

Global Automotive Parts Performance Dashboard

NETFLIX THEMED POWER BI PROJECT

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Introduction:

This is the comprehensive documentation of our Power BI Sales Analysis project for the years 2021-2022. This documentation aims to provide a detailed overview of our approach, methodologies, and insights gained from analyzing sales data of electronic components across 11 countries and 4 regions. Through meticulous data preparation, dynamic visualization techniques, and insightful analysis, we have uncovered key trends, identified top-performing products, and implemented strategic measures to optimize sales performance.

In this documentation, you will find a step-by-step account of how we transformed raw data into actionable insights using Power BI. We will delve into our data cleaning processes, currency conversion strategies, creation of interactive visualizations such as monthly sales trends and Pareto charts, and the development of key performance indicators (KPIs) to track against our sales goals. Furthermore, we will discuss the implications of our findings and provide recommendations for future strategies to enhance market competitiveness and drive sustainable growth.

This documentation is designed not only to serve as a record of our analytical journey but also as a resource for stakeholders and decision-makers seeking to leverage data-driven insights for informed business decisions. Whether you are new to Power BI or seeking to deepen your understanding of sales analytics, this documentation aims to empower you with practical knowledge and actionable insights.

Data Sources

The following datasets were used:

1. Data 2021
2. Data 2022
3. Product Data
4. Region Data

Regions	Countries	Product type	Product Names
NAFTA	USA Canada Mexico	Coil Spring	Coil S123
		Valve	V123
		Pully	P123
APAC	China India	Brake	B123
		Spring	S123
EMEA	Germany Italy Poland UK	Clutch	C123
Africa	Africa Ghana South Africa	Brake Pads	Brake

1. Regions and Countries:

- NAFTA (North American Free Trade Agreement Region):

Countries

- USA (United States of America): The largest economy in the region, and a significant player in global trade and industry.
- Canada: A major economy with strong trade ties to the USA, known for its resource-rich industries and advanced manufacturing.
- Mexico: A growing economy with strong manufacturing capabilities, especially in automotive and electronics, often linked to the USA and Canada through trade agreements.

- APAC (Asia-Pacific):

Countries

- China: The world's second-largest economy and a global manufacturing hub, with a vast consumer market.
- India: One of the fastest-growing economies, with a large population and a significant emerging market for various industries.

- EMEA (Europe, Middle East, and Africa):

Countries

- Germany: The largest economy in Europe, known for its advanced manufacturing, particularly in the automotive and engineering sectors.
- Italy: A major European economy with strengths in fashion, automotive, and industrial machinery.
- Poland: An emerging market in Central Europe with a growing economy, known for its manufacturing and IT services.
- UK (United Kingdom): A major financial hub and advanced economy, with significant influence in global trade, finance, and services.

- Africa:

Countries

- Africa: Refers to the broader continent, representing markets that may not be specified individually.
- Ghana: A growing economy in West Africa, known for its resources, including gold and cocoa, as well as a developing manufacturing sector.
- South Africa: The most developed economy on the African continent, with strong industries in mining, manufacturing, and services.

Process used while Data Cleaning and Transformation:

1. Load Data:

- Load all provided datasets into Power BI.
- Purpose to do so: To begin the analysis, all relevant datasets must be imported into Power BI.

2. Transform Data:

- Go to the `Transform Data` option.
- Use the `First Row as Header` for every table.
- Remove any empty columns.
- Purpose to do so: Ensuring the first row is used as headers provides meaningful column names. Removing empty columns cleans up the dataset and makes it more manageable.

3. Append Data:

- Append `Data 2021` and `Data 2022` to create a new consolidated table.
- Duplicate the appended table and name it `DATE`.
- Purpose to do so: Appending the data consolidates sales data from both years into a single table for easier analysis. Creating a duplicate ensures that we have a working copy for further transformations.

4. Unpivot and Clean Data:

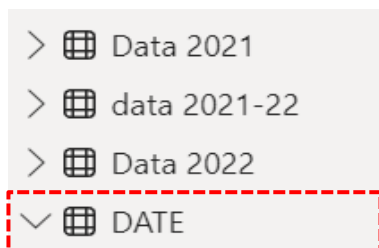
- Unpivot all months in the `DATE` table.
- Extract text before the delimiter in the month column.
- Separate the month from the extracted text.
- Merge the year and month columns, rename the merged column to `Date`, and change its type to `Date`.
- Purpose to do so: Unpivoting converts columns into rows, making the data format suitable for time series analysis. Extracting and merging date components standardizes the date format, enabling easier filtering and analysis by date.

5. Create Date Table:

- Ensure the `DATE` table contains `Date`, `Month`, and `Year` columns.
- Purpose to do so: Having a structured date table allows for comprehensive time-based analysis and easier integration with other tables in the model.

Columns:

- Date (Data Type: Date)
- Month (Data Type: Text/String)
- Year (Data Type: Integer)



6.Currency Conversion

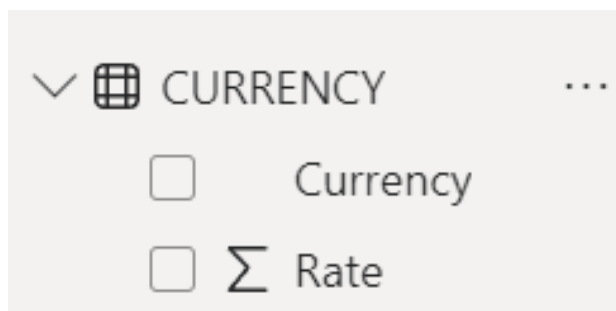
- Create Currency Table:
 - Create a table called `Currency` and fill it with the exchange rates for USD, Euro, and INR.
 - Purpose to do so: This enables dynamic conversion of sales data into different currencies based on user selection, facilitating global financial analysis.
-
- Sales Conversion Measure:
 - Create a measure for sales that adjusts according to the selected currency slicer:
 - DAX Formula

```
CSALES = IF(
ISFILTERED('CURRENCY'[Currency]),
SUM('DATE'[SALES]) * VALUES('CURRENCY'[Rate]),
SUM('DATE'[SALES]))
```

- Purpose to do so: This measure ensures that sales figures are converted to the selected currency in real-time, enhancing the report's flexibility and usability for stakeholders in different regions.

Columns:

- Currency (Data Type: Text/String)
- Rate (Data Type: Decimal/Float)



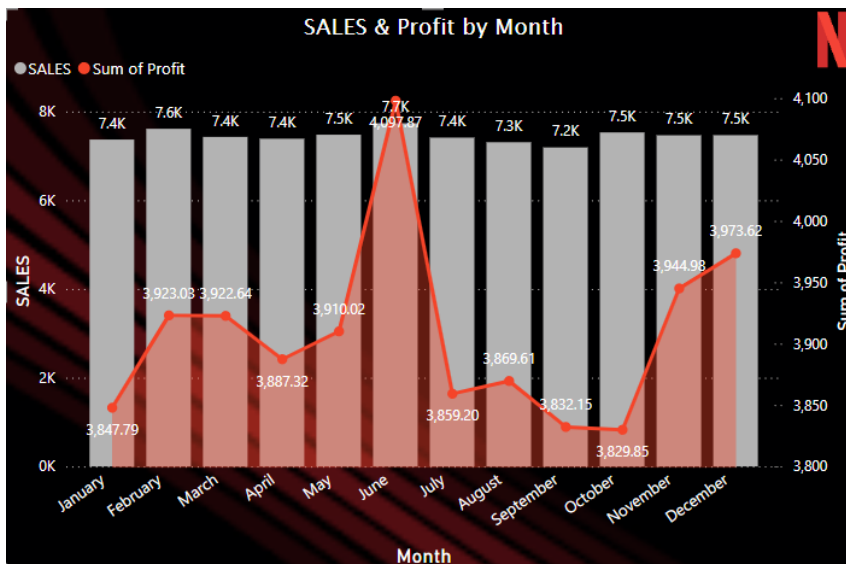
Visualization

1. Monthly Sales and Profit Chart:

- Create a chart showing monthly sales and profit with drill-down options.
- Purpose to do so: Visualizing monthly trends helps identify patterns, peaks, and troughs in sales and profit, allowing for more informed decision-making.

Columns Used:

- Monthly Sales (Data Type: Decimal/Float)
- Profit (Data Type: Decimal/Float)

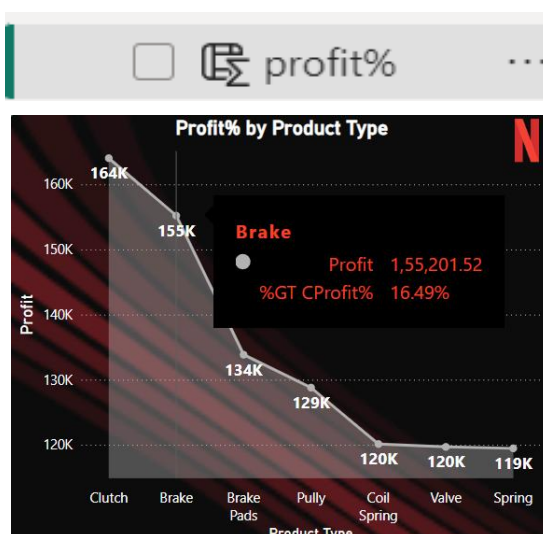


2. Profit Percentage Calculation:

- Calculate profit percentage for each product:
- DAX Formula:

$\text{Profit\%} = \text{DIVIDE}('DATE'[\text{Total Profit}], 'DATE'[\text{Total Sales}], 0) * 100$

Data Type: Decimal/Float



- Purpose to do so: Knowing the profit percentage for each product helps in understanding which products are most profitable and can guide strategic decisions.

3. Pareto Analysis

A Pareto chart is a combination of a bar graph and a line graph that helps identify the most significant factors in a dataset. Named after the Pareto Principle (or the 80/20 rule), it shows that roughly 80% of effects come from 20% of causes. In the context of sales, it means that a small number of products often contribute to the majority of sales.

Each bar represents the sales of a product.

The bars are sorted in descending order, from the highest to the lowest sales.

The line shows the cumulative percentage of total sales.

A threshold (like 80%) can be used to identify the few key products that make up the majority of the sales.

- Pareto Sales Percentage Measure:
- Calculate Pareto sales percentage:
- DAX Formula

Pareto Sales % =

```
IF(
ISINSCOPE('Productsss'[ProductType]),
VAR __AllselectedComp = ALLSELECTED('Productsss'[ProductType])
VAR __CompTable = ADDCOLUMNS(__AllselectedComp, "@Count", [Sales])
VAR __CurrentCount = [Sales]
VAR __CumCompTable = FILTER(__CompTable, [@Count] >= __CurrentCount)
VAR __CumComp = SUMX(__CumCompTable, [@Count])
VAR __AllSelectedCompCount = CALCULATE([Sales], __AllselectedComp)
VAR __Result = DIVIDE(__CumComp, __AllSelectedCompCount)
RETURN
__Result
)
```

Data Type: Decimal/Float

- Purpose to do so : The Pareto analysis helps identify the top contributors to sales, usually following the 80/20 rule, where 80% of effects come from 20% of causes.

4. Pareto Classification Measure:

- Create a measure for Pareto classification:
- DAX Formula

Pareto CF = IF([Pareto %] <= [Pareto Threshold Value], "White", "Red")

Data Type: Text/String

- Purpose to do so: This measure visually distinguishes between products that fall within the top 80% of sales and those that do not, facilitating quicker insights.

5. Pareto Threshold Table:

- Create a table for Pareto threshold values using:
- DAX Formula

Pareto Threshold = GENERATESERIES(0.01, 1.01, 0.001)

Columns:

- Pareto Threshold (Data Type: Decimal/Float)
- Purpose to do so: This table allows for dynamic adjustment of the Pareto threshold, making the analysis more flexible and tailored to specific needs.

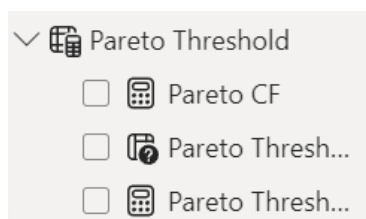
6. Pareto Threshold Value Measure:

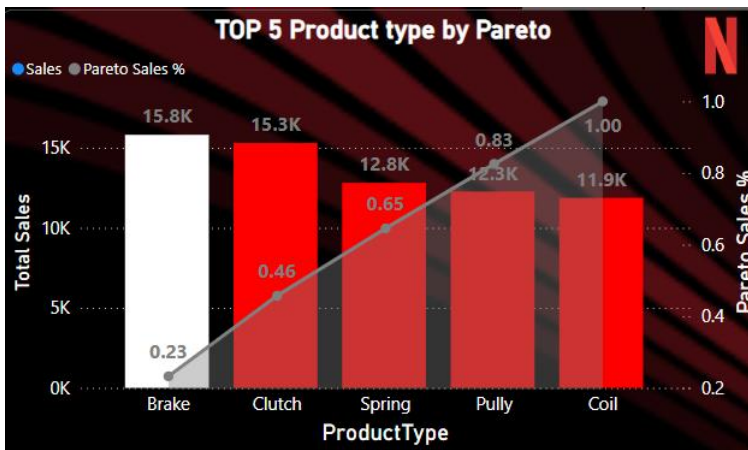
- Define the selected Pareto threshold value:
- DAX Formula

Pareto Threshold Value = SELECTEDVALUE('Pareto Threshold'[Pareto Threshold], 0.7)

Data Type: Decimal/Float

- Purpose to do so: Setting a default threshold value ensures consistency in the analysis while allowing for user customization.





Product Type Classification

- Product Type Measure:
- Classify product types using:
- DAX Formula

ProductType =

SWITCH(

TRUE(),

'Productsss'[Product Name] = "Coil S123", "Coil",

'Productsss'[Product Name] = "V123", "Valve",

'Productsss'[Product Name] = "P123", "Pulley",

'Productsss'[Product Name] = "B123", "Brake",

'Productsss'[Product Name] = "S123", "Spring",

'Productsss'[Product Name] = "C123", "Clutch",

'Productsss'[Product Name] = "Brake P123", "Brake Pads",

"Unknown"

)

Data Type: Text/String

- Purpose to do so : Classifying products by type simplifies analysis and reporting, making it easier to group and compare similar products.

KPI and Year-over-Year Analysis

1. KPI Measure:

- Create a KPI measure to track against a goal of 100,000:
- DAX Formula

KPI = 100000

Data Type: Integer

- Purpose to do so: KPIs provide a quick overview of performance against predefined goals, aiding in performance monitoring.



2. Year-over-Year (YoY) Analysis:

- Calculate YoY sales growth:
- DAX Formula

YoY =

VAR CurrentYearSales = SUM('DATE'[SALES])

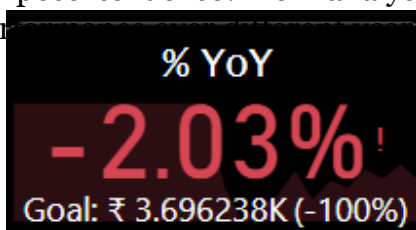
VAR PreviousYearSales = CALCULATE(SUM('DATE'[SALES]),
SAMEPERIODLASTYEAR('DATE'[DATE]))

RETURN

IF(ISBLANK(PreviousYearSales), BLANK(), (CurrentYearSales - PreviousYearSales) /
PreviousYearSales * 100)

Data Type: Decimal/Float

- Purpose to do so: YoY analysis helps in understanding growth trends and comparing performance across periods, which is crucial for strategic planning.



Learnings from the Project

Working on this Power BI Sales Analysis project provided valuable insights and skills that are crucial for data analysis and visualization. Here are some key learnings:

Data Handling and Transformation

- **Data Cleaning:** Learned how to clean and prepare raw data for analysis, including removing empty columns, handling headers, and dealing with missing values.
- **Data Transformation:** Gained experience in transforming data to a suitable format for analysis, such as unpivoting columns and merging date components.

Power BI Techniques

- **Data Import and Integration:** Understood how to import multiple datasets into Power BI and integrate them to create a cohesive dataset.
- **Append Queries:** Learned to append multiple datasets to consolidate data from different years, enabling comprehensive analysis.
- **Dynamic Measures:** Developed dynamic measures for currency conversion and sales analysis, making the reports flexible and user-friendly.

Analytical Skills

- **Profit Analysis:** Gained insights into calculating and analyzing profit percentages and margins, which are critical for assessing product performance.
- **Pareto Analysis:** Learned how to apply Pareto principles to identify top-performing and underperforming products, aiding in strategic focus.
- **Year-over-Year Analysis:** Acquired skills in performing YoY analysis to compare sales performance over different periods.

Visualization and Reporting

- **Interactive Visualizations:** Created interactive charts and graphs that allow users to drill down into data, providing a more detailed understanding of trends and patterns.
- **KPI Tracking:** Developed Key Performance Indicators (KPIs) to track performance against predefined goals, helping in monitoring progress and making informed decisions.

Problem-Solving and Critical Thinking

- **Complex Formulas:** Tackled complex DAX formulas to calculate various measures and metrics, enhancing problem-solving skills.
- **Custom Measures:** Created custom measures to address specific analytical needs, demonstrating critical thinking and adaptability.

Practical Applications

- **Business Insights:** Learned how to derive actionable business insights from data, which can drive strategic decisions and improve business outcomes.
- **Global Perspective:** Understood the importance of considering global factors, such as currency exchange rates, in data analysis.

Future Directions

- **Continuous Improvement:** Recognized the importance of regularly updating and refining the analysis to maintain its relevance and accuracy.

- **Advanced Techniques:** Identified opportunities to explore advanced analytics and predictive modeling for deeper insights.