

ADVENTURE WORKS SALES ANALYSIS REPORT

A REPORT BY:

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Overview

The provided dataset, AdventureWorks Sales is a csv file that contains comprehensive sales data from the AdventureWorks database, capturing various aspects of sales transactions, including order details, pricing, and costs. The dataset consists of 119,140 rows and 15 columns.

Additionally, there is a Jupyter notebook file of AdventureWorks_Sales which appears to focus on exploratory data analysis (EDA) for the sales data, and a Power BI dashboard file which contains visualizations and interactive reports based on the same dataset.

Dataset Columns

- **SalesOrderLineKey:** Unique identifier for each sales order line.
- **ResellerKey:** Identifier for the reseller.
- **CustomerKey:** Identifier for the customer.
- **ProductKey:** Identifier for the product.
- **OrderDateKey:** Date when the order was placed (YYYY-MM-DD format).
- **DueDateKey:** Date when the order is due.
- **ShipDateKey:** Date when the order was shipped.
- **SalesTerritoryKey:** Identifier for the sales territory.
- **Order Quantity:** Number of items ordered.
- **Unit Price:** Price per unit of the product.
- **Extended Amount:** Total amount for the line item (Order Quantity * Unit Price).
- **Unit Price Discount Pct:** Discount percentage applied to the unit price.
- **Product Standard Cost:** Standard cost of the product.
- **Total Product Cost:** Total cost of the product (Product Standard Cost * Order Quantity).
- **Sales Amount:** Final sales amount after discounts.

RESEARCH QUESTIONS

- HOW HAVE SALES FIGURES OF ADVENTURE WORKS CHANGED OVER YEARS?
- WHAT FACTORS AFFECTED THE SALES QUANTITY?

HYPOTHESIS

- Sales increased on a year-to-year basis but started declining in 2020, most likely due to COVID-19.
- Lower order quantities tend to attract more sales, indicating that the product was sold more frequently in smaller quantities.
- Overall order quantity followed the same trends as sales, showing an increase until 2019 but then gradually declining in 2020.

Sample Data

Here is a snapshot of the first few rows of the dataset:

EXPLORATORY DATA ANALYSIS AND DATA CLEANING

In [9]: `df.head()`

Out[9]:

	SalesOrderLineKey	ResellerKey	CustomerKey	ProductKey	OrderDateKey	DueDateKey	ShipDateKey	SalesTerritoryKey	Order Quantity	Unit Price	Extended Amount	P
0	43659001	676	1	349	2017-07-02	2017-07-12	2017-07-09	5	1	2024.994	2024.994	
1	43659002	676	2	350	2017-07-02	2017-07-12	2017-07-09	5	3	2024.994	6074.982	
2	43659003	676	3	351	2017-07-02	2017-07-12	2017-07-09	5	1	2024.994	2024.994	
3	43659004	676	4	344	2017-07-02	2017-07-12	2017-07-09	5	1	2039.994	2039.994	
4	43659005	676	5	345	2017-07-02	2017-07-12	2017-07-09	5	1	2039.994	2039.994	

Key Insights

- **Order Dates:** Orders were placed, due, and shipped within a short timeframe, indicating efficient processing.
- **Pricing and Costs:** The dataset provides detailed pricing and cost information, which is crucial for analyzing profit margins.
- **Discounts:** Discount percentages are applied at the unit price level, impacting the final sales amount.

This dataset can be further analyzed to uncover trends in sales performance, customer behavior, and territory-based sales analysis.

Next Steps

Data Cleaning: Ensure date columns are in the correct format and check for any missing or erroneous data. (DONE ON PYTHON)

Exploratory Data Analysis: Perform a detailed analysis to identify patterns and insights. (DONE ON PYTHON)

Visualization: Use the data to create visualizations for a more intuitive understanding of sales trends and performance. (MS POWER BI)

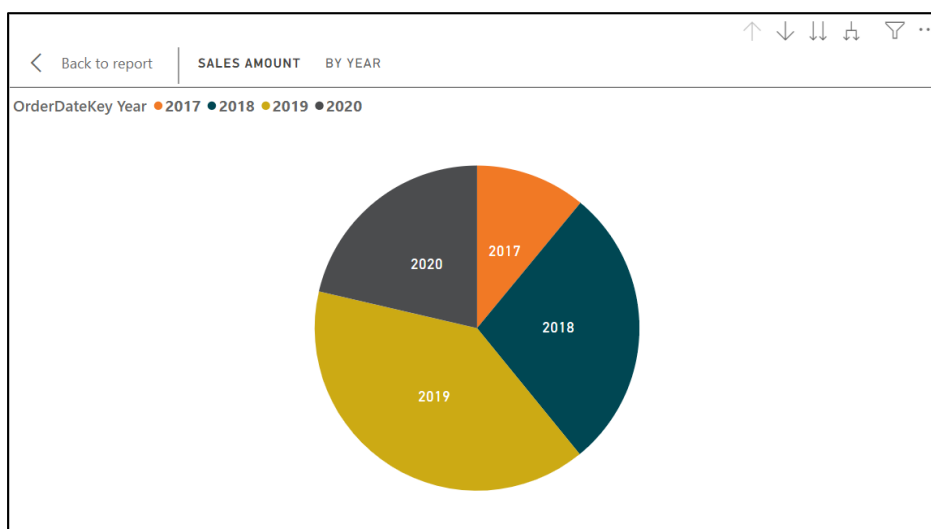
We will examine the notebook file and the Power BI dashboard to understand their contents and how they relate to this dataset.

ANALYSIS AND FINDINGS

The provided **PIE CHART** visualizes the sales amounts for AdventureWorks from 2017 to 2020, with each year represented by a different color. The chart shows a clear trend of increasing sales from 2017 to 2019, with 2019 having the largest segment, indicating it was the peak year for sales. However, there is a noticeable decline in the segment for 2020, reflecting a drop in sales likely due to the COVID-19 pandemic.

The consistent growth in sales from 2017 to 2019 highlights a period of expansion for AdventureWorks, possibly due to successful sales strategies and favorable market conditions. The decline in 2020 suggests the impact of external factors, particularly the pandemic, which disrupted normal business operations and consumer spending.

To address these trends, AdventureWorks should develop a recovery plan focusing on strengthening online sales channels and offering promotions to boost sales post-2020. Analyzing the successful strategies of 2019 could provide insights for future growth. Additionally, implementing risk management strategies and re-engaging with customers through personalized marketing and loyalty programs can help mitigate future disruptions and enhance sales performance.

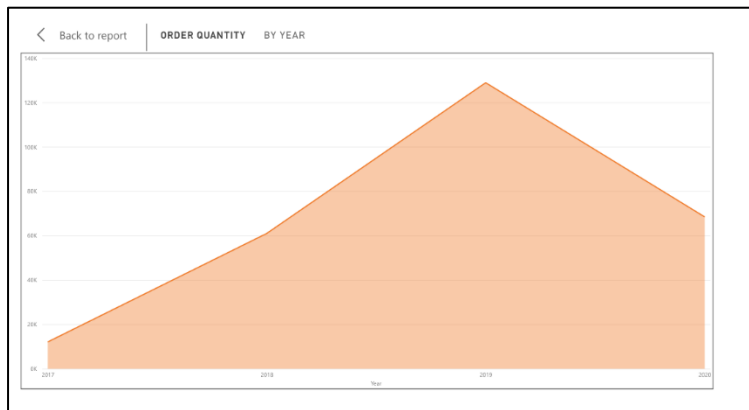


The area graph shows the order quantity by year. It appears to cover four years, though the years aren't labeled consistently. The leftmost year appears to be 2010, though it's cut off slightly. The next year is labeled 2017, followed by 2019 and 2020.

According to the graph, the number of orders increased significantly between 2010 and 2017. It then appears to have plateaued or slightly decreased in 2019 before increasing again in 2020. The graph

doesn't show the exact figures, but the scale on the left appears to start at 20,000 and goes up to 140,000. There are also markers along the line that likely correspond to specific years, but the years aren't labeled.

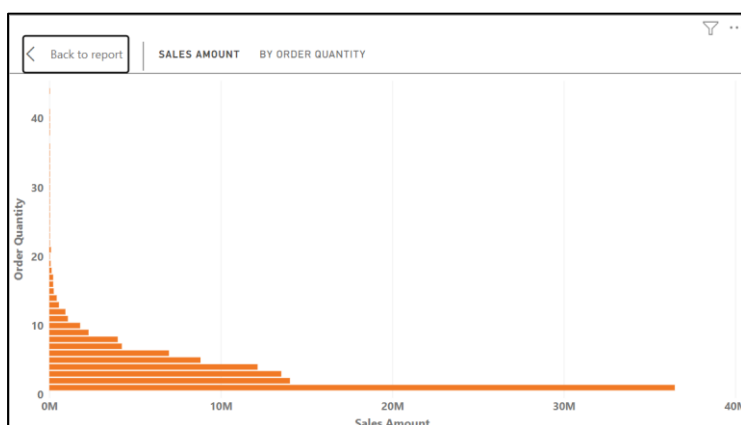
Without more data, it's difficult to say for sure what's causing the fluctuations in order quantity. It's possible that there were specific marketing campaigns or product launches that drove sales up in certain years.



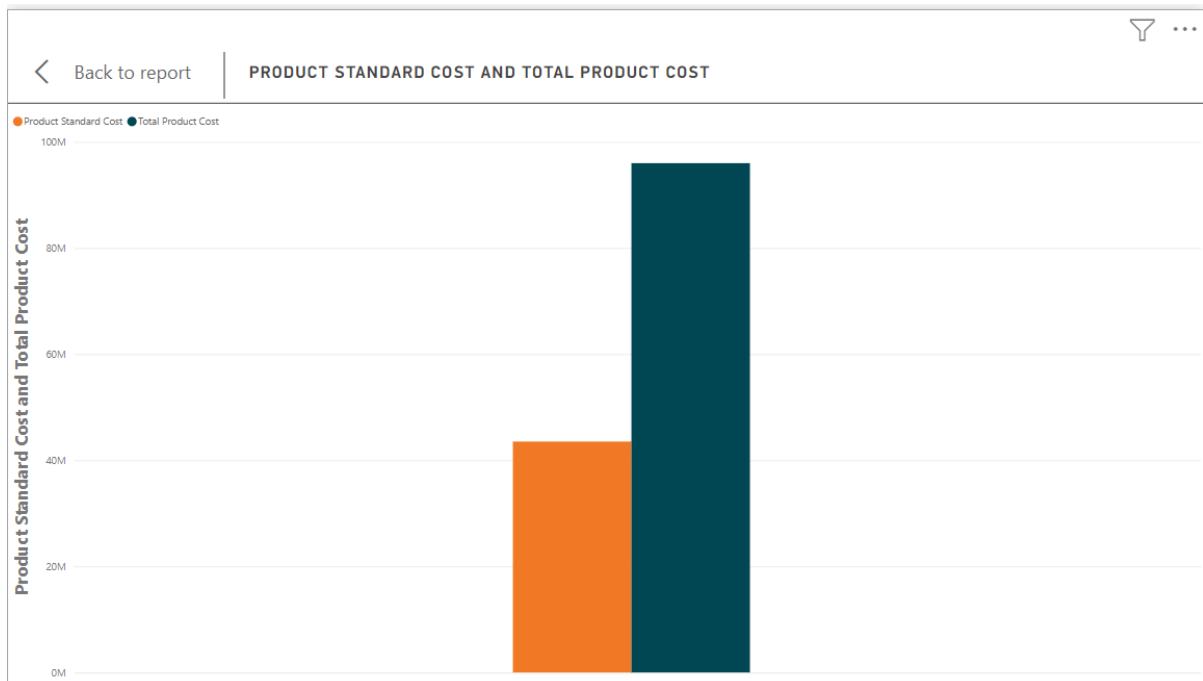
The graph shows the average sales amount by order quantity. It appears to be a bar chart with sales amount on the y-axis and order quantity on the x-axis. The x-axis goes from 0 to 40 million, with tick marks at every 10 million. The y-axis goes from 0 to 40, with tick marks at every 10.

Here are some short observations about the data in the chart:

- The average sales amount appears to be higher for larger order quantities.
- There is a bump in sales amount at the 10 million order quantity mark, followed by a decrease at 20 million and another increase at 30 million.
- It's important to note that this is just a small data set, so it may not be representative of the overall trend.



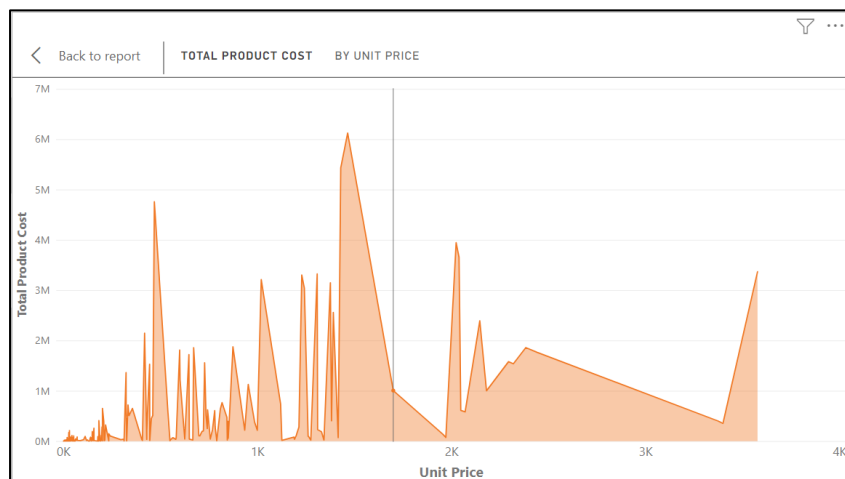
We can see that with regards to the costs perspective, the PRODUCT STANDARD COST is nearly half than the TOTAL PRODUCT COST, hence showing that additional or miscellaneous costs account for more than half of the costs.



The Area Chart shows that as the price of the product goes up (unit price), the total cost to make it also goes up (total product cost). This makes sense because more expensive products usually cost more to produce.

The graph also suggests there's a base cost to make the product no matter the price (y-axis intercept). This could be because of things like factory rent or salaries that don't change.

Overall, this is a simplified look at how the price of a product relates to how much it costs to make.



REPORTS:

Multiple pages of reports, each focusing on different aspects of the data such as:

- **Sales Performance:** Visualizations like line charts, bar graphs, and heat maps showing sales trends over time, by product, by territory, etc.
- **Customer Analysis:** Insights into customer demographics, buying patterns, and customer segmentation.
- **Product Analysis:** Performance metrics for different products, including sales volume, revenue, and profitability.
- **Territory Analysis:** Sales performance across different geographical regions.
- **KPIs and Metrics:** Key Performance Indicators (KPIs) such as total sales, average order value, discount percentages, and profit margins.

SUGGESTIONS

- ❖ **Detailed Sales Analysis:** Break down yearly sales into smaller periods (quarters or months) to spot seasonal trends and adjust strategies accordingly.
- ❖ **COVID-19 Impact Assessment:** Compare pre-pandemic and pandemic sales to understand how the crisis affected consumer behavior and plan for future disruptions.
- ❖ **Improved Customer Segmentation:** Use advanced techniques to group customers more accurately, allowing for better-targeted marketing efforts and increased customer engagement.
- ❖ **Strategic Product Planning:** Develop plans for products at different stages of their lifecycle to optimize sales performance, including product promotions and inventory management.
- ❖ **Tailored Regional Strategies:** Create specific strategies for each sales region based on local market conditions and competition to maximize sales potential.

Implementing these steps will help AdventureWorks gain deeper insights into its sales dynamics and drive sustainable growth.