ADVENTURE WORKS ANALYSIS DASHBOARD

A Comprehensive Sales, Customer, and Product Performance Insights

Presented By

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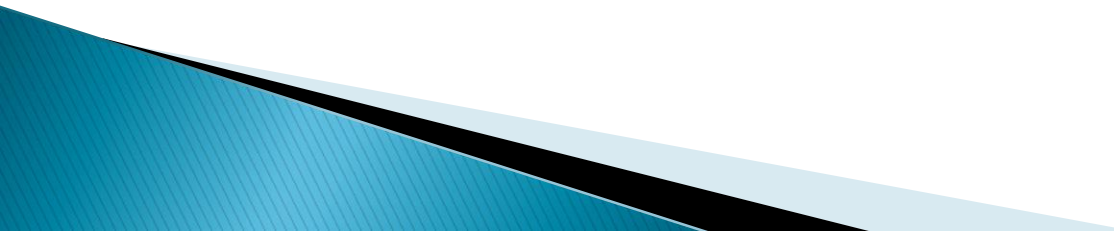23rd October, 2024

Introduction

- ## Overview of Adventure Works Case study
  - This is a case study designed to test my understanding and knowledge of data analytics and visualization, it leverages my skills to generate actionable business insights through analytics to help business leaders make data driven decisions.
- ## Project Objective
  - Conduct a comprehensive analysis of sales data, customer behavior, and product performance to uncover trends and provide actionable insights.

Problem Statement

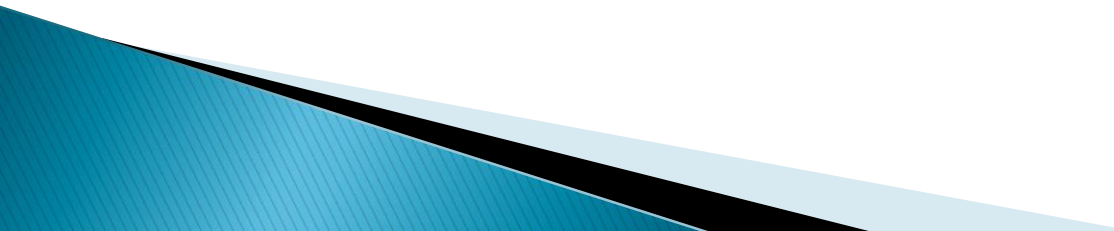> ## Challenges Identified:
> - Lack of in-depth analysis leading to missed sales opportunities.
> - Difficulty understanding complex relationships between sales, customers, and products.
> - Need for better sales strategies, product offerings, and marketing campaigns.

> ## Objective Recap:
> - Provide data-driven insights to improve sales strategies, refine product offerings, and enhance decision-making.
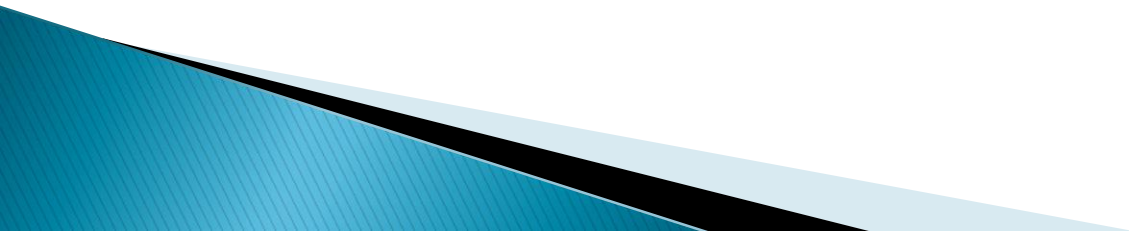
Project Objectives

- Identify sales trends over time (peak periods, dips).
- Understand customer behavior by analyzing demographics and purchasing patterns.
- Evaluate product performance, highlighting best-sellers and underperformers.
- Compare sales performance across regions.
- Determine the impact of seasonal trends on sales.
- Optimize sales strategies based on insights.
- Recommend enhancements for product offerings.
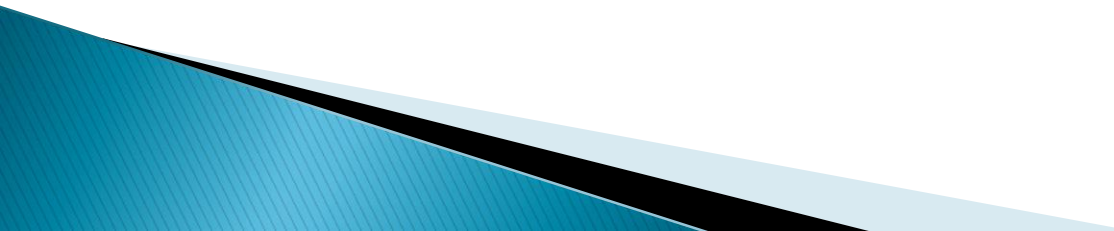
Methodology

- **Data collection**:
  - Sales data from Sales tables, demographics tables, product details and territorial information and using the tables to create the SQL database(Adventure Works).
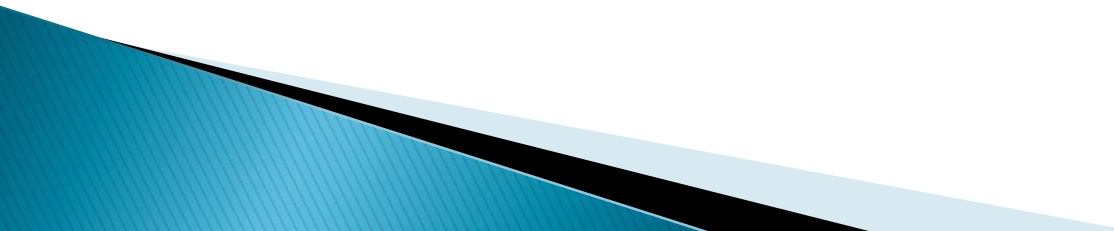- **Data Cleaning and Preparation:**
  - SQL queries and Python(Jupyter notebooks) for data extraction
  - Data preprocessing and validation
- **Analysis Techniques:**
  - Time series analysis for sales trends
  - Customer segmentation using demographic data
  - Product performance analysis
  - Hypothesis testing for price and sales correlation, territorial performance, and seasonal trends

Hypotheses

- **Hypothesis 1**: Higher product prices correlate with lower sales quantities.
- **Hypothesis 2**: Sales performance varies significantly across different territories.
- **Hypothesis 3**: Sales are higher for certain product categories due to seasonal trends.
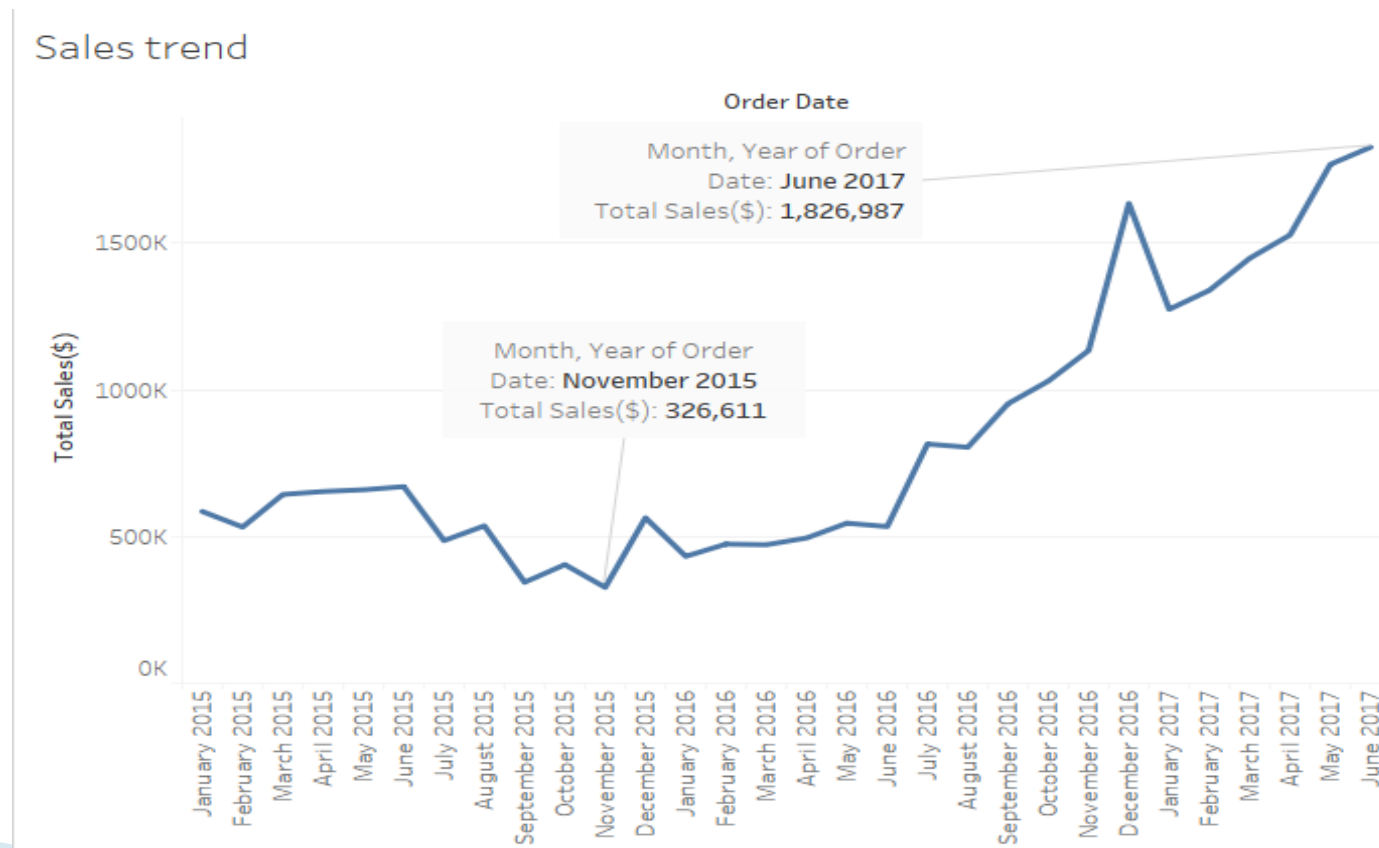
Sales Trends Analysis

- Methodology:
  - Time series analysis using sales data by month and year.
- Findings:
  - Identified peak sales period towards the year 2017, with the highest month being, June, 2017
  - Notable dips in sales during the months of the year 2015 especially, November 2015
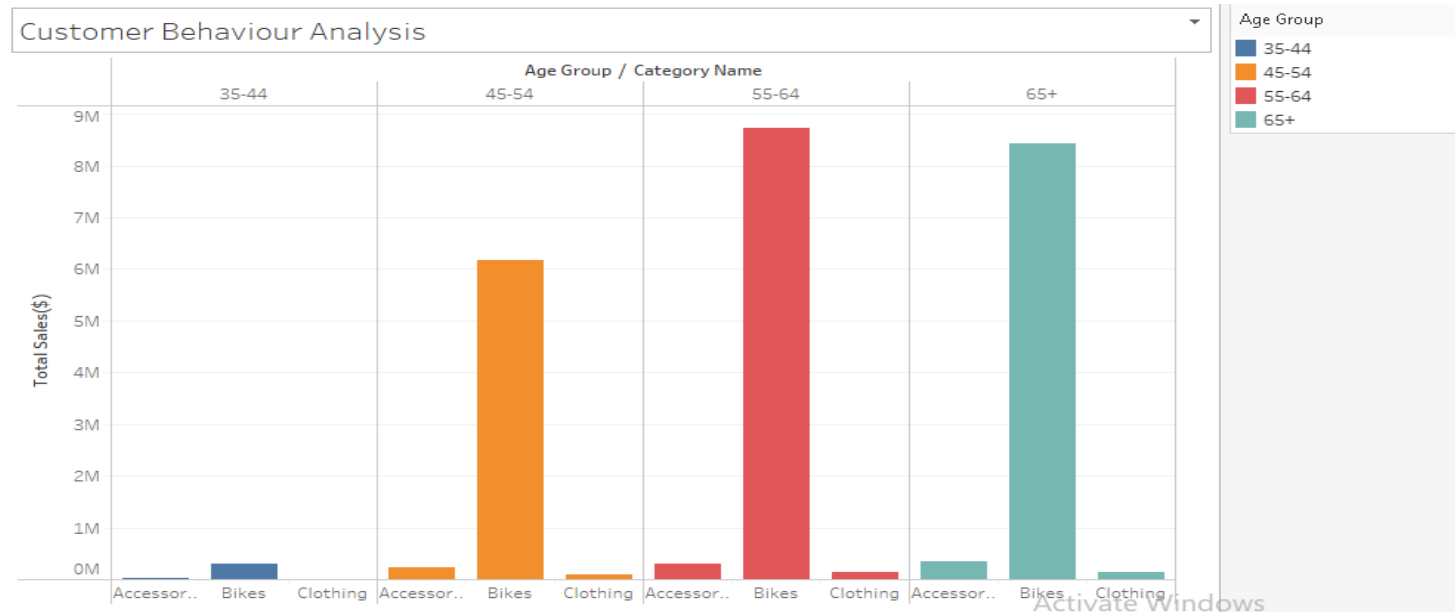
Customer Behavior Analysis

- **Methodology:**
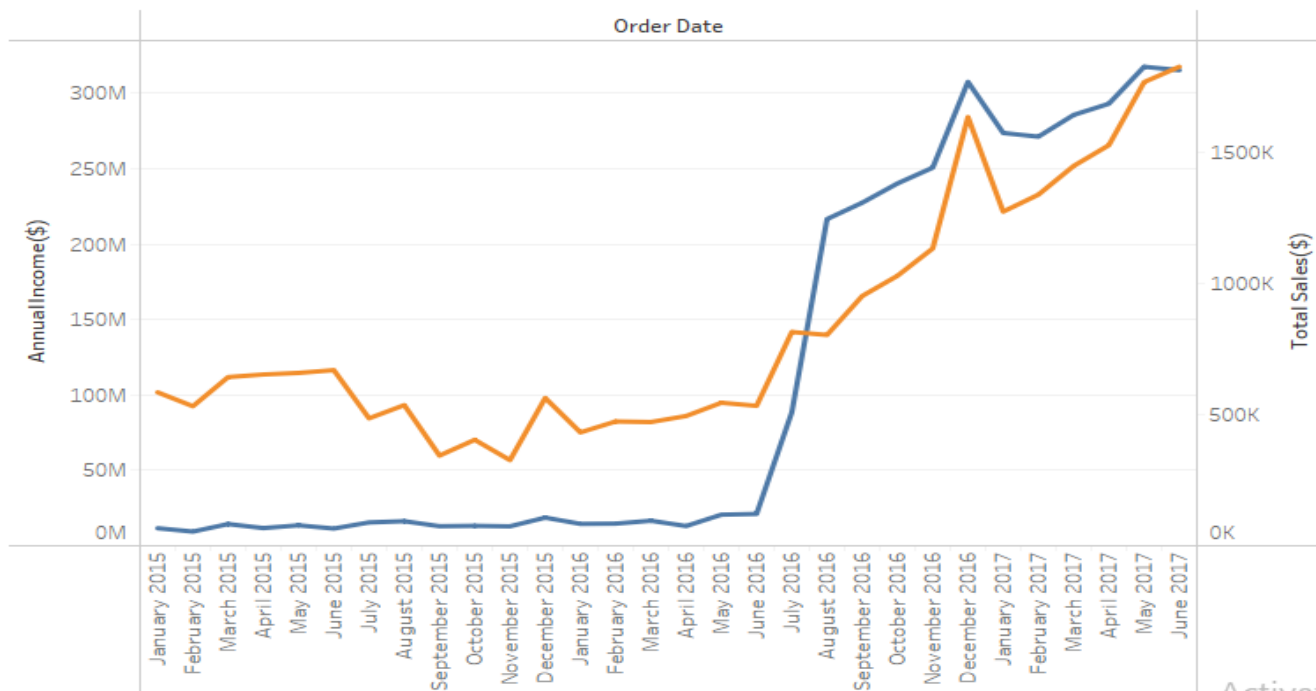 - ◦ Customer segmentation based on demographics and purchasing power.
- **Findings:**
  - ◦ Higher-income customers tend to have a higher purchasing power.
  - ◦ Younger customers tend to have a lower purchasing power than older customer.

Customer Behaviour Analysis

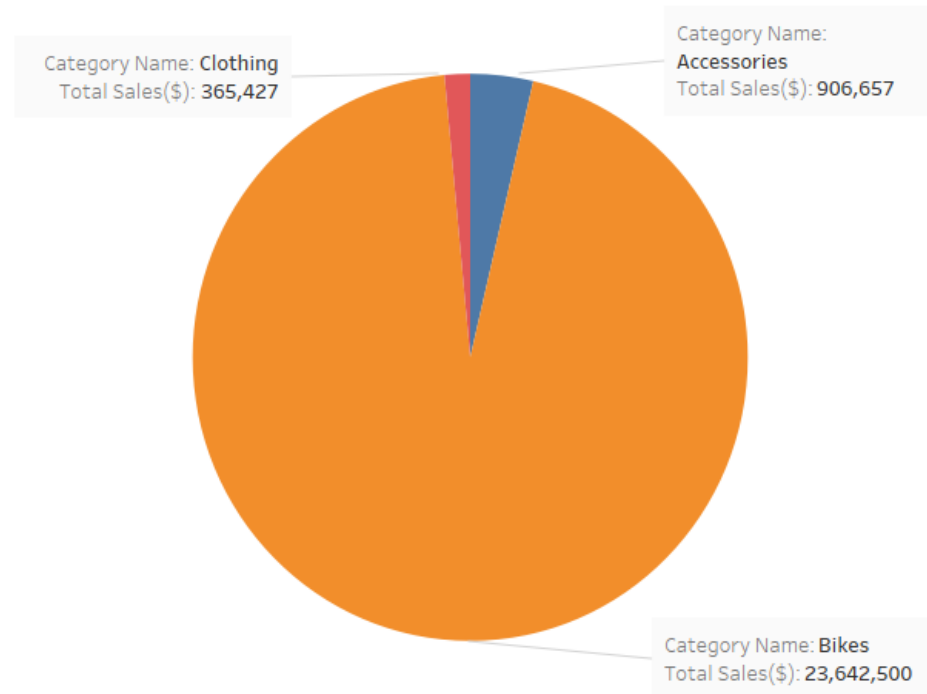Customer Behaviour Analysis based on Annual Income

Product Performance Evaluation

- Methodology:
  - Analysis of top-performing vs. underperforming products.
- Findings:
  - Best-selling products are under the bike category.
  - Underperformers: Low-end apparel and accessories.

Sales based on Product Category

Category Name: Clothing
Total Sales($): 365,427

Category Name:
Accessories
Total Sales($): 906,657

Category Name: Bikes
Total Sales($): 23,642,500

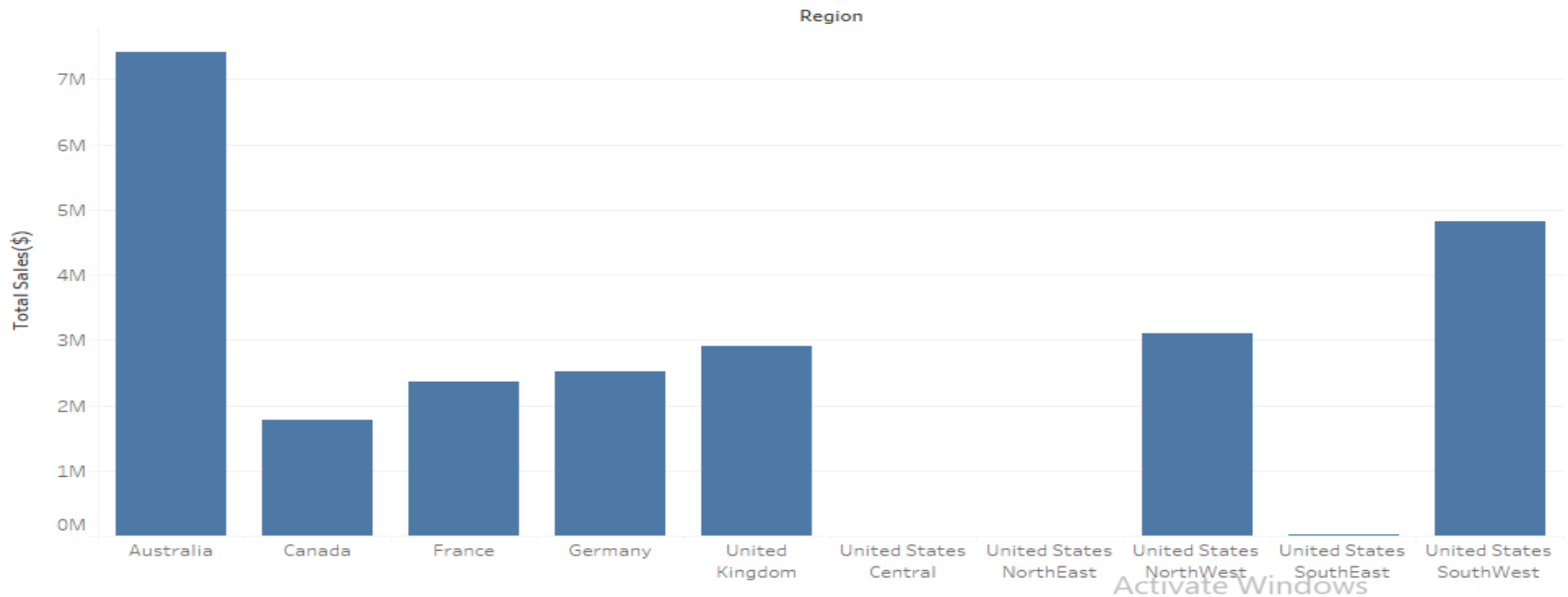Activate Wind

Territorial Sales Analysis

- ▸ **Methodology:**
  - • Comparison of regional sales data using SQL queries and Python visualizations.
- ▸ **Findings:**
  - ◦ Australia outperform other areas in overall sales.
  - • Lower sales in the US Central, NorthEast and SouthEast regions.

Sales Peformance based on Regions
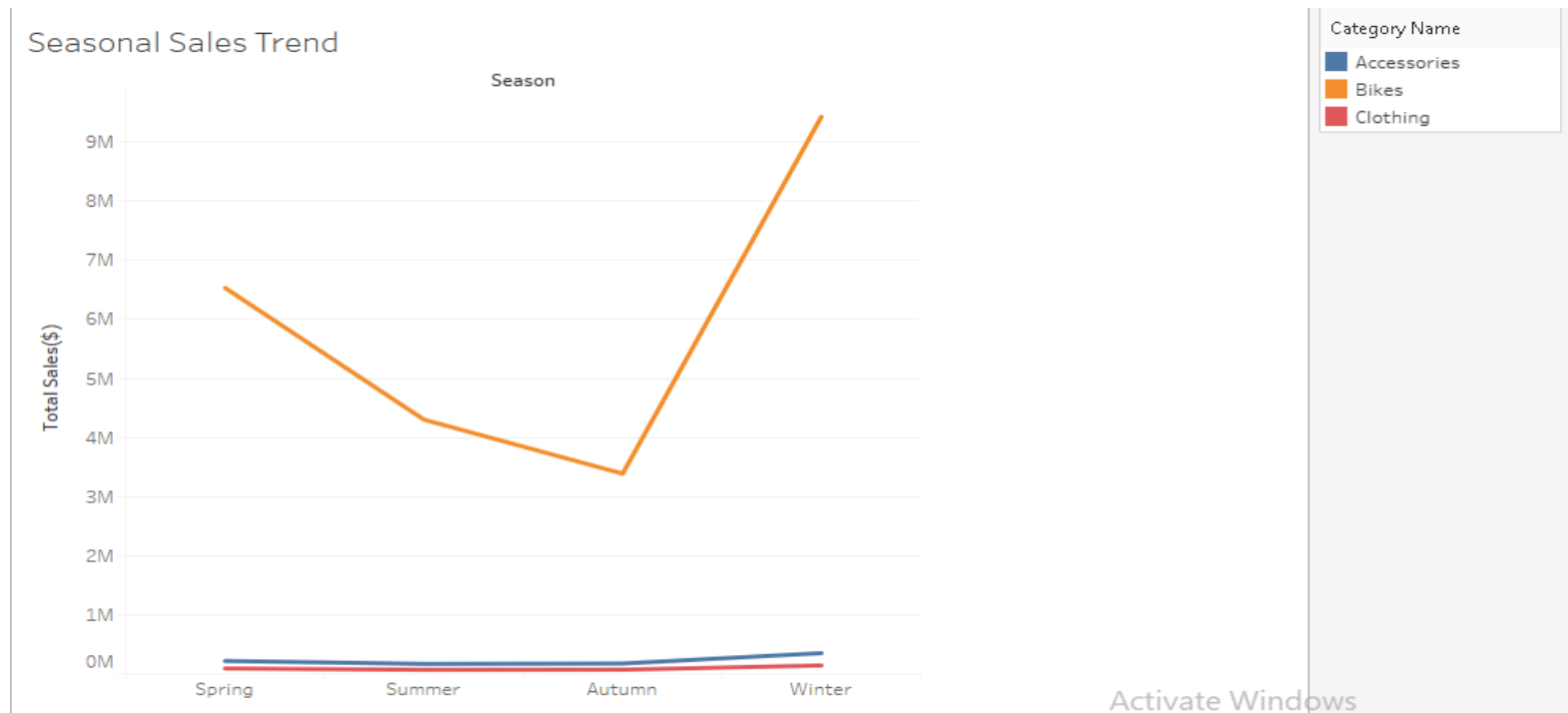
Total Sales by Territories

SUM(Total Sales($))

- ·   3,143
- ○   2,000,000
- ○   4,000,000
- ◯   6,000,000
- ◯   7,416,455

France

United States SouthWest

Australia

~5000 mi

Activate Windows

Seasonal Trends Analysis

▸ **Methodology:**
 ◦ Correlation between seasonal holidays and sales spikes.

▸ **Findings:**
  ◦ Sales peak around Christmas and New Year's, with high sales in winter season.
  ◦ Autumn sales dip.

Hypothesis Testing Results

- ▸ **Hypothesis 1:**
  - **Result:** Confirmed. Higher-priced products have lower sales quantities, as demonstrated by a significant inverse correlation.
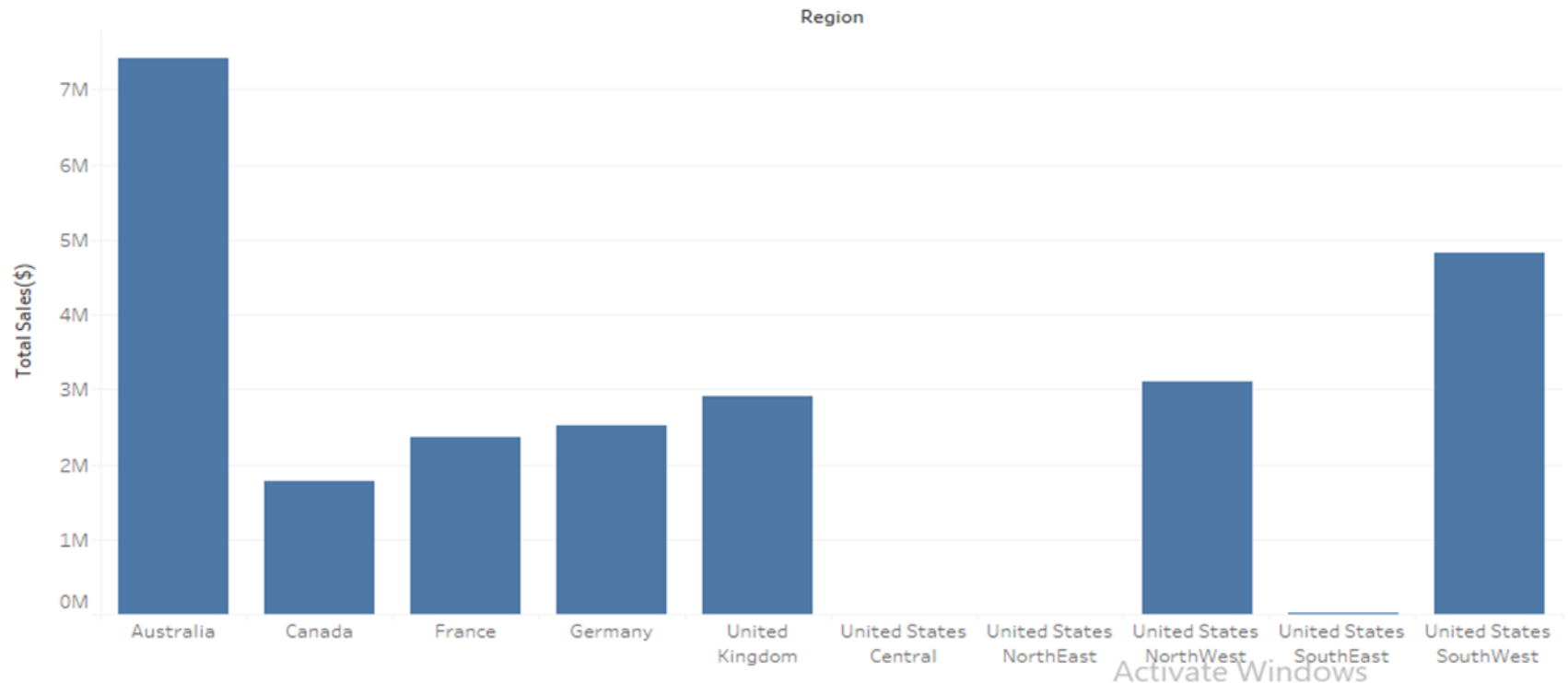

Linear Regression : Price vs Quantity Sold
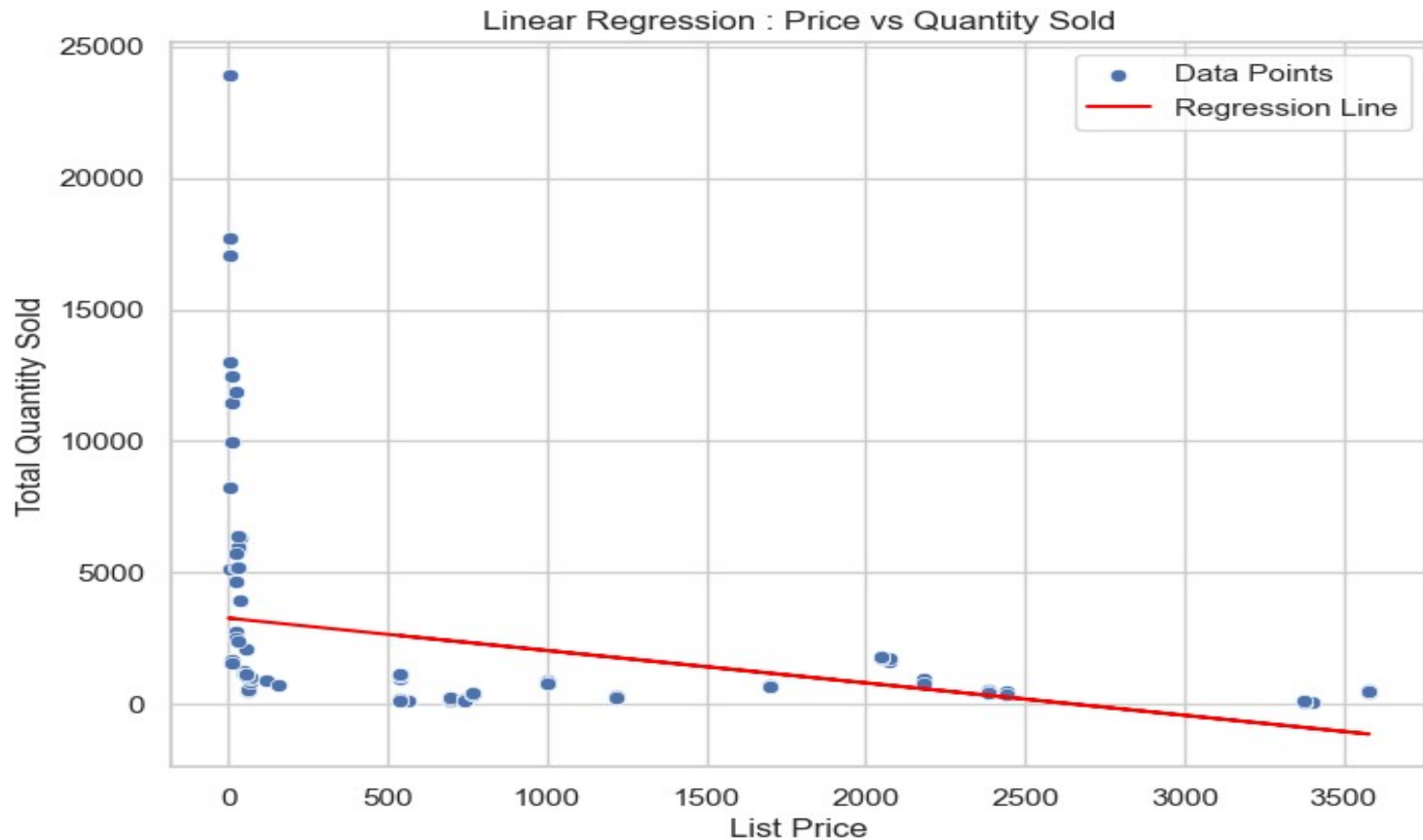
Hypothesis Testing Results

▸ **Hypothesis 2:**
  ◦ **Result**: Confirmed. Sales performance varies greatly by territory, with significant differences in revenue across regions.
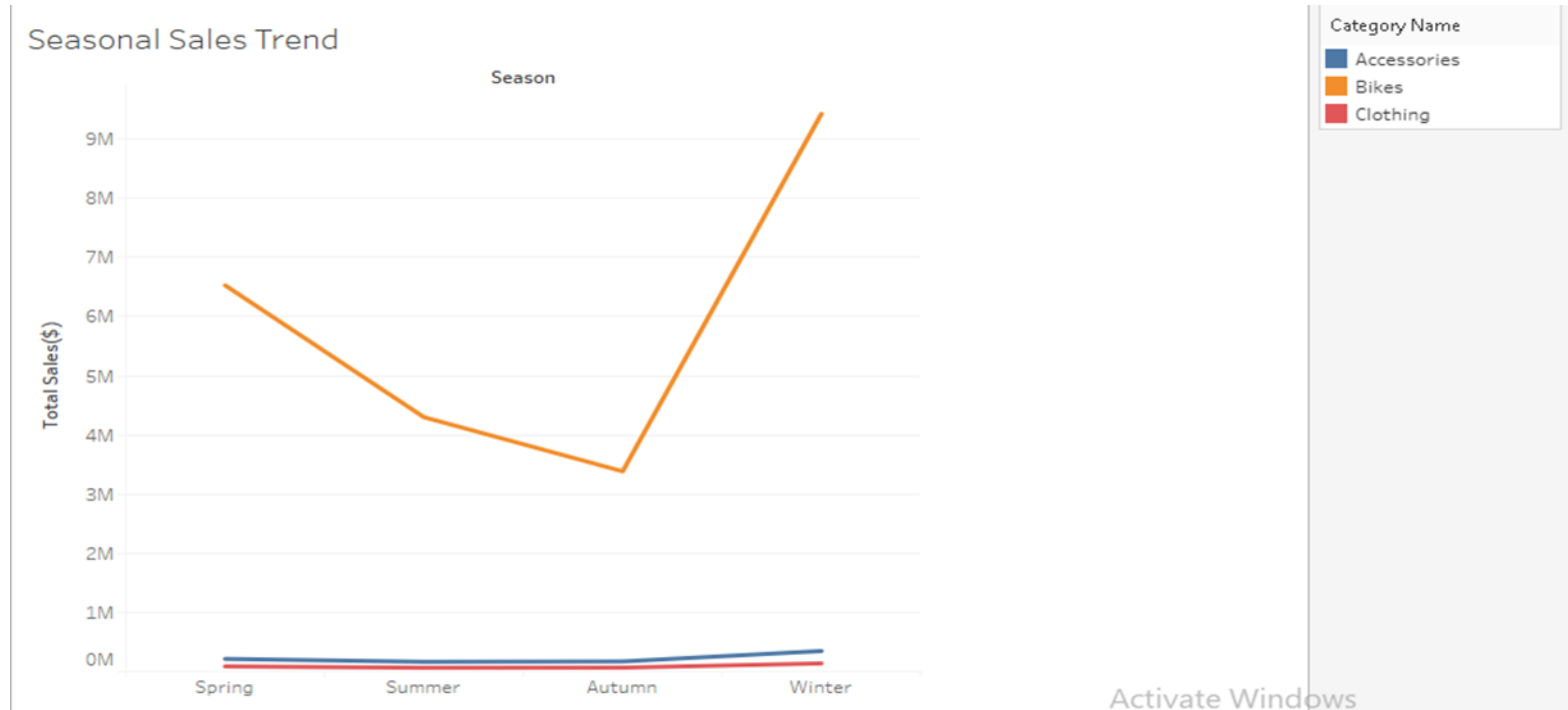

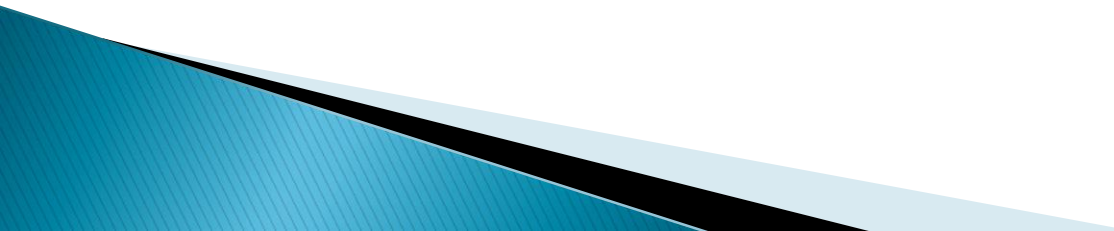Sales Peformance based on Regions
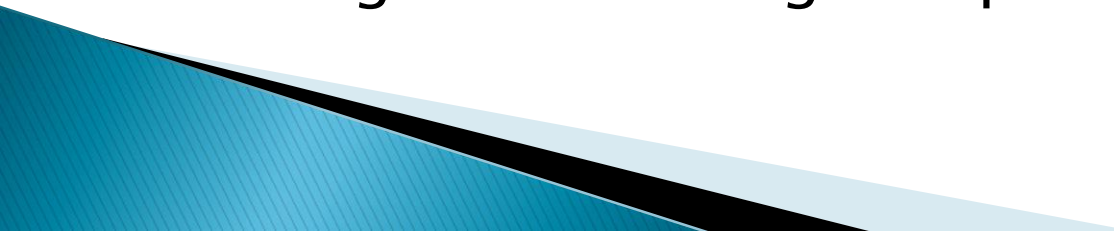
Hypothesis Testing Results

- **Hypothesis 3:**
  - **Result**: Confirmed. All categories, especially bikes, see increased sales during specific seasons.

Key Insights

- **Sales Trends**: Sales performance is highly influenced by seasonality, especially during holidays.
- **Customer Behavior:** Wealthier and older customers drive product sales.
- **Product Performance**: A clear divide between best-sellers and underperformers, suggesting opportunities to discontinue or re-strategize low-performing items.
- **Regional Differences**: The company can benefit from targeted regional marketing strategies.

Recommendations

- **Optimize Pricing Strategies**: Dynamic pricing models for premium products to balance sales volume and profitability.
- **Targeted Marketing Campaigns**: Focus on high-performing regions and demographics.
- Seasonal promotions around holiday periods to maximize revenue.
- **Product Portfolio Refinement**: Discontinue low-performing products and focus on developing new offerings in high-demand categories.
- **Territorial Expansion Strategies**: Strengthen market presence in underperforming regions, such as the US regions with targeted promotions.

Conclusion

- ## Summary of Findings:
  - Data-driven insights reveal actionable strategies for improving sales and product offerings.
- ## Next Steps:
  - Implement recommended sales strategies, enhance product offerings, and roll out targeted marketing initiatives.
- ## Final Takeaway:
  - This comprehensive analysis positions Adventure Works to capitalize on market opportunities and drive sustained growth.