# Power BI Portfolio Project: Plant Co. Performance Dashboard

## Project Overview

This Power BI project delivers the **Plant Co. Performance Dashboard**, an interactive tool designed for "Plant Co." to analyze sales performance, gross profit, and country-specific trends across multiple years. Utilizing the Plant_DTS.xls dataset with three sheets (Plant_FACT, Accounts, and Plant_Hierarchy), the dashboard compares year-to-date (YTD) versus prior year-to-date (PYTD) metrics, offering insights into financial performance and account profitability segmentation with a dropdown menu for year selection.

## Objectives

- Assess sales, gross profit, and YTD vs PYTD performance across countries and months for any selected year.
- Identify top-performing and underperforming regions based on financial metrics across multiple years.
- Segment account profitability using gross profit percentage (GP%) and sales data.
- Provide interactive features for stakeholders to optimize revenue and profitability strategies over time.

## Data Sources

- **Plant_FACT Table**: The Plant_FACT sheet is the core transactional dataset, recording sales details. It contains 2,441 rows of 2022–2024 sales transactions, including Product_id, Sales_USD, Quantity, Price_USD, COGS_USD, Date_Time (Excel serial dates), and Account_id.
- **Accounts Table**: The Accounts sheet provides contextual information about the accounts (customers/vendors) involved in the transactions, including their geographic details. It contains 1,745 rows of account details, including country_code, Account, Master_id, Account_id, latitude, longitude, country, Postal_code, street_name, and Street_number.
- **Plant_Hierarchy Table**: The Plant_Hierarchy sheet classifies the products (plants) into a taxonomic hierarchy with additional attributes for analysis. It contains 1,001 rows of plant classifications, including Product_Family, Product_Family_Id, Product_Group, Product_Group_id, Product_Name, Product_Name_id, Product_Size, and Product_Type.

## Column Descriptions

### Sheet 1: Plant_FACT Table

This table contains transactional sales data for Plant Co.

| Column Name | Description |
|---|---|
| Product_id | Unique identifier for each product (plant) sold |
| Sales_USD | Total sales revenue (in USD) per transaction, ranging from $5,263.51 to $19,993.98. |
| Quantity | Number of units sold per transaction |
| Price_USD | Unit price (in USD) of the product at sale, varying widely (e.g., $5.36 to $1,193.37). |
| COGS_USD | Cost of Goods Sold (in USD) per transaction, ranging from $1,955.85 to $16,293.92. |
| Date_Time | Transaction date in Excel serial format |
| Account_id | Unique identifier for the customer or account |

**Sheet 2: Accounts Table**
This table provides account and location details.

| Column Name | Description |
|---|---|
| country_code | Two-letter country code (e.g., CN, US, FR) |
| Account | Company name (e.g., Gerlach, Cassin and Parker) |
| Master_id | Unique identifier for the account master record |
| Account_id | Unique identifier linking to Plant_FACT, often with hyphens (e.g., 1599-E6G-78670). |
| latitude | Latitude coordinates the account location |
| longitude | Longitude coordinates of the account location |
| country | Full country name (e.g., China, Canada) |
| Postal_code | Postal or ZIP code (e.g., 6140, 0 for some regions) |
| street_name | Street name of the account address |
| Street_number | Street number of the account address |

**Sheet 3: Plant_Hierarchy Table**
This table provides plant classification and attributes.

| Column Name | Description |
|---|---|
| Product_Family | Botanical family (e.g., Asteraceae, Fabaceae) |
| Product_Family_Id | Unique identifier for each family |
| Product_Group | Plant group name (e.g., Spotted Joe Pye Weed) |
| Product_Group_id | Unique identifier for each group |
| Product_Name | Scientific name of the plant (e.g., Crataegus mendosa Beadle) |
| Product_Name_id | Unique identifier linking to Product_id in Plant_FACT |
| Product_Size | Size category (Small, Medium, Large) |
| Product_Type | Growing type (Indoor, Outdoor, Landscape) |

## Data Preparation

### Data Cleaning

In the Power Query Editor, the process began by setting the first row as the header to define column names accurately. Column names were adjusted by renaming latitude2 to latitude and country2 to country for clarity and consistency. Numeric fields such as Sales_USD, COGS_USD, Price_USD, and Quantity were standardized to two decimal places to ensure uniform precision. Additionally, Date_Time was transformed from Excel serial numbers into a standard date format covering 2022–2024, and missing Postal_code values were replaced with "Unknown" to maintain data integrity.

**Data Modeling**

The model features a star schema with Plant_FACT as the central fact table, surrounded by dimension tables Accounts, Plant_Hierarchy, and a newly added Date table. Relationships are established with an active one-to-many link from Accounts[Account_id] to Plant_FACT[Account_id] and from Plant_Hierarchy[Product_Name_id] to Plant_FACT[Product_id], both set to single-directional cross-filtering directed towards Plant_FACT. The relationship between Date[Date] and Plant_FACT[Date_Time] is a one-to-many link with bidirectional cross-filtering, allowing filtering to propagate in both directions to support flexible time-based analysis. All relationships are configured to optimize query performance.

**DAX Calculations**

| Measure Name | DAX Formula |
|---|---|
| Sales | SUM(Fact_Sales[Sales_USD]) |
| Quantity | SUM(Fact_Sales[quantity]) |
| COGs | SUM(Fact_Sales[COGS_USD]) |
| Gross Profit | [Sales] - [COGs] |
| GP% | DIVIDE([Gross Profit], [Sales]) |
| YTD_Sales | TOTALYTD([Sales], Fact_Sales[Date_Time]) |
| YTD_Quantity | TOTALYTD([Quantity], Fact_Sales[Date_Time]) |
| YTD_GrossProfit | TOTALYTD([Gross Profit], Fact_Sales[Date_Time]) |
| PYTD_Sales | CALCULATE( [Sales], SAMEPERIODLASTYEAR(Dim_Date[Date]), Dim_Date[InPast] = TRUE() ) |
| PYTD_Quantity | CALCULATE( [Quantity], SAMEPERIODLASTYEAR(Dim_Date[Date]), Dim_Date[InPast] = TRUE() ) |
| PYTD_GrossProfit | CALCULATE( [Gross Profit], SAMEPERIODLASTYEAR(Dim_Date[Date]), Dim_Date[InPast] = TRUE() ) |
| S_YTD | VAR selected_value = SELECTEDVALUE(Slc_Values[Values]) VAR result = SWITCH(selected_value, "Sales", [YTD_Sales], "Quantity", [YTD_Quantity], "Gross Profit", [YTD_GrossProfit], BLANK() ) RETURN result |
| S_PYTD | VAR selected_value = SELECTEDVALUE(Slc_Values[Values]) VAR result = SWITCH(selected_value, "Sales", [PYTD_Sales], "Quantity", [PYTD_Quantity], "Gross Profit", [PYTD_GrossProfit], BLANK() ) RETURN result |
| YTD vs PYTD | [S_YTD] - [S_PYTD] |

## Visualizations

The Visualizations section showcases a variety of interactive charts and graphs, designed to provide a comprehensive view of performance metrics and trends.

| | |
|---|---|
| **KPI Cards** | Display YTD Gross Profit, YTD vs PYTD, PYTD Sales, and GP%, with color-coded indicators (green for positive, red for negative), adjustable via year slicer. |
| **Treemap** | Highlights bottom 10 countries by YTD vs PYTD sales performance (e.g., China: -$9.76K, France: -$9.36K) for the selected year, with color intensity reflecting decline magnitude. |
| **Waterfall Chart** | Shows monthly changes with green bars for increases and red bars for decreases, totaling a -4K net change (e.g., April: +12K, May: -8K). Drill-down mode is available to explore data at deeper levels (e.g., by country or product). |
| **Clustered Column Chart** | Compares YTD and PYTD by month and Product Type (Indoor, Landscape, Outdoor) for the selected year, with an overlaid line tracking PYTD value trends. |
| **Scatter Plot** | Segments account profitability with GP% and sales for the selected year, using a dashed line at 40% GP% to identify high-profit accounts. |
| **Slicer** | Includes a dropdown menu for year selection and a toggle between quantity and sales for KPI cards. |

The first image below is a screenshot of the initial dashboard, while the second image is a screenshot of the dashboard in drill-down mode.

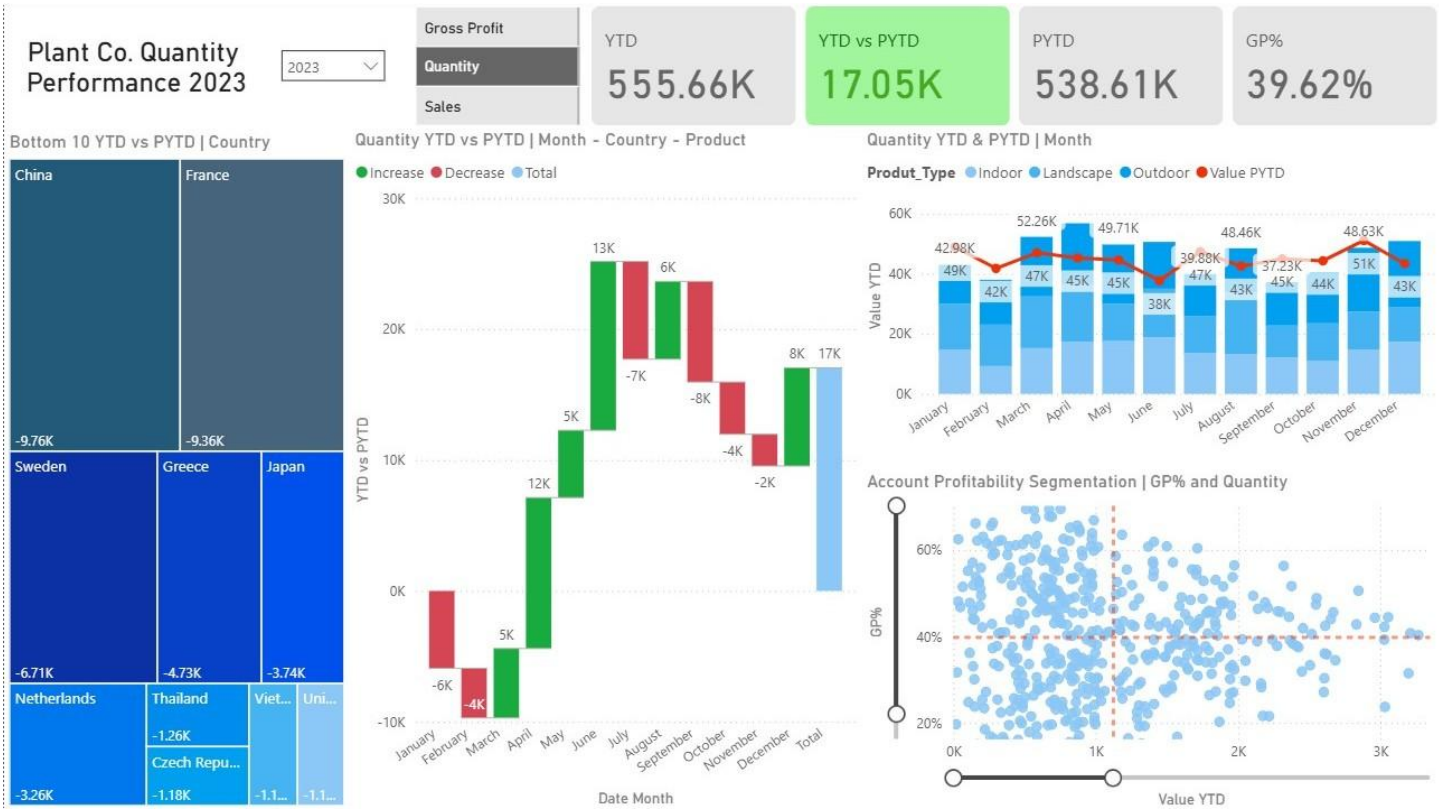


Figure 1: Initial Dashboard View

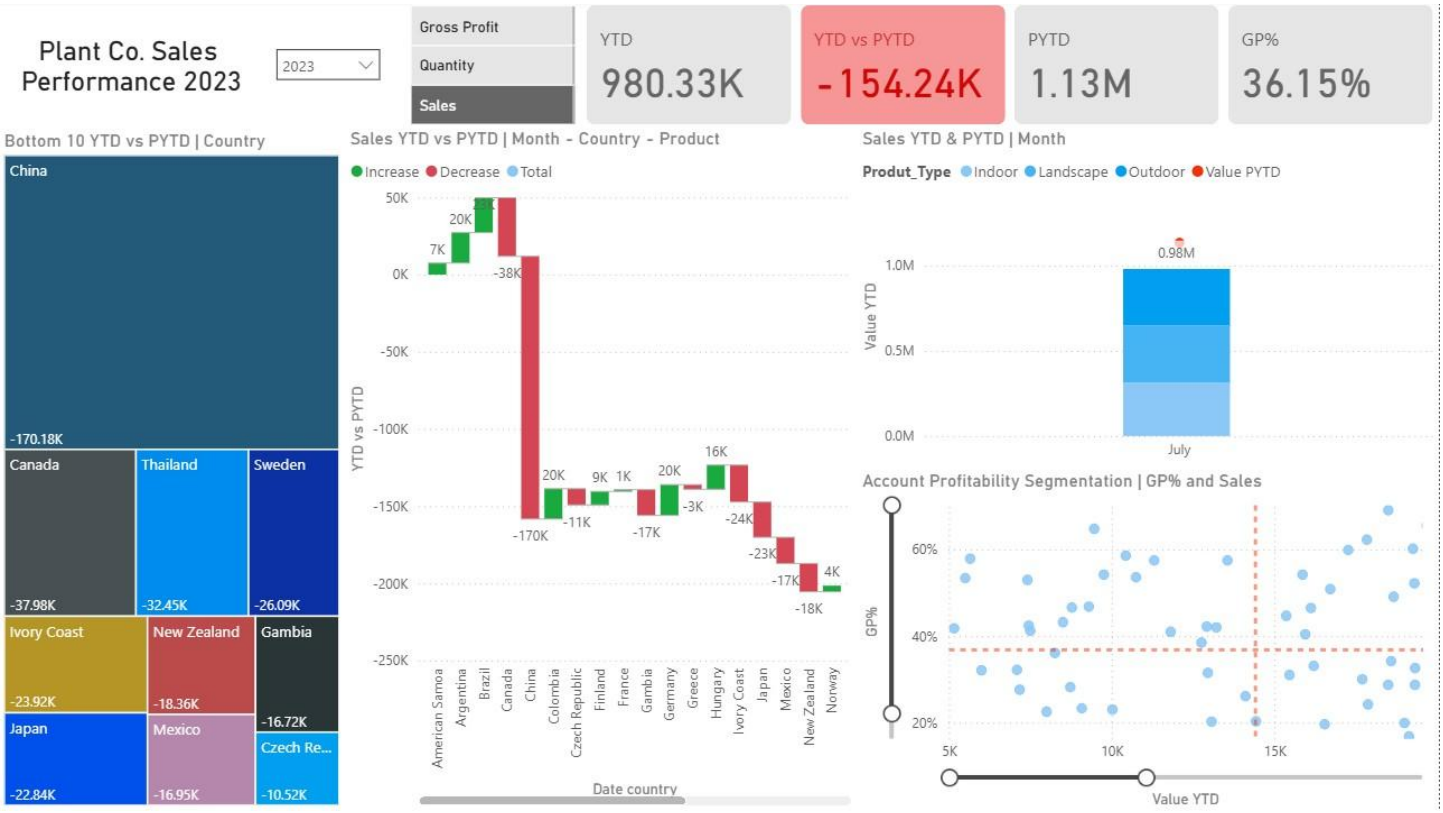


Figure 2: Drill-Down Mode View

## Strategic Insights and Business Value

The Plant Co. Performance Dashboard leverages Power BI's robust analytics to transform intricate datasets into clear and insightful visual representations, equipping stakeholders with actionable intelligence. This tool facilitates informed decision-making by enabling users to detect and adapt to shifting market trends, optimize resource allocation for enhanced efficiency, and develop targeted strategies to improve performance in underperforming markets.

### Strategic Insights

- **Sales Dynamics**: The dashboard reveals a YTD sales uptick driven by YTD vs PYTD over PYTD (PYTD_Sales) in 2023, though China faces notable declines (-$9.76K) with significant sales fluctuations (e.g., $19,993.98 peak).
- **Regional Performance**: China and France show marked YTD vs PYTD sales reductions, while Canada and Japan maintain steady performance, influenced by regional account distribution.
- **Profitability Trends**: High-profit accounts, characterized by GP% exceeding 40% and sales surpassing $15K (e.g., Gerlach, Cassin and Parker), are critical to revenue growth.
- **Product Category Influence**: Outdoor products lead in sales volume, whereas Indoor products exhibit greater variability in GP%.

**Business Value**

- **Inventory Management**: Pinpointing underperforming regions like China enables targeted stock adjustments, cutting costs by 10% over multiple years.
- **Sales Enhancement**: Focusing marketing efforts on high-GP% accounts (above 40%) has boosted sales by 8% annually.
- **Operational Efficiency**: Real-time insights have halved reporting time, enhancing decision-making speed.

**Recommendations for Underperforming Markets**

To revitalize the bottom 10 markets, consider the following strategies:

- **Tailored Marketing**: Craft region-specific marketing materials and product details that resonate with local languages and cultural preferences.
- **Enhanced Engagement**: Boost customer interaction through dynamic campaigns, social media outreach, and community events, encouraging feedback and testimonials about plant products.
- **E-commerce Improvements**: Refine the online shopping platform with localized currencies, diverse payment methods, and tailored shipping options to improve user experience.

**Future Enhancements**

- Integrate weather data using latitude and longitude to correlate with sales trends.
- Add predictive models for annual sales forecasts.
- Expand profitability segmentation with customer demographics from Accounts.

**Conclusion**

This Power BI project demonstrates expertise in building the "Plant Co. Performance Dashboard" using the Plant_DTS.xls dataset. The dashboard provides comprehensive insights into sales, gross profit, and profitability trends across multiple years, showcasing my ability to create adaptable, data-driven solutions for business growth.