

AMAZON MARKETPLACE ANALYSIS

I. OVERVIEW OF THE DATASET

The dataset contains Amazon sales and refund data for various products, with details on sales performance, returns, and financial metrics. Below is a structured explanation of the key columns.

1.1 General Information

These columns identify the product and its sales region:

- **Amazon store** – Identifies the marketplace (e.g., US, UK, Germany).
- **Parent ASIN** – The main product identifier for grouped items.
- **ASIN** – The unique product identifier for each SKU.

1.2 Sales & Orders Information

These columns describe how many units were sold and at what price:

- **Start date & End date** – The reporting period for the sales data.
- **Average sales price** – The average selling price per unit.
- **Units sold** – Total number of units sold.
- **Units returned** – Total number of returned units.
- **Net units sold** – Units sold minus returned units.

II. OVERVIEW OF THE PROJECT

This project involves analyzing sales data to generate insights and visualizations. The analysis includes calculating return rates, analyzing sales trends, seasonal sales analysis, profitability analysis, sales performance by marketplace, anomaly detection, and sales performance by ASIN per month.

2.1 Data Sources

The analysis is based on the following data sources:

- **test_data.txt**: Contains the raw sales data.
- **formatted_data.csv**: Contains the formatted sales data.
- **updated_data.csv**: Contains the updated sales data with additional processing
- **cleaned_data.csv**: Contains the cleaned sales data, ready for analysis.

2.2 Scripts

- **mapped_data.py**: Python script for mapping and formatting the raw data.
- **engineered_data.py**: Python script for engineering additional features in the data.
- **cleaning_data.py**: Python script for cleaning the data.
- **analysis_data.py**: Python script for performing the analysis and generating visualizations.
- **README.md**: This documentation file

III. ANALYSIS AND VISUALIZATIONS

The analysis is performed using the [analysis_data.py](#) script, which generates the following visualizations:

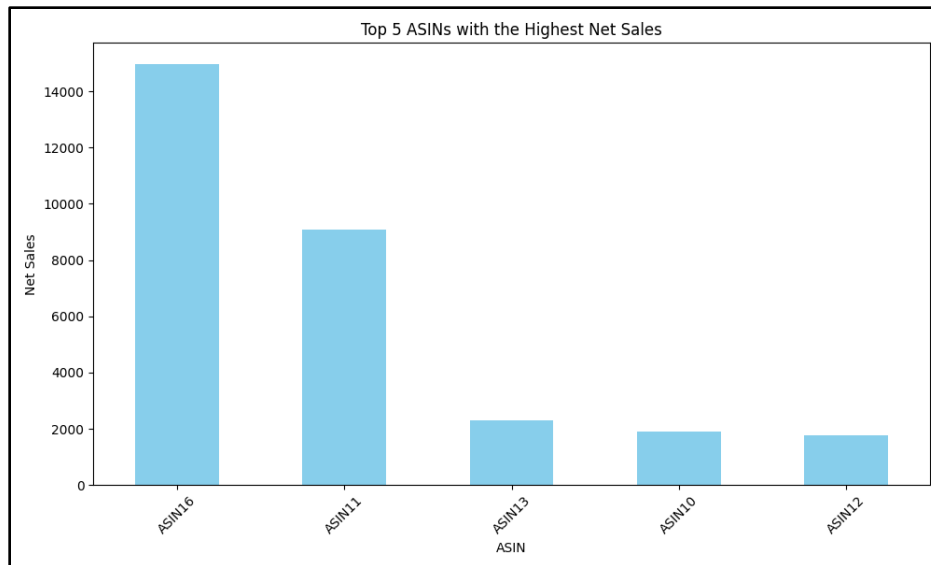
3.1 Top 5 ASINs with the Highest Net Sales.

Description: Identifies the top 5 ASINs with the highest net sales.

Plot: A bar plot showing the top 5 ASINs with the highest net sales.

File: [top_asins.png](#)

Insight: Highlights the ASINs that contribute the most to the overall sales.



Visual no.1: The distribution is highly skewed, with ASIN16 and ASIN11 contributing the most to net sales.

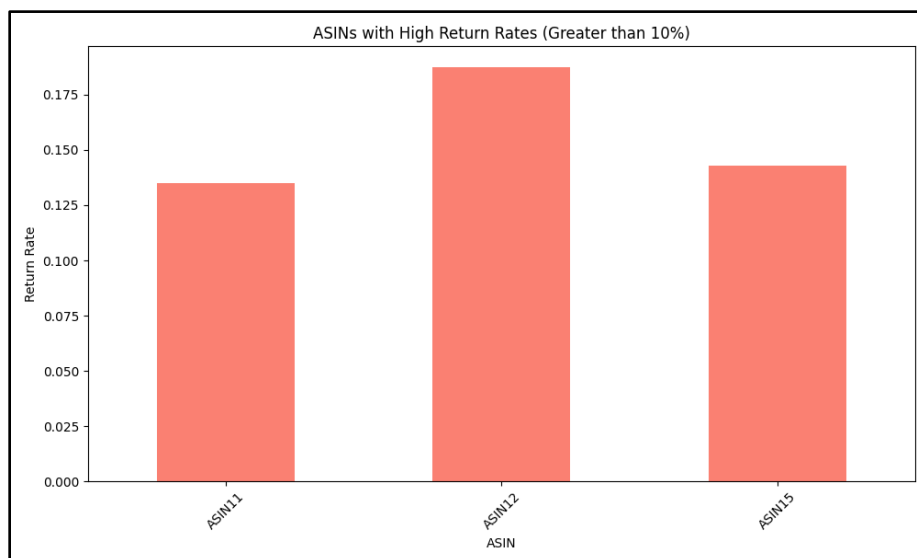
3.2 ASINs with High Return Rates

Description: Calculates the return rates for each ASIN and identifies products with return rates greater than 10%.

Plot: A bar plot showing ASINs with high return rates.

File: [high_return_rate_asins.png](#)

Insight: Helps identify products with high return rates, indicating potential quality issues or customer dissatisfaction.



Visual no.2: ASIN12 has the highest return rate, exceeding 17%, which may indicate product issues, unmet customer expectations, or misleading listings.

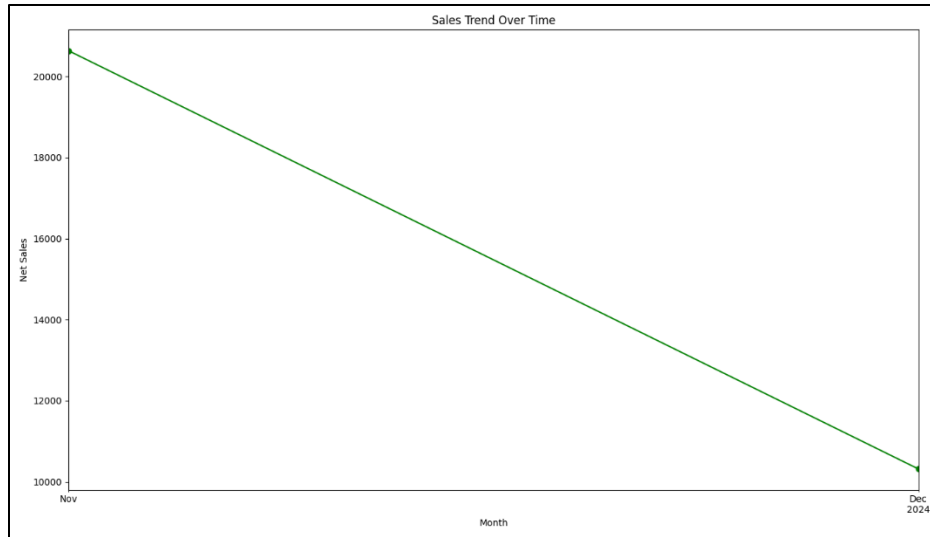
3.3 Sales Trend Over Time

Description: Examines the sales trends over time by grouping the data by month and summing the net sales.

Plot: A line plot showing the sales trend over time.

File: [sales_trend.png](#)

Insight: Provides a visual representation of how sales have changed over time, helping to identify trends and patterns.



Visual no.3: This downward trend could indicate seasonal fluctuations, reduced demand, or external factors affecting sales performance.

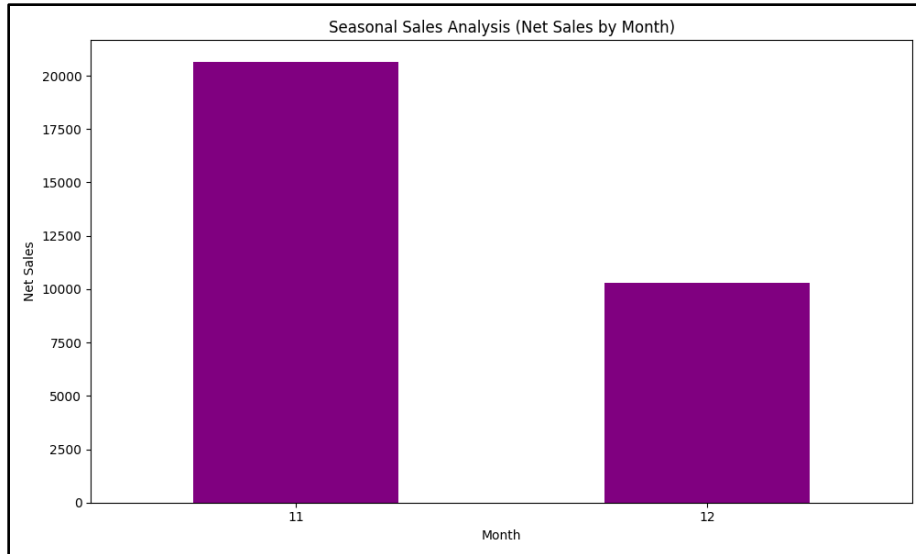
3.4 Seasonal Sales Analysis

Description: Identifies peak sales periods and seasonal trends by grouping net sales by month.

Plot: A bar plot showing net sales by month.

File: [seasonal_sales.png](#)

Insight: Highlights seasonal variations in sales, helping to identify peak sales periods and plan for seasonal demand.



Visual no.4: Possible Seasonal Impact with November's high sales could be influenced by major shopping events like Black Friday and Cyber Monday, while December sales may drop post-holiday shopping peaks.

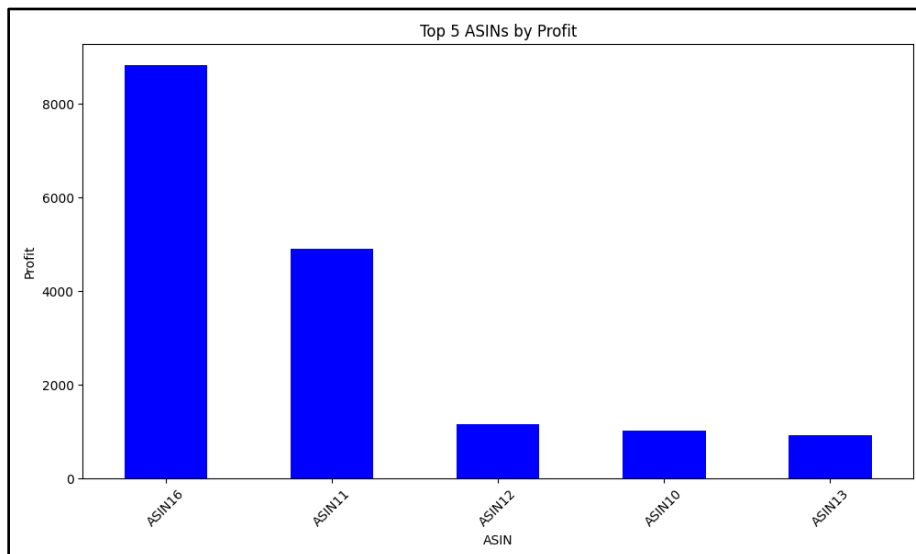
3.5 Profitability Analysis

Description: Calculates the profitability of each ASIN by subtracting the net proceeds total from the net sales.

Plot: A bar plot showing the top 5 ASINs by profit.

File: [profitability.png](#)

Insight: Helps identify the most profitable products, providing insights into which products contribute the most to the bottom line



Visual no.5: Possible Reasons for Disparity with ASIN12, ASIN10, and ASIN13 that might have suffered from low sales volume, high costs, or pricing issues.

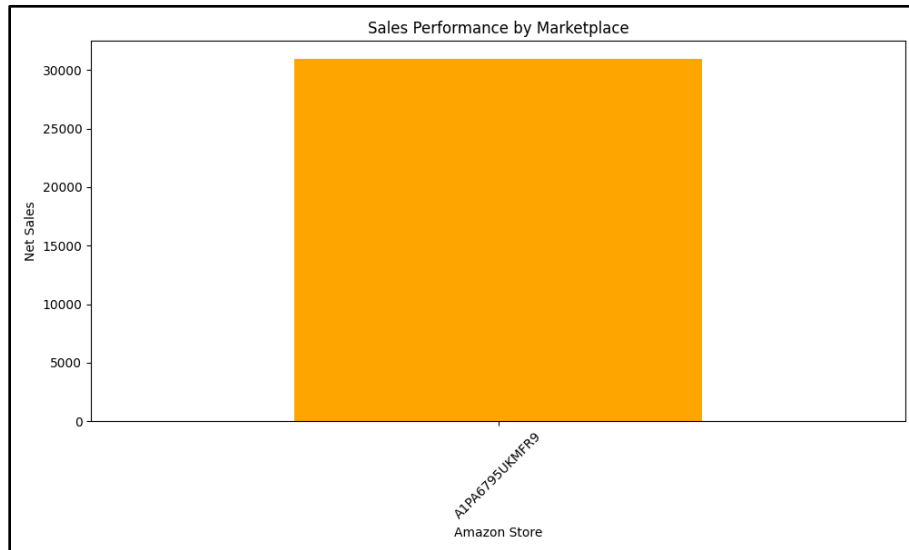
3.6 Sales Performance by Marketplace

Description: Compares sales performance across different marketplaces.

Plot: A bar plot showing net sales by Amazon store.

File: [marketplace_performance.png](#)

Insight: Provides a comparison of sales performance across different marketplaces, helping to identify the best-performing marketplaces.



Visual no.6: No other marketplace appears in the chart, suggesting exclusive or dominant sales via Amazon.

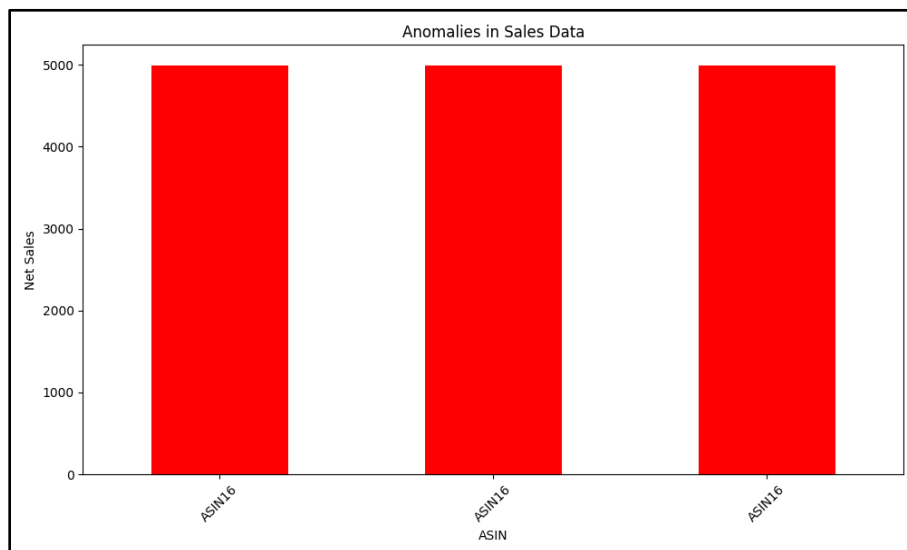
3.7 Anomalies in Sales Data

Description: Identifies anomalies in sales data by considering sales values that are more than 3 standard deviations from the mean.

Plot: A bar plot showing anomalies in sales data.

File: [anomalies.png](#)

Insight: Helps identify unusual sales values that may require further investigation.



Visual no.7: Incorrect aggregation or multiple entries for the same transaction from a possible system glitch or recording error.

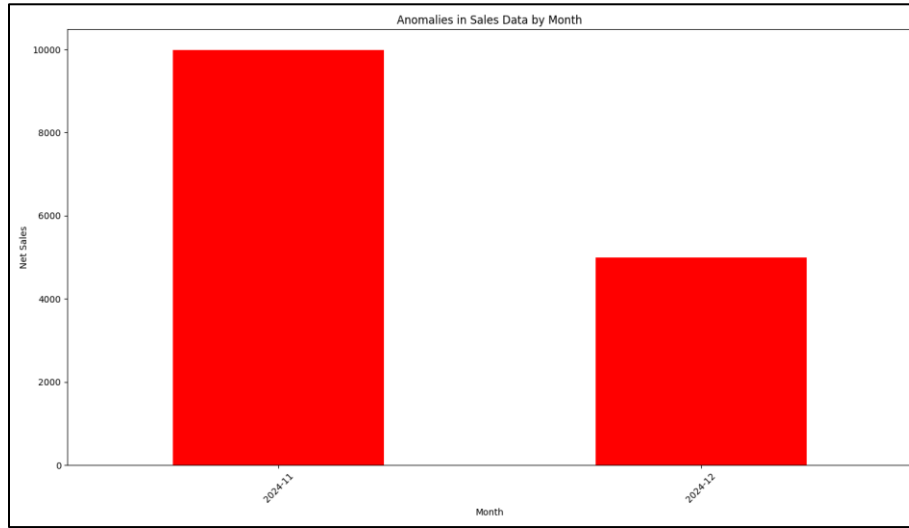
3.8 Anomalies in Sales Data by Month

Description: Groups anomalies by month and plots them.

Plot: A bar plot showing anomalies in sales data by month.

File: [anomalies by month.png](#)

Insight: Provides a monthly breakdown of anomalies, helping to identify specific periods with unusual sales values.



Visual no.8: Mislabeling or Reporting Error with Sales mistakenly logged multiple times in a single month and duplicated to the succeeding month.

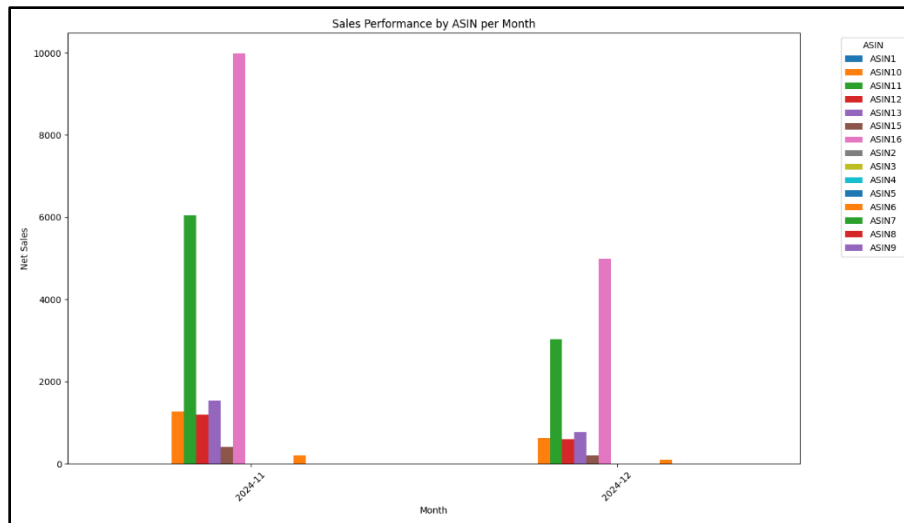
3.9 Sales Performance by ASIN per Month

Description: Examines sales performance by ASIN per month by grouping the data by month and ASIN.

Plot: A grouped bar plot showing sales performance by ASIN per month.

File: [sales performance by asin month.png](#)

Insight: Provides a detailed view of how each ASIN performs on a monthly basis, helping to identify trends and patterns for individual products



Visual no.9: ASIN16 (Pink) had the highest sales in both November and December 2024 but showed a drop in December one factor is Seasonality impact, with fewer purchases in December due to possible **Inventory depletion** from post-promotions.

IV. RECOMMENDATIONS

Based on the analysis and visualizations, the following recommendations can be made:

4.1 Focus on Top-Selling Products:

The top 5 ASINs with the highest net sales should be prioritized for marketing and inventory management to maximize revenue.

- Investigate what makes ASIN16 and ASIN11 perform well (e.g., strong demand, effective marketing, competitive pricing).
- Consider scaling advertising efforts on ASIN13, ASIN10, and ASIN12 to improve their performance.
- Review customer feedback on ASIN16 and ASIN11 to identify strengths that can be applied to other products.

4.2 Address High Return Rates:

Products with high return rates should be investigated for potential quality issues or customer dissatisfaction.

- Analyze customer feedback for ASIN12, ASIN11, and ASIN15 to identify common return reasons (e.g., product defects, misleading descriptions).
- Optimize product listings with clearer descriptions and images to reduce mismatched expectations.
- Improve quality control to prevent defective items from being shipped.
- Consider return policies and customer service improvements to handle returns efficiently and maintain customer trust.

4.3 Monitor Sales Trends:

Regularly monitor sales trends over time to identify any significant changes or patterns.

- Analyze contributing factors: Investigate if the decline is due to seasonality, competition, or marketing changes.
- Optimize promotional strategies: Introduce discounts, targeted ads, or bundled offers to boost December sales.
- Review inventory and pricing: Ensure competitive pricing and sufficient stock levels to maintain sales.

- Monitor customer behavior: Check for shifts in demand or external economic factors influencing purchases.

4.4 Plan for Seasonal Demand:

Use the seasonal sales analysis to plan for peak sales periods. Ensure adequate inventory and marketing efforts are in place to capitalize on these periods.

- Leverage holiday promotions: Extend Black Friday/Cyber Monday deals or introduce pre-Christmas sales.
- Analyze customer purchase behavior: Identify if customers shift to competitors or delay purchases.
- Optimize ad campaigns: Increase December marketing efforts to counter the sales decline.
- Bundle deals or limited-time offers: Encourage purchases with incentives in December.

4.5 Optimize Profitability:

Focus on the most profitable products and consider strategies to increase their sales. This could include targeted marketing campaigns or bundling products.

- Double down on ASIN16 & ASIN11: Increase marketing, stock levels, and promotional efforts.
- Investigate ASIN12, ASIN10, ASIN13: Check pricing strategies, demand, and cost structure.
- Reassess underperforming ASINs: Consider bundling, promotions, or discontinuation if margins are too low.

4.6 Evaluate Marketplace Performance:

Compare sales performance across different marketplaces and allocate resources to the best-performing ones. Consider expanding to new marketplaces if there is potential for growth.

- Leverage Amazon further: Optimize listings, use Amazon Ads, and ensure Prime eligibility.
- Explore other platforms: Consider testing sales on additional marketplaces to reduce risk.
- Analyze Customer Segments: If customers prefer Amazon, focus on enhancing experience & retention strategies.

4.7 Investigate Anomalies:

Investigate any anomalies in sales data to understand the underlying causes. This could help in identifying potential issues or opportunities for improvement.

- Data Cleaning: Remove duplicate ASIN entries and validate unique transactions.
- Verify Sales Sources: Cross-check with raw transaction logs for accuracy.
- Implement Validation Rules: Prevent future data anomalies through automated checks.

4.8 Track Monthly Performance:

Regularly track sales performance by ASIN per month to identify trends and patterns for individual products. This can help in making data-driven decisions about product management and marketing strategies.

- Replenish stock for high-performing ASINs to prevent sales loss.
- Investigate low-performing ASINs to determine if they need better promotions or adjustments.
- Analyze past seasonal trends to predict future sales patterns.
- Consider targeted discounts in December to sustain momentum.

V. CONCLUSIONS

The sales performance analysis indicates a strong surge in November, likely driven by Black Friday and Cyber Monday promotions, followed by a decline in December. ASIN16 and ASIN6 were the top-performing products, but their sales dropped in December, suggesting potential inventory depletion or reduced seasonal demand.

To sustain momentum, restocking high-performing ASINs, analyzing customer demand patterns, and implementing targeted December promotions could help mitigate the decline. Further, assessing low-performing ASINs for potential improvements in marketing or pricing strategies is recommended.