E-Commerce Pricing, Discount & Customer Rating Analysis Using Power BI

Project Objective

This project is basically about digging into how products are priced in an e-commerce setup. I wanted to look at the pricing structure first, you know, see what makes sense there. Then there's the discounts, how they vary across different categories, that part feels important because not everything gets the same deals.

Understanding customer ratings is another big thing. People rate stuff based on what, exactly? I am trying to figure out if price or discounts play into that. It seems like there might be some connection between the three, price, discount, and rating, though I am not totally sure yet how strong it is.

The goal overall is to pull out some business insights that could help with decisions in online selling. And yeah, building an interactive dashboard in Power BI to show it all off professionally.

Dataset Description

For the data, I used this file called cleaned_ecommerce_powerbi_dataset.csv.

- It has columns like Product_ID, which is just to track each item.
- Then Category and Subcategory, to group things.
- Original Price and Final Price, obviously for the money side.
- Discount Percent tells how much off.
- Rating from customers.
- And Scraping Date, when the info was pulled.

I cleaned it up before bringing it into Power BI, removed some junk that wasn't helpful. That took a bit, but it made things smoother later. Some parts still feel a little messy, like maybe I missed a connection or two.

Data Cleaning & Preprocessing

- I started with cleaning the data, which was kind of necessary because there were these null values messing things up, so I removed them first.
- Duplicates were another issue, especially with the Product_ID entries, and getting rid of those helped a lot.
- Then I worked on standardizing the discount format, since it was all over the place at first. Ratings needed to be converted to numeric too, that took a bit of fiddling.
- Prices I made sure were in decimal format, and if something required calculated columns, I added those where it made sense.

Data Modeling in Power BI

Moving on to Power BI, I imported the dataset there and checked all the data types right away, you know, to avoid any surprises later.

If there were multiple tables, I set up the relationships between them.

For the dashboard, I created this horizontal bar chart showing discount versus rating. It basically looks at how total discount changes by rating levels.

I think it helps spot if higher discounts mean better ratings, but from what I see, it does not really push ratings up that much. Customer satisfaction probably comes from other stuff besides just price cuts, like maybe the product quality or something. That part stands out to me, though I might be missing some connections.

Created DAX Measures:

- Avg Final Price = AVERAGE(Table[Final_Price])
- Avg Discount = AVERAGE(Table[Discount_Percent])
- Avg Rating = AVERAGE(Table[Rating])
- Total Revenue = SUM(Table[Final_Price])
- Total Discount = SUM (Table [Discount_Percent])

Dashboard Visualizations Created

- ➤ The dashboard has a few main parts that help look at the data on discounts and ratings for products.
- ➤ One of them is this horizontal bar chart for discount versus rating. It shows how the total discount changes with different ratings, and I think it's supposed to point out if bigger discounts really mean better customer feedback.
- ➤ From what I see, discount does not strongly boost the rating, so satisfaction probably comes from other stuff besides just lowering the price.
- ➤ Then there's the line chart tracking discount percent over time, based on scraping dates. It helps spot if there are seasonal changes in pricing or like promotional pushes.
- ➤ The patterns go up and down, which might mean sale periods happening now and then.

I am not totally sure how to connect everything perfectly, but another chart is the combo one for price versus rating in subcategories.

- ➤ The columns are for the sum of final prices, and the line tracks the sum of ratings. Some categories with higher prices end up with lower ratings, which suggests price alone does not make people happy.

The detailed product table stands out because it uses conditional formatting to highlight things quickly.

- ➤ For discounts over 50 percent, it turns green, under 10 percent gets red, and ratings below 3 are orange. That way you can spot heavy discount items or poorly rated ones right away, along with any price outliers that seem off.

KPI cards give a fast overview too. Average final price is about rupees 206.91, rating around 3.75, and discount at 18.83 percent. It's like an executive summary in one glance.

- ➤ One more visual is the scatter plot with final price on the x axis and discount percent on y, colored by category.
- ➤ There is no clear straight line relationship, and high priced stuff does not always come with big discounts.

> ➢ It varies a lot by category, maybe because strategies differ. This part gets a bit messy to explain, but it shows discount is not predictable just from price.

Business Analysis & Interpretation

Based on KPI:

- Average Price = ₹206.91
- Average Discount = 18.83%
- Average Rating = 3.75

Interpretation

- Moderate Pricing Strategy
- Moderate Discounting Strategy
- Acceptable but not excellent rating

Key Business Insights:

- High discounts DO NOT ensure higher ratings
- Some high-priced categories show lower satisfaction
- The discounting strategy may require optimization
- Varied price trends for Electronics and Beauty categories
- Products with small discounts and good ratings - brand trust important

Statistical Observations

- Low correlation of discount to rating
- Non-Linear Relationship between Price and Discount Category-based pricing variation exists

Business Suggestions

- Improve discount policy rather than offering large general discounts
- Make product quality a priority for creating better product ratings
- Study the high-priced products that are rated poorly, so as to better understand why they are performing poorly
- Use dynamic pricing
- Use specific promotion campaigns
- Monitor price changes while monitoring customer satisfaction

Software, Hardware & Technology Used Procurement

- Power BI Desktop
- DAX (Data Analysis Expressions)
- Microsoft Excel (may be used to clean data initially)
- CSV data set

Real Time Applications

- The dashboard will provide assistance to:
- E-commerce managers
- Pricing strategists
- Marketing Teams

- Product Performance Analysts

Also enabling:

- Data-driven pricing decisions
- Optimizing discounts
- Creating rating improvement strategies

Obstacles Encountered

- Handling large volumes of data
- Figuring out the right visuals
- Logic associated with conditional formatting
- Deciding what KPIs to apply
- How variables relate to each other

Summary

The project shows how businesses can use Power BI for:

- Real time business analysis
- Pricing optimization
- Analyzing customer behavior

The Dashboard gives a complete overview of the following:

✓ Pricing

✓ Discounts

✓ Customer Satisfaction

The project was a success in demonstrating how Power BI can be used in a practical manner in a real business environment.

Future Add-ons

- Adding sales quantity
- Adding profit margins
- Adding a predictive model for ratings
- Adding forecasts
- Connecting live customer data to databases
- Analyzing customer reviews with text analytics.