Project Title: Adventure Works
Tools: Excel, SQL, Power BI, Tableau
Project Code: P1114
Group Number: 4

1. Executive Summary

This project focuses on analyzing the Adventure Works dataset to evaluate overall business performance across sales, customers, products, regions, and time periods. Interactive dashboards were developed using Power BI and Tableau to provide clear insights for decision-makers. The analysis helps identify growth opportunities, high-performing products, regional trends, and areas for operational improvement.

Executive KPI Snapshot (2010–2014)

KPI	Value
Total Sales	**$29.36M**
Total Profit	**$12.08M**
Profit Margin	**41.15%**
Total Customers	**18.48K**
Total Orders	**60.40K**
Analysis Period	**2010–2014**

2. Business Problem Statement

The company required a centralized and visual reporting solution to:

- Monitor sales and profit trends over time
- Identify top-performing products and customers
- Compare revenue with production cost
- Understand regional performance
- Support strategic decision-making using data

3. Objectives of the Project

- Clean and prepare raw data for analysis
- Build a structured data model using SQL
- Create interactive dashboards in Power BI and Tableau
- Track key business KPIs
- Provide actionable business insights

4. Dataset Description

Source: Adventure Works sample database

Main Tables Used:

- Sales
- Customers
- Products
- Geography
- Date
- Production Cost

Key Attributes:

- Order Date
- Sales Amount
- Production Cost
- Customer Segment
- Product Category & Subcategory
- Region & Country

5. Tools & Technologies

Tool	Purpose
SQL	Data extraction, joins, transformations
Excel	Initial cleaning & validation
Power BI	KPI tracking & interactive dashboard
Tableau	Advanced visual analytics & storytelling

6. Data Preparation & Modeling

- Removed duplicate records and null values
- Standardized date formats and currency
- Created calculated fields (Profit, Profit Margin, Quarterly Sales)
- Built relationships between fact and dimension tables
- Optimized queries for performance

7. Key Performance Indicators (KPIs)

- Total Sales
- Total Profit
- Profit Margin (%)
- Total Orders
- Total Customers
- Average Order Value
- Sales Growth Rate
- Cost vs Revenue

8. Dashboard Overview

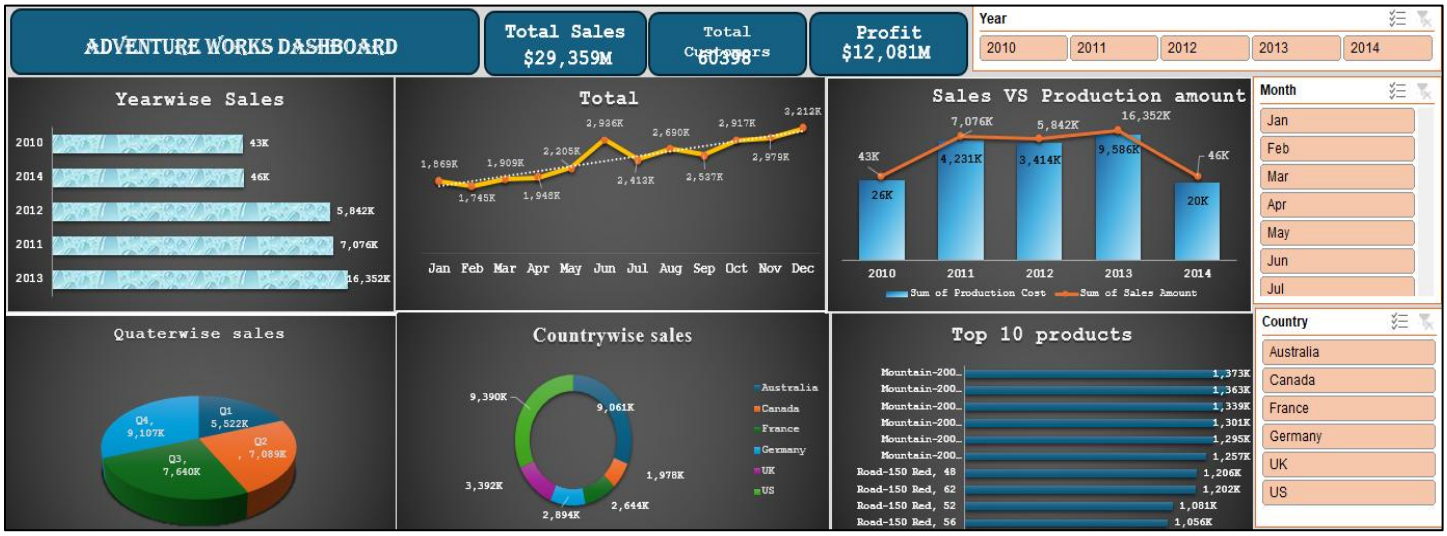
8.1 Excel Dashboard

Purpose: Initial exploratory analysis and KPI validation

Main Features:

- KPI cards for Total Sales ($29.36M), Total Profit ($12.08M), and Total Customers
- Year-wise sales comparison (2010–2014)
- Monthly sales trend line chart
- Sales vs Production Cost comparison chart
- Quarter-wise sales distribution (Q1–Q4)
- Country-wise sales donut chart
- Top 10 products by sales bar chart
- Interactive slicers for Year, Month, and Country

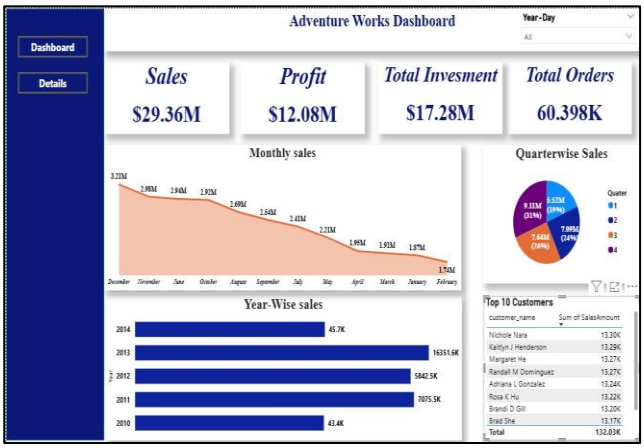
Business Value: The Excel dashboard provided a quick validation layer for KPIs and trends before building Power BI and Tableau dashboards. It helped ensure data consistency and allowed early identification of peak sales years, seasonal patterns, and top-performing products.

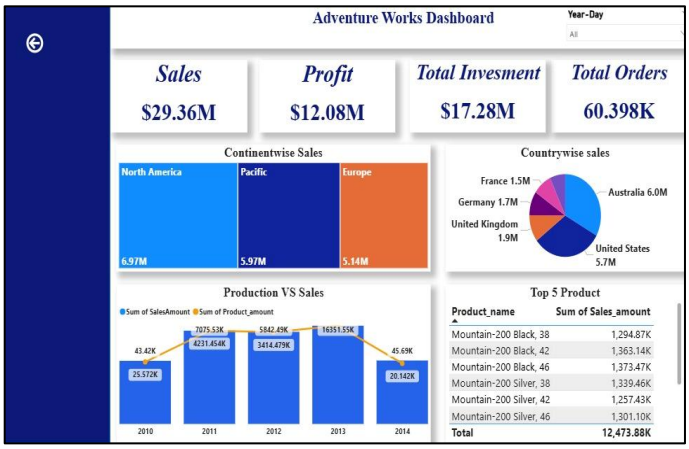


8.2 Power BI Dashboard

Main Features:

- KPI cards for Sales, Profit, Customers, Orders
- Sales trend by Year & Quarter
- Top 10 Products by revenue
- Regional sales map
- Profit margin by category

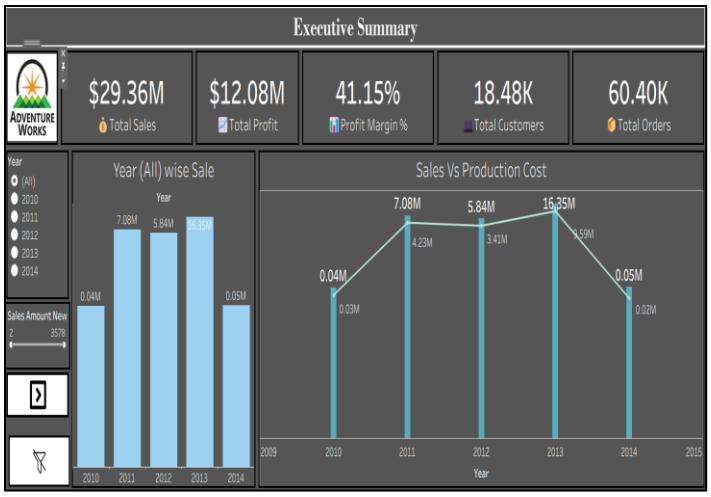


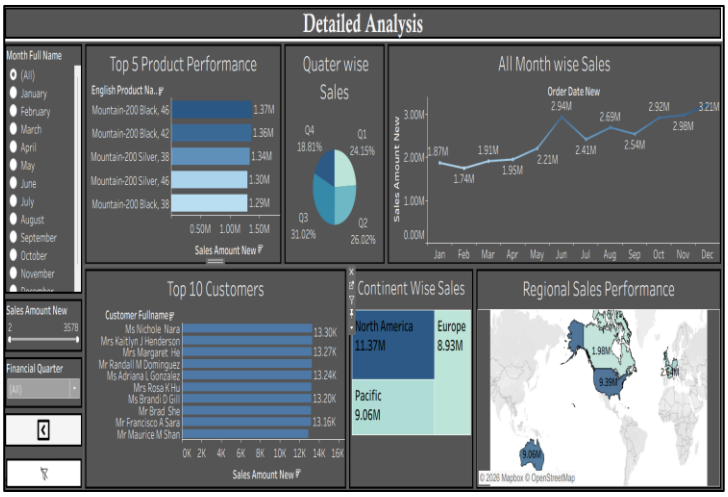


8.3 Tableau Dashboard

Main Features:

- Interactive filters (Year, Region, Category)
- Sales vs Production Cost combo chart
- Customer segmentation analysis
- Monthly sales trend
- Navigation buttons for dashboard sections





9. Dashboard Visualizations Explanation

9.1 Executive KPI Snapshot

KPI	Value	Business Meaning
Analysis Period	2010–2014	Complete historical sales cycle
Total Sales	**$29.36M**	Overall revenue generated
Total Profit	**$12.08M**	Net business gain after cost
Profit Margin	**41.15%**	Strong operational efficiency
Total Customers	**18.48K**	Market reach
Total Orders	**60.40K**	Demand volume

9.2 Sales Trend Analysis (Time Series)

Year-wise Sales Performance:

Year	Sales ($M)	Production Cost ($M)
2010	0.04	0.03
2011	7.08	4.23
2012	5.84	3.41
2013	**16.35**	9.59
2014	0.05	0.02

Key Observations:

- **2013 is the peak year**, contributing **~56% of total revenue**.
- Sales increased sharply from 2011 → 2013.
- Both sales and production costs follow similar trends, maintaining healthy margins.

9.3 Seasonal & Quarterly Performance

Quarter	Sales Contribution
Q1	24.15%
Q2	26.02%
Q3	**31.02%**
Q4	18.81%

9.4 Product Performance (Top 5)

Product	Sales ($M)
Mountain-200 Black (46)	1.37
Mountain-200 Black (42)	1.36
Mountain-200 Silver (38)	1.34
Mountain-200 Silver (46)	1.30
Mountain-200 Black (38)	1.29

9.5 Regional & Continent Performance

Continent	Sales ($M)
North America	**11.37**
Pacific	9.06
Europe	8.93

9.6 Profitability Analysis

- Overall profit margin: **41.15%**

10. Key Insights & Findings

1. **2013 Revenue Breakthrough**
   Over **55% of total multi-year sales** occurred in 2013, marking it as a benchmark year for strategic replication.
2. **Strong Profitability**
   A **41% profit margin** reflects effective cost management and premium product positioning.
3. **Clear Seasonality**
   Nearly **57% of annual sales occur in Q3 & Q4**, proving the importance of seasonal planning.
4. **Untapped Global Markets**
   Europe and Asia-Pacific remain high-potential regions with limited current penetration.
5. **Product Portfolio Strength**
   Road and mountain bikes generate high margins, while accessories drive consistent transaction volume.

11. Business Recommendations

Area	Recommendation	Expected Impact
Growth Strategy	Analyze and replicate 2013 sales drivers	Revenue acceleration
Inventory Planning	Align stock with Q3–Q4 peaks	Lower stock-outs & holding costs
Cost Control	Maintain supplier optimization to protect 41% margin	Sustained profitability
Market Expansion	Invest in Europe & Asia-Pacific	New revenue streams
Product Strategy	Prioritize high-margin bikes + expand accessories	Balanced growth

12. Challenges Faced & Solutions

Challenge	Solution
Large dataset	Query optimization using SQL indexes
Data inconsistency	Data cleaning in Excel & SQL
Dashboard performance	Reduced visuals & optimized calculations
KPI accuracy	Cross-validation between tools

13. Learning Outcomes

- Hands-on experience with real-world datasets
- Improved SQL querying & data modeling skills
- Dashboard design best practices
- Business-oriented data storytelling
- Stakeholder-focused reporting

14. Conclusion

The project successfully delivered an end-to-end business intelligence solution using SQL, Power BI, and Tableau. The dashboards enable management to track performance, identify risks, and make data-driven decisions efficiently. This project demonstrates strong analytical, technical, and visualization capabilities.