Report Title

"Analyzing Mobile Phone Market Trends: Insights "

Rupesh Jain (045048) | PGDM-BDA (PYTHON PROJECT TERM-1)

Objective :

To conduct a comprehensive analysis of the mobile phone market trends, including pricing strategies, and product features, rating and reviews in order to provide valuable insights for stakeholders, retailers, and manufacturers to make informed decisions and optimize their strategies in the mobile phone industry. The project aims to analyze various aspects of the mobile phone market and extract meaningful insights that can benefit different stakeholders in the industry.

General Description Of Data :

	Product Name	Current Price	MRP	Discount %age	Reviews	Number Rate & Review	Description
0	SAMSUNG Galaxy Z Flip5 (Lavender, 256 GB)	₹99,999	₹1,02,999	2% off	4.4	216 Ratings & 22 Reviews	8 GB RAM | 256 GB ROM17.02 cm (6.7 inch) Displ...
1	SAMSUNG Galaxy Z Flip5 (Graphite, 256 GB)	₹99,999	₹1,02,999	2% off	4.4	216 Ratings & 22 Reviews	8 GB RAM | 256 GB ROM17.02 cm (6.7 inch) Displ...
2	SAMSUNG Galaxy Z Flip5 (Mint, 256 GB)	₹99,999	₹1,02,999	2% off	4.4	216 Ratings & 22 Reviews	8 GB RAM | 256 GB ROM17.02 cm (6.7 inch) Displ...
3	APPLE iPhone 14 (Purple, 512 GB)	₹97,999	₹1,09,900	10% off	4.6	47,871 Ratings & 1,824 Reviews	512 GB ROM15.49 cm (6.1 inch) Super Retina XDR...
4	APPLE iPhone 14 (Starlight, 512 GB)	₹97,999	₹1,09,900	10% off	4.6	47,871 Ratings & 1,824 Reviews	512 GB ROM15.49 cm (6.1 inch) Super Retina XDR...
...	...	...	...	...	...	...	...
211	vivo Y02t (Sunset Gold, 64 GB)	₹9,499	₹15,999	35% off			4 GB RAM | 64 GB ROM16.54 cm (6.51 inch) HD+ D...
212	REDMI 12c (Matte Black, 128 GB)	₹10,399	₹15,999	36% off			6 GB RAM | 128 GB ROM | Expandable Upto 1 TB17...
213	Snexian GURU 312	₹630	₹999	15% off			32 MB RAM | 32 MB ROM | Expandable Upto 16 GB4...
214	vivo V29e 5G (Artistic Red, 128 GB)	₹26,999	₹31,999	15% off			8 GB RAM | 128 GB ROM17.22 cm (6.78 inch) Full...
215	vivo V29e 5G (Artistic Blue, 128 GB)	₹26,999	₹31,999				8 GB RAM | 128 GB ROM17.22 cm (6.78 inch) Full...

216 rows × 7 columns

This DataFrame presents a comprehensive overview of mobile phones available in the market under the value of Rs 1,00,000 , with data collected from web scraping. It includes detailed information on each mobile phone's product name, current price, maximum retail price (MRP), discount percentage, customer reviews, the number of ratings and reviews, and a brief description of the product specifications.

Column Descriptions:

- Product Name: The name of the mobile phone model.
- Current Price: The current selling price of the mobile phone.

- MRP (Maximum Retail Price): The maximum retail price of the mobile phone before any discounts.
- Discount %age: The percentage of discount offered on the mobile phone.
- Reviews: The average customer rating for the mobile phone.
- Number Rate & Review: The total number of ratings and reviews provided by customers.
- Description: A concise description of the mobile phone's specifications and features.

This DataFrame serves as a valuable resource for market analysis, price comparison, and understanding customer sentiment towards various mobile phone models .

```
# Summary Statistics
summary = df.describe()
print(summary)
```

```
       Unnamed: 0  Current Price  Discount %age     Reviews  \
count   211.00000     211.000000     211.000000  211.000000
mean    105.00000   19186.625592      26.080569    4.178673
std      61.05462   27241.051409      10.129079    0.236180
min       0.00000     649.000000       2.000000    3.300000
25%      52.50000    6631.500000      18.000000    4.100000
50%     105.00000    9499.000000      26.000000    4.200000
75%     157.50000   14999.000000      34.000000    4.300000
max     210.00000   99999.000000      46.000000    4.700000

       Number Rate & Review
count            211.000000
mean           34001.308057
std            42449.224998
min               53.000000
25%             3513.500000
50%            19965.000000
75%            47871.000000
max           228134.000000
```

Each row of the output means:

- count: This row tells you the number of non-null values in each numerical column. It provides a count of available data points for each column.
- mean: This row shows the mean (average) value for each column. For example, in the "Prices" column, it indicates the average price of the mobile phones.

- std: The standard deviation measures the variability or dispersion of data. It shows how much the values in each column deviate from the mean. A higher standard deviation indicates more variation.
- min: This row displays the minimum value in each column. For example, in the "Prices" column, it indicates the lowest price among the mobile phones.
- 25%: This row represents the 25th percentile value. It shows the value below which 25% of the data falls. It's often referred to as the first quartile (Q1).
- 50%: This row corresponds to the median value (50th percentile) in each column. The median is the middle value when the data is sorted.
- 75%: This row shows the 75th percentile value, which is also known as the third quartile (Q3). It represents the value below which 75% of the data falls.
- max: This row displays the maximum value in each column. For example, in the "Prices" column, it indicates the highest price among the mobile phones.

An overview of the central tendency, spread, and the range of values for the numerical columns in the mobile phone dataset is obtained to understand key statistics about the data.

Analysis :

PRICE ANALYSIS :

- Average Price (Mean): The average price of mobile phones in the dataset is approximately ₹19,186.63. This is the average price point in the market. It can be used as a reference point to gauge how different mobile phones compare in terms of their pricing. Businesses can use this information to position their products competitively within this price range.

- Median Price: The median price of mobile phones in the dataset is ₹9,499.00. The median is the middle value when all prices are sorted in ascending order. It's a robust measure of central tendency and is not influenced by extreme outliers. This

statistic suggests that half of the mobile phones in the dataset are priced below ₹9,499.00, while the other half are priced above it. It is used to understand the price point that's most representative of the market.

- Price Range: The price range is ₹99,350.00. This represents the difference between the highest and lowest prices in the dataset. It provides insight into the variability of prices within the market. A wide price range indicates that there are mobile phones available at both low and high price points, catering to a diverse customer base. Managers can consider this range when deciding whether to introduce products at various price levels.

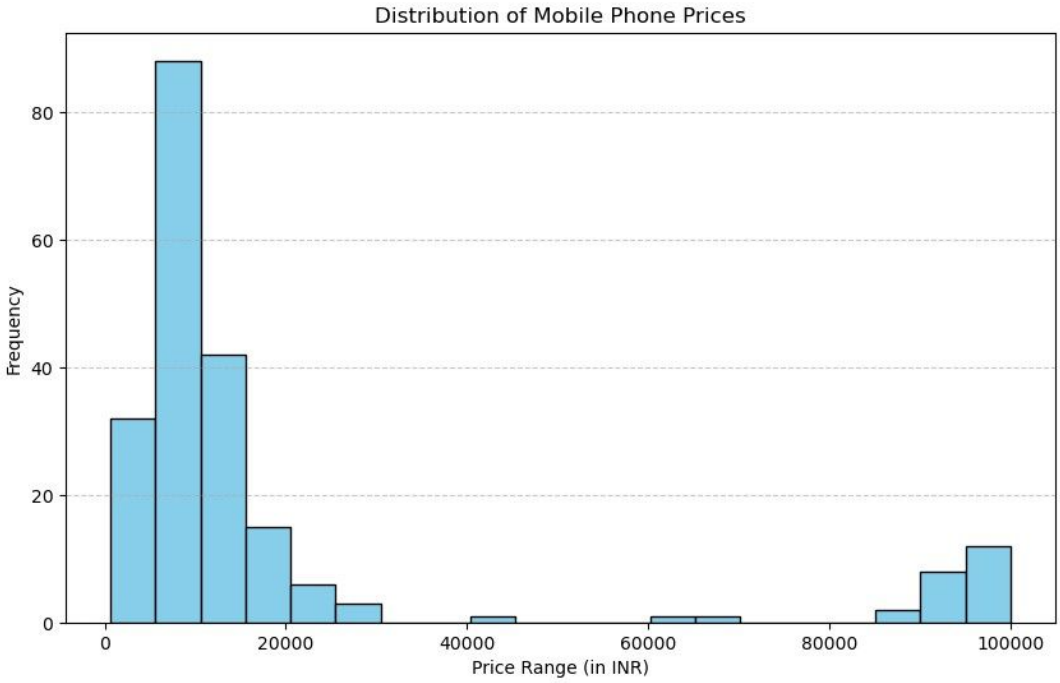
```
Row with Minimum Price:
Unnamed: 0                                                        151
Product Name                                                HOTLINE H310
Current Price                                                      649.0
MRP                                                             ₹1,099
Discount %age                                                      5.0
Reviews                                                            3.9
Number Rate & Review                                             10802
Description             32 MB RAM | 32 MB ROM4.57 cm (1.8 inch) Displa...
Name: 151, dtype: object

Row with Maximum Price:
Unnamed: 0                                                          0
Product Name                    SAMSUNG Galaxy Z Flip5 (Lavender, 256 GB)
Current Price                                                   99999.0
MRP                                                          ₹1,02,999
Discount %age                                                      2.0
Reviews                                                            4.4
Number Rate & Review                                               216
Description             8 GB RAM | 256 GB ROM17.02 cm (6.7 inch) Displ...
```

- The row with the minimum price represents an affordable mobile phone with a current price of ₹649.0, which is significantly lower than the MRP of ₹1,099. The discount percentage is 5.0%, and it has received relatively positive reviews with a rating of 3.9. It also has a substantial number of ratings and reviews, indicating some level of popularity.

- In contrast, the row with the maximum price represents a high-end mobile phone, the SAMSUNG Galaxy Z Flip5, with a current price of ₹99,999.0. The MRP is ₹1,02,999, and the discount percentage is 2.0%. This phone has a rating of 4.4, which suggests it is well-received by customers, although it has a lower number of ratings and reviews compared to the minimum price phone.

These rows represent mobile phones at opposite ends of the price spectrum within the dataset. The minimum price phone is budget-friendly and has garnered a reasonable number of reviews. On the other hand, the maximum price phone is a premium device with a higher price point and positive customer feedback, albeit with fewer reviews compared to the budget option.



- Histogram: This shows the frequency of mobile phones at different price intervals. It's expected that the histogram will have a longer tail on the right side (higher prices) due to the presence of premium and high-end mobile phones.

- Skewness: The positive skewness of the distribution suggests that while there are many mobile phones in the lower to mid-price range, there are relatively fewer mobile phones with very high prices.

In summary, the dataset exhibits a positively skewed distribution of prices, with a concentration of mobile phones in the lower to mid-price range. However, it also includes more expensive mobile phones, resulting in a wide price range. This distribution information is valuable for product positioning and pricing strategy decisions.

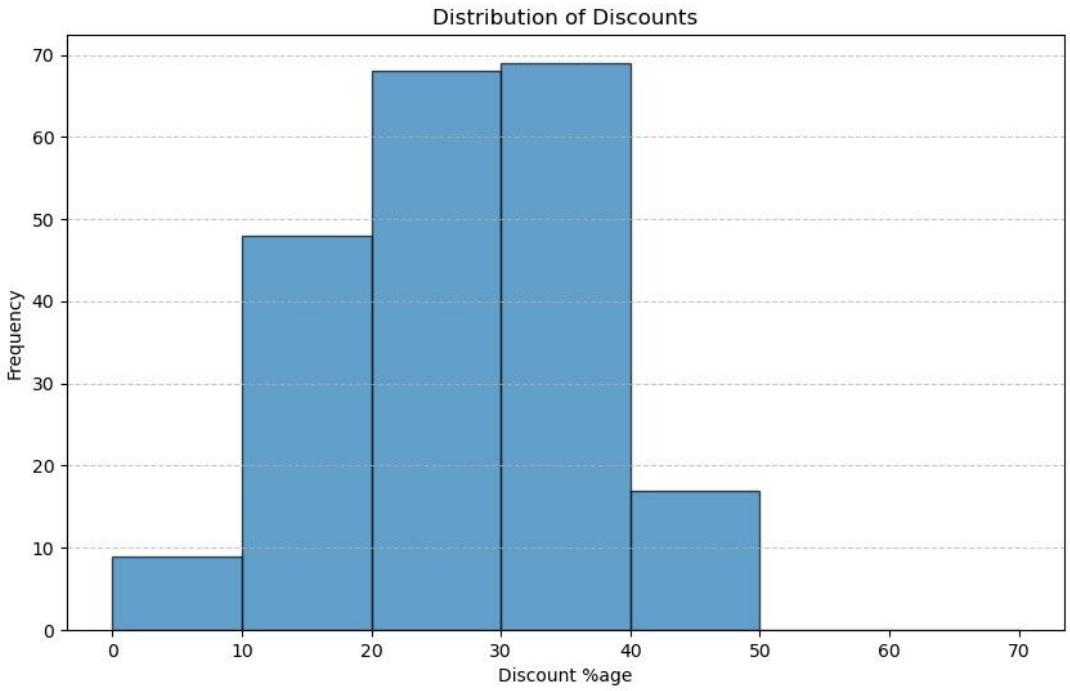
DISCOUNT ANALYSIS :

```
Mobile phone with the highest discount:
Unnamed: 0                                                          94
Product Name                                  POCO M5 (Icy Blue, 64 GB)
Current Price                                                    8499.0
MRP                                                             ₹15,999
Discount %age                                                      46.0
Reviews                                                             4.6
Number Rate & Review                                             200102
Description             4 GB RAM | 64 GB ROM | Expandable Upto 512 GB1...
Name: 94, dtype: object

Mobile phone with the lowest discount:
Unnamed: 0                                                           0
Product Name                    SAMSUNG Galaxy Z Flip5 (Lavender, 256 GB)
Current Price                                                    99999.0
MRP                                                           ₹1,02,999
Discount %age                                                        2.0
Reviews                                                              4.4
Number Rate & Review                                                 216
Description             8 GB RAM | 256 GB ROM17.02 cm (6.7 inch) Displ...
Name: 0, dtype: object
```

- The mobile phone with the highest discount is the POCO M5, currently priced at ₹8,499.0, with an original MRP of ₹15,999. The discount percentage is substantial at 46.0%. It has received highly positive reviews, with a rating of 4.6, and an impressive number of ratings and reviews (200,102). This suggests that it is a popular choice among customers due to its significant discount and positive feedback.

- In contrast, the mobile phone with the lowest discount is the SAMSUNG Galaxy Z Flip5, priced at ₹99,999.0, with an MRP of ₹1,02,999, resulting in a discount percentage of 2.0%. While it still has a good rating of 4.4, it has a comparatively lower number of ratings and reviews (216). This indicates that despite the lower discount, it maintains a positive reputation among customers.



The discount distribution suggests a mix of products with different discount percentages. Most mobile phones have relatively modest discounts, but there are notable exceptions with significant markdowns. Understanding this distribution can help businesses strategize their pricing and marketing efforts to appeal to different segments of customers in the mobile phone market.

REVIEW ANALYSIS :

```
The average rating of mobile phones is: 4.18


Mobile phone with the highest rating:
     Unnamed: 0                                      Product Name  \
8             8  APPLE iPhone 11 Pro Max (Midnight Green, 64 GB)
10           10      APPLE iPhone 11 Pro Max (Space Grey, 64 GB)
114         114                      REDMI A2 (Sea Green, 64 GB)

     Current Price        MRP  Discount %age  Reviews  Number Rate & Review  \
8          95699.0  ₹1,09,900           12.0      4.7                  1101
10         95699.0  ₹1,17,100           18.0      4.7                  1101
114         6990.0     ₹9,999           30.0      4.7                  1101

                                          Description
8    64 GB ROM16.51 cm (6.5 inch) Super Retina XDR ...
10   64 GB ROM16.51 cm (6.5 inch) Super Retina XDR ...
114  2 GB RAM | 64 GB ROM16.56 cm (6.52 inch) Displ...

Mobile phone with the lowest rating:
     Unnamed: 0                                Product Name  Current Price  \
200         200  realme Narzo N53 (Feather Black, 128 GB)        12290.0
201         201   MOTOROLA Edge 40 (Nebula Green, 256 GB)        29999.0
210         210            vivo Y02t (Cosmic Grey, 64 GB)         9499.0

         MRP  Discount %age  Reviews  Number Rate & Review  \
200  ₹12,999           14.0      3.3                  1018
201  ₹34,999           20.0      3.3                  1018
210  ₹15,999           40.0      3.3                  3771

                                          Description
200  6 GB RAM | 128 GB ROM17.12 cm (6.74 inch) Disp...
201  8 GB RAM | 256 GB ROM16.51 cm (6.5 inch) Full ...
210  4 GB RAM | 64 GB ROM16.54 cm (6.51 inch) HD+ D...
```

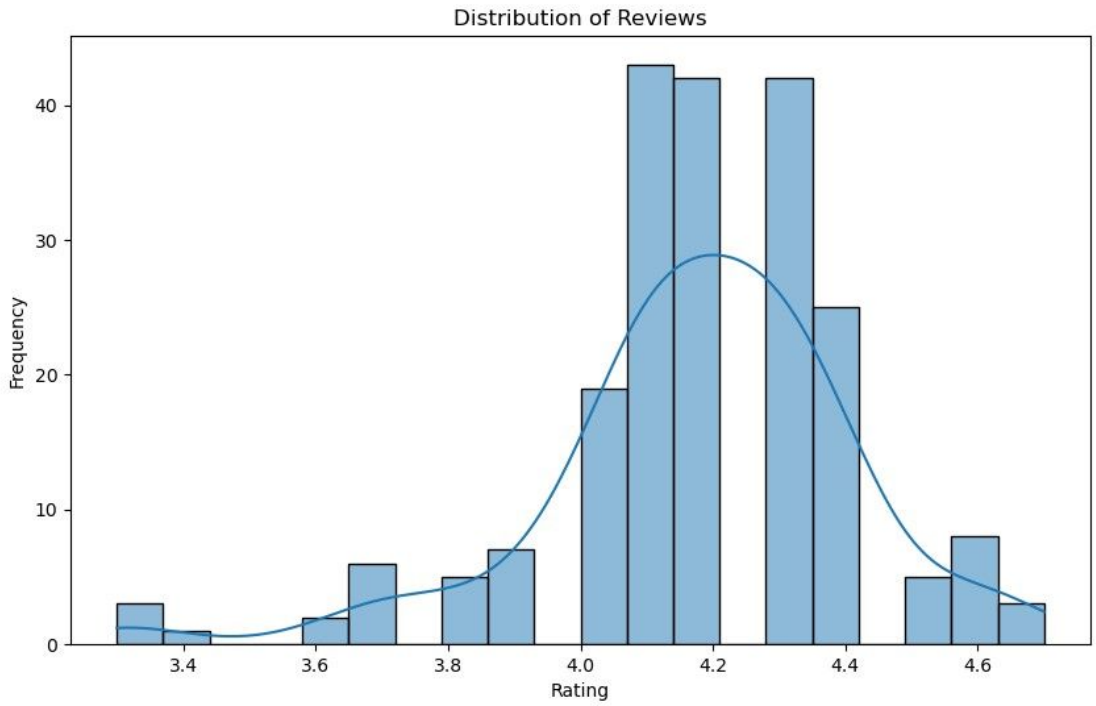
Average Rating:

- The average rating of mobile phones in the dataset is 4.18. This indicates that, on average, the mobile phones in the dataset have received positive ratings.

Analysis of Ratings:

- The highest-rated phones have ratings close to 4.7, indicating high customer satisfaction.

- The lowest-rated phones have ratings of 3.3, suggesting lower customer satisfaction.
- There is a notable price difference between the highest-rated and lowest-rated phones.
- Reviews and ratings may influence customers' purchasing decisions, so it's essential for businesses to focus on product quality and customer feedback.



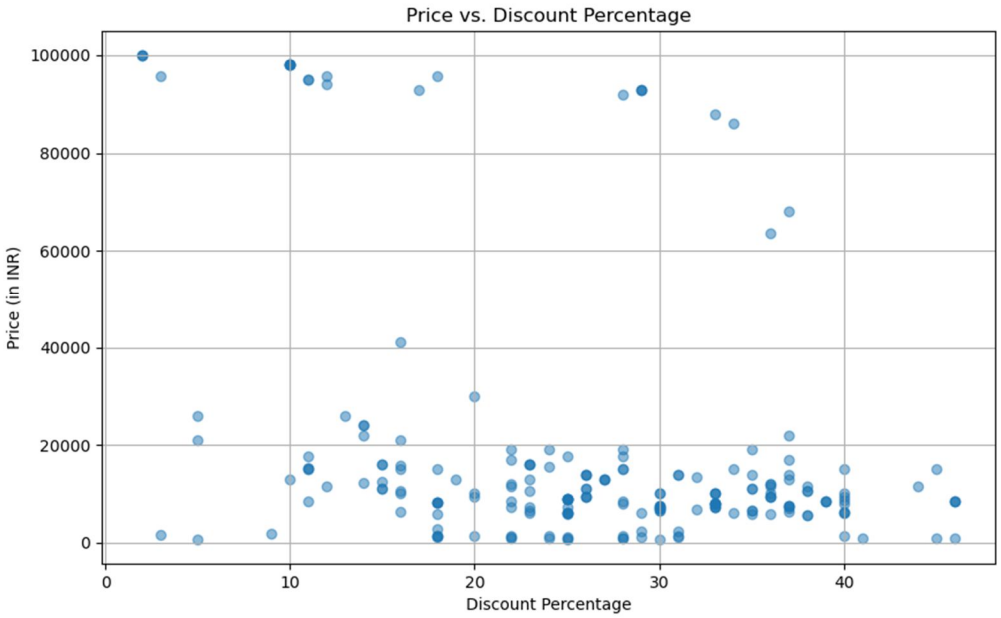
The analysis of ratings provides insights into customer sentiment regarding different mobile phones in the dataset. Businesses can use this information to improve product quality, address customer concerns, and make informed marketing decisions.

FINDINGS & INFERENCES

PRICE VS DISCOUNT :

The price vs. discount percentage analysis for this dataset reveals important insights about how discounts affect mobile phone prices.

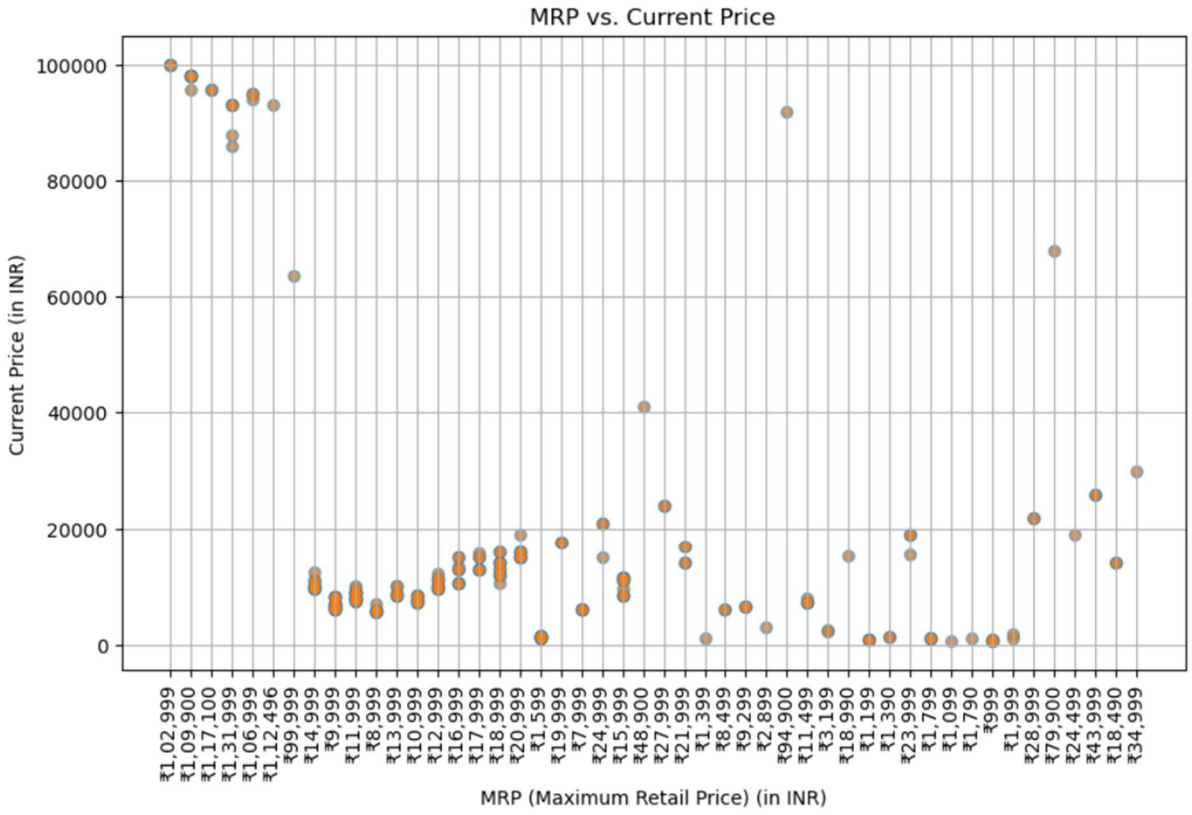
- Price Range: The dataset covers a wide range of mobile phone prices, with the minimum price being ₹649 and the maximum price being ₹99,999. This indicates that consumers have various options to choose from, catering to different budget preferences.
- Discount Percentage Distribution: The distribution of discount percentages varies across the dataset. Some mobile phones have high discounts, while others have lower discounts or no discounts at all. The discount percentages range from 2% to 46%. This distribution suggests that consumers can find both discounted and non-discounted mobile phones in the market.



- Market Competition: The presence of various discount percentages and price ranges indicates market competition among mobile phone brands. Brands may adjust their pricing and discount strategies to remain competitive in the market.
- Consumer Preferences: Consumers with different budget constraints and preferences can find mobile phones that suit their needs within the dataset. Some may prioritize discounts, while others may prioritize specific features or brands.

In conclusion, the price vs. discount percentage analysis provides valuable insights into the pricing dynamics of mobile phones in the market. It highlights the influence of discounts on prices and reflects the competitive nature of the mobile phone industry. Businesses can use this information to optimize their pricing and discount strategies to meet consumer demand effectively.

MRP VS CURRENT PRICE :



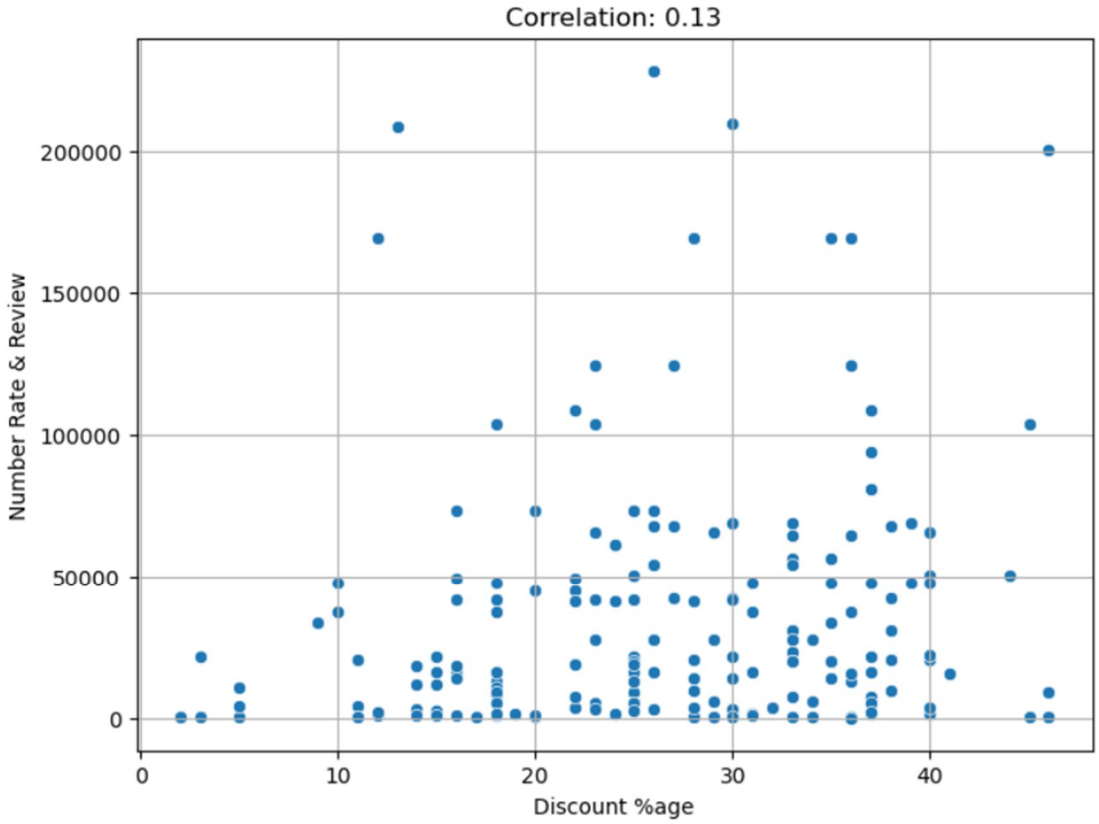
The analysis of the Maximum Retail Price (MRP) and Current Price in the dataset reveals several important findings:

- Consumer Decision Factors: The price difference between the MRP and the Current Price is an essential factor in consumer decision-making. Consumers are likely to be attracted to mobile phones with significant discounts, as they perceive these products as offering better value for money. The presence of discounts can influence purchasing decisions.
- Market Dynamics: The dataset's findings reflect the competitive nature of the mobile phone market. Brands and retailers adjust their pricing and discount strategies to compete effectively. The ability to offer competitive discounts can be a crucial factor in capturing consumer demand.
- Consumer Budgets: The availability of mobile phones across a broad price spectrum accommodates consumers with varying budget constraints. Some consumers may seek premium phones at discounted prices, while others may prefer budget-friendly options.
- Optimization Opportunities: Businesses can analyze this data to optimize their pricing and discounting strategies. Understanding the price points at which consumers are more likely to make a purchase can help companies tailor their offerings to meet consumer demand effectively.

In summary, the analysis of MRP and Current Price in the dataset provides insights into pricing dynamics, consumer preferences, and competitive strategies within the mobile phone market. These findings can guide businesses in making informed decisions about pricing and marketing their products.

COORELATION :

The correlation coefficient of 0.13 between the discount percentage and the number of reviews indicates a relatively weak positive correlation between these two variables in the dataset. Here's what this correlation suggests:



There is a positive correlation between discount percentage and the number of reviews.

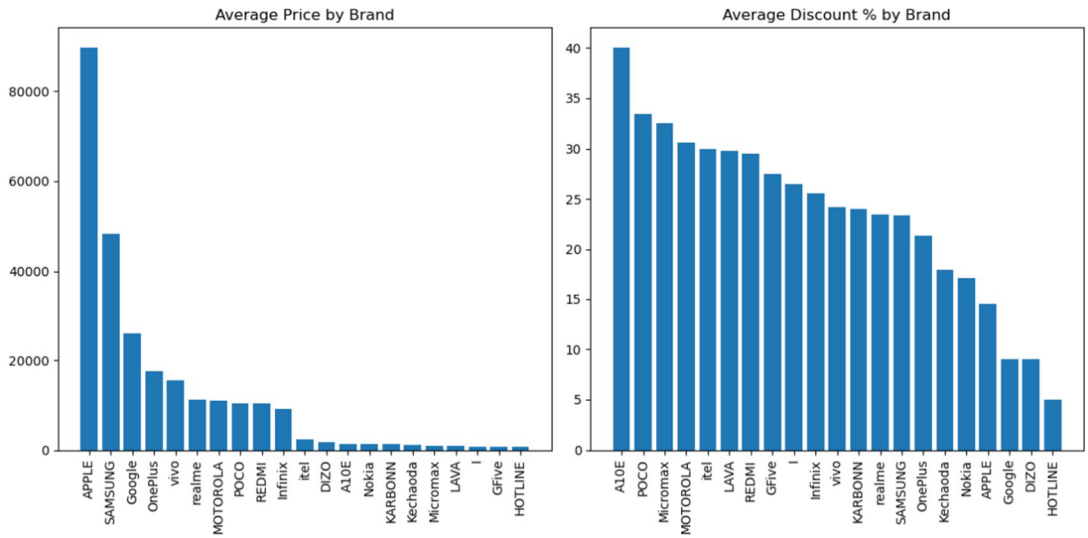
- Weak Positive Relationship: A correlation coefficient of 0.13 is close to zero, which indicates that there is only a weak positive linear relationship between the discount percentage and the number of reviews. In other words, as the discount percentage increases, there is a slight tendency for the number of reviews to increase, but this relationship is not very strong.
- Complex Consumer Decision-Making: The decision to write a review is influenced by multiple factors, and discounts are just one of them. Customers may leave reviews for reasons unrelated to pricing, such as their overall experience with the product or the desire to share their opinions with others.
- Marketing Strategies: Businesses should recognize that while discounts can attract attention and potentially lead to more reviews, they should not rely solely on discounts to drive customer engagement. Providing excellent products and customer service can have a more significant impact on review generation.

In summary, the weak positive correlation of 0.13 suggests that while discounts may have a modest influence on the number of reviews, they are not the primary driver of customer reviews. Other factors and aspects of the customer experience likely play more significant roles in shaping consumer behavior in this regard.

BRANDWISE PRICE AND DISCOUNT OFFERED:

Analyzing the brand-wise price and discount offered by each brand in the dataset provides valuable insights into how different brands position themselves in the mobile phone market. Here are some observations and comments based on this :

- Brand Price Range: The dataset includes mobile phones from various brands, each with its unique pricing strategy. Some brands target the premium segment with higher-priced phones, while others focus on the budget or mid-range markets. The brand-wise price distribution helps identify these pricing segments.
- Discount Strategies: Brands often use discounts as a marketing strategy to attract customers and boost sales. The brand-wise discount analysis reveals which brands are more aggressive in offering discounts and which ones maintain relatively stable prices.



- Premium Brands vs. Budget Brands: Premium brands like Apple and Samsung typically have higher initial prices, and discounts may be less substantial. In contrast, budget or mid-range brands may offer more significant discounts to make their products more attractive to price-conscious consumers.
- Customer Perception: The level of discount offered by a brand can influence customer perception. Brands offering consistent discounts may be seen as more budget-friendly, while those with fewer discounts may be perceived as premium or maintaining product value.
- Competitive Analysis: Brands in highly competitive markets may resort to frequent discounts to gain a competitive edge. Analyzing price and discount data can help identify which brands are actively competing for market share.
- Customer Preferences: The analysis can also shed light on customer preferences. Some customers may prefer brands with more stable pricing, while others seek brands that frequently offer discounts.
- Market Trends: Over time, changes in brand-wise pricing and discount patterns can indicate evolving market trends. Brands that adapt to changing consumer preferences and market dynamics may perform better.
- Marketing Effectiveness: The effectiveness of marketing strategies, including discount campaigns, can be assessed by examining how discounts impact sales and customer behavior for each brand.
- Recommendations: Based on the analysis, businesses can make informed decisions about their pricing and discount strategies. They can identify opportunities to target specific market segments or adjust pricing to align with customer expectations.

In summary, brand-wise price and discount analysis provide a comprehensive view of how different brands position themselves in the mobile phone market. It helps brands understand their competitive landscape, customer preferences, and the effectiveness of their pricing strategies. This information can guide decision-making and marketing efforts in a dynamic and competitive industry.

MANAGERIAL IMPLICATIONS :

The managerial implications of the mobile phone market analysis project are substantial and can influence various aspects of decision-making and strategy development for businesses operating in this industry. Here are some key managerial implications based on the findings of the project:

- Pricing Strategy Optimization: The analysis of price data provides insights into how pricing affects customer behavior. Managers can adjust pricing strategies to maximize revenue and market share. For example, one can identify price points that attract more customers or implement dynamic pricing based on demand and competition.
- Marketing Effectiveness : The effectiveness of marketing strategies, including discounts and promotional campaigns. Managers can allocate marketing budgets more efficiently and measure the return on investment (ROI) for different marketing initiatives. Understanding the impact of discounts on sales and customer sentiment helps managers make informed decisions about discount campaigns. They can optimize discount levels, timing, and duration to achieve specific objectives, such as clearing inventory or attracting new customers.
- Competitive Positioning: Brand-wise price and discount analysis helps managers assess their brand's position in the market relative to competitors. They can identify areas where their brand is competitive or where adjustments are needed to gain a competitive edge.
- Market Segmentation: By analyzing price ranges and customer preferences, managers can identify different market segments. This knowledge allows for targeted marketing and product development efforts, catering to the specific needs and budgets of various customer groups.
- Customer Sentiment Analysis: The analysis of customer reviews and ratings provides insights into product satisfaction. Managers can use this information to enhance product features and quality. Also developing customer retention

strategies, helping managers identify areas for improvement and enhance customer loyalty .

- Competitive Benchmarking: Managers can benchmark their brand's performance against competitors to identify strengths and weaknesses. This information is valuable for developing strategies to outperform rivals.
- Long-Term Strategy: Insights into market trends and customer preferences provide a foundation for long-term strategic planning. Managers can adapt to changing market dynamics, invest in emerging technologies, and explore new market segments.
- Risk Mitigation: By monitoring market trends, managers can identify potential risks, such as declining demand for certain products or aggressive pricing by competitors. This allows for proactive risk mitigation strategies.
- Data-Driven Decision-Making: The project highlights the importance of data-driven decision-making in the mobile phone market. Managers can invest in data analytics and technologies to continually monitor market dynamics and adjust strategies accordingly.

In conclusion, the managerial implications of this project extend across various facets of mobile phone market management. By leveraging data-driven insights, managers can make more informed decisions, enhance competitiveness, and drive business success in a dynamic and competitive industry.