# 📊 Adventure Works – Data Analysis Documentation

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## 🔹 Project Overview

This document details the full analytical process performed on the cleaned Adventure Works dataset. It includes the business questions, tools and techniques used, statistical and visual methods, and the conclusions derived. The analysis was carried out in Excel using PivotTables, Power Pivot, Power Query, and statistical Excel functions.

## 🎯 Project Objectives

- Identify sales trends by product, category, and reseller type  
- Compare salesperson performance against their targets  
- Analyze regional performance to identify strong or underperforming territories  
- Provide data-driven insights to support marketing and sales strategy refinement

## 🛠 Tools and Techniques Used

- Microsoft Excel (Power Query, Power Pivot, PivotTables, Slicers)  
- Custom DAX Measures (e.g., Times Missed, Met Target %, Missing Target Rate)  
- Calculated columns and trendline forecasts  
- Scatter plots, bar charts, pie charts, and line graphs  
- Filtering, grouping, sorting, and conditional formatting  
- Derived KPIs using measures and time-based slicing

## 📈 Analytical Work Summary

### 🔹 Sales and Products

- Identified top-selling subcategories using PivotTables with revenue and quantity  
- Analyzed profitability using calculated profit fields (Revenue - Cost)  
- Performed time-series trend analysis (multi-year sales and moving averages)  
- Evaluated relationship between product price and sales/orders via scatter plots and R² trendlines  
- Examined impact of product color using aggregation and visual comparisons

### 🔹 Resellers

- Ranked resellers by revenue (current year)  
- Analyzed regional distribution using geo-grouped sales  
- Calculated YoY regional growth to highlight expansion potential  
- Segmented performance by BusinessType and compared average sales per type

### 🔹 Salespeople and Targets

- Created MetTarget measure using DAX to identify if monthly sales exceeded targets  
- Built matrix view of target achievement by month and employee  
- Aggregated total achievements to rank most consistent performers  
- Visualized performance over time with conditional formatting and pivot breakdown

### 🔹 KPIs and Time Comparisons

- Calculated Total Sales, Gross Profit, and Target Achievement Rate (YTD vs previous year)  
- Used Date table to enable consistent filtering by Year, Month, and Quarter  
- Analyzed revenue seasonality and monthly averages to detect sales cycles

### 📌 Detailed Target Performance Process

To evaluate monthly target achievement per salesperson, a structured transformation process was applied using Power Query, as follows:  
  
1. A merged table named `SalespeoplePerformance` was created by combining the `SalespeopleTarget`, `Salespeople`, and `Sales` tables. The resulting table is at the sales order (transaction) level and includes key fields such as:  
- SalesOrderNumber (Sales)  
- EmployeeKey (Salespeople)  
- EmployeeID (SalespeopleTarget)  
- Name, JobTitle (Salespeople)  
- OrderDate, Revenue (Sales)  
- TargetMonth, SalesTarget (SalespeopleTarget)  
  
2. A new column named `SalesMonth` was added using the formula:  
 `Date.StartOfMonth([OrderDate])`  
 to match the structure of the `TargetMonth` field.  
  
3. A summarized table named `SalespeopleCheck` was created by grouping the `SalespeoplePerformance` table by `Name` and `SalesMonth`, and aggregating total revenue per salesperson per month.  
  
4. The `SalespeopleCheck` table was then merged back with `SalespeoplePerformance` using two keys:  
 - `Name`  
 - `SalesMonth = TargetMonth`  
 to retrieve the corresponding `SalesTarget`.  
  
5. Finally, a conditional column `MetTarget` was added to indicate whether the summed revenue for the month exceeded or met the sales target:  
 `if [MonthlySales] >= [SalesTarget] then 1 else 0`  
  
This enabled accurate KPI analysis on a per-salesperson, per-month basis.

## 💡 Insights & Business Implications

- Product and subcategory-level performance differences guide inventory and promotions  
- Regional growth data supports market expansion planning  
- Identified top-performing salespeople and patterns of underperformance  
- Recommendations include focusing efforts on high-margin products and regions with upward trends

## ✅ Final Remarks

This analytical process demonstrated structured, layered business intelligence using Excel. The work showcases both technical competency and business awareness, producing insights that support actionable decision-making.