AutoSales - Business Requirement Document (BRD)

Project Title: AutoSales Insights
Tool Used: Power BI Desktop

Business Objective

The objective of this project is to design an interactive and insightful Power BI dashboard for auto sales data. The dashboard will allow business users to monitor performance metrics, analyze customer and regional trends, evaluate deal sizes, and make data-driven decisions based on seasonal patterns and key profitability indicators.

Project Scope

- Import and clean the raw Excel dataset.
- Normalize the flat file into multiple dimension tables and a central fact table (star schema).
- Create dynamic DAX measures and KPIs.
- Design an intuitive one-page dashboard using appropriate Power BI visuals.
- Provide data-driven insights that support strategic sales and marketing actions.

Data Source Description

The data source is a single consolidated Excel sheet that combines various fields, including customer details, order records, product attributes, pricing, quantities, and deal size information. This data was manually transformed into structured tables suitable for modeling and analysis.

AutoSales Insights - Solution Implementation Document (Power Bi)

Task 1: Data Import and Initial Cleaning

- Imported the consolidated Excel sales data into Power BI Desktop.
- Renamed all columns for readability and naming consistency.
- Removed unnecessary, blank, or duplicate columns.
- Assigned correct data types to each field (e.g., Date, Whole Number, Text) to ensure accurate aggregation and filtering.

Task 2: Data Transformation Using Power Query

- Assessed column quality and data distribution in Power Query Editor.
- Converted foreign key fields into whole number types for performance optimization.
- Documented each transformation step clearly in the Applied Steps pane.
- Extracted the following dimension tables from the original dataset:
    - Customers – Included customer name, city, country, postal code, and contact details.
    - Products – Included product code, product line, and MSRP.
    - Orders – Included order number, order status, order date, and days since last order.
    - Deal Size – Derived unique deal size values and assigned a unique key for mapping.
    - DateMaster – Generated from order date and expanded to include year, month, quarter, month name, and weekday.

- The remaining fields and foreign keys were retained in the FactSales table.

Task 3: Data Modeling (Star Schema Design)

The data model implemented in this project is the **Star Schema**, a widely adopted dimensional modeling technique in business intelligence and analytics platforms like Power BI.

Why Star Schema :

- **Simplicity and Readability**:
  Star schema offers a simple and flat structure where all dimension tables directly connect to the fact table. This layout is easier to understand and manage for report creators and business users, especially when working on visual dashboards.

- **Faster Query Performance**:
  Power BI performs best with fewer table joins. In a Star Schema, dimension tables are denormalized, minimizing joins and improving query speed. A Snowflake Schema would require multiple joins between normalized dimension tables, which could slow down performance, especially on larger datasets or interactive dashboards.

- **Optimized for Reporting and Aggregation**:
  Since this project is focused on creating aggregated views like total sales, customer segmentation, and time-based trends, the Star Schema is ideal. It enables efficient grouping and summarization, which are more cumbersome with a Snowflake model due to the increased number of joins and table dependencies.

- **Ease of Maintenance and Flexibility**:
  Star Schema structures are easier to maintain, modify, and extend. Adding new columns or attributes to dimension tables (like customer type or product brand) is straightforward.

Relationship Structure in the Model:

The **FactSales** table serves as the central fact table and is directly connected to five denormalized dimension tables:

- *Sales[PostalCode] → Customers[PostalCode]*
- *Sales[ProductCode] → Products[ProductCode]*
- *Sales[OrderNumber] → Orders[OrderNumber]*
- *Sales[DealSizeKey] → DealSize[DealSizeKey]*
- *Sales[OrderDate] → DateMaster[OrderDate]*

Data Integrity and Performance Practices:

- Referential integrity was enforced by removing duplicates and nulls from key columns in both the fact and dimension tables.
- All relationships were configured as **single-directional** to simplify the filter context and avoid ambiguity in cross-table filtering.
- Data types and cardinality were optimized to ensure high performance and compatibility with DAX calculations.

Task 4: DAX Measures

The following DAX measures were created to support analytical calculations:

- Total Sales
  Total Sales = SUM(Sales[SALES])
- Total Quantity
  Total Quantity = SUM(Sales[QUANTITYORDERED])

- Total Orders
  Total Orders = DISTINCTCOUNT(Sales[ORDERNUMBER])

- Total Customers
  Total Customers = DISTINCTCOUNT(Customers[CUSTOMERNAME])

- Total Cost
  *Total Cost = SUMX(Sales, Sales[QUANTITYORDERED]*RELATED(Products[MSRP]))*

- Gross Profit
  Gross Profit = [Total Sales] - [Total Cost]

- Profit Margin %
  Profit Margin % = DIVIDE([Gross Profit], [Total Sales])

- Avg Quantity per Order
  Avg Quantity per Order = DIVIDE([Total Quantity], [Total Orders])

- Avg Sales per Customer
  Avg Sales per Customer = DIVIDE([Total Sales], [Total Customers])

Task 5: KPI Design

Card visuals were implemented to present the following key performance indicators on the dashboard for quick reference and decision support:

- Total Sales
- Total Orders
- Total Customers
- Total Quantity Ordered
- Total Profit

These KPIs give executives an immediate overview of sales health and performance efficiency.

Task 6: Dashboard Design and Visualizations

- A line chart was used to display monthly sales trends and analyze seasonality.
- A bar chart highlighted the top five countries based on sales.
- A stacked column chart showcased the top five customers contributing most to gross profit.
- A donut chart visualized sales contribution by deal size categories.
- A pie chart showed order volume distribution by deal size.
- Slicers were added for Year and Month to allow users to interactively filter data.
- Design improvements included uniform color themes, meaningful titles, axis labels, tooltips, and a logical layout for storytelling.

Task 7: Business Insights and Interpretation

- Identified top-performing countries, aiding regional targeting and campaign allocation.
- Highlighted high-profit customers, guiding loyalty programs and upselling efforts.
- Discovered that medium and large deals generated the majority of sales revenue.
- Analyzed sales seasonality to support inventory planning and marketing timing.
- Calculated average sales per customer to help identify underperforming segments for potential re-engagement.
