DATA ANALYSIS REPORT

Sales Performance

July 2017 to December 2017

Prepared for

AdventureWorks

By

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Introduction

This report details the development and analysis of a sales performance dashboard for AdventureWorks for the period 1 July to 31 December 2017. The primary objective of this dashboard is to provide AdventureWorks with a clear and concise overview of their sales performance during this six-month period. By visualizing key sales metrics and trends, this dashboard aims to provide actionable insights to inform strategic decision-making and drive business growth.

This report addresses the following key business questions:

- **Overall Sales Performance:** What is the total sales volume, total sales revenue, profit, and profit margin for AdventureWorks during this period?
- **Sales Trends Over Time:** How did sales perform month-by-month from July to December 2017? Are there any noticeable seasonal trends or patterns that can be leveraged?
- **Geographic Sales Distribution:** Which countries are generating the most sales volume in terms of units sold? How does the geographic distribution of sales contribute to overall performance, and are there opportunities for expansion in specific regions?
- **Product Performance:** Which bike models are the most popular in terms of units sold? Are there any specific product categories that are driving sales? Are there opportunities to optimize the product portfolio based on these insights?
- **Delivery Performance:** What is the average order delivery time for each country? Are there any significant variations in delivery times across different regions? Does delivery performance correlate with sales success? If so, what strategies can AdventureWorks implement to enhance delivery efficiency and potentially drive sales growth?

By addressing these key business questions, the dashboard provides AdventureWorks with the data-driven insights necessary to identify areas for improvement in sales operations, optimize product offerings, and ultimately, drive revenue growth. The following sections of this report will detail the data used, the methodology employed in creating the dashboard, a comprehensive analysis of the key findings, and actionable insights based on the analysis.

Data Overview

The data used in this analysis originates from the AdventureWorks database, a Microsoft SQL Server database. For this project, a subset of the AdventureWorks data was extracted and exported in CSV format. This CSV file will be imported into spreadsheet software for manipulation, analysis, and dashboard development. The extracted data details sales transactions from 1 July to 31 December 2017, and include the following variables:

- OrderNo
- SalesOrderLineKey
- OrderQuantity
- ItemCost
- ItemPrice
- OrderDate
- DeliveryDueDate
- OrderToDelivery
- CustomerName
- CustomerCity
- CustomerState
- CustomerCountry
- ProductCategory
- ProductSubcategory
- Product
- ProductColor
- Model
- Order Line Price

A preview of the raw data, as extracted from the database, is shown below:

adventureworks-sales-data.csv U

```
OrderNo,SalesOrderLineKey,OrderQuantity,ItemCost,ItemPrice,OrderDate,DeliveryDueDate,OrderToDelivery,CustomerName,CustomerCity,CustomerState,CustomerCountry,ProductCategory,ProductSubcategory,Product,ProductColor,Model,Order Line Price
SO43697,43697001,1,2171.29,3578.27,01/07/2017,05/07/2017,4,Cole Watson,Metchosin,British Columbia,Canada,Bikes,Road Bikes,"Road-150 Red, 62",Red,Road-150,3578.27
SO43698,43698001,1,1912.15,3399.99,01/07/2017,11/07/2017,10,Rachael Martinez,Pantin,Seine Saint Denis,France,Bikes,Mountain Bikes,"Mountain-100 Silver, 44",Silver,Mountain-100,3399.99
SO43699,43699001,1,1912.15,3399.99,01/07/2017,06/07/2017,5,Sydney Wright,Lebanon,Oregon,United States,Bikes,Mountain Bikes,"Mountain-100 Silver, 44",Silver,Mountain-100,3399.99
SO43700,43700001,1,413.15,699.1,01/07/2017,10/07/2017,9,Ruben Prasad,Beverly Hills,California,United States,Bikes,Road Bikes,"Road-650 Black, 62",Black,Road-650,699.1
SO43701,43701001,1,1912.15,3399.99,01/07/2017,11/07/2017,10,Christy Zhu,North Ryde,New South Wales,Australia,Bikes,Mountain Bikes,"Mountain-100 Silver, 44",Silver,Mountain-100,3399.99
SO43702,43702001,1,2171.29,3578.27,01/07/2017,05/07/2017,4,Colin Anand,,California,United States,Bikes,Road Bikes,"Road-150 Red, 44",Red,Road-150,3578.27
SO43703,43703001,1,2171.29,3578.27,01/07/2017,07/07/2017,6,Albert Alvarez,Perth,South Australia,Australia,Bikes,Road Bikes,"Road-150 Red, 62",Red,Road-150,3578.27
SO43704,43704001,1,1898.09,3374.99,01/07/2017,04/07/2017,3,Julio Ruiz,East Brisbane,Queensland,Australia,Bikes,Mountain Bikes,"Mountain-100 Black, 48",Black,Mountain-100,3374.99
SO43705,43705001,1,1912.15,3399.99,01/07/2017,05/07/2017,4,Curtis Lu,East Brisbane,Queensland,Australia,Bikes,Mountain Bikes,"Mountain-100 Silver, 38",Silver,Mountain-100,3399.99
```

Preparation and Processing

The CSV file is opened in Microsoft Excel and the worksheet renamed to **Sales**. As a first step, the data within the worksheet was formatted as an Excel table, also named **Sales**. This action applied automatic formatting, inserted filters to each column header, and created *Structured References* ([@ColumnName]). These Structured References significantly improved formula readability, provided dynamic range adjustment, and facilitated easier reuse of calculations as the dataset might change in the future.

Additional Variables

Next, several calculated columns were added to the **Sales** table to derive additional insights from the data. These columns utilized Structured References, enabling dynamic and clear formulas that automatically adjusted to changes in the dataset. These additional variables included the following:

TotalCost	Calculated as `=[@OrderQuantity]*[@ItemCost]` to determine the total cost of each sales order line
TotalRevenue	Calculated as `=[@OrderQuantity]*[@ItemPrice]` to determine the total revenue generated by each sales order line
Profit	Calculated as `=[@TotalRevenue]-[@TotalCost]` to determine the gross profit for each sales order line
Month	Extracted the month and year of the order date using the formula `=TEXT([@OrderDate],"mmm-yy")` for cleaner visualization

Helper Worksheet

A new worksheet named **Helper** was created to summarize and aggregate data for use in the dashboard visualizations. This provides the ability to use advanced formatting for a clean and visually appealing dashboard, that is easy to maintain and update. The Key Performance Indicators (KPIs) and Metrics for the 6-month period from 1 July to 31 December 2017 are calculated as follows:

Sales Volume	Calculated as `=COUNTA(Sales!A2:A1202)` to determine the total number of order numbers (no duplicate values are present)
Total Sales	Calculated as `=SUM(Sales!G2:G1202)` to determine the 6-month total revenue generated by each sales order line

Profit	Calculated as `=SUM(Sales!H2:H1202)` to determine the 6-month total of gross profit for each sales order line
Profit Margin	Calculated as `=(C4/C3)*100%` to determine the percentage of profit earned by AdventureWorks in relation to its total revenue

A Pivot Table is inserted to indicate the proportion of bike types sold as follows:

Rows	`ProductSubcategory`
Values	`Sum of OrderQuantity`

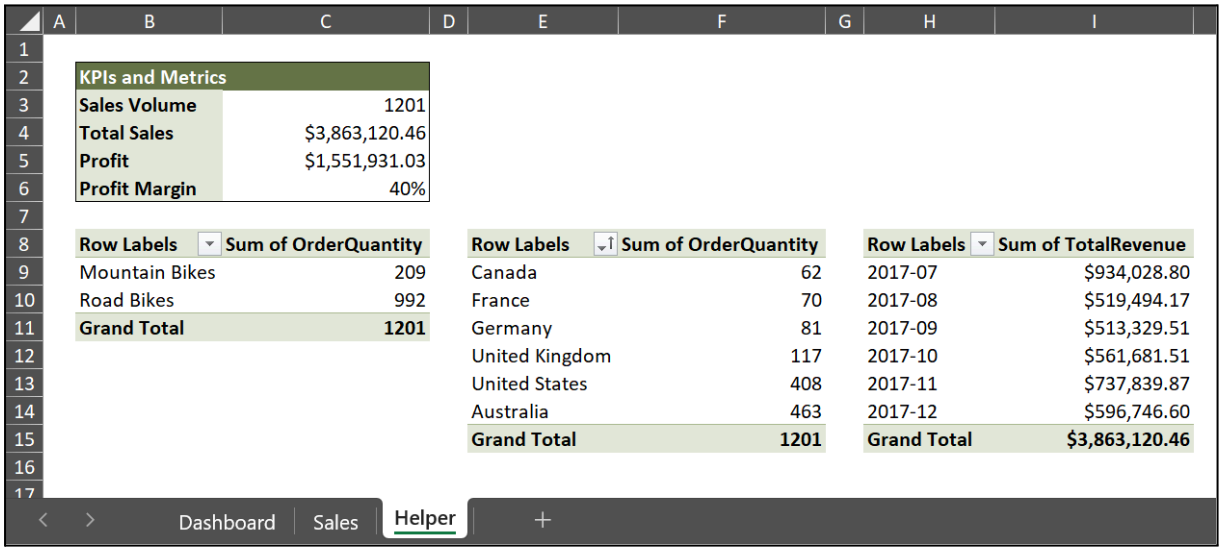
To indicate the number of orders by country for the 6-month period, a pivot table is inserted as follows:

Rows	`CustomerCountry`
Values	`Sum of OrderQuantity`

Lastly, a pivot table is inserted to indicate the total sales revenue by month as follows:

Rows	`Month`
Values	`Sum of TotalRevenue`

The final **Helper** worksheet containing the KPIs and Metrics calculated, as well as the 3 pivot tables as described above, is shown below:



KPIs and Metrics	
Sales Volume	1201
Total Sales	$3,863,120.46
Profit	$1,551,931.03
Profit Margin	40%

Row Labels	Sum of OrderQuantity
Mountain Bikes	209
Road Bikes	992
Grand Total	1201

Row Labels	Sum of OrderQuantity
Canada	62
France	70
Germany	81
United Kingdom	117
United States	408
Australia	463
Grand Total	1201

Row Labels	Sum of TotalRevenue
2017-07	$934,028.80
2017-08	$519,494.17
2017-09	$513,329.51
2017-10	$561,681.51
2017-11	$737,839.87
2017-12	$596,746.60
Grand Total	$3,863,120.46

Visualization

Branding

To enhance the visual appeal and professionalism of the dashboard, a custom brand identity was developed for AdventureWorks. The logo design references the company's core business by transforming the **letter A** into a road bike, adding an adventurous flair:

The logo provides only three color options to use in branding. Complementary earthy tones, to evoke a sense of adventure and being out in nature, were added to expand the brand color palette as follows:

	#667447	Moss Green
	#768753	Camouflage Green
	#f3be5f	Maize
	#8B5A2B	Saddle Brown
	#D2691E	Burnt Orange
	#8B0000	Dark Red

Building a Dashboard

The dashboard was designed to provide a concise and visually appealing overview of KPIs and metrics. To achieve this, a consistent visual style was applied throughout the dashboard, utilizing a combination of custom shapes and Excel's built-in charting and pivot table capabilities.

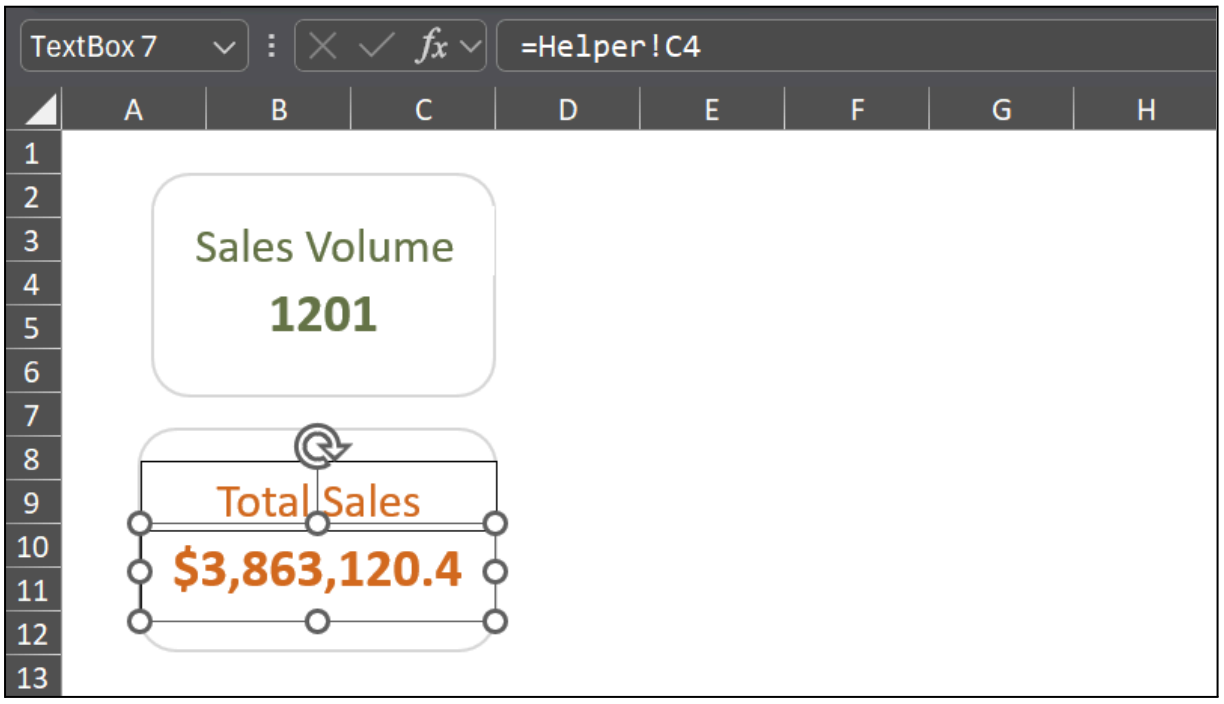
Widget Design

To display dynamic and visually appealing KPIs and metrics, a combination of shapes was used to construct the widgets:

1. A rounded square serves as the canvas, featuring a light grey border and white fill.
2. A text box without a border or fill displays the metric description (e.g. **Sales Volume**), using a font color from the brand color palette.
3. A second text box, also without a border or fill, contains a cell reference to the KPI or metric calculated in the **Helper** worksheet. This text is formatted in bold, with a slightly larger font size, and uses the same font color as the description.

The use of a cell reference ensures that the KPI or metric updates dynamically as the underlying data changes, eliminating the risk of manual typing errors. Once the shapes were aligned and formatted, they were grouped together to form a single widget. This process was repeated for the remaining metrics, ensuring a cohesive and professional presentation of KPIs and metrics on the dashboard.

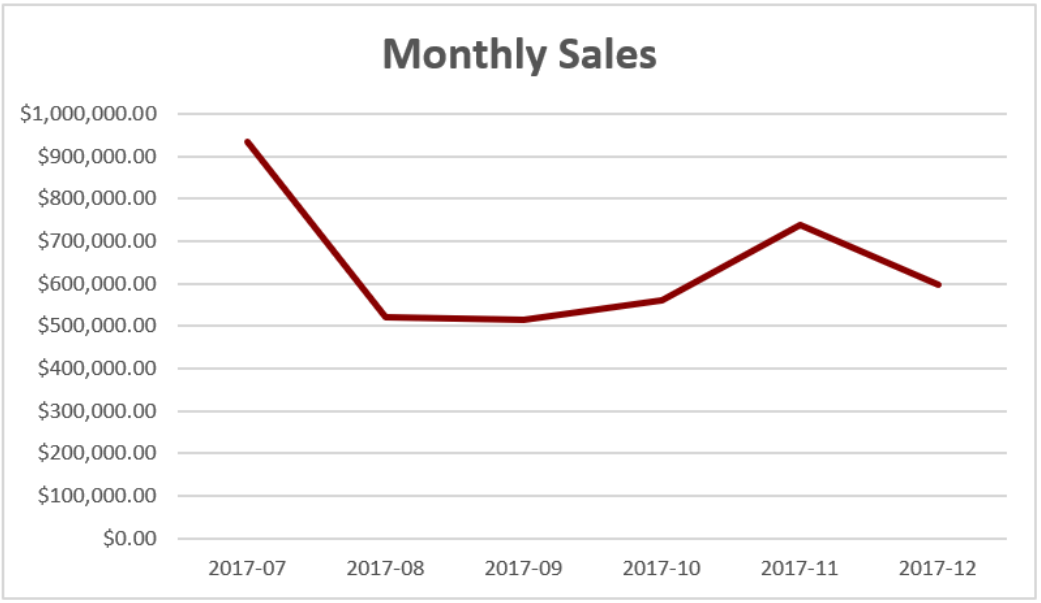
Below is a screenshot illustrating the construction of a dashboard widget. The top image shows a completed widget displaying **Sales Volume** along with its corresponding metric. The bottom image depicts a widget in progress, highlighting the three shapes before grouping and the cell reference in the formula bar. This demonstrates how the metric is dynamically linked to the underlying data in the **Helper** worksheet.



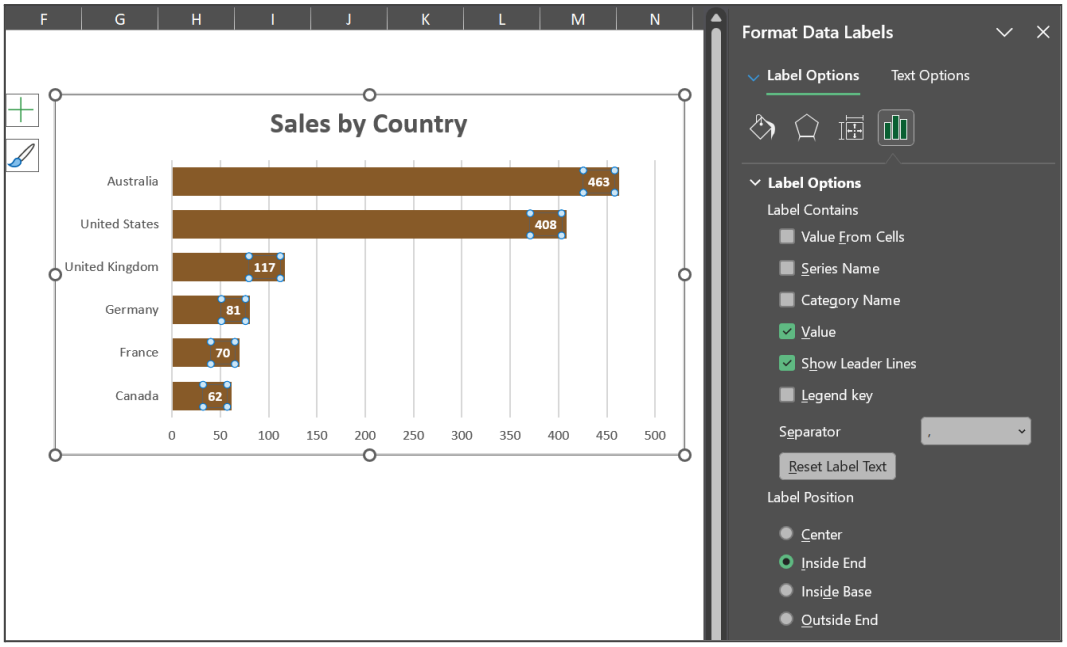
Graphical Representations

KPIs and metrics were graphically visualized using pivot charts and graphs that update dynamically as the underlying data changes. The supporting pivot tables for these charts and graphs were created earlier in the Helper worksheet.

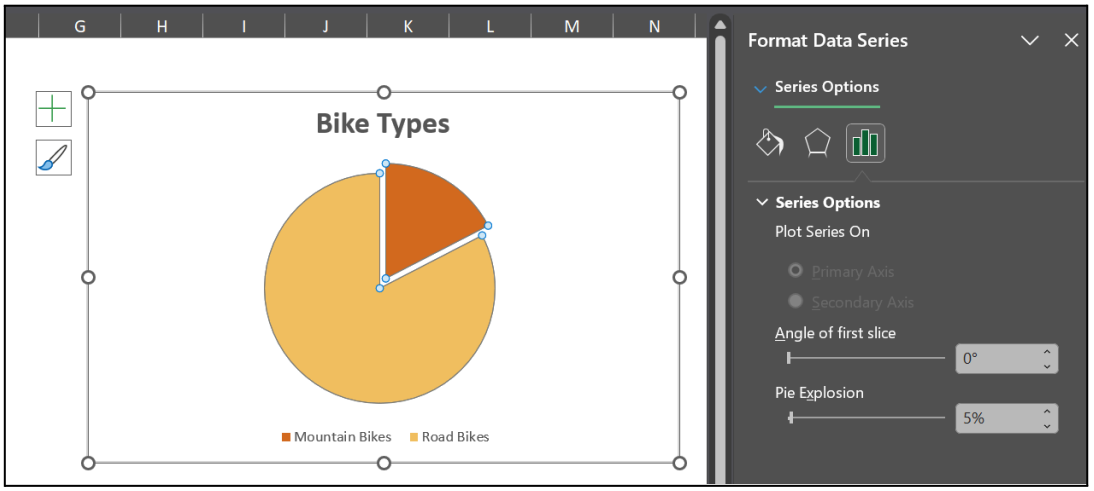
First, the monthly sales trend was visualized using a line graph. The total sales revenue was summarized by month, utilizing the additional variable previously created in the "yyyy-mm" format for cleaner visualization. The graph title was updated to **Monthly Sales**. Additionally, the line was formatted to align with the brand color palette, and its weight was increased for better visibility, as shown in the screenshot below.



Next, sales by country were visualized using a bar chart. To enhance readability and clarity, data labels were added to the inside end of each bar, displaying the total order quantity for each country. The chart title was updated to **Sales by Country** and the bars were formatted to align with the brand color palette, as shown below:



Finally, a pie chart was created to visualize the proportion of road bikes and mountain bikes sold. As AdventureWorks only sells these two types of bikes, a pie chart was an appropriate choice. A 5% pie explosion was applied to the segments to enhance visual distinction. The chart was titled **Bike Types** and formatted to align with the brand color palette, as shown below:



Pivot Table Integrations

The first pivot table inserted summarizes the 10 best-selling bike models. The table configuration is as follows:

Rows	`Product`
Values	`Sum of OrderQuantity`

The pivot table is then sorted in descending order by order quantity and a value filter is applied to display only the top 10 results. The heading **Top 10 Bike Models** is added above the pivot table for clarity.

Under the heading Average Order Delivery Time, a second pivot table was inserted to summarize the average order delivery time for each country. The table configuration is as follows:

Rows	`CustomerCountry`
Values	`Average of OrderToDelivery`

A screenshot of both pivot tables, as they will appear on the dashboard, is included below:

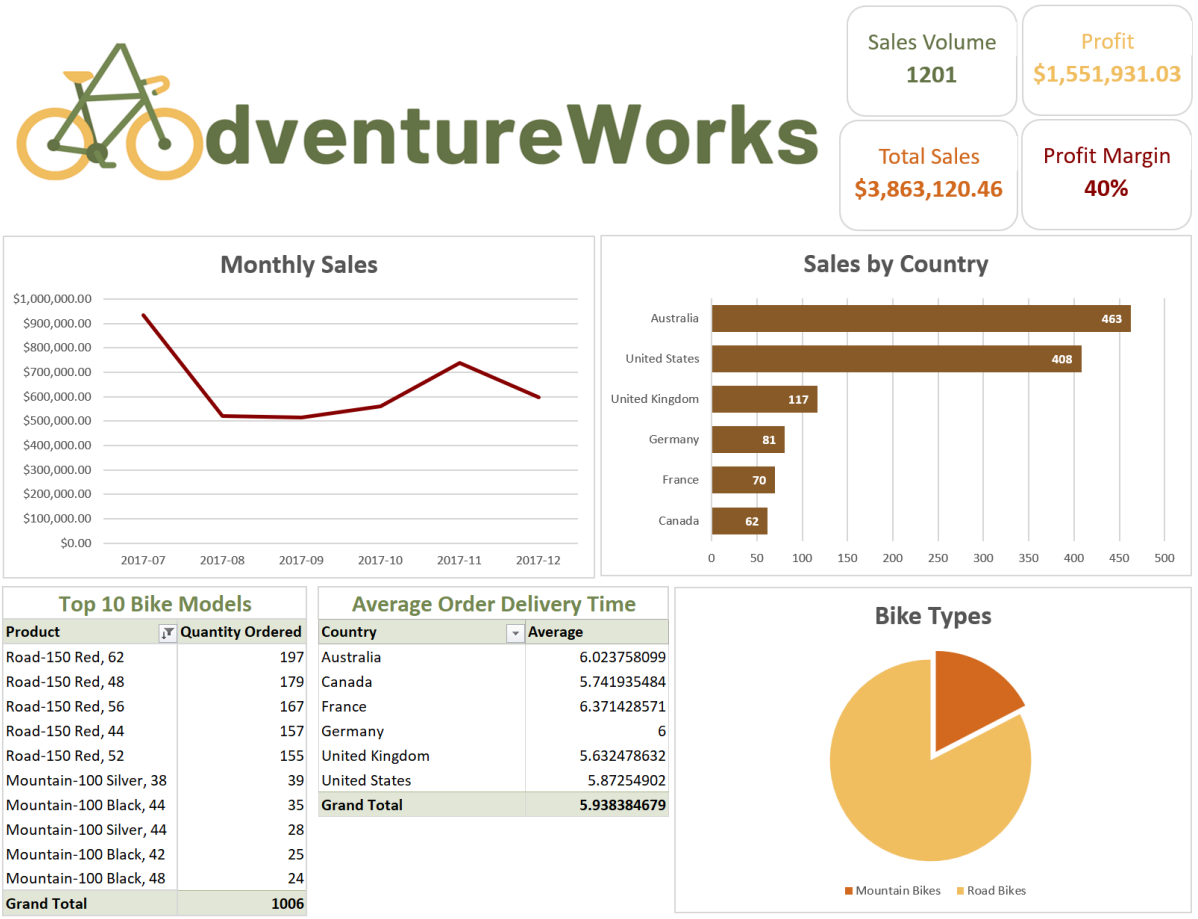
Top 10 Bike Models

Product	Quantity Ordered
Road-150 Red, 62	197
Road-150 Red, 48	179
Road-150 Red, 56	167
Road-150 Red, 44	157
Road-150 Red, 52	155
Mountain-100 Silver, 38	39
Mountain-100 Black, 44	35
Mountain-100 Silver, 44	28
Mountain-100 Black, 42	25
Mountain-100 Black, 48	24
Grand Total	**1006**

Average Order Delivery Time

Country	Average
Australia	6.023758099
Canada	5.741935484
France	6.371428571
Germany	6
United Kingdom	5.632478632
United States	5.87254902
Grand Total	**5.938384679**

Putting it all together



Data Insights

The dashboard provides actionable insights into KPIs and metrics for AdventureWorks during the period of 1 July to December 2017, addressing the following business questions:

Overall Sales Performance

- Total sales volume: **1201**
- Total sales revenue: **$3,863,120.46**
- Profit: **$1,551,931.03**
- Profit margin: **40%**

Sales Trends Over Time

- The month of July experienced the highest sales volume, likely due to the summer season in the Northern Hemisphere.

- A slight sales increase was observed in November, which could be attributed to the holiday season or potential summer sales in the Southern Hemisphere.

Geographic Sales Distribution

- Australia, despite having a significantly smaller population compared to the United States (approximately 26 million vs. 345 million), generated the highest sales volume.
- This suggests that AdventureWorks may have a strong market presence in Australia.

Product Performance

- The dashboard reveals that road bikes significantly outsell mountain bikes.
- The top 5 best-selling bike models are all road bikes, with each model selling, on average, more than 100 units above the closest competing mountain bike model.

Delivery Performance

- The average order delivery time across all countries is 5.94 days.
- France exhibits the highest average delivery time at 6.37 days, although the deviation from the overall average is relatively small.
- While not a major concern, further investigation into potential factors contributing to the slightly longer delivery times in France may be warranted.

Recommendations

Based on the insights provided by the dashboard, the following is recommended for AdventureWorks:

Leverage Seasonal Trends

- Capitalize on summer sales to maximize revenue during peak seasons by increasing marketing efforts and inventory levels, particularly in the Northern Hemisphere.
- Explore opportunities to boost sales during the Southern Hemisphere's summer months through targeted marketing campaigns and inventory adjustments.

Focus on the Australian Market

- Conduct in-depth market research in Australia to understand the factors driving high sales volume.
- Develop targeted marketing campaigns tailored to the Australian market, considering unique preferences and purchasing behaviors.

- Investigate opportunities for further market penetration and expansion in the Southern Hemisphere.

Optimize Product Portfolio

- Given the strong demand for road bikes, invest in research and development to introduce new and innovative road bike models.
- Analyze the performance of current mountain bike models and consider product improvements or line extensions to enhance their competitiveness.
- Explore opportunities to diversify the product portfolio beyond road and mountain bikes, such as electric bikes or accessories, to attract new customer segments.

Improve Delivery Performance in France

- Investigate the root causes of slightly longer delivery times in France by reviewing logistics and delivery processes.
- Consider exploring alternative shipping carriers or delivery methods to optimize delivery speed and efficiency in France.

Conclusion

These recommendations are based on the data analysis presented in the dashboard. Further investigation and analysis may be required to fully understand market dynamics and develop more specific, actionable strategies.