

# Final Project Business Intelligence Analyst

## Project Based Internship VIX

Presented by  
Liandra Andika



# Liandra Andika

## About Me

I am an Accounting graduate from Universitas Islam Indonesia with a strong interest in data analysis and business intelligence. With previous experience in administration and editorial work, I have developed attention to detail and analytical thinking skills. I am eager to explore how data can drive strategic business decisions and to grow my expertise in transforming data into meaningful insights.

# Case Study

## Background:

PT Sejahtera Bersama aims to analyze product sales trends by category, city, and transaction time. The goal is to improve marketing strategies using a Business Intelligence (BI) approach, supported by Google Query for data aggregation, and visualizations were conducted using Looker Studio dashboards.

## Objectives:

1. Identify the primary key for each of the four sales datasets (Task 1).
2. Establish relationships among customer, product, category, and transaction tables (Task 2).
3. Create a master transaction table combining customer, product, category, quantity, and total sales data using Google Query (Task 3).
4. Develop an interactive Looker Studio dashboard showing:
  - ❖ Total overall sales
  - ❖ Sales & quantity by product category
  - ❖ Sales & quantity by city
  - ❖ Top 5 categories by highest sales
  - ❖ Top 5 categories by highest quantity (Task 4)
5. Analyze dashboard insights and propose strategies to maintain or increase sales (Task 5).

# Task 1: Identify the Primary Key

Task 1 Run Schedule Open in More Save

```

1  -- ✓ CEK PRIMARY KEY UNTUK TABEL CUSTOMERS
2  SELECT
3    COUNT(DISTINCT CustomerID) AS unique_count,
4    COUNT(*) AS total_count
5  FROM `bank-muamalat-bi-analytics.Salesdata.Customers`;
6  -- ✓ CEK PRIMARY KEY UNTUK TABEL PRODUCTS
7  SELECT
8    COUNT(DISTINCT ProdNumber) AS unique_count,
9    COUNT(*) AS total_count
10 FROM `bank-muamalat-bi-analytics.Salesdata.Products`;
11 -- ✓ CEK PRIMARY KEY UNTUK TABEL ORDERS
12 SELECT
13   COUNT(DISTINCT OrderID) AS unique_count,
14   COUNT(*) AS total_count
15 FROM `bank-muamalat-bi-analytics.Salesdata.Orders`;
16 -- ✓ CEK PRIMARY KEY UNTUK TABEL PRODUCTCATEGORY
17 SELECT
18   COUNT(DISTINCT CategoryID) AS unique_count,
19   COUNT(*) AS total_count
20 FROM `bank-muamalat-bi-analytics.Salesdata.ProductCategory`;

```

## Steps:

- Executed queries in BigQuery to calculate the number of unique values and total records in each table.
- If the count of unique values equals the total record count, the column is considered a primary key.

## Results:

- CustomerID → *Customers* table
- ProdNumber → *Products* table
- OrderID → *Orders* table
- CategoryID → *ProductCategory* table

Query results

Job information Results Visualization

Row	unique_count	total_count
1	2123	2123

Query results

Job information Results Visualization

Row	unique_count	total_count
1	3339	3339

Query results

Job information Results Visualization

Row	unique_count	total_count
1	70	70

Query results

Job information Results Visualization

Row	unique_count	total_count
1	7	7

## Task 2: Establish Relationships Between Tables

Task 2 Run Schedule Open in More Save qu

```
1 -- Cek relationship antara Customers → Orders
2 SELECT
3   COUNT(*) AS total_orders,
4   COUNT(DISTINCT o.CustomerID) AS unique_customer_in_orders,
5   COUNT(DISTINCT c.CustomerID) AS total_customers,
6   COUNT(DISTINCT o.CustomerID) / COUNT(DISTINCT c.CustomerID) AS ratio
7 FROM `bank-muamalat-bi-analytics.Salesdata.Orders` AS o
8 LEFT JOIN `bank-muamalat-bi-analytics.Salesdata.Customers` AS c
9 ON o.CustomerID = c.CustomerID;
10 -- Cek relationship antara Products → Orders
11 SELECT
12   COUNT(*) AS total_orders,
13   COUNT(DISTINCT o.ProdNumber) AS unique_prod_in_orders,
14   COUNT(DISTINCT p.ProdNumber) AS total_products,
15   COUNT(DISTINCT o.ProdNumber) / COUNT(DISTINCT p.ProdNumber) AS ratio
16 FROM `bank-muamalat-bi-analytics.Salesdata.Orders` AS o
17 LEFT JOIN `bank-muamalat-bi-analytics.Salesdata.Products` AS p
18 ON o.ProdNumber = p.ProdNumber;
19 -- Cek relationship antara ProductCategory → Products
20 SELECT
21   COUNT(DISTINCT p.Category) AS unique_category_in_products,
22   COUNT(DISTINCT pc.CategoryID) AS total_category,
23   COUNT(DISTINCT p.Category) / COUNT(DISTINCT pc.CategoryID) AS ratio
24 FROM `bank-muamalat-bi-analytics.Salesdata.Products` AS p
25 LEFT JOIN `bank-muamalat-bi-analytics.Salesdata.ProductCategory` AS pc
26 ON p.Category = pc.CategoryID;
```

Query results

Job information **Results** Visualization JSON Execution details

Row	total_orders	unique_customer...	total_customers	ratio
1	3339	1671	1671	1.0

Job information **Results** Visualization JSON Execution details

Row	total_orders	unique_prod_in_o...	total_products	ratio
1	3339	69	69	1.0

Job information **Results** Visualization JSON

Row	unique_category_...	total_category	ratio
1	7	7	1.0

### Steps:

- Identified and validated table relationships using BigQuery queries.
- Ensured data integrity and consistent connections among tables.

### Relationship Results:

- Customers → Orders
  - Relation: **CustomerID**
  - Type: One-to-Many
  - Ratio: 1.0 (all customers appear in orders)
- Orders → Products
  - Relation: **ProdNumber**
  - Type: One-to-Many
  - Ratio: 1.0 (each product appears in orders)
- Products → ProductCategory
  - Relation: **CategoryID**
  - Type: One-to-Many
  - Ratio: 1.0 (all categories are linked to products)

Conclusion:

**Customers → Orders → Products → ProductCategory**

All ratios = 1.0, confirming **referential integrity** between tables.



# Task 3: Create a Master Transaction Table

Task 3 Run Schedule Open in More

```
1 SELECT
2   o.Date AS order_date,
3   pc.CategoryName AS category_name,
4   p.ProdName AS product_name,
5   p.Price AS product_price,
6   o.Quantity AS order_qty,
7   (o.Quantity * p.Price) AS total_sales,
8   c.CustomerEmail AS cust_email,
9   c.CustomerCity AS cust_city
10  FROM `bank-muamalat-bi-analytics.Salesdata.Orders` AS o
11  JOIN `bank-muamalat-bi-analytics.Salesdata.Customers` AS c
12    ON o.CustomerID = c.CustomerID
13  JOIN `bank-muamalat-bi-analytics.Salesdata.Products` AS p
14    ON o.ProdNumber = p.ProdNumber
15  JOIN `bank-muamalat-bi-analytics.Salesdata.ProductCategory` AS pc
16    ON p.Category = pc.CategoryID
17  ORDER BY o.Date ASC;
18
```

Query completed  
Query results

Job information	Results	Visualization	JSON	Execution details	Execution graph
Row	order_date	category_name	product_name	product_price	
1	01/01/2020	Training Videos	Drone Video Techniques	37.99	
2	01/01/2020	Robots	RWW-75 Robot	883.0	
3	01/01/2020	eBooks	Polar Robots	23.99	
4	01/01/2020	Drone Kits	BYOD-220	69.0	
5	01/01/2020	eBooks	Spherical Robots	16.75	
6	01/01/2020	eBooks	SCARA Robots	19.5	
7	01/01/2021	eBooks	Multi Rotor Drones	24.95	
8	01/01/2021	Drones	DC-304 Drone	395.0	
9	01/01/2021	eBooks	Delivery Drones	14.99	
10	01/02/2020	Drone Kits	RYOD-550	179.0	

## Objective:

To create a master transaction table using Google BigQuery that integrates all datasets.

## Process:

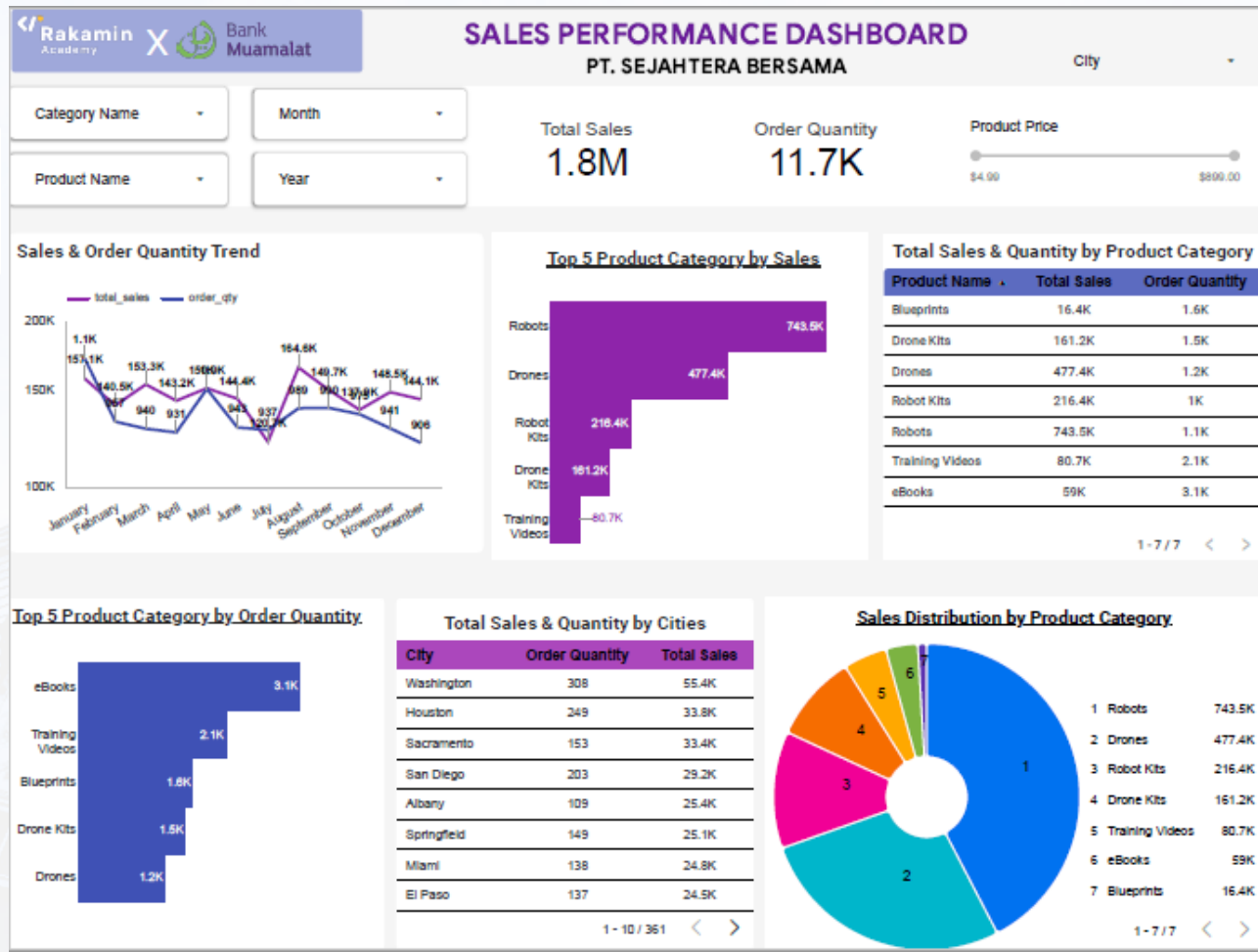
1. Loaded the four datasets – Orders, Customers, Products, and ProductCategory – into BigQuery.
2. Performed a relational join using SQL syntax in BigQuery.
3. Created a new table \*Master\_Transaction\* from the query result.
4. Verified data accuracy and exported the table for Looker Studio visualization.

## Result:

A unified master transaction table containing customer, product, and category information with calculated total sales, ready for business intelligence analysis in Looker Studio.

## Task 4: Data Visualization

Link Dashboard Looker Studio:  
<https://lookerstudio.google.com/s/o3o-JSUXlwg>

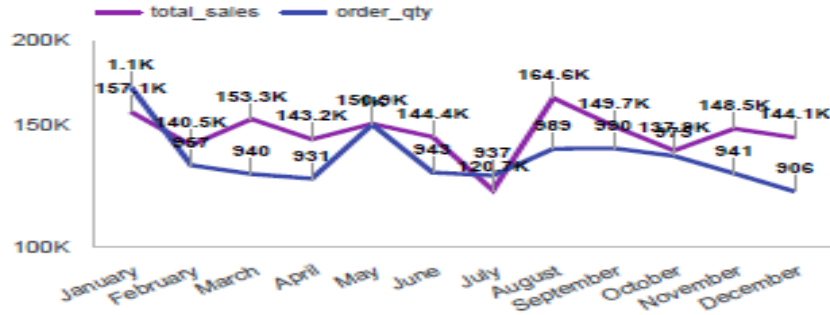


# Insights

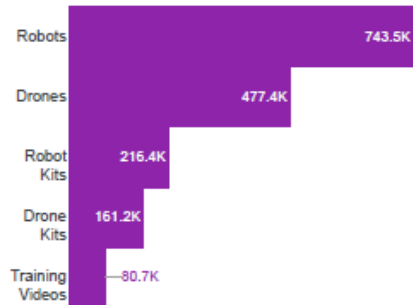
Total Sales  
1.8M

Order Quantity  
11.7K

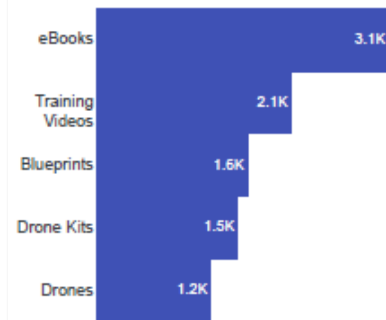
## Sales & Order Quantity Trend



### Top 5 Product Category by Sales



### Top 5 Product Category by Order Quantity



## Sales Performance Overview

1. Total sales reached \$1.8M with around 11.7K total orders, indicating a relatively stable sales performance throughout the year.
2. There were noticeable fluctuations – significant increases occurred in April and August, possibly due to promotional campaigns or seasonal demand.

## Top Product Categories

Robots became the top-selling category (\$743.5K) followed by Drones (\$477.4K). However, in terms of order volume, eBooks dominated (3.1K orders), reflecting high interest in affordable digital products.



# Insights

## Total Sales & Quantity by Cities

City	Order Quantity	Total Sales
Washington	308	55.4K
Houston	249	33.8K
Sacramento	153	33.4K
San Diego	203	29.2K
Albany	109	25.4K
Springfield	149	25.1K
Miami	138	24.8K
El Paso	137	24.5K

## City Performance

Washington recorded the highest total sales (\$55.4K), followed by Houston and Sacramento. Sales distribution remains concentrated in several major cities.

# **Business Insights & Strategic Recommendations**

1. Focus on High-Performing Categories
  - a. Robots category achieved the highest total sales (~\$743.5K).
  - b. Increase stock availability, run seasonal discounts, and expand product variety to sustain momentum.
2. Optimize High-Demand Productse
  - a. Books recorded the highest number of orders (3.1K) but lower sales value.
  - b. Apply bundling strategy with Training Videos.
  - c. Launch loyalty or repeat-purchase discount programs to drive retention.
3. Expand to High-Potential Cities
  - a. Washington and Houston lead in total sales.
  - b. Strengthen digital marketing campaigns in emerging cities like Miami and San Diego to expand market reach.
4. Leverage Seasonal Sales Trends
  - a. Sales peaks identified in June and August suggest seasonal patterns.
  - b. Plan mid-year and end-year campaigns to maximize promotional impact during high-demand periods.
5. Personalize Marketing Using Customer Data
  - a. Utilize CustomerEmail and CustomerCity for data-driven marketing:
    - Send personalized email campaigns by customer preference.
    - Offer product recommendations based on purchase history.

# **Conclusion**

By focusing on high-performing categories, optimizing demand-driven products, expanding into new markets, and applying personalized promotions, PT Sejahtera Bersama can strengthen customer loyalty and achieve sustainable sales growth

# Thank You



Bank  
Muamalat