

PYTHON DATA ANALYSIS PROJECT



DISCOUNT IMPACT ON AMAZON SALES & CUSTOMER ANALYSIS



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BACKGROUND

Amazon, a leading e-commerce platform, offering an extensive range of products alongside frequent discounts and promotions. However, despite the implementation of significant discounts across various categories, data indicates that higher discount levels do not consistently lead to improved customer satisfaction. Certain products with substantial discounts still receive lower ratings, raising critical questions regarding customer perception, product quality, and purchasing behavior.

In addition, Amazon is focused on optimizing its discount strategies for high-value items to ensure customers are satisfied with their purchases. The company also seeks to gain a deeper understanding of which product categories are most responsive to discounts and how customer feedback can be leveraged to drive sales growth and improve the overall shopping experience.

EXECUTIVE SUMMARY

- Objective: Examine the distribution of discounts to gain insights into their effects on product ratings, sales performance, and customer satisfaction
- Key insights:
 - Relationship between discounts, ratings and product prices.
 - Other factors impacting rating besides discounts.
 - Primary driven determents to growth in sales and customer satisfaction of high-ticket products.
 - Most beneficial categories from discount promotion and their top 10 best-selling products as well as least-selling products.
 - Frequent concerns identified in products with low ratings.
- Recommendation:
 - Improve revenue and rating in underperforming products.
 - Leverage promotional strategies to high-rated products.

DATA PREPARATION AND METHODOLOGY

Code Link: <https://colab.research.google.com/drive/1TstyTHPBcQU60SDSWOhwu9pJlPpyNxVd?usp=sharing>

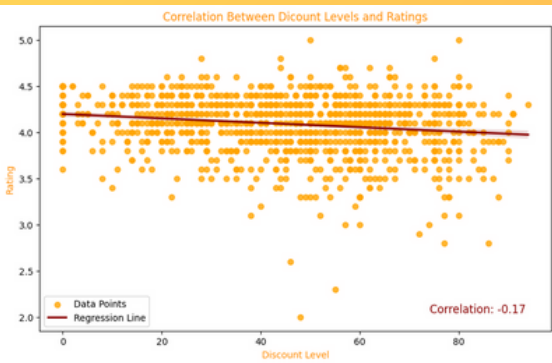


ANALYSIS

1. RELATIONSHIP BETWEEN DISCOUNTS, RATINGS AND PRICES

In order to access the relationship between ratings with discount percentages and after-discount prices, a correlation analysis was conducted.

Figure 1. Correlation Between Discount Levels and Ratings



The resulting correlation coefficient, $R = -0.1709$, indicates a **weak negative correlation** between **discount levels** and **ratings**. This implies that as the discount percentage slightly increases, the ratings tend to decrease, though the relationship is weak. Hence, discounts do not appear to be a critical factor in determining customer satisfaction (figure 1).

Likewise, the correlation coefficient of **0.132** between **discounted prices** and **ratings** suggests a **weak positive relationship**. This indicates that, although there is a slight tendency for higher ratings as discounted prices increase, the relationship is not strong enough to draw definitive conclusions. Thus, customer satisfaction does not appear to be significantly impacted by Discounted Prices (figure 2).

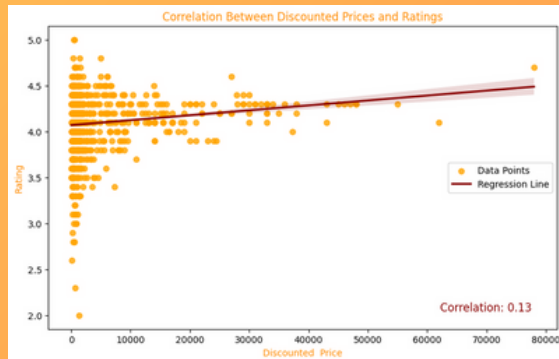


Figure 2. Correlation Between Discounted Prices and Ratings

It is observed that factors beyond discounts are influencing customer ratings. A more comprehensive analysis of the discount distribution and rating patterns across products, particularly within higher discount ranges, is required to identify other variables that may be impacting customer ratings

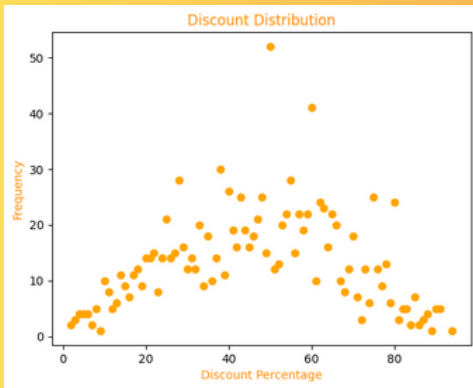
2. OTHER POTENTIALLY AFFECTING ASPECTS

2.1. Discount and Rating Distribution across Products

Out of 1,256 products, 1,211 are eligible for **discount** promotions ranging from **2%** to **94%**,

The most frequent discounts fall between 30% to 60% (figure 3).

Figure 3. Discount Distribution



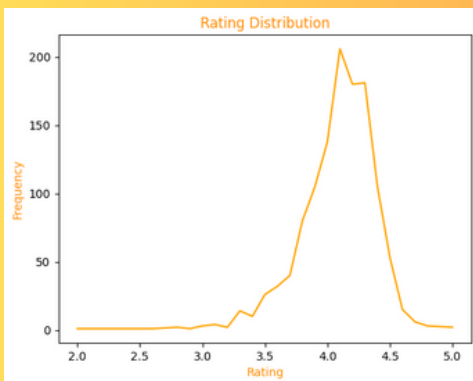
Discount percentages are divided into 3 different ranges for analysis:

- Low:  
- Med:   
- High:  




The ratings range from a minimum value of 2 to a maximum value of 5, with **2** representing the **lowest** possible rating and **5** the **highest**.

However, the majority of ratings fall within the range of 3.75 to 4.5, indicating a concentration of customer feedback in this mid-to-high rating spectrum (figure 4).

Figure 4. Rating Distribution



Ratings are also categorized into 3 different ranges:

- Low:  
- Med:   
- High:  

2.2. Rating Distribution in High Discount Range & Most Common Review Title in Low Rated Products

Figure 5 displays the distribution of ratings across 589 products in the high discount range, with a clear visualization of the most frequent ratings falling between 3.5 and 4.5.

Nevertheless, there are several abnormally low ratings, which prompt significant questions regarding customer perception, product quality, and purchasing behavior (figure 5). Consequently, the reviews with low ratings are analyzed to identify the most common feedback, helping to pinpoint the underlying issues.

As shown in Figure 6, **poor quality** and **malfunctioning products** appear to be the **primary factors** influencing customer satisfaction.

Figure 5. Rating Distribution in High Discount Range

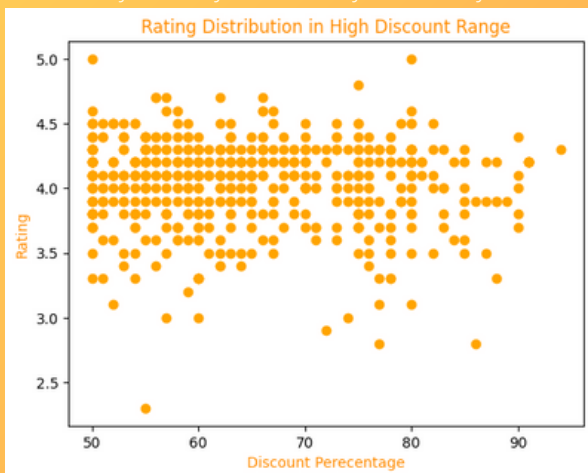
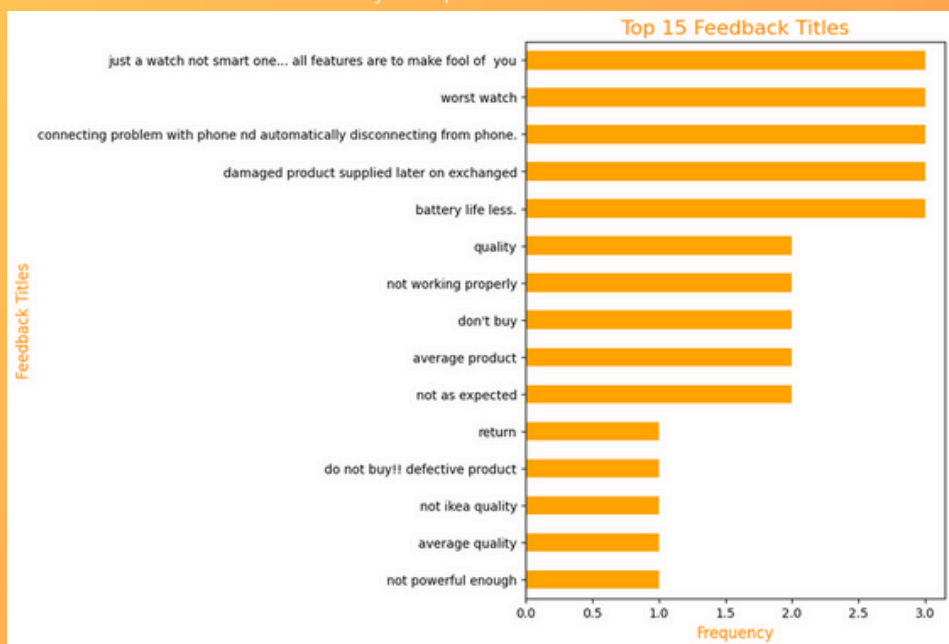


Figure 6. Top 15 Feedback Titles



3. STRATEGIES FOR HIGH TICKET ITEMS

3.1. Sales Performance and Rating Distribution in High-Ticket Products

After applying discounts, prices range from ₹39.00 to ₹77,990.00, with high-ticket items defined as **products priced over ₹1,000.00**.

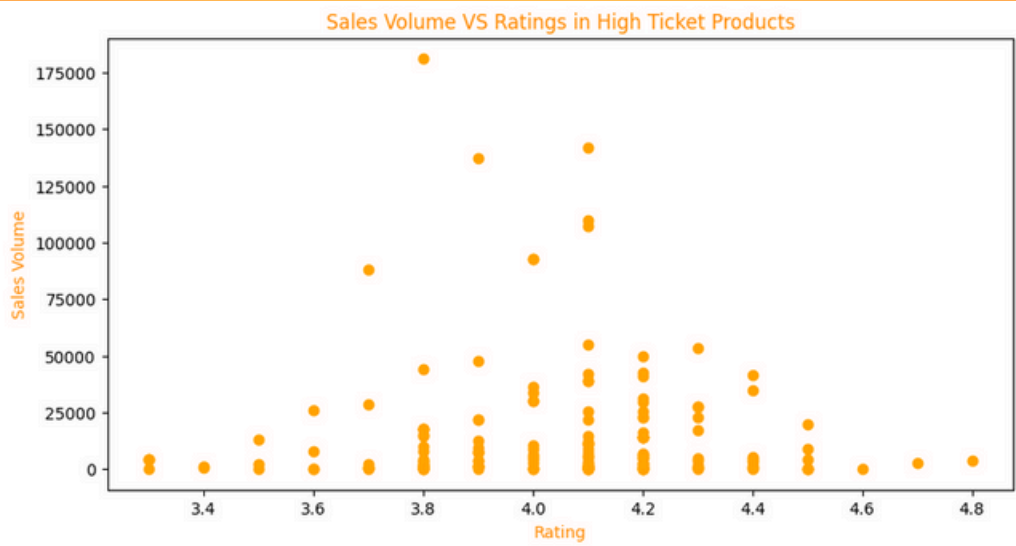


Figure 7. Sales Volume VS Ratings in High-Ticket Products

Figure 7 illustrates ratings in this segment range from 3.3 to 4.8, with the highest frequency occurring between 3.8 and 4.3.

Its total sales range from just a few units to over **175,000** units sold.



Figure 9. Most Common Review Titles in High-Ticket Products with Low Sales & Low Ratings

It is evident that **product quality** and **after-discount pricing** play a crucial role in **influencing customer satisfaction** (figure 8 & figure 9).

4. CATEGORY-SPECIFIC INSIGHTS

4.1. Average Discount VS Average Rating Across Categories

A total of 9 categories exists, of which only 8 are eligible for discounts. Average discount distributed across them ranging from **21.28%** to **57.50%**.

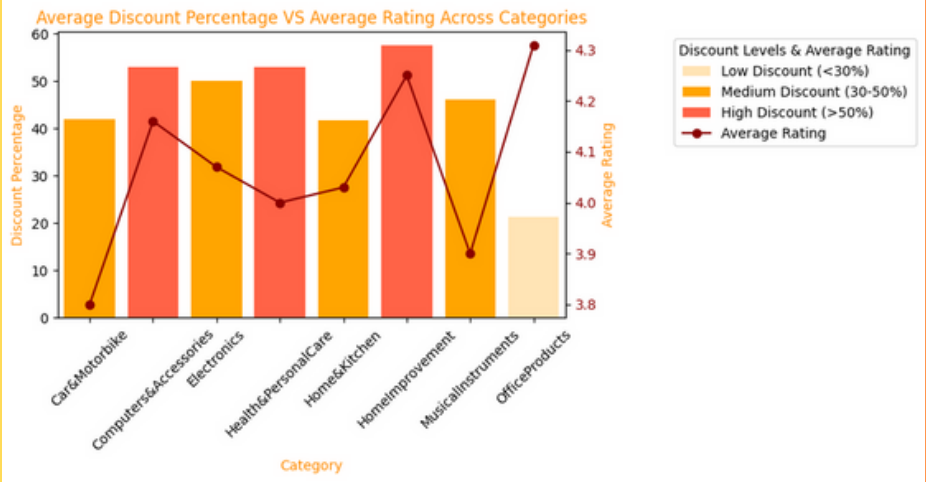


Figure 10. Average Discount Percentage VS Average Rating Across Categories

Home Improvement has the highest average discount, with a total of 2 products, while Office Products has the lowest average discount, with a total of 18 products (figure 11).

Although average discount of **Electronics** lies within the medium discount range, it has the **most total products** and **sales volume** among categories.

Figure 11. Total Products per Main Category

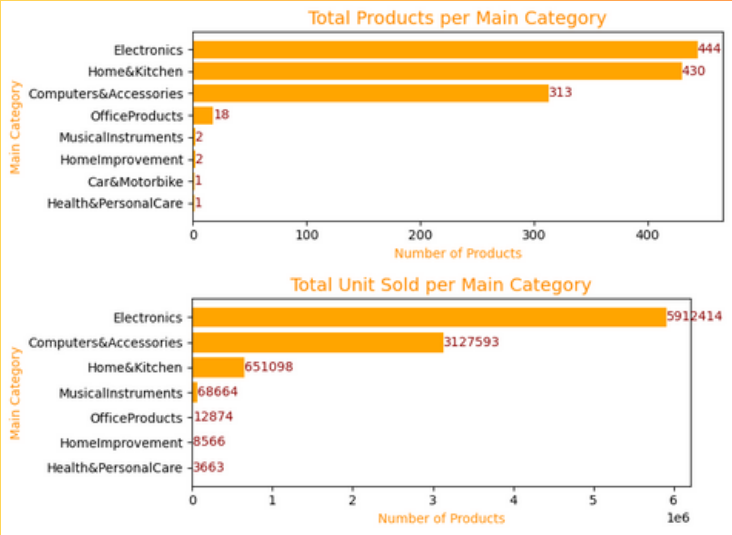


Figure 11. Total Unit Sold per Main Category

4.1. Most Beneficial Categories from Discounts

The most advantageous product categories are those that feature products with significant discounts (high discount range) and also generate high total sales.

After analysis, three **categories** emerge as the **most beneficial** including **Electronics**, **Computers & Accessories** and **Home & Kitchen** respectively (figure 12 & figure 13).

Category	Total Sales	Average Discount
Electronics	5912414	66.73%
Computers & Accessories	3127593	65.04%
Home & Kitchen	651098	59.54%

Figure 12. Table of Total Sales and Average Discount of Most Advantageous Categories

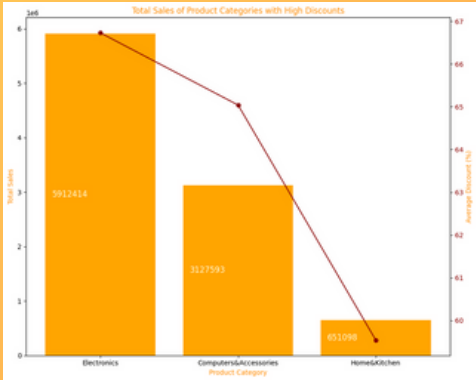


Figure 13. Total Sales of Product Categories with High Discount

Additionally, the **top 10 products** with the **highest sales** and the top 10 products with the **lowest sales** are identified to enhance inventory management and marketing strategies

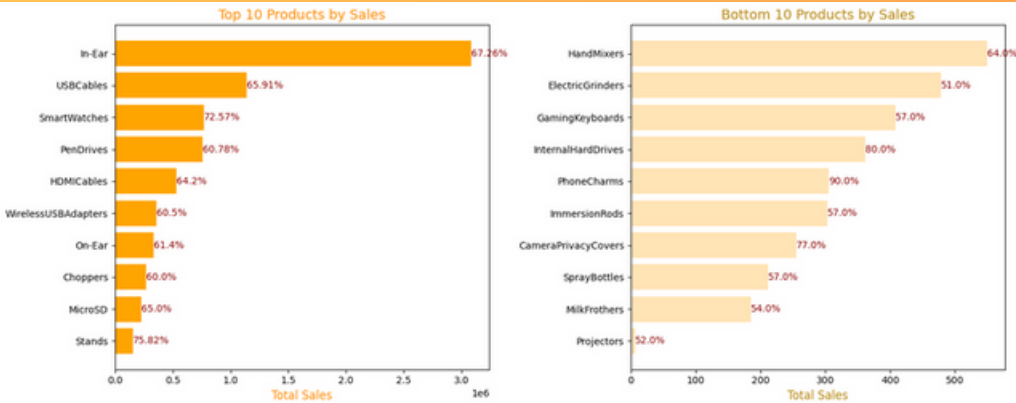


Figure 14. Top 10 and Bottom 10 Products by Sales

The inventory of the top 10 products shall be prioritized for restocking in anticipation of upcoming discount promotions, while the sales performance of the bottom 10 products could be improved by offering higher discounts.

Customers frequently raise concerns about product quality, with the **majority of feedback** indicating that the products are “**not working properly**”.

KEY FINDINGS AND RECOMMENDATIONS



While discounts and prices exhibit a limited influence on customer satisfaction, their impact is relatively minor compared to the substantial effect of unreliable quality and malfunctioning products on customer ratings which explains for the concern of the low rating appearance despite high discounts on products.



For high-ticket items, offering budget-friendly prices combined with high-quality products will strengthen total sales and improve product ratings.



Electronics, Computers & Accessories and Home & Kitchen are the 3 most beneficial from discount promotion since their total sales rank highest across 8 discount-applicable categories. In which, top 10 products in high discount range with the most total sales which should be significantly replenished in preparation for the upcoming discount promotion, while the bottom 10 products with weakest sales volume should either upgrade their quality nor have their discount percentages increased to drive sales performance.



Regarding low-rated products, defective and malfunctioning items pose a critical issue. To address this, several approaches can be implemented, including enhancing quality control processes, conducting root cause analysis, and offering clear return and refund policies.