclocross Bicycles	Santa Cruz Bikes	MireyaCopeland
1	Johnathan V…	Pleasanton	CA	2016-01-01	1	2899.99	Trek Fuel EX 8 …	Mountain Bikes	Santa Cruz Bikes	MireyaCopeland
1	Johnathan V…	Pleasanton	CA	2016-01-01	2	3599.98	Trek Remedy 29 …	Mountain Bikes	Santa Cruz Bikes	MireyaCopeland
2	Jaqueline C…	Huntington…	NY	2016-01-01	2	1199.98	Electra Townie …	Cruisers Bicycles	Baldwin Bikes	MarceleneBoyer
2	Jaqueline C…	Huntington…	NY	2016-01-01	1	599.99	Electra Townie …	Cruisers Bicycles	Baldwin Bikes	MarceleneBoyer
3	Joshua Robe…	Patchogue	NY	2016-01-02	1	599.99	Electra Townie …	Cruisers Bicycles	Baldwin Bikes	VenitaDaniel
3	Joshua Robe…	Patchogue	NY	2016-01-02	1	999.99	Surly Wednesday…	Mountain Bikes	Baldwin Bikes	VenitaDaniel
4	Nova Hess	Duarte	CA	2016-01-03	2	1499.98	Ritchey Timberw…	Mountain Bikes	Santa Cruz Bikes	GennaSerrano
5	Arla Ellis	Utica	NY	2016-01-03	1	599.99	Electra Townie …	Comfort Bicycles	Baldwin Bikes	MarceleneBoyer
5	Arla Ellis	Utica	NY	2016-01-03	1	429.00	Pure Cycles Vin…	Cruisers Bicycles	Baldwin Bikes	MarceleneBoyer
5	Arla Ellis	Utica	NY	2016-01-03	2	3098.00	Surly Straggler…	Cyclocross Bicycles	Baldwin Bikes	MarceleneBoyer
6	Sharyn Hopk…	Baldwinsvi…	NY	2016-01-04	2	1099.98	Electra Townie …	Cruisers Bicycles	Baldwin Bikes	MarceleneBoyer
6	Sharyn Hopk…	Baldwinsvi…	NY	2016-01-04	1	599.99	Electra Townie …	Cruisers Bicycles	Baldwin Bikes	MarceleneBoyer
6	Sharyn Hopk…	Baldwinsvi…	NY	2016-01-04	1	449.00	Pure Cycles Wes…	Cruisers Bicycles	Baldwin Bikes	MarceleneBoyer
6	Sharyn Hopk…	Baldwinsvi…	NY	2016-01-04	2	1999.98	Surly Wednesday…	Mountain Bikes	Baldwin Bikes	MarceleneBoyer
6	Sharyn Hopk…	Baldwinsvi…	NY	2016-01-04	2	5999.98	Trek Conduit+ -…	Electric Bikes	Baldwin Bikes	MarceleneBoyer
7	Laureen Paul	Bellmore	NY	2016-01-04	1	529.99	Electra Moto 1 …	Cruisers Bicycles	Baldwin Bikes	MarceleneBoyer
7	Laureen Paul	Bellmore	NY	2016-01-04	2	858.00	Pure Cycles Vin…	Cruisers Bicycles	Baldwin Bikes	MarceleneBoyer
7	Laureen Paul	Bellmore	NY	2016-01-04	1	999.99	Surly Wednesday…	Mountain Bikes	Baldwin Bikes	MarceleneBoyer
8	Leslie Higg…	Saratoga S…	NY	2016-01-04	1	269.99	Electra Girl's …	Children Bicycles	Baldwin Bikes	VenitaDaniel
8	Leslie Higg…	Saratoga S…	NY	2016-01-04	2	1199.98	Electra Townie …	Cruisers Bicycles	Baldwin Bikes	VenitaDaniel

The next step was to import the database to excel using **GET DATA FROM SQL SERVER DATABASE** for further analysis. Which looks like the following table.

Table 3



order_id	customers	city	state	order_date	total_units	revenue	product_name	category_name	store_name	sales_rep
1	Johnathan Velazquez	Pleasanton	CA	2016-01-01	2	1199.98	Electra Townie Origin	Cruisers Bicycles	Santa Cruz Bikes	MireyaCopelar
1	Johnathan Velazquez	Pleasanton	CA	2016-01-01	1	599.99	Electra Townie Origin	Cruisers Bicycles	Santa Cruz Bikes	MireyaCopelar
1	Johnathan Velazquez	Pleasanton	CA	2016-01-01	2	3098	Surly Straggler - 2016	Cyclocross Bicycles	Santa Cruz Bikes	MireyaCopelar
1	Johnathan Velazquez	Pleasanton	CA	2016-01-01	1	2899.99	Trek Fuel EX 8 29 - 20	Mountain Bikes	Santa Cruz Bikes	MireyaCopelar
1	Johnathan Velazquez	Pleasanton	CA	2016-01-01	2	3599.98	Trek Remedy 29 Carb	Mountain Bikes	Santa Cruz Bikes	MireyaCopelar
2	Jaqueline Cummings	Huntington Station	NY	2016-01-01	2	1199.98	Electra Townie Origin	Cruisers Bicycles	Baldwin Bikes	MarceleneBoy
2	Jaqueline Cummings	Huntington Station	NY	2016-01-01	1	599.99	Electra Townie Origin	Cruisers Bicycles	Baldwin Bikes	MarceleneBoy
3	Joshua Robertson	Patchogue	NY	2016-01-02	1	599.99	Electra Townie Origin	Cruisers Bicycles	Baldwin Bikes	VenitaDaniel
3	Joshua Robertson	Patchogue	NY	2016-01-02	1	999.99	Surly Wednesday Frar	Mountain Bikes	Baldwin Bikes	VenitaDaniel
4	Nova Hess	Duarte	CA	2016-01-03	2	1499.98	Ritchey Timberwolf Fr	Mountain Bikes	Santa Cruz Bikes	GennaSerrano
5	Arla Ellis	Utica	NY	2016-01-03	1	599.99	Electra Townie Origin	Comfort Bicycles	Baldwin Bikes	MarceleneBoy
5	Arla Ellis	Utica	NY	2016-01-03	1	429	Pure Cycles Vine 8-Sp	Cruisers Bicycles	Baldwin Bikes	MarceleneBoy
5	Arla Ellis	Utica	NY	2016-01-03	2	3098	Surly Straggler - 2016	Cyclocross Bicycles	Baldwin Bikes	MarceleneBoy
6	Sharyn Hopkins	Baldwinsville	NY	2016-01-04	2	1099.98	Electra Townie Origin	Cruisers Bicycles	Baldwin Bikes	MarceleneBoy
6	Sharyn Hopkins	Baldwinsville	NY	2016-01-04	1	599.99	Electra Townie Origin	Cruisers Bicycles	Baldwin Bikes	MarceleneBoy
6	Sharyn Hopkins	Baldwinsville	NY	2016-01-04	1	449	Pure Cycles Western :	Cruisers Bicycles	Baldwin Bikes	MarceleneBoy
6	Sharyn Hopkins	Baldwinsville	NY	2016-01-04	2	1999.98	Surly Wednesday Frar	Mountain Bikes	Baldwin Bikes	MarceleneBoy
6	Sharyn Hopkins	Baldwinsville	NY	2016-01-04	2	5999.98	Trek Conduit+ - 2016	Electric Bikes	Baldwin Bikes	MarceleneBoy

Analysis

The first set of information that I came up with for management was the total revenue per year as well as the total revenue per month throughout the years since 2016, the information was used in pivot tables

Table 4

order_date - Year	SUM of revenue
2016	2709484.47
2017	3845515.02
2018	2023989.39
Grand Total	**8578988.88**

The pivot table above shows the total revenue per year from 2016-2018, making 2017 the most profit year to this moment, 2018 was the current year on which the data was analysed, that's the reason the data is incomplete. All years combined for total of 8578988.88 sales.

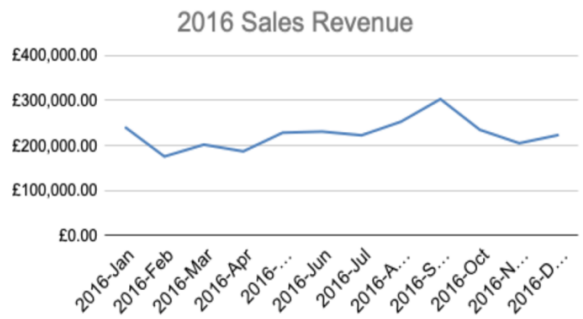
Table 5

order_date - Year-Month	SUM of revenue
2016-Jan	241184.15
2016-Feb	175768.1
2016-Mar	202157.14
2016-Apr	187223.55
2016-May	228701.13
2016-Jun	231120.29
2016-Jul	222854.21
2016-Aug	253130.83
2016-Sep	303282.61
2016-Oct	235051.79
2016-Nov	205315.47
2016-Dec	223695.2
2017-Jan	316954.77
2017-Feb	348740.47
2017-Mar	348177.13
2017-Apr	254105.57
2017-May	297754.66
2017-Jun	419892.07
2017-Jul	255727.63
2017-Aug	322553.32
2017-Sep	329388.68
2017-Oct	345316.18
2017-Nov	315881.67
2017-Dec	291022.87
2018-Jan	426301.72
2018-Feb	223941.44
2018-Mar	406701.2
2018-Apr	909179.47
18-Jun	209.99

The pivot table above shows the sum of revenue for both years and the months from 2016-2018, it a more detailed table compared to pivot table 1. Below are the

visualisation for the sales revenues thought the years, so that management can have a clear understanding through graphs.

Table 6



The graph above is a representation of the sales revenue and we can notice a pick just as the end of September and the Lowest sales revenues in the month of February

Table 7

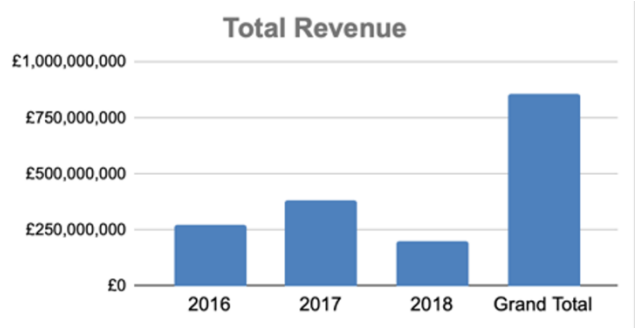
2017 was a well-balanced year with sales increasing compared to previews years reaching the 400.000 mark in sales a much improvement from the previews year.

Table 8

2018 has the potential to be the most profit year as of now it has reached the highest mark in sales passing 750.000 thousands euros in sales. The bar graph below

summarises the total revenue for each year keeping in mind that 2018 data was only till June of that year.

Table 9



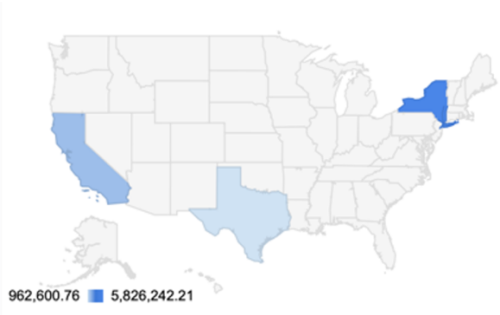
The next step was to show the revenue per state and per store. Both pivot table are provided below

Table 10

state	SUM of revenue
CA	1790145.91
NY	5826242.21
TX	962600.76
Grand Total	**8578988.88**

The sum of revenue per state shows that New York has the highest number of sales and Texas has the lowest number of sales. A map graph better represent the sum of revenue per state pivot table, showing the darker the blue the highest sale revenue per state.

Table 11



I also wanted to show the sales of revenue per store, so I create the pivot table showing the stores names and the sum of revenue provided below. Showing that Baldwin Bikes are the ones with the highest sales numbers with 68% of the sales.

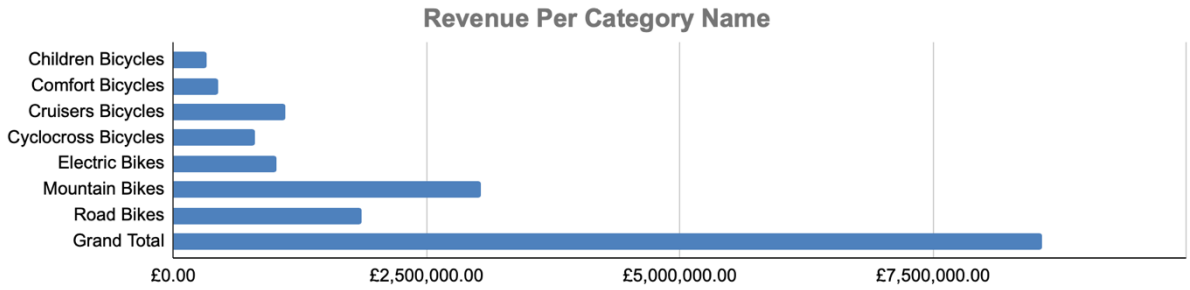
Table 12

store_name	SUM of revenue
Baldwin Bike	5826242.21
Rowlett Bike	962600.76
Santa Cruz B	1790145.91
Grand Total	**8578988.88**

Table 13

While the BikeStore's revenue is diversified across various categories of bikes, mountain bikes remain the cornerstone of its financial success. Their high sales volume and average selling price make them the most significant contributors, underscoring the importance of catering to this category to maintain and enhance revenue growth as it shows below.

Table 14



An entire look at the pivot tables

Table 15

order_date - Year	SUM of revenue
2016	2709484.47
2017	3845515.02
2018	2023989.39
Grand Total	**8578988.88**

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2016-Jan	241184.15
2016-Feb	175768.1
2016-Mar	202157.14
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2018-Feb	223941.44
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CA	1790145.91
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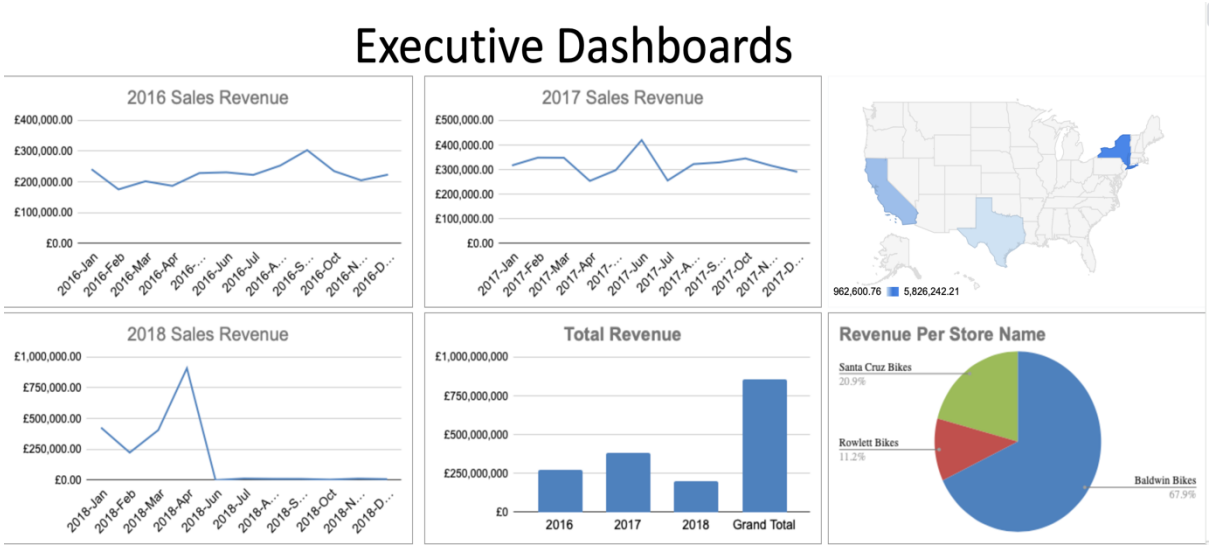
Grand Total	**8578988.88**

store_name	SUM of revenue
Baldwin Bike	5826242.21
Rowlett Bike	962600.76
Santa Cruz B	1790145.91
Grand Total	**8578988.88**

category_na	SUM of revenue
Children Bicy	327888.21
Comfort Bicy	438506.87
Cruisers Bicy	1109151.04
Cyclocross Bi	799874.6
Electric Bikes	1020236.85
Mountain Bil	3030775.71
Road Bikes	1852555.6
Grand Total	**8578988.88**

Act

Table 16



The comprehensive sales dashboard designed for the executive team at the theoretical bicycle retail company provides an in-depth analysis of the company's sales performance. It consolidates key metrics and insights, allowing executives to monitor and evaluate the effectiveness of sales strategies. The dashboard includes detailed reports on sales volume, revenue, and growth trends, segmented by product categories, regions, and sales channels. It also features visualizations such as graphs and charts to present data in an easily digestible format. By offering real-time data updates, the dashboard helps executives make informed decisions and adjust strategies to enhance sales outcomes.