Case Study Report

E-commerce Sales

Role: Business Analyst Intern

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Date: 16 April, 2025

As a data consultant for major consumer brands (e.g., Kellogg's, Logitech, Kimberly-Clark), I have analyzed their Amazon performance data to identify opportunities, patterns, and challenges in online sales performance. Using SQL and analytical tools, I've addressed key business questions, derived insights, and flagged critical issues.

Please find the SQL solution file for all the questions here (contains all the SQL solutions)

Please find the Excel solution file for all the questions here (contains all the tables/charts/graphs)

Question 1: Most Expensive SKU (on average)

SQL solution file

Excel solution file

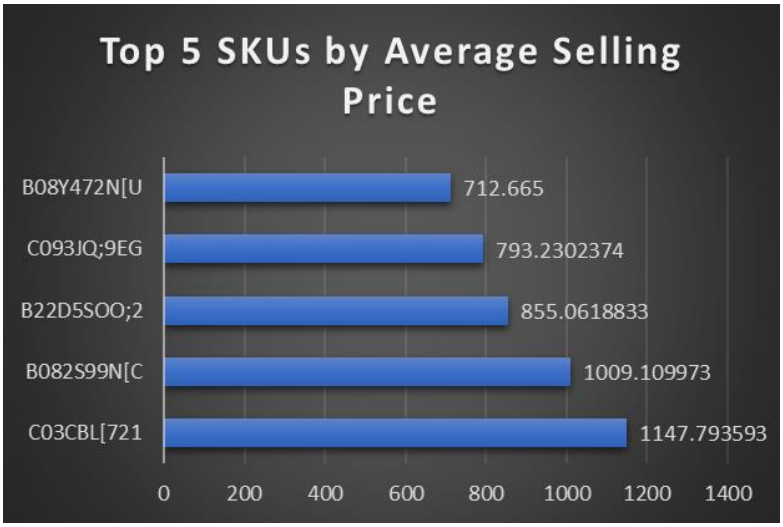
Approach:

- Aggregated total revenue and units sold per SKU

- Computed Average Selling Price (ASP) = Revenue / Units

Result:

- **SKU Name:** C03CBL[721
- **Average Price:** ₹1147.79
- **Total Revenue:** ₹575,044.59
- **Total Units Sold:** 501



Question 2: Percentage of SKUs with Revenue

[SQL solution file]

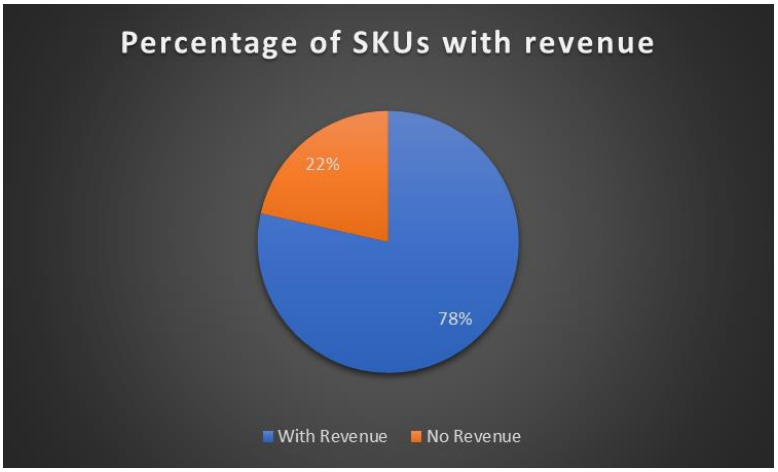
[Excel solution file]

Approach:

- Counted distinct SKUs with sum(revenue) > 0
- Compared against total SKUs

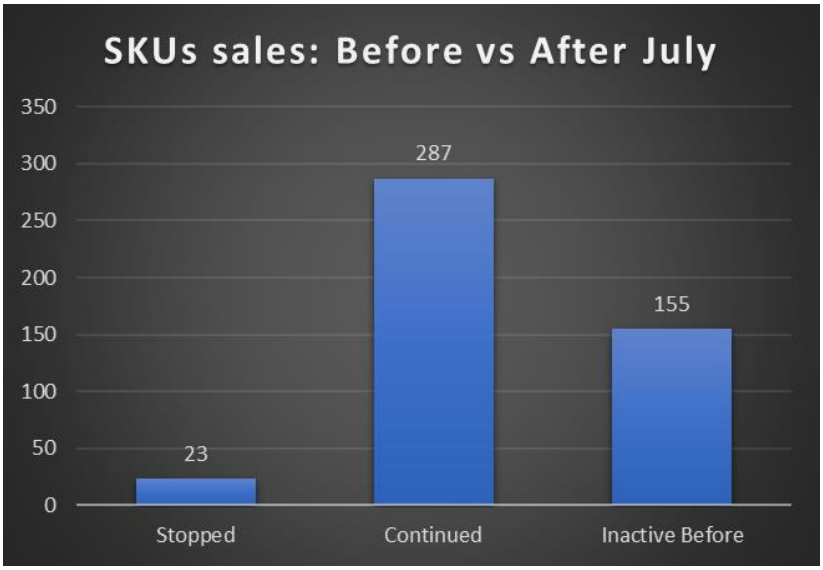
Result:

- **Total SKUs:** 465
- **SKUs with Revenue:** 365
- **Percentage: 78.49%**



SKUs That Stopped Selling After July

- Identified SKUs with sales in July, but zero sales afterward
- **Number of such SKUs:** 23
- **Sample SKUs:** B012GU7SOL, B116DUQLEB, B20EKD5JF4, B225I326ET, C019:8WTE8, C01JPONNVK, C02UYCQYRF, C035O8\UJC, ...



Question 3: Sale Event Dates

SQL solution file

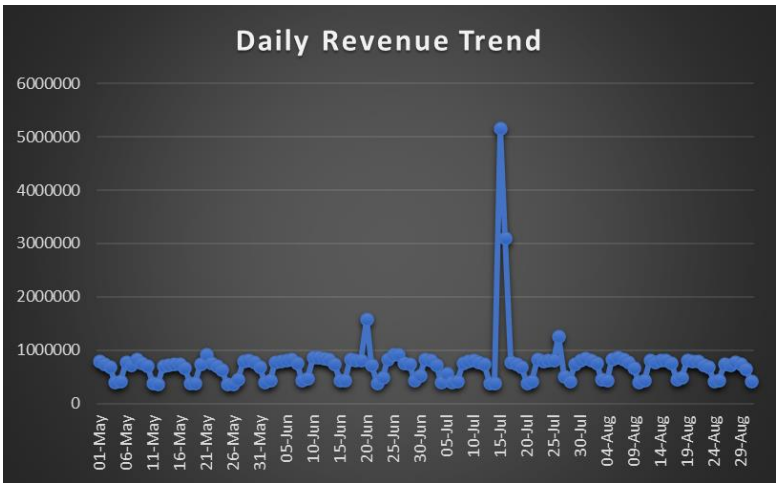
Excel solution file

Approach:

- Plotted daily revenue trends (sum of ordered_revenue vs Feed_date)
- Identified spikes significantly above average

Sale Period Identified:

July 15 – 16, 2019



Sharp revenue spike suggests a sale

Question 4: Post-Sale Cannibalization

SQL solution file

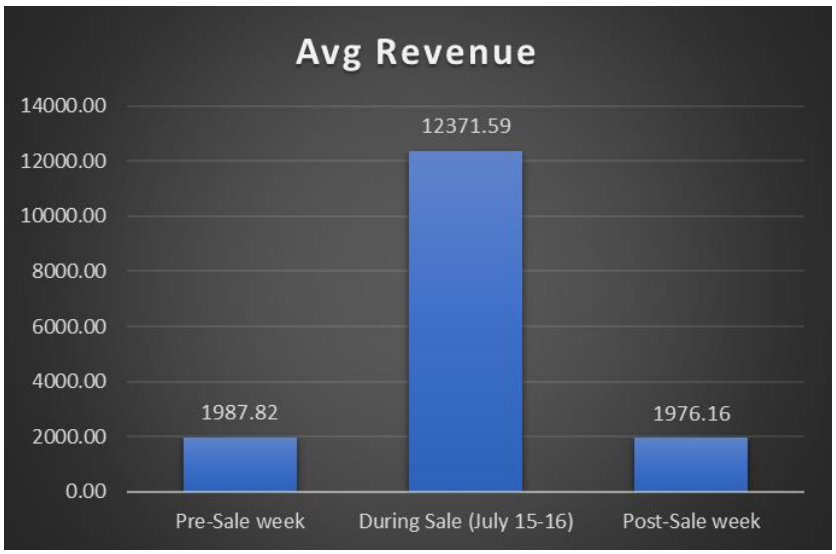
Excel solution file

Approach:

- Compared sales before vs during vs after sale event
- Used paired t-test for statistical validation

Key Insight:

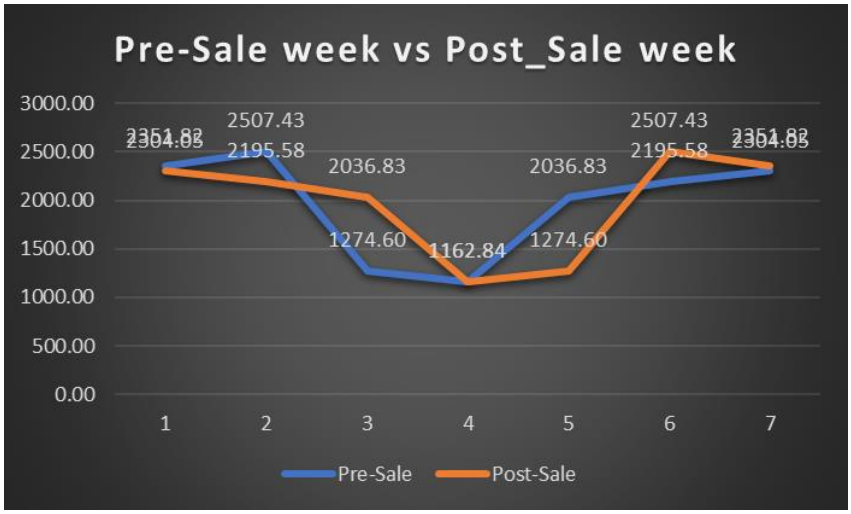
- Avg revenue for Pre-Sale: 1987.82
- Avg revenue during Sale: 12371.59 **(up by 522%)**
    - Avg revenue for Post-Sale: 1976.16 **(down by -0.59%)**



Post-sale revenue is -0.59% lower than pre-sale levels, suggesting no significant cannibalization

- **Statistical Test:** Paired P-Test for Pre-Sale Week revenue vs Post-Sale Week revenue

  Since P = 0.05 which is >= 0.05, **Not Statistically Significant (No cannibalization)**



Possible Reasons:

- Limited Sale Duration (2 days) prevented over-purchasing.
- Potential New Customers: Sale may have attracted new buyers who returned

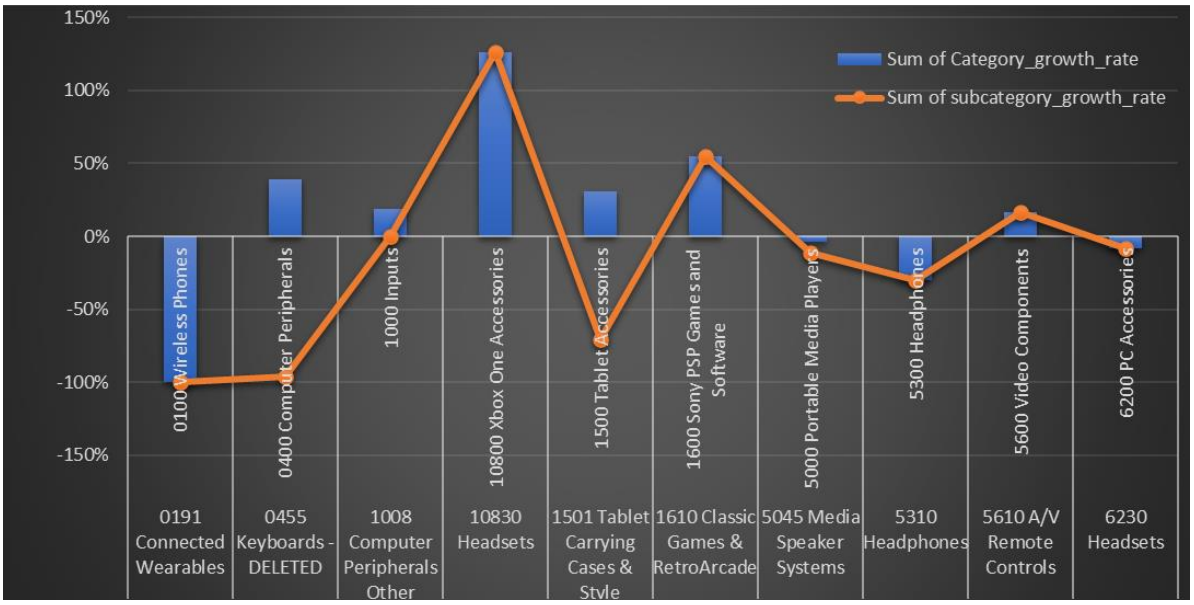
Question 5: Slowest-Growing Subcategories

SQL solution file

Excel solution file

Approach:

- To analyze growth, we need to divide the dataset into 2 timeframes:
    - Early period (before July 1)
    - Late Period (July 1 and after)
- Calculated Growth Rate for each subcategory and its corresponding category.



Findings:

Category	Category_growth_rate	Sub_category	subcategory_growth_rate
0100 Wireless Phones	**-100%**	**0191 Connected Wearables**	**-100%**

0400 Computer Peripherals	**39%**	**0455 Keyboards - DELETED**	**-96%**
1000 Inputs	**19%**	**1008 Computer Peripherals Other**	**0%**
10800 Xbox One Accessories	**126%**	**10830 Headsets**	**126%**
1500 Tablet Accessories	**31%**	**1501 Tablet Carrying Cases & Style**	**-71%**
1600 Sony PSP Games and Software	**55%**	**1610 Classic Games & RetroArcade**	**55%**
5000 Portable Media Players	**-4%**	**5045 Media Speaker Systems**	**-11%**
5300 Headphones	**-30%**	**5310 Headphones**	**-30%**
5600 Video Components	**17%**	**5610 A/V Remote Controls**	**17%**

6200 PC Accessories	**-8%**	**6230 Headsets**	**-8%**

Most Concerning Sub-Category: 0455 Keyboards - DELETED

- It's part of a rapidly expanding category, showing a growth of 39%, but it's also faced a staggering decline of 96%. This points to a serious problem within this specific subcategory, which could be due to reasons like delisting, stocking issues, or quality concerns.
- The word **"DELETED"** hints that it may have been taken off the market or discontinued, so we need to confirm that.
- Next steps: look into the availability of the SKU, check its search performance, and see if there's a replacement product that has been introduced.

Additional Subcategories to Monitor:

- 1501 Tablet Carrying Cases & Style: Also declined sharply (-71%) in a +31% category.

Question 6: Data Anomalies

SQL solution file

Excel solution file

Issues Detected:

For Sales_Data:

- Null values in column `REP_OOS`.

Assumption: no out-of-stock views for the SKUs.

Imputation: filled with '0' in all the blank cells in the column.

- Negative values for Ordered_Units and Ordered_Revenue.

  Assumption: May represent returns/cancellation. Hence, no imputation

- Identified rows where Ordered_Revenue > 0 and Ordered_Units = 0 in Sales_data. This creates inconsistencies in ASP and conversion metrics.

  Assumption: Subscription-based or service revenue rather than physical product sales. Hence, no imputation

- Incorrect delimiter '\' at row B38643.

  Imputation: Replaced with the correct ones (without '\' at the end).

For Glance_Views:

- Negative values in the Units column.

  Assumption: Returns or Cancellations. Hence, no imputation

- Incorrect delimiter '\' at row B35799.

  Imputation: Replaced with the correct ones (without '\' at the end).

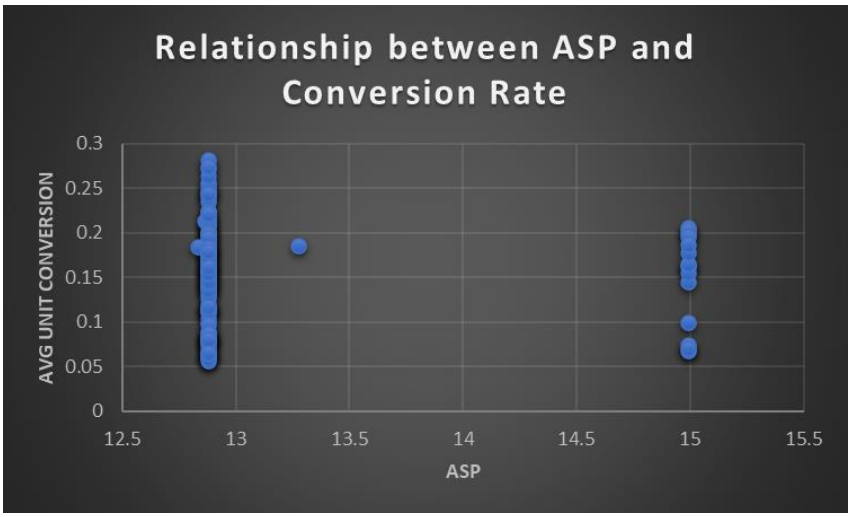
Question 7: Conversion vs Average Selling Price for SKU C120[H:8NV

SQL solution file

Excel solution file

Approach:

- Filtered the data for SKU C120[H:8NV] from both Sales and Glance Views tables.
- Joined both the tables.
- Calculated Unit Conversion as Ordered Units / Views for each date.
- Calculated Average Selling Price (ASP) as Ordered Revenue / Ordered Units.
- Observed that ASP remained nearly constant, making it difficult to determine any correlation with Unit Conversion.



- The Average Selling Price (ASP) remains almost constant throughout the time period (hovering around 12.8 and 15).
- Unit Conversion shows some fluctuations, but since ASP did not change, those variations cannot be connected to pricing.
- This makes it hard to determine any causal relationship between Unit Conversion and ASP for this SKU from this dataset alone.

Statistical Test: ASP vs. Avg Conversion Rate

Pearson Correlation Coefficient = -0.03, Close to 0 means **no linear relationship**

Interpretation:

- Close to -1 → strong negative correlation (conversion drops with higher price)
- Close to +1 → strong positive correlation
- Close to 0 → no linear relationship

Findings:

The Average Selling Price for SKU C120[H:8NV] has stayed pretty steady throughout the specified period. Since there hasn't been much fluctuation in pricing, we can't really figure out if there's any connection between the Average Selling Price and Unit Conversion.

Thank You

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