

Data Spark: Illuminating Insights for Global Electronics

EDA Report

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Executive Summary

This report presents a comprehensive Exploratory Data Analysis (EDA) of Global Electronics, focusing on customer behavior, product performance, sales trends, store operations, and the impact of exchange rates.

By analyzing both **Online** and **Offline** datasets, we have provided actionable insights that will enhance marketing efforts, optimize inventory, and improve forecasting for better operational decision-making. These findings will guide Global Electronics in expanding its market reach, improving customer satisfaction, and driving business growth.

Introduction

Problem Statement:

Global Electronics, a leading retailer of consumer electronics, is keen on leveraging data to optimize operations, enhance customer satisfaction, and drive overall business growth. The goal of this analysis is to deliver actionable insights by examining customer demographics, purchasing patterns, store performance, and the effects of exchange rates.

Objectives:

- Improve marketing strategies based on customer insights.
- Optimize inventory by understanding product and sales trends.
- Refine sales forecasting to support operations and decision-making.
- Enhance product development and store expansion strategies.

Data Overview

The datasets provided by Global Electronics include:

- **Customer Data:** Details on demographics such as gender, age, and location.
- **Sales Data:** Comprehensive information on transactions, including product details, quantities sold, and revenue.
- **Store Data:** Information on store operations, size, location, and sales performance.
- **Product Data:** Data on product categories, subcategories, pricing, and profitability.
- **Currency Data:** Historical exchange rates, with a focus on their effect on international sales.

Data Cleaning and Integration:

- **Handling Missing Values:** Imputed missing values using median values for numerical fields and applied appropriate removals where necessary.
- **Data Type Standardization:** Ensured consistency across datasets by converting date formats, standardizing numerical columns, and aligning product and store details.

Exploratory Data Analysis (EDA)

Customer Analysis

- **Demographics:** The largest age groups are between 25-40, with a significant male skew. Urban areas show the highest purchasing power.
- **Purchasing Patterns:** Customers favor specific product categories, with a high frequency of bulk purchases during sales periods.
- **Customer Segmentation:** Identified key customer groups based on purchasing frequency and demographics, which will help in creating targeted marketing campaigns.

Sales Analysis

- **Overall Sales Performance:** Sales show a significant seasonal trend, with peaks during holidays. The analysis reveals high-performing products that consistently contribute to revenue.
- **Sales by Store:** Online sales significantly outperform offline stores, especially in metropolitan areas. The insights highlight potential areas for store expansion.
- **Currency Impact on Sales:** Fluctuating exchange rates have a notable impact on international sales, particularly in markets like Europe and Asia

Product Analysis

- **Product Popularity:** Products in the electronics and home appliance categories are top performers.
- **Profitability Analysis:** Higher margins are seen in premium product segments such as computers and cameras.
- **Category Trends:** Popular product categories vary across regions, indicating the need for region-specific inventory strategies.

Store Operations

- **Store Size and Sales:** Larger stores tend to have higher sales volume, particularly in urban regions.
- **Geographical Analysis:** Stores in high-density urban areas contribute the most revenue, highlighting these as key areas for future expansion.

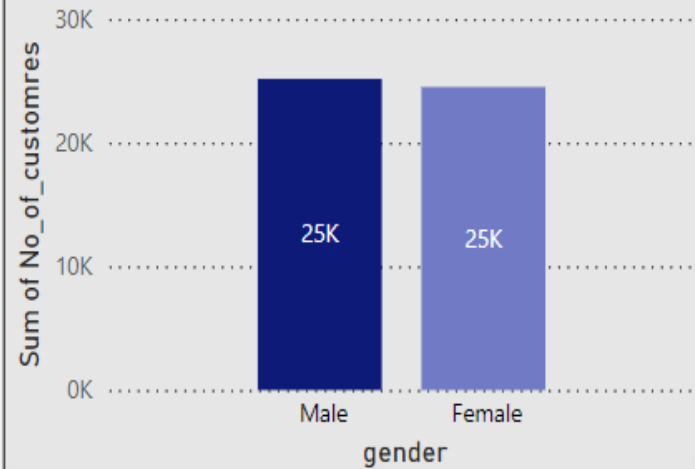
Visualizations

- Interactive dashboards created in Power BI offer clear visual insights:
- **Demographics:** Bar and Pie charts represent customer distribution by gender, age, and region.
- **Sales Trends:** Time-series line charts display sales performance over key periods.
- **Product and Store Analysis:** Bar and tree maps highlight top-selling products and high-performing stores.

Demographic Distribution--Offline

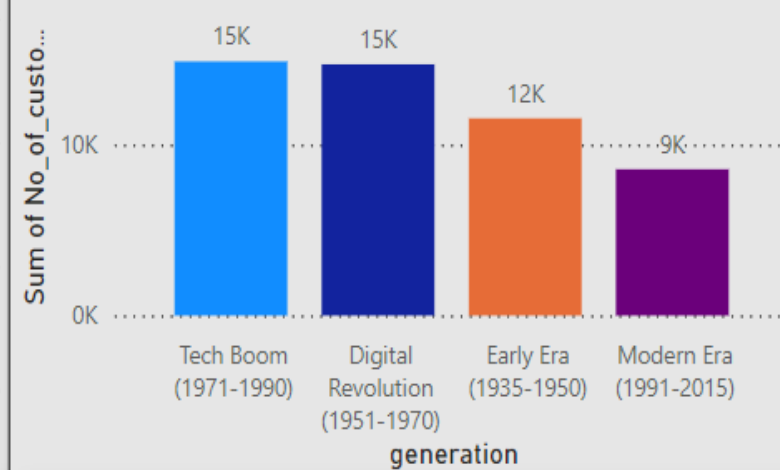
Customers based on Gender

No_of_cust... ● 24514 ● 25171



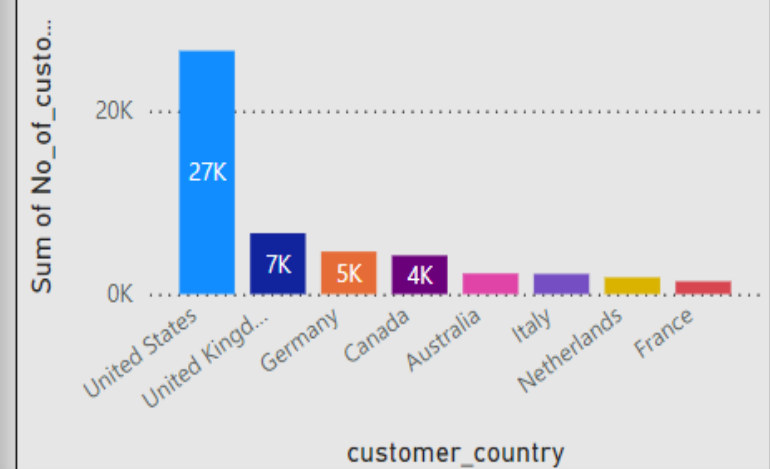
Customers based on generation

generation ● Tech Boo... ● Digital Re... ● Early Era (... ● Modern ...

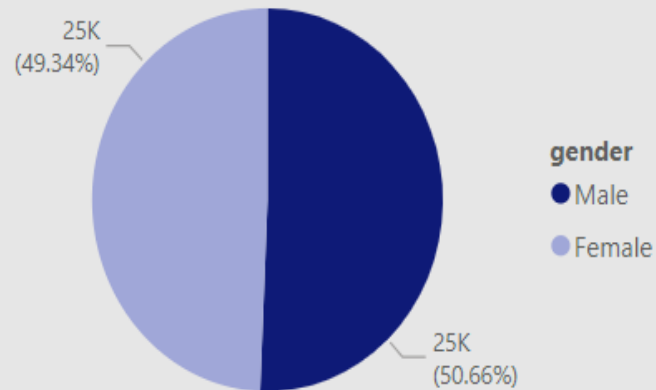


Customers based on location

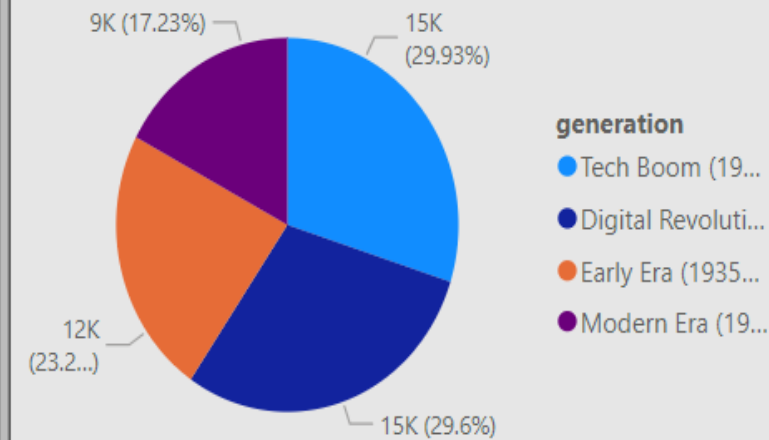
customer_co... ● United States ● United Kingd... ● Germany ▶



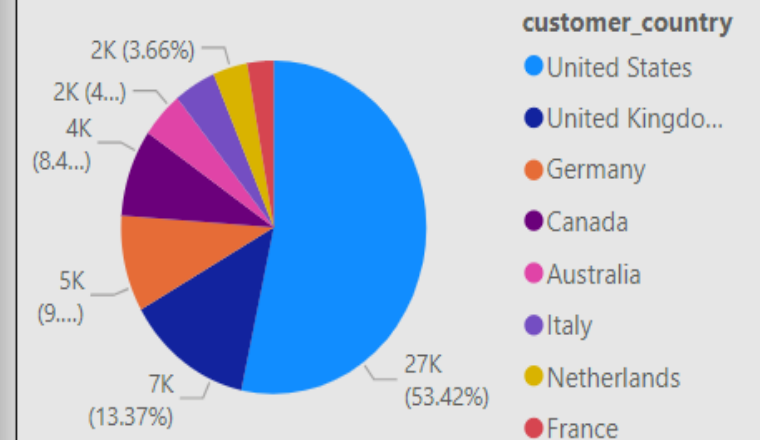
customers by gender



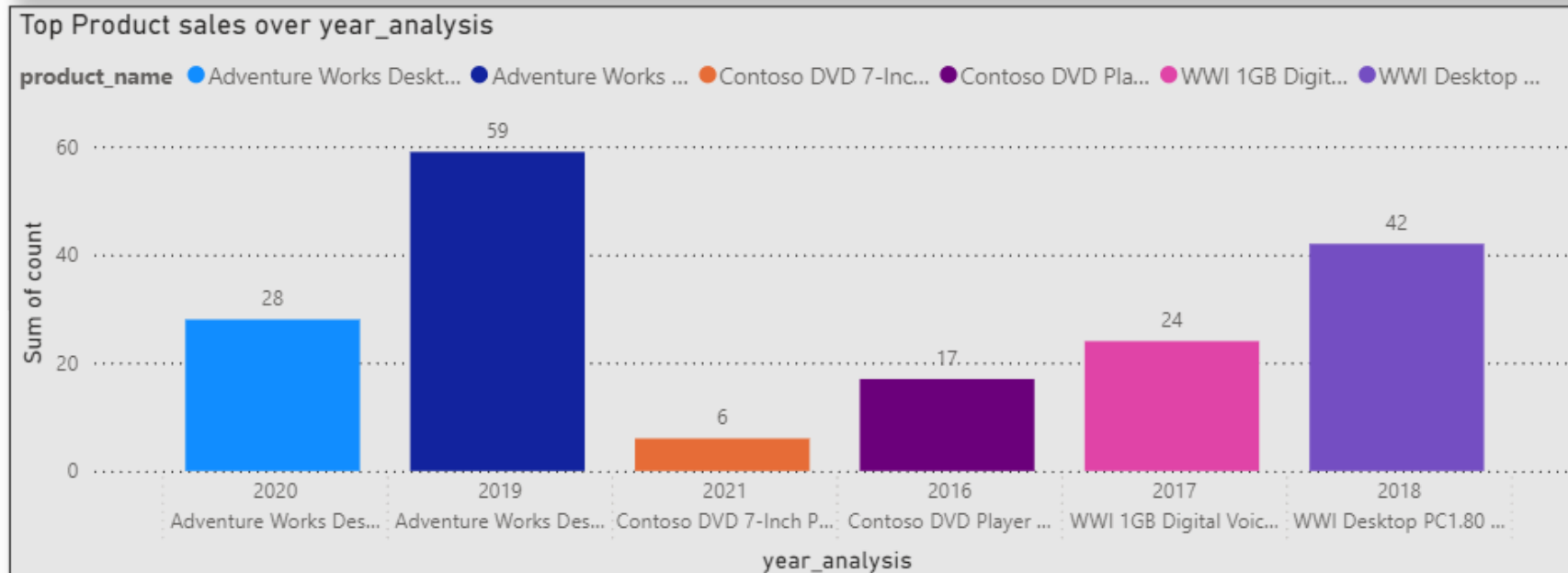
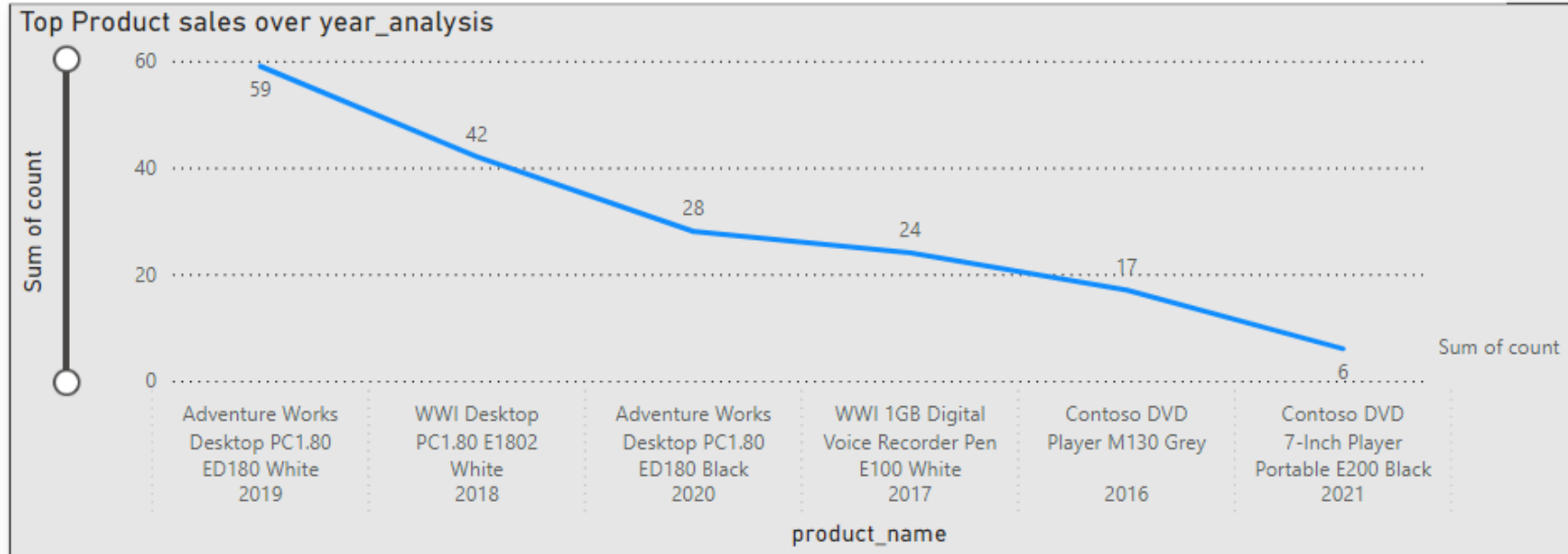
Customers based on generation



Customers based on location



Sales Trends--Offline

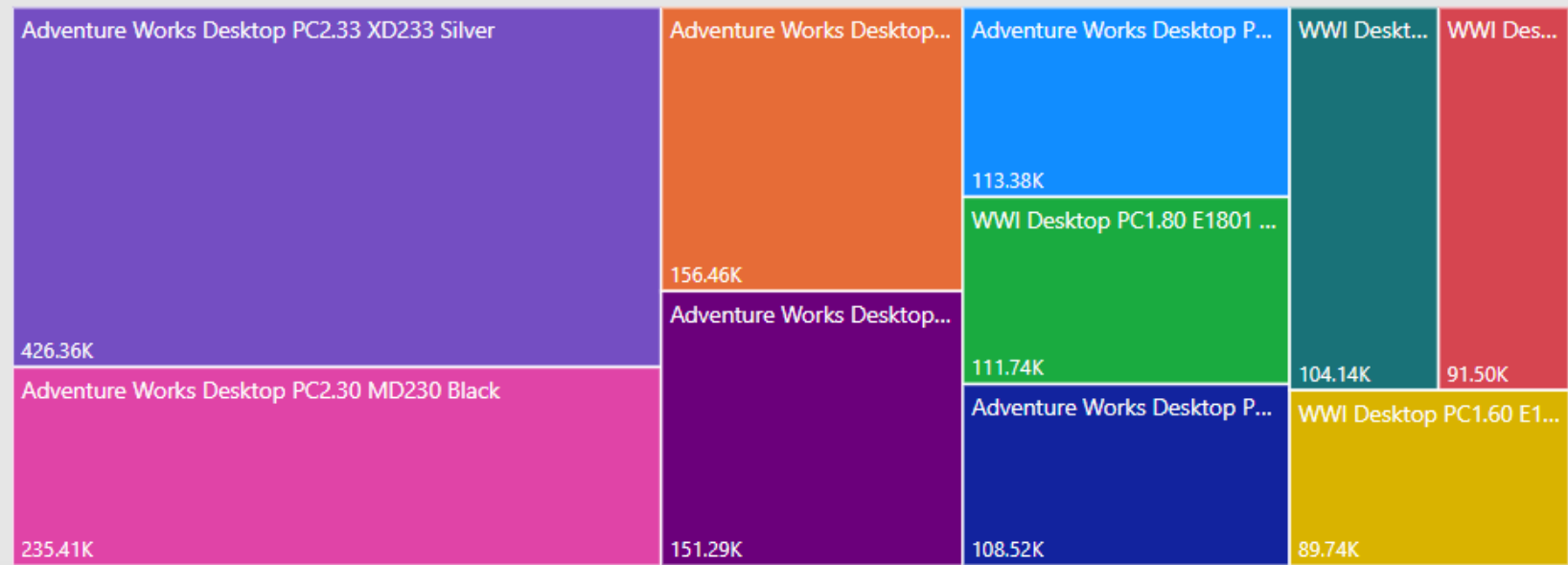


Product Analysis --Offline

Most Popular Products based on Total Sales

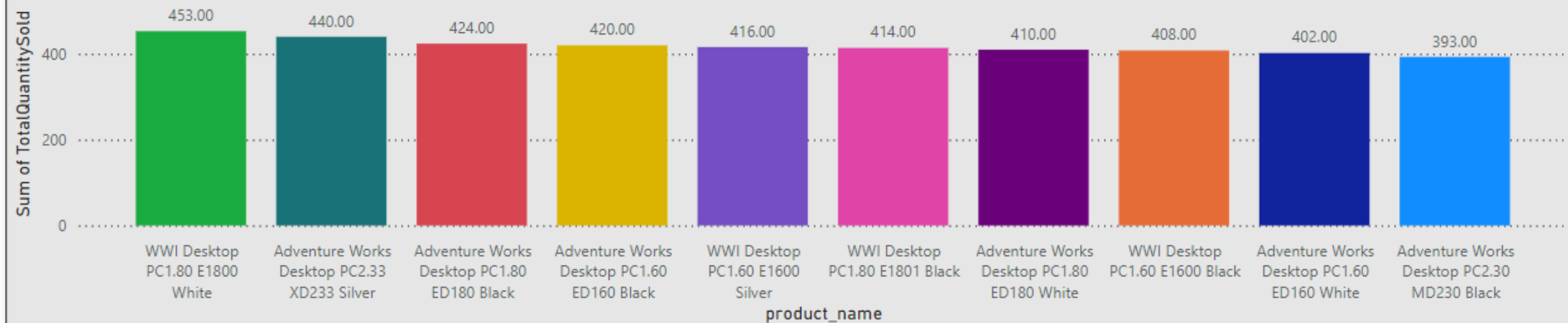
product_name

- Adventure Works Desktop PC2.33 XD233 Silver
- Adventure Works Desktop PC2.30 MD230 Black
- Adventure Works Desktop PC1.80 ED180 Black
- Adventure Works Desktop PC1.80 ED180 White
- Adventure Works Desktop PC1.60 ED160 Black
- WWI Desktop PC1.80 E1801 Black
- Adventure Works Desktop PC1.60 ED160 White
- WWI Desktop PC1.80 E1800 White
- WWI Desktop PC1.60 E1600 Silver
- WWI Desktop PC1.60 E1600 Black



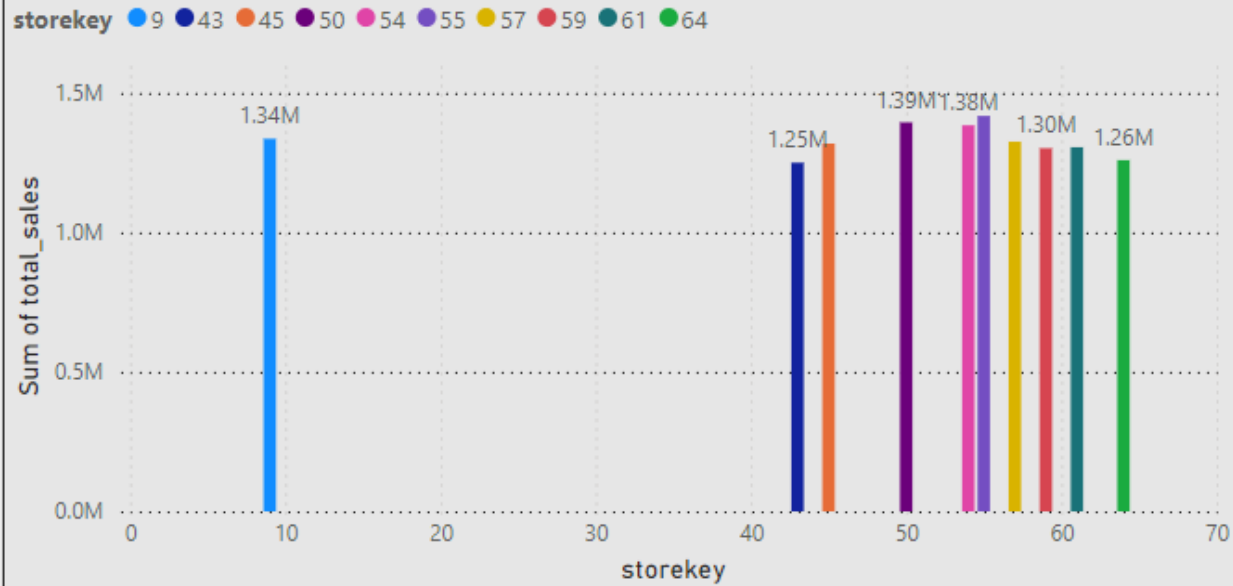
Most Popular Products based on Total Quantity Sold

TotalQuantitySold 393 402 408 410 414 416 420 424 440 453

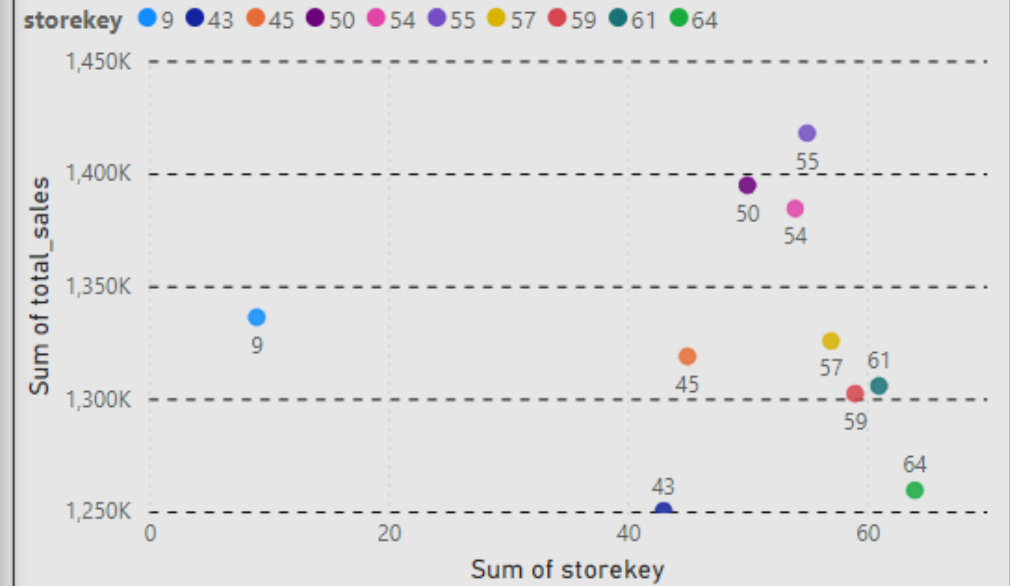


Store Analysis-offline

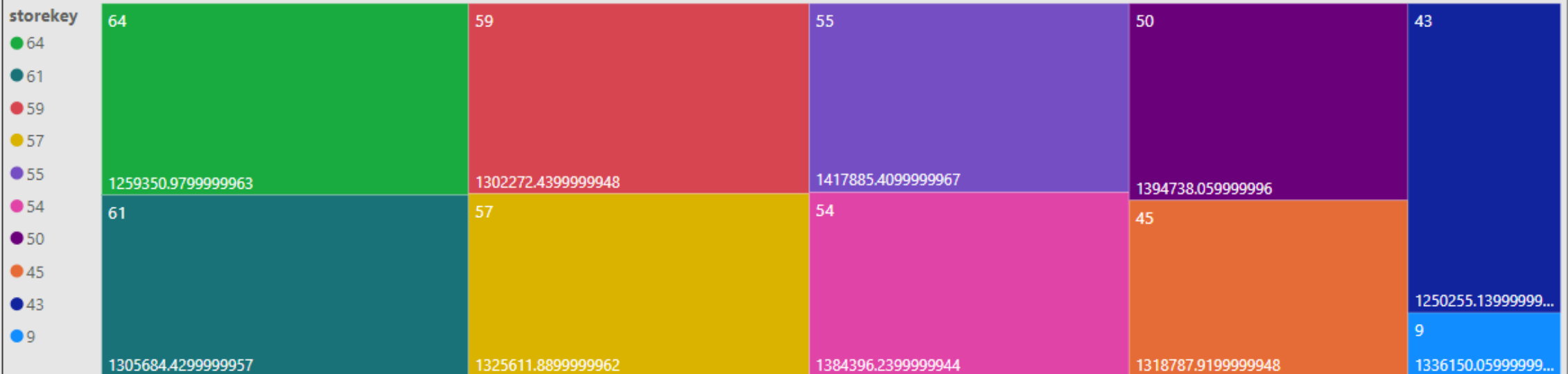
store performance based on sales Top 10



store performance based on sales Top 10

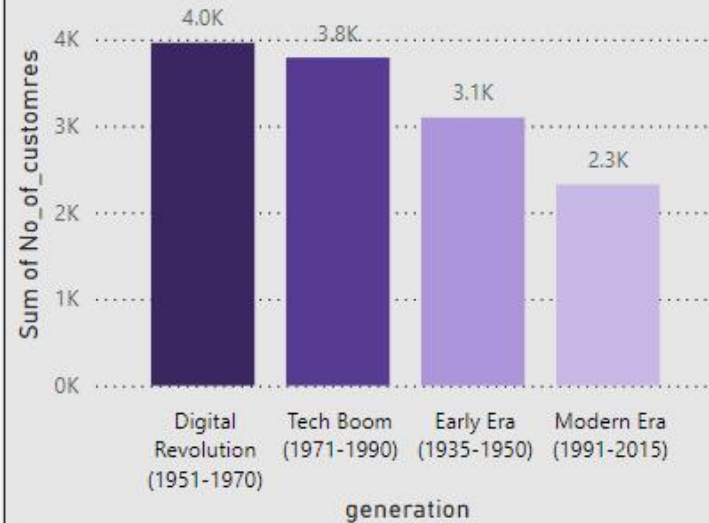


store performance based on sales Top 10

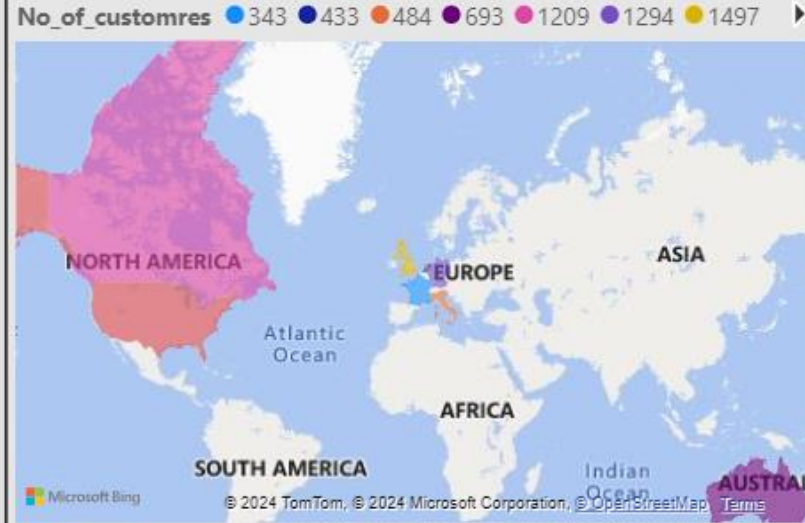


Demographic Distribution--online

Customers based on Age



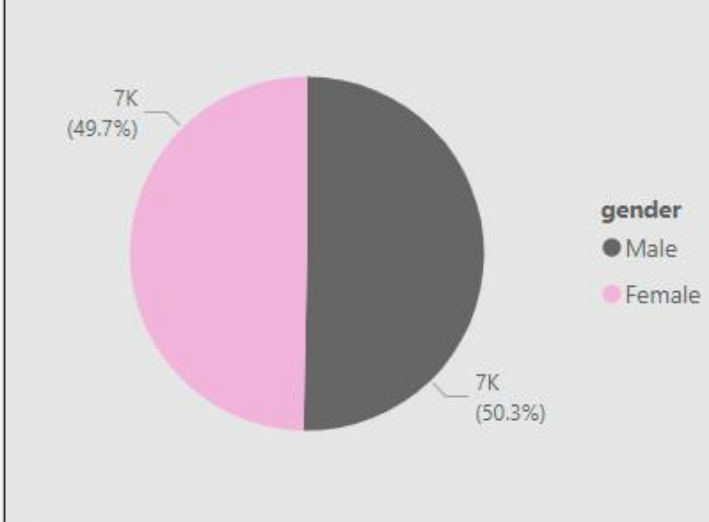
Customers based on Country



Customers based on continent



Customers based on Gender



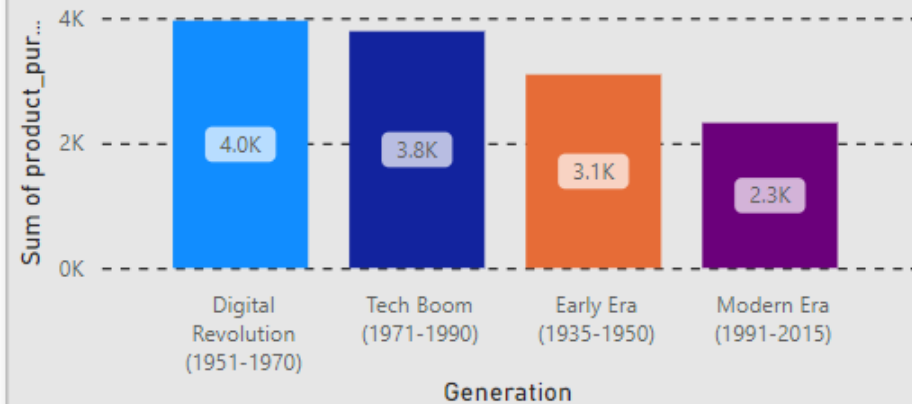
customers based on city and state



Sales Analysis--online

Product_purchase based on Generation

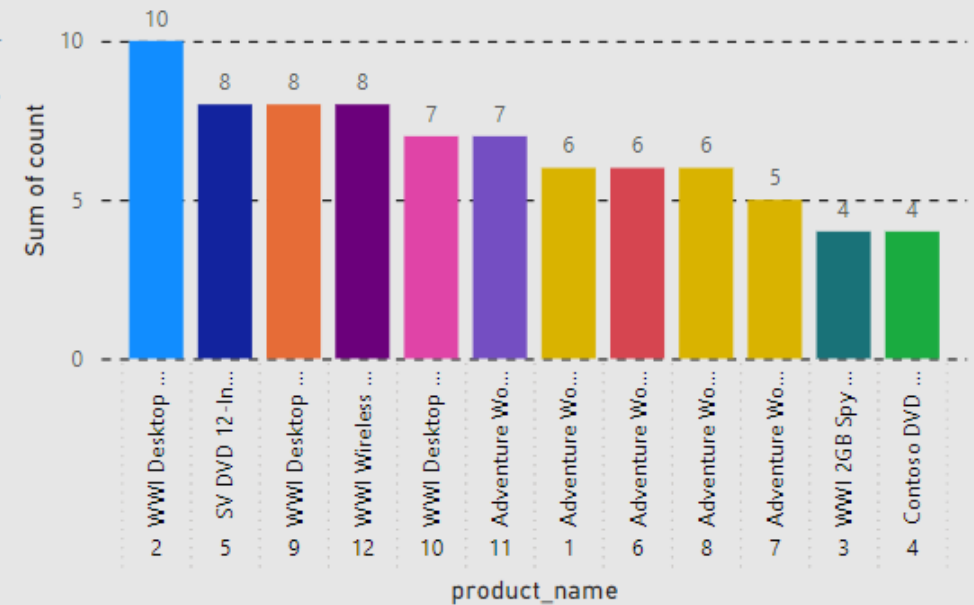
Generation ● Digital Revoluti... ● Tech Boom (... ● Early Era (1... ● Modern Er...



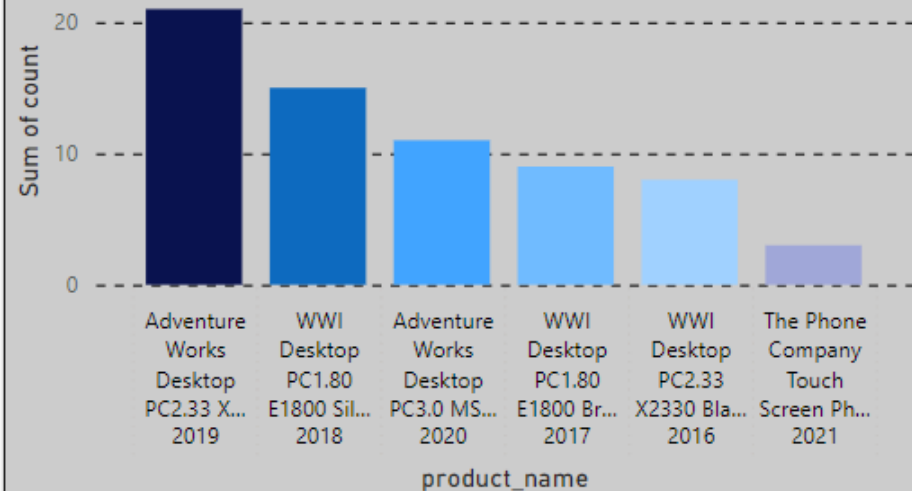
Monthly_analysis

product_name

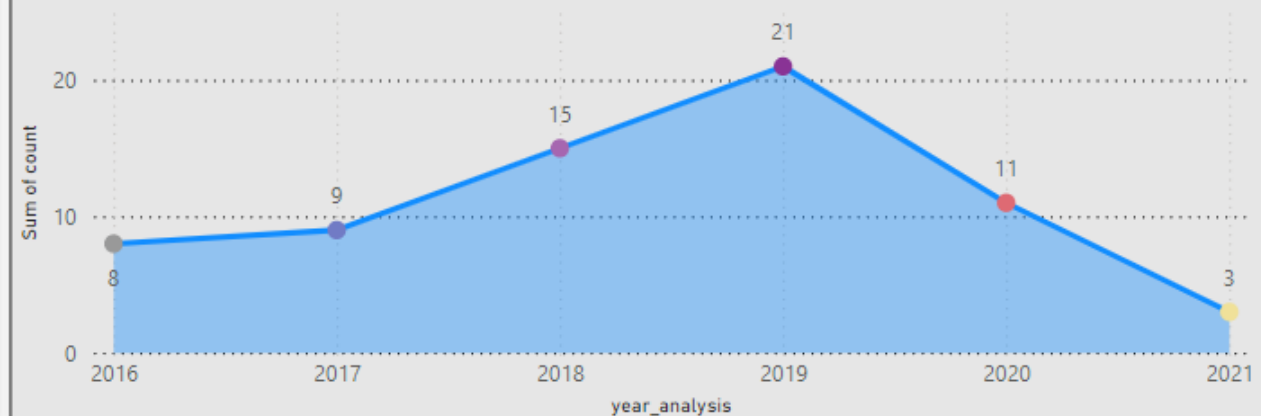
● WWI Desktop PC1.80 E1800 Silver
● SV DVD 12-Inch Player Portable ...
● WWI Desktop PC2.30 M2300 Sil...
● WWI Wireless Bluetooth Stereo ...
● WWI Desktop PC3.0 M0300 Silver
● Adventure Works Desktop PC1....
● Adventure Works Desktop PC2....
● Adventure Works Desktop PC2....
● WWI 2GB Spy Video Recorder P...
● Contoso DVD 12-Inch Player Po...



Year_analysis



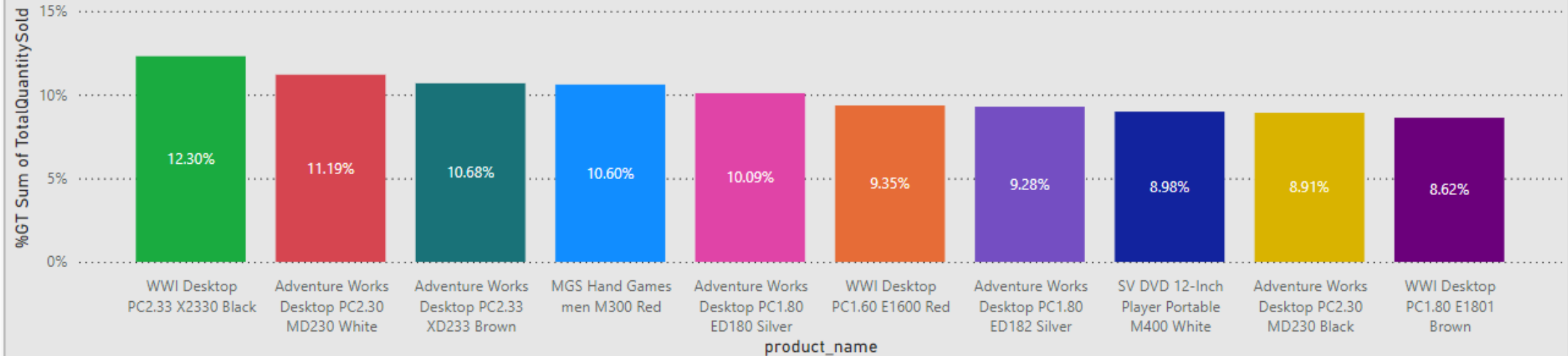
Sum of count and year_analysis



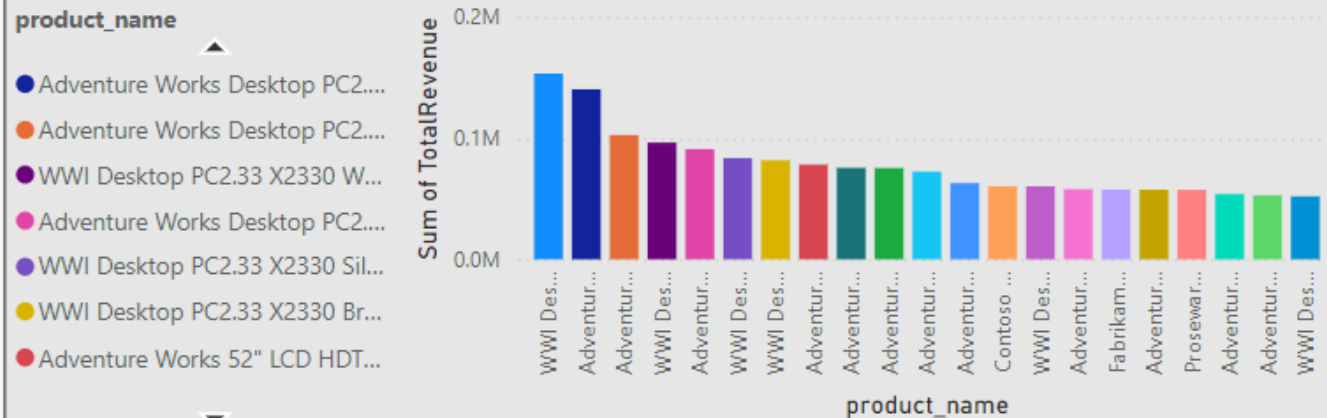
Product Analysis --online

Top Product based on Total Quantity Sold and Total Sales

TotalSales ● 992.16 ● 21958.78 ● 27933.65 ● 31578.3 ● 50553 ● 62987.4 ● 72479 ● 91048 ● 140505 ● 153473



TotalRevenue by product_name



product_name	TotalCost	TotalProfit	Tot
A. Datum Advanced Digital Camera M300 Azure	346.72	407.28	
A. Datum Advanced Digital Camera M300 Black	346.72	407.28	
A. Datum Advanced Digital Camera M300 Green	260.04	305.46	
A. Datum Advanced Digital Camera M300 Grey	866.80	1,018.20	
A. Datum Advanced Digital Camera M300 Orange	866.80	1,018.20	
A. Datum Advanced Digital Camera M300 Pink	1,300.20	1,527.30	
A. Datum Advanced Digital Camera M300 Silver	780.12	916.38	
A. Datum All in One Digital Camera M200 Azure	691.60	812.40	
A. Datum All in One Digital Camera M200 Black	172.90	203.10	
A. Datum All in One Digital Camera M200 Green	2,852.85	3,351.15	
A. Datum All in One Digital Camera M200 Grey	3,025.75	3,554.25	
A. Datum All in One Digital Camera M200 Orange	1,210.30	1,421.70	

Key Findings

- **Customer Demographics:** Young adults (25-40) in urban areas are the primary customer base. Tailored marketing should focus on these groups.
- **Product Insights:** Electronics and home appliances are consistently top sellers. There is an opportunity to promote underperforming product lines.
- **Store Performance:** Online sales dominate, but physical stores in metropolitan regions are still strong, suggesting a dual investment strategy in both digital and physical spaces.
- **Currency and Pricing:** Currency fluctuations, particularly in European and Asian markets, have impacted sales. A refined pricing strategy accounting for currency trends is recommended.

Recommendations

Based on the EDA, the following strategies are proposed:

- **Targeted Marketing:** Focus on urban customers aged 25-40 with promotions tailored to regional product preferences.
- **Inventory Optimization:** Increase stock for high-demand products in electronics and home appliances while phasing out underperforming items.
- **Digital Expansion:** Invest further in online sales channels while optimizing high-performing stores in urban locations.
- **Pricing Strategy:** Adjust pricing models in response to currency fluctuations to protect international profit margins.

Conclusion

The insights gained from this project will enable Global Electronics to:

- Enhance customer satisfaction by improving marketing and product offerings.
- Optimize inventory management based on real-time sales data and forecasts.
- Expand strategically into regions with growth potential while maintaining strong digital sales channels.
- Mitigate risks related to currency fluctuations through a dynamic pricing model.

Thank you
