

# Project: Sales Dataset Analysis

## Objective:

Analyze the dataset containing sales transaction information from a retail business. The goal is to perform comprehensive data analysis, extract meaningful insights, and create interactive visualizations using Microsoft Excel. Additionally, leverage advanced Excel features such as **What-If Analysis**, **Goal Seek**, **Macros**, **Power Query**, and **Power Pivot** to deepen your analysis and automate tasks.

## Instructions:

### 1. Format the Worksheet:

- Format the columns for better readability, such as currency formatting for "Gross sales", "Net sales", "Total sales", "Shipping", and "Taxes".
- Use **Date formatting** for the "Date" column to ensure proper sorting and filtering.
- Apply **bold headers** and freeze the top row to keep it visible as you scroll through the data.

### 2. Clean the Data:

- Check for and remove any **duplicate rows** or **blank entries** in the dataset.
- Use **data validation** to ensure that all data entries (like sales numbers and dates) are consistent and free of errors. For example, ensure "Net quantity" is never negative.
- Identify and resolve any **outliers** or incorrect values, especially in "Net quantity", "Gross sales", and "Total sales".
- Use **Power Query** to import, clean, and transform the data if it's in an external format (e.g., CSV, text files). Use Power Query's data-cleaning features like filtering, removing duplicates, and handling null values.

### 3. Analyze Sales Performance:

- **Calculate** the total sales for each transaction by subtracting "Discounts", "Returns", "Shipping", and "Taxes" from "Gross sales". Create a new column titled "Adjusted Sales" to reflect this.
- **Determine** the total revenue, average order value, and total discounts across all transactions.
- **Segment** the data by different sales types, channels, or product categories and calculate key metrics (e.g., total sales, average sales per order, total returns).

#### 4. Use Formulas to Extract Insights:

- Use the **SUM** function to calculate the total "Gross sales", "Net sales", "Total sales" across the entire dataset.
- **Apply COUNTIF/COUNTIFS** to count the number of orders for each "Transaction type" (e.g., sales, returns) or "Sale type" (e.g., online, in-store).
- **Calculate the average discount** per order using **AVERAGEIF** based on the "Sale type" or "Sales channel".
- Use **IF** or **IFERROR** to flag and handle any negative or erroneous sales data that might result from data entry mistakes.

#### 5. Time-Based Analysis:

- **Group** the data by **Date** (daily, monthly, quarterly) using **PivotTables** to assess sales trends over time.
- **Identify** peak sales periods by analyzing the "Total sales" over different time intervals. Look for patterns that could indicate seasonal variations.
- **Use Date Functions** like **MONTH()**, **YEAR()**, **WEEKDAY()**, and **EOMONTH()** to categorize and analyze sales performance over different periods.

#### 6. Sales Channel and Product Type Analysis:

- **Create a PivotTable** to calculate the total sales, average sales, and total returns for each "Sales channel" and "Product type".
- **Filter** by "Sales channel" and compare performance across different channels (e.g., online vs. offline sales). Summarize the impact of each channel on overall sales.
- **Identify** the best-selling products or product categories based on the "Net quantity" and "Net sales".

#### 7. Returns Analysis:

- **Calculate** the return rate by dividing "Returns" by "Gross sales" for each order, and summarize by "Product type" or "Sales channel".
- **Analyze** the impact of returns on total sales, identifying trends in product types or regions that have higher return rates.
- **Use Conditional Formatting** to highlight transactions with high return rates or products with excessive returns.

#### 8. What-If Analysis & Goal Seek:

- **Use Goal Seek** to determine the sales target needed to achieve a specific revenue or profit goal. For example, set a goal for "Net sales" and use Goal Seek to find out how many units of a product need to be sold to reach that target.

- **Use What-If Analysis** to simulate different scenarios, such as:
  - How would a 10% increase in sales prices impact total revenue?
  - What would happen if the return rate decreased by 5%?
  - Create a **Scenario Manager** to compare various sales and discount scenarios and their effect on profitability.

## 9. Pivot Tables and Pivot Charts:

- Create **PivotTables** to aggregate data by different dimensions such as "Sale type", "Transaction type", "Product type", or "Sales channel".
- **Use PivotCharts** to visualize sales trends and compare sales performance across different categories (e.g., pie charts for sales by product type, line charts for sales over time).
- Add **Slicers** to your PivotTables and charts to allow interactive filtering by categories such as "Sale type", "Sales channel", and "Product type".

## 10. Create a Sales Dashboard:

- **Design** a summary dashboard with key performance indicators (KPIs) such as:
  - Total sales (Gross, Net, and Adjusted)
  - Average sales per order
  - Total discounts and returns
  - Top-performing sales channels and products
- **Use data validation** to allow the user to select specific date ranges or categories to dynamically update the dashboard.
- Include **interactive features** such as slicers for "Date", "Product type", or "Sales channel" to allow users to filter and view data by specific segments.

## 11. Automate Tasks Using Macros:

- **Record and run macros** to automate repetitive tasks, such as:
  - Formatting the worksheet (e.g., currency formatting, bolding headers, freezing panes).
  - Generating summary tables or charts.
  - Running calculations and formatting pivot tables automatically when new data is added.
- Assign the macros to buttons on the worksheet to make it easy to run them.

## 12. Power Pivot & Data Modeling:

- **Use Power Pivot** to create a data model by connecting multiple tables (e.g., Sales transactions, Products, Customers) for more advanced analysis. Link these tables using relationships based on common columns like "Product ID" or "Customer ID".
- **Create calculated columns** in Power Pivot to perform complex calculations (e.g., profit margin, adjusted sales).
- **Create a Power Pivot-based PivotTable** to summarize sales performance using your data model, allowing you to work with large datasets more efficiently.

## 13. Insights and Recommendations:

- **Summarize** the key insights from your analysis, such as:
  - Which sales channels are driving the highest sales.
  - Which product categories are performing best and worst.
  - The effect of discounts and returns on net revenue.
  - Any actionable recommendations for improving sales performance, reducing returns, or optimizing discount strategies.

## Deliverables:

1. A cleaned and formatted Excel worksheet with the original dataset.
2. Formulas applied to calculate key metrics such as total sales, average sales, and return rates.
3. PivotTables and PivotCharts summarizing sales data by various dimensions.
4. An interactive dashboard showcasing key performance indicators and insights.
5. A written summary of insights, including actionable recommendations based on the analysis.
6. A presentation file that contains the details of the project (10 slides).

**Evaluation Rubric:**

<b>Evaluation Criteria</b>	<b>Marks</b>
1. Data Cleaning and Preparation	10
2. Data Analysis and Use of Formulas	15
3. Pivot Tables and Pivot Charts	15
4. Dashboard Creation	10
5. What-If Analysis and Goal Seek	10
6. Macros and Automation	10
7. Power Pivot and Data Modeling	10
8. Presentation and Reporting	20
<b>Total Marks</b>	<b>100</b>

## **Suggested Slide Structure for the Presentation:**

### **Slide 1: Title Slide**

- **Title:** Sales Dataset Analysis – Advanced Excel Project
- **Subtitle:** Student's name, date, and course & batch name information.

### **Slide 2: Project Overview & Objectives**

- **Project Objective:** Briefly describe the overall purpose of the project. For example: "To analyze sales data to identify trends, understand sales performance, and provide actionable business insights."
- **Goals:** State the key goals of the analysis, such as:
  - Analyze sales trends over time.
  - Identify high-performing products and sales channels.
  - Determine the impact of returns and discounts.
  - Create a dynamic dashboard with key metrics.

### **Slide 3: Data Description and Preparation**

- **Dataset Overview:** Brief description of the dataset (e.g., 20,000 rows, columns such as Order ID, Sale ID, Product Type, etc.).
- **Data Cleaning Process:** Mention the steps taken to clean the data (e.g., removal of duplicates, handling missing values, data formatting).
- **Visuals:** Include a screenshot of the dataset **before** and **after** cleaning (showing raw data vs. cleaned data).

### **Slide 4: Key Metrics Calculation and Data Analysis**

- **Important Calculations:** Mention the key metrics calculated using Excel functions, such as:
  - Total sales (Gross, Net, Adjusted)
  - Average sales per order
  - Discount rates, return rates
  - Sales by channel/product type
- **Screenshots:** Show a screenshot of the Excel worksheet with formulas visible for calculating metrics (e.g., total sales, average, etc.).

### **Slide 5: Pivot Tables and Pivot Charts**

- **Pivot Table Summary:** Discuss how you used PivotTables to aggregate data by dimensions like sales channel, product type, or date.
- **Pivot Chart Visualizations:** Show how PivotCharts were used to visualize sales trends over time or by product type.
- **Visuals:** Include a screenshot of one or more **PivotTables** and **PivotCharts**.

## Slide 6: Dashboard Overview

- **Dashboard Design:** Introduce the concept of the dashboard, its components (e.g., KPIs, charts, slicers), and its purpose in making the data more accessible and interactive.
- **KPIs:** List key performance indicators displayed on the dashboard (e.g., Total Sales, Return Rate, Best Selling Products, Average Order Value).
- **Visuals:** Insert a screenshot of the **complete dashboard** with KPIs and interactive elements (like slicers and charts).

## Slide 7: What-If Analysis & Goal Seek

- **What-If Scenarios:** Describe any **What-If Analysis** you performed (e.g., simulations to analyze how changes in sales or return rates impact total revenue).
- **Goal Seek:** Explain any goal-setting you did, such as finding the number of units required to meet a sales target.
- **Visuals:** Include screenshots of the **What-If Analysis** and **Goal Seek** results, showing the inputs and outputs.

## Slide 8: Macros and Automation

- **Macro Recording:** Explain how you used macros to automate repetitive tasks, such as formatting, data calculations, or generating reports.
- **Automation Benefits:** Discuss how using macros saved time and improved the efficiency of the analysis.
- **Visuals:** Show a screenshot of the **Macro Code** or a screenshot of the **macro in action** (e.g., a button that runs a macro to update charts or tables).

## Slide 9: Insights and Recommendations

- **Key Insights:** Summarize the most important insights from the analysis, such as:
  - Best-performing sales channels/products.
  - Trends in discounting and its impact on total sales.
  - Seasonal sales variations or peak performance times.
  - Recommendations for improving sales based on analysis (e.g., reduce returns, increase discounts on underperforming products).
- **Visuals:** Consider adding key visuals like **charts** or **graphs** that support these insights.

## Slide 10: Conclusion and Questions

- **Summary:** Briefly wrap up your analysis, highlighting the key findings and actions for the business based on your analysis.
- **Next Steps:** Mention any future steps or analyses that could be done for deeper insights (e.g., forecast sales for the next quarter, improve data accuracy, etc.).

- **Questions:** Provide a slide inviting questions from the audience.
- **Visuals:** Keep this slide clean with just a concluding message and a prompt for questions.

### **Tips for an Effective Presentation:**

- **Clarity and Simplicity:** Avoid too much text. Use **bullet points**, **short sentences**, and **clear visuals** (charts, tables, screenshots).
- **Screenshots:** Use **high-quality** screenshots of Excel, especially for dashboards, PivotTables, and charts. Make sure the data is legible.
- **Consistency:** Maintain a consistent color scheme and font style across all slides.
- **Practice:** Ensure that you can explain each slide concisely within the time limit (usually 5-10 minutes for presentations).
- **Engage the Audience:** Don't just read from the slides. Discuss the **insights** and **recommendations** in a way that shows your understanding of the data and its business implications.