

Analysis of Smartphone Specifications and Pricing

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About the dataset

The dataset comprises 2,647 entries detailing various smartphone specifications and pricing information. Key columns include 'Brand', 'Model', 'Color', 'Memory', 'Storage', 'Rating', 'Selling Price', and 'Original Price'. The 'Brand' and 'Model' columns are represented as VARCHAR, indicating a diverse range of smartphone brands and models. The 'Color' column also uses VARCHAR, showcasing a variety of color options available for each model. 'Memory' and 'Storage' are specified in gigabytes, reflecting the device's capacity.

The 'Rating' column, a DOUBLE type, provides insights into customer satisfaction, with a mean rating of 4.00 and a range from 0.00 to 5.00. The 'Selling Price' and 'Original Price' columns, also DOUBLE types, reveal pricing trends, with average selling and original prices of 26,461.36 and 17,266.90, respectively.

From the sample data, it is evident that the OPPO A53 model is available in multiple colors and configurations, with consistent ratings around 4.3 to 4.5. The selling prices for this model range from 11,990.0 to 13,990.0, indicating a competitive pricing strategy. Overall, the dataset provides a comprehensive overview of smartphone offerings, highlighting variations in specifications and pricing across different brands and models.

Relevant Inquiries

Q1. What is the trend in the average selling price of products over the past year?



Monthly Average Selling Price

- Data Range:** The analysis covers data from March 2024 to March 2025.
- Average Selling Price:** The mean average selling price over the year is approximately 16,046.49, with a standard deviation of 4,594.02.
- Price Fluctuations:** The highest average selling price was in August 2024 at 24,228.71, while the lowest was in November 2024 at 9,618.73.

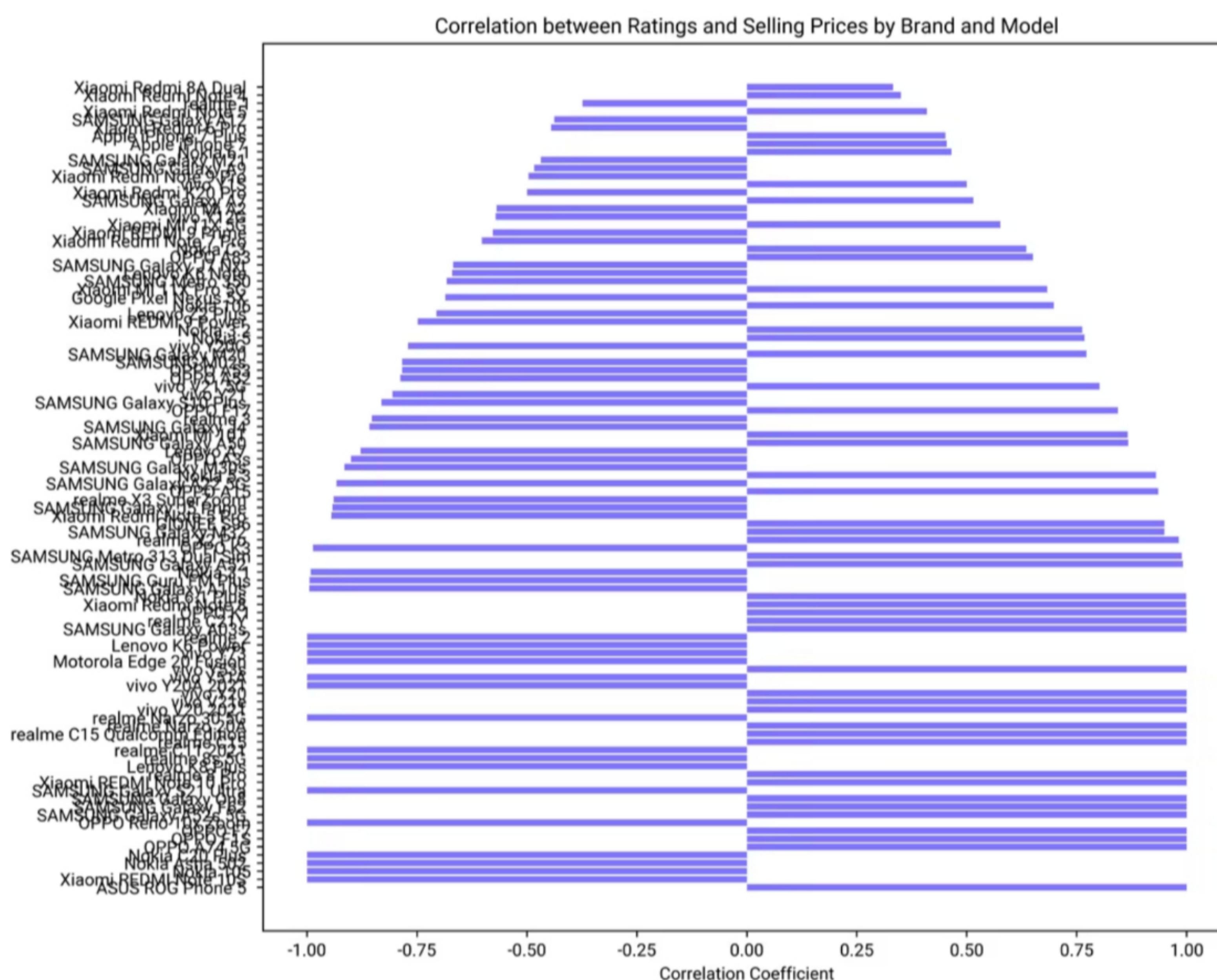
Visual Trend Analysis

- Initial Increase:** The average selling price increased from March to April 2024.
- Fluctuations:** There were noticeable fluctuations with peaks in July and August 2024.
- Significant Drop:** A sharp decline occurred from September to November 2024.
- Recovery and Decline:** Prices showed some recovery in December 2024 and January 2025, followed by a gradual decline towards March 2025.

Conclusion and Insights

- Volatility:** The average selling price exhibited significant volatility over the year, with sharp increases and decreases.
- Seasonal Peaks:** Peaks in selling prices were observed in mid-year, suggesting possible seasonal demand.
- End-of-Year Decline:** The decline towards the end of the year may indicate reduced demand or market adjustments.

Q2. Investigate if there are specific brands or models that consistently show a stronger correlation between ratings and selling prices compared to others.



Correlation Calculation

- Data Overview:** The correlation between ratings and selling prices was calculated for each brand and model. The dataset includes 786 records with a mean correlation of -0.02, indicating a generally weak relationship.
- Sample Data:** Some models, like the ASUS ROG Phone 5, show a perfect positive correlation (1.0), while others have missing values, indicating no available correlation data.

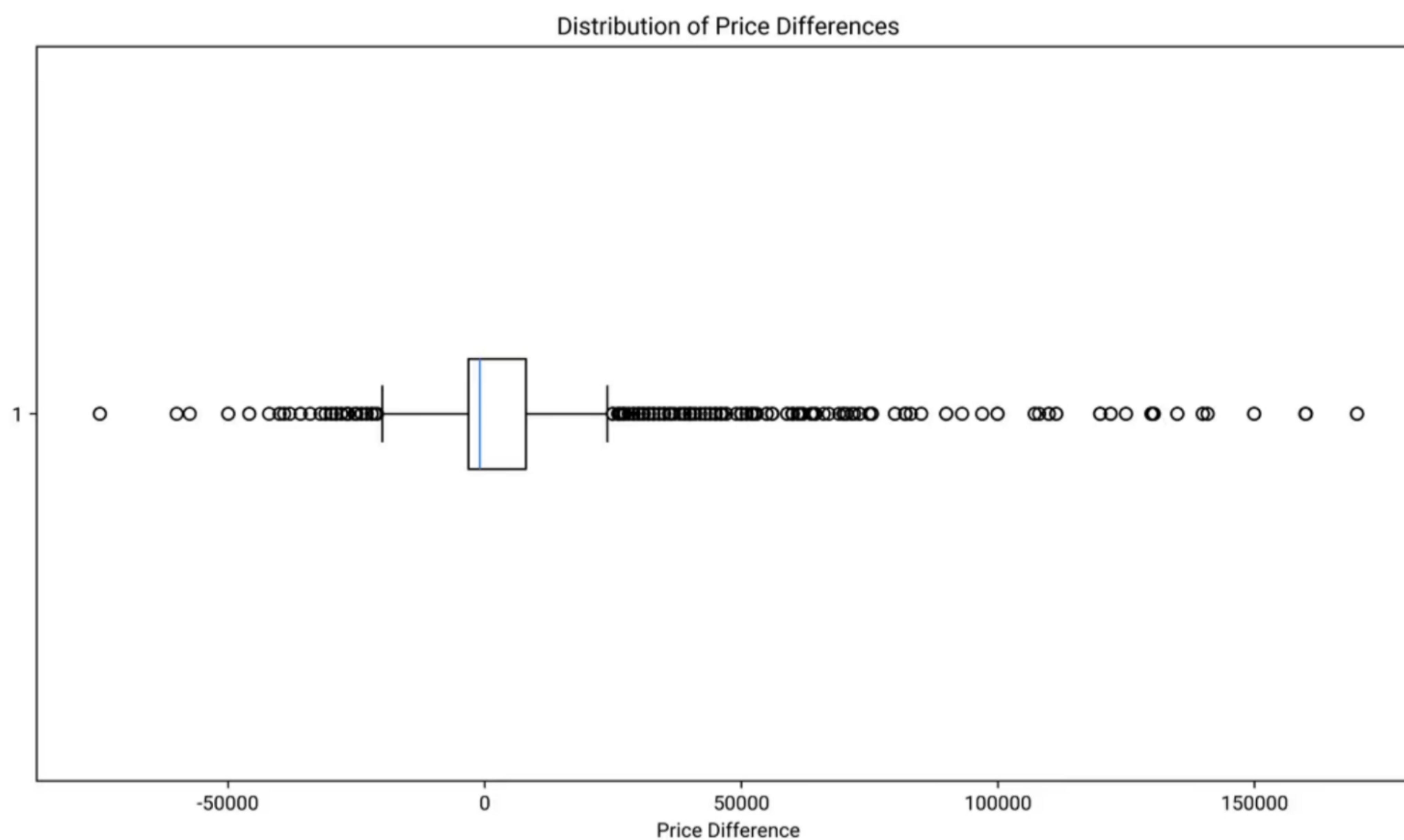
Visualization of Correlation

- Visual Insights:** The bar chart displays the correlation coefficients for various brands and models. The distribution is centered around zero, with some models showing stronger positive or negative correlations.
- Notable Models:** Certain models, such as those from ASUS, appear to have higher positive correlations, suggesting a stronger relationship between ratings and selling prices.

Conclusion and Insights

- Stronger Correlations:** Specific models, particularly from ASUS, show a stronger correlation between ratings and selling prices, indicating that higher ratings might be more closely associated with higher prices for these models.
- General Trend:** Overall, the correlation across brands and models is weak, suggesting that factors other than ratings might significantly influence selling prices.

Q3. Are there any anomalies in the selling prices of products compared to their original prices?



Calculation of Price Differences

- **Mean Price Difference:** The average difference between selling and original prices is **9194.46**.
- **Standard Deviation:** The standard deviation of the price differences is **29277.07**, indicating variability in the data.
- **Anomalies Definition:** Anomalies are defined as price differences more than 2 standard deviations from the mean.
- **Sample Data:** The sample data shows consistent price differences for the OPPO A53 model, none of which are marked as anomalies.

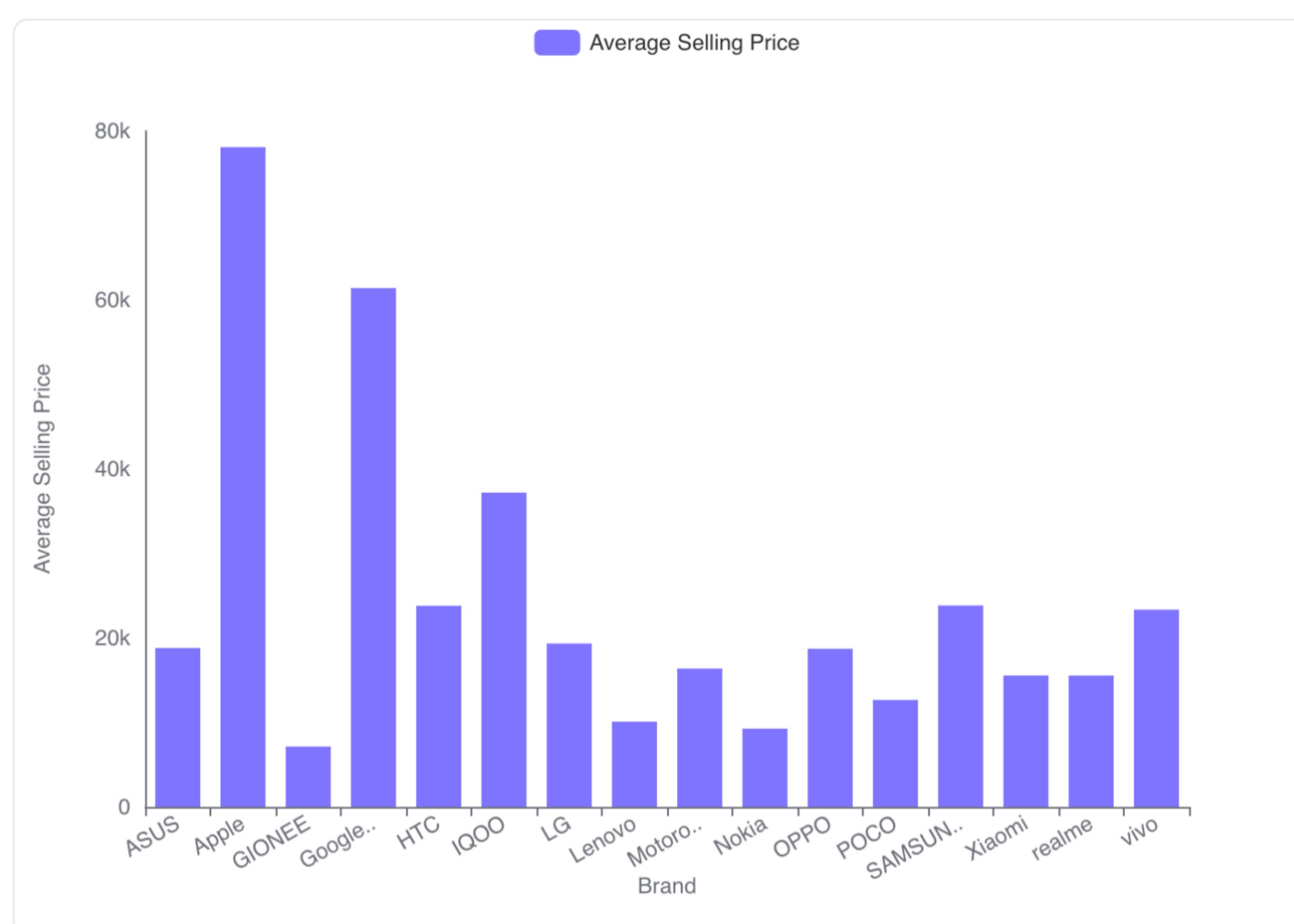
Visualization of Price Differences

- **Box Plot Analysis:** The box plot shows a wide range of price differences, with several outliers on both the negative and positive sides.
- **Outliers:** There are significant outliers beyond the whiskers of the box plot, indicating anomalies in the data.

Conclusion and Insights

- **Presence of Anomalies:** There are indeed anomalies in the selling prices compared to the original prices, as indicated by the outliers in the box plot.
- **Further Investigation:** These anomalies may require further investigation to understand the reasons behind the significant deviations, such as pricing errors or promotional discounts.

Q4. What is the average selling price by brand?



Calculated Average Selling Prices

- **ASUS:** 18,796.92
- **Apple:** 78,065.14
- **GIONEE:** 7,135.09
- **Google Pixel:** 61,391.86
- **HTC:** 23,797.20
- **IQOO:** 37,190.00
- **LG:** 19,323.18
- **Lenovo:** 10,083.84
- **Motorola:** 16,357.47
- **Nokia:** 9,251.49
- **OPPO:** 18,709.14
- **POCO:** 12,649.00
- **SAMSUNG:** 23,829.93
- **Xiaomi:** 15,540.38
- **realme:** 15,535.65
- **vivo:** 23,327.22

Visualization

- The bar chart visually represents the average selling prices, highlighting that **Apple** and **Google Pixel** have the highest average prices, while **GIONEE** has the lowest.

Conclusion and Insights

- **Apple and Google Pixel:** These brands have significantly higher average selling prices compared to others, indicating a premium market positioning.
- **GIONEE and Nokia:** These brands have the lowest average selling prices, suggesting a focus on budget-friendly options.

Q5. Analyze the correlation between the discount percentage and the product rating. Are higher-rated products more likely to have larger discounts?

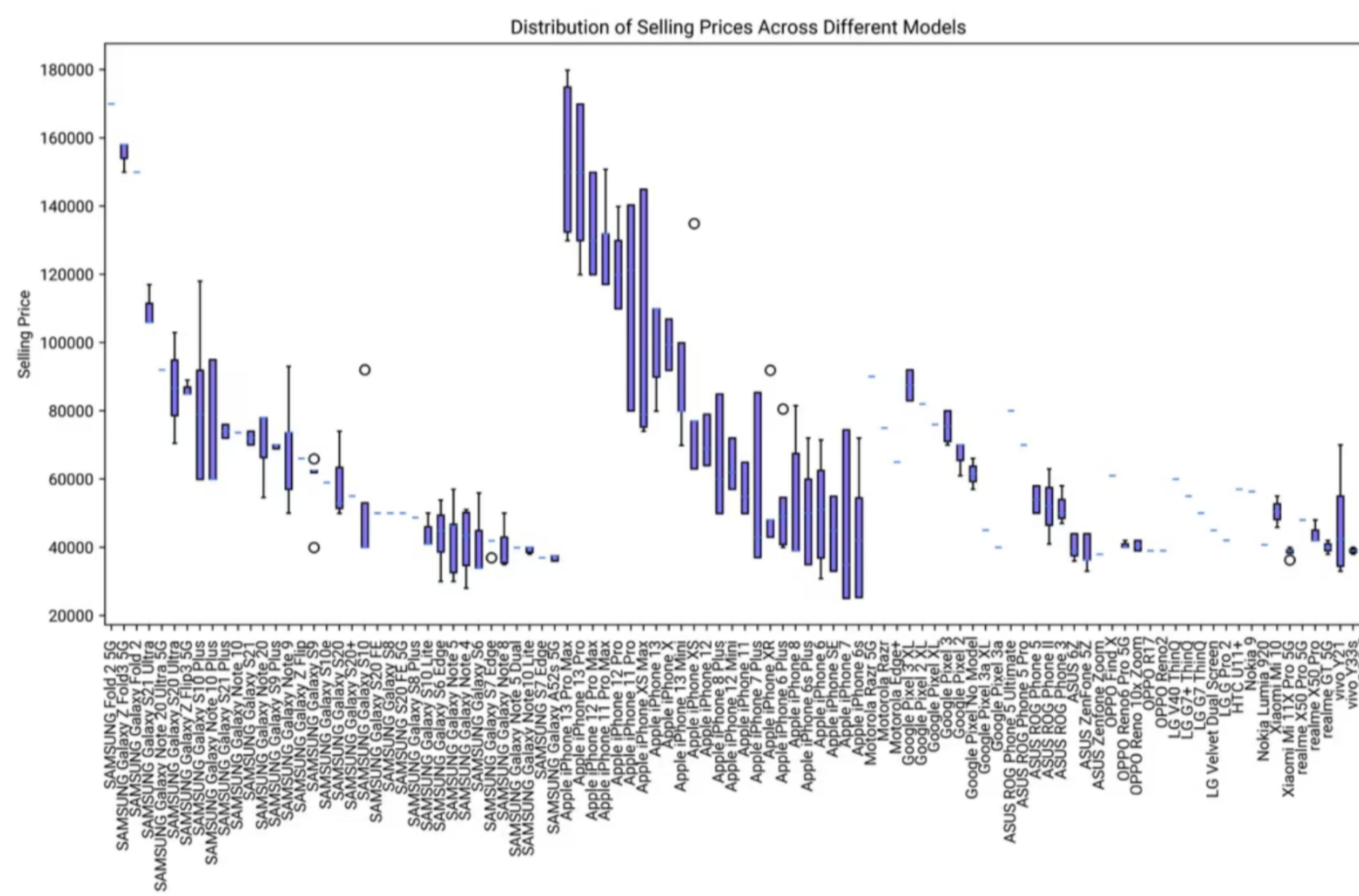
Correlation Calculation

- **Discount Percentage Calculation:** The discount percentage for each product was calculated using the formula: $((\text{Original Price} - \text{Selling Price}) / \text{Original Price}) \times 100$.
- **Correlation Result:** The correlation between the discount percentage and the product rating was found to be approximately **0.18**.

Conclusion and Insights

- **Correlation Interpretation:** The correlation coefficient of **0.18** indicates a weak positive relationship between discount percentage and product rating. This suggests that there is a slight tendency for higher-rated products to have larger discounts, but the relationship is not strong.
- **Implication for Retail Strategy:** While there is a weak positive correlation, it is not substantial enough to conclude that higher-rated products are significantly more likely to have larger discounts. Retailers might consider other factors when deciding on discount strategies for products with high ratings.

Q6. What is the distribution of selling prices across different models within each brand?



Statistical Analysis

- **Mean Selling Price:** The average selling price across models is approximately 19,539.09, with a wide range from 1,000 to 169,999.
- **Standard Deviation:** The standard deviation of selling prices is 2,414.12, indicating variability in prices across models.
- **Price Range:** The minimum selling price is 1,000, while the maximum is 179,900, showing a significant spread in the data.
- **Percentiles:** The 25th percentile is 18,411.83, the median (50th percentile) is 19,328.49, and the 75th percentile is 20,552.34, indicating the central tendency and spread of the data.

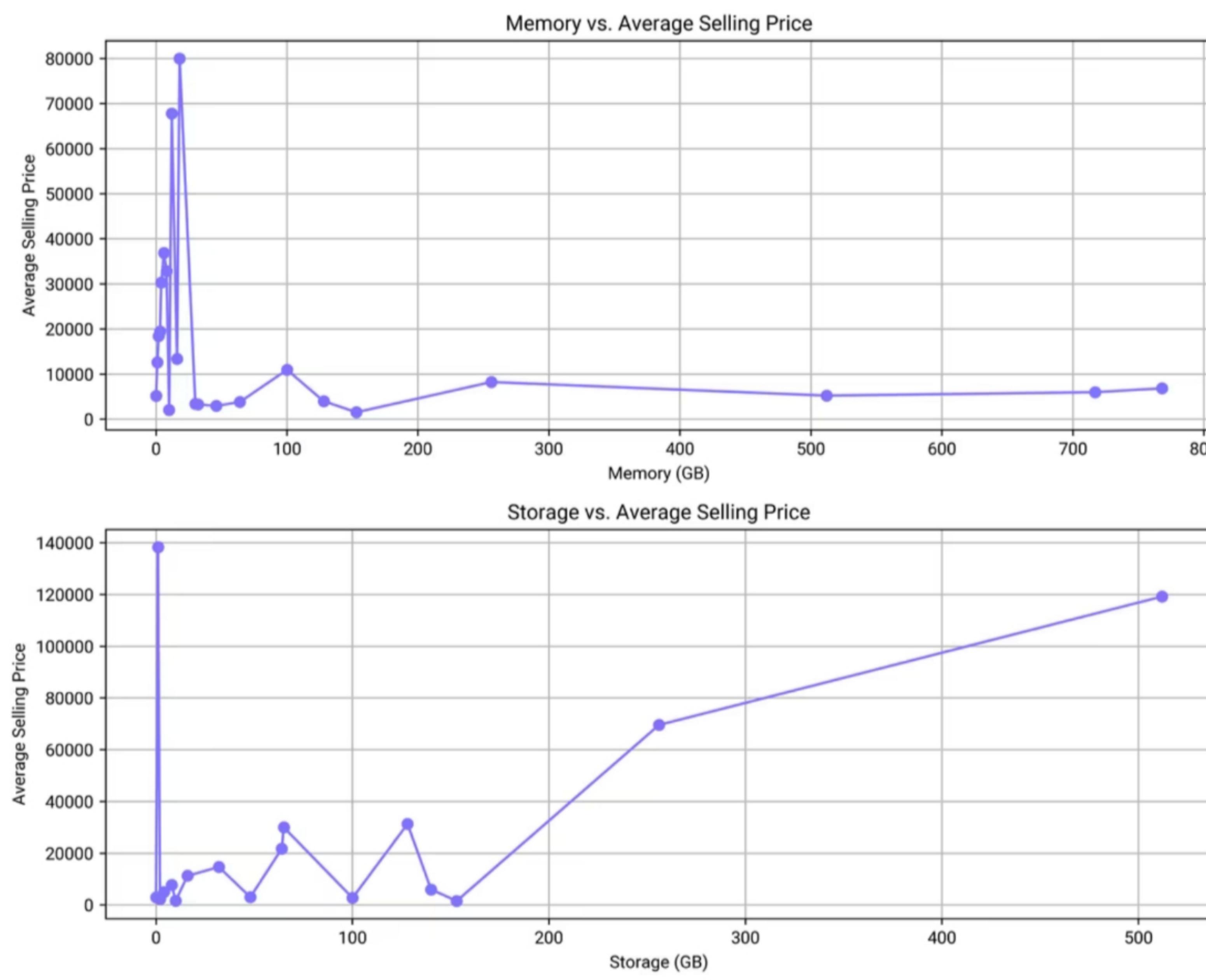
Visualization Insights

- **Box Plot Overview:** The box plot illustrates the distribution of selling prices for different models within each brand.
- **Price Variability:** There is noticeable variability in selling prices, with some brands showing a wide range of prices across models.
- **Outliers:** Several outliers are present, indicating models with prices significantly higher or lower than the typical range for their brand.

Conclusion and Insights

- **Diverse Pricing:** The data shows a diverse range of selling prices across different models and brands, with some brands offering models at both low and high price points.
- **Market Segmentation:** The variability and presence of outliers suggest market segmentation, where brands target different consumer segments with various models.

Q7. How do memory and storage capacities affect the selling price trend?



Memory vs. Selling Price

- **Average Memory Capacity:** The mean memory capacity is 131.18 GB, with a wide range from 0 to 768 GB.
- **Average Selling Price:** The mean selling price is 17,058.12, with prices ranging from 1,549 to 79,999.
- **Price Trends:** Lower memory capacities (0-18 GB) show significant variability in average selling prices, with some high peaks at specific capacities like 12 GB and 18 GB.

Storage vs. Selling Price

- **Average Storage Capacity:** The mean storage capacity is 90.53 GB, ranging from 0 to 512 GB.
- **Average Selling Price:** The mean selling price is 27,583.75, with a wide range from 1,549 to 138,280.73.
- **Price Trends:** Storage capacities show a sharp increase in selling price at 1 GB, with fluctuations at lower capacities and a steady increase at higher capacities.

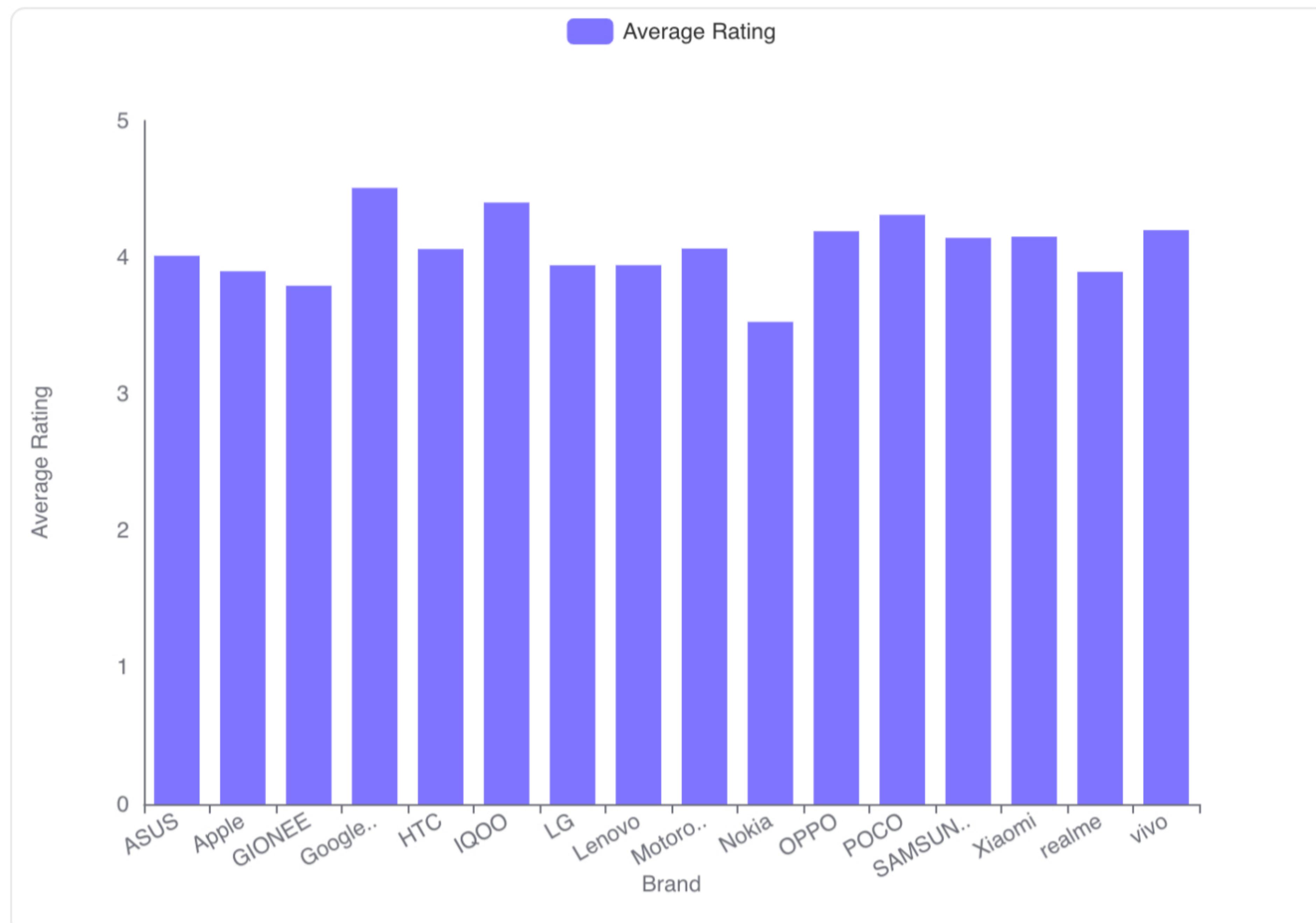
Visualization Insights

- **Memory Chart:** The chart shows high variability in selling prices at lower memory capacities, with a general decline and stabilization at higher capacities.
- **Storage Chart:** The chart indicates a sharp peak at 1 GB, followed by fluctuations and a steady increase in selling prices as storage capacity increases.

Conclusion and Insights

- **Memory Impact:** Lower memory capacities exhibit high variability in selling prices, suggesting that other factors may influence price at these levels. Higher capacities tend to stabilize in price.
- **Storage Impact:** Storage capacity has a more direct correlation with selling price, especially at higher capacities, indicating that larger storage is a significant factor in determining higher prices.

Q8. How do average ratings compare across different brands?



Average Ratings by Brand

- **Highest Average Rating:** Google Pixel has the highest average rating of 4.51.
- **Lowest Average Rating:** Nokia has the lowest average rating of 3.53.
- **Overall Average:** The mean of average ratings across all brands is 4.06, with a standard deviation of 0.24.

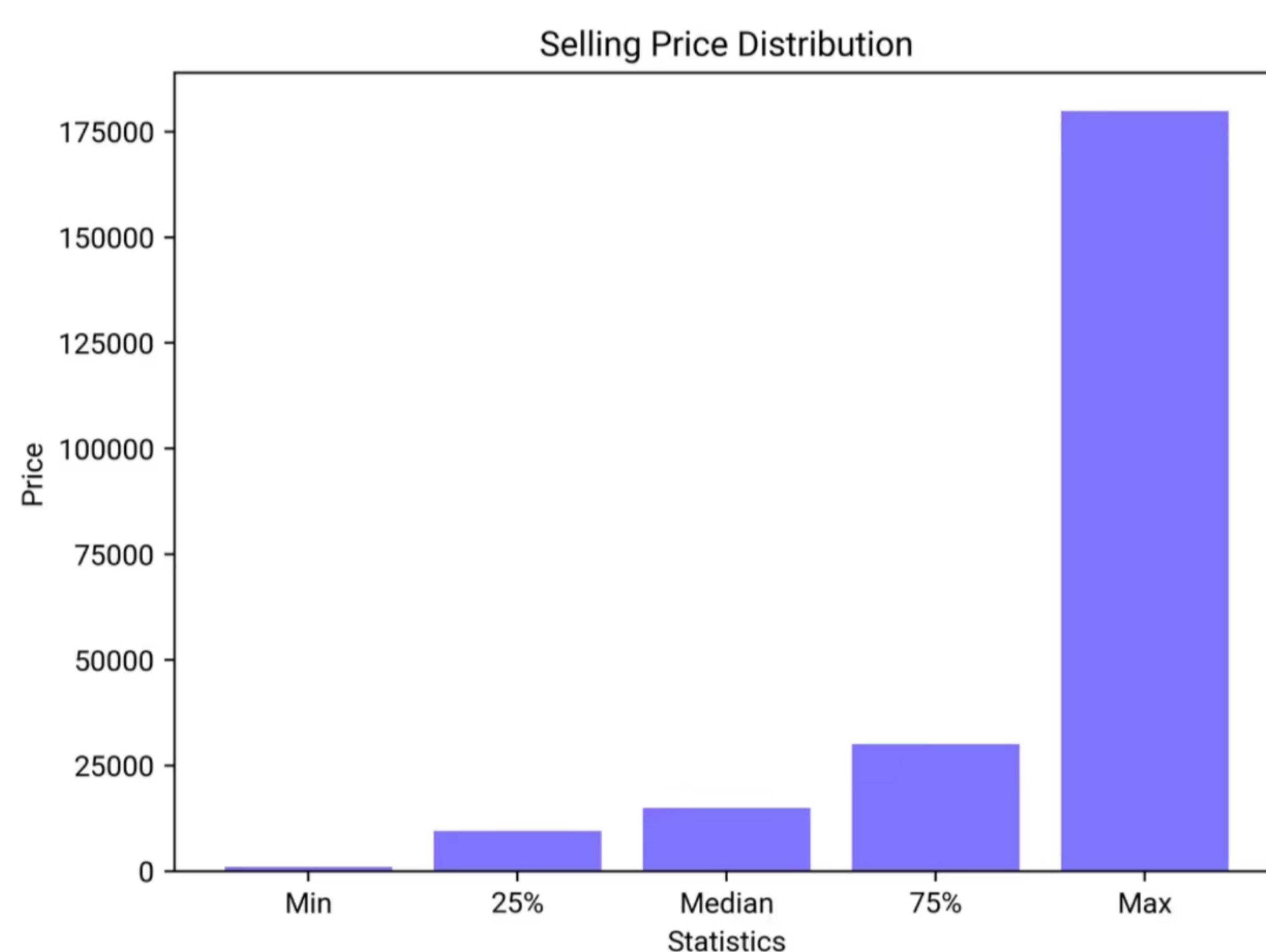
Visualization of Average Ratings

- **Visual Insights:** The bar chart clearly shows that Google Pixel stands out with the highest average rating, while Nokia is at the lower end.
- **Close Competitors:** Brands like IQOO, POCO, and vivo also have high average ratings, close to Google Pixel.

Conclusion and Insights

- **Key Observation:** There is a noticeable variation in average ratings among different brands, with Google Pixel leading and Nokia trailing.
- **Market Implication:** Brands with higher average ratings, such as Google Pixel, IQOO, and POCO, may have a competitive advantage in terms of customer satisfaction.

Q9. What is the distribution of selling prices for all products?



Statistical Analysis

- **Count:** There are 2,647 entries in the 'Selling Price' column.
- **Mean:** The average selling price is approximately 26,461.36.
- **Standard Deviation:** The standard deviation is 29,816.22, indicating a wide spread in prices.
- **Minimum:** The lowest selling price is 1,000.
- **25th Percentile:** 25% of the products have a selling price below 9,490.
- **Median (50th Percentile):** The median selling price is 14,999.
- **75th Percentile:** 75% of the products have a selling price below 29,994.
- **Maximum:** The highest selling price is 179,900.

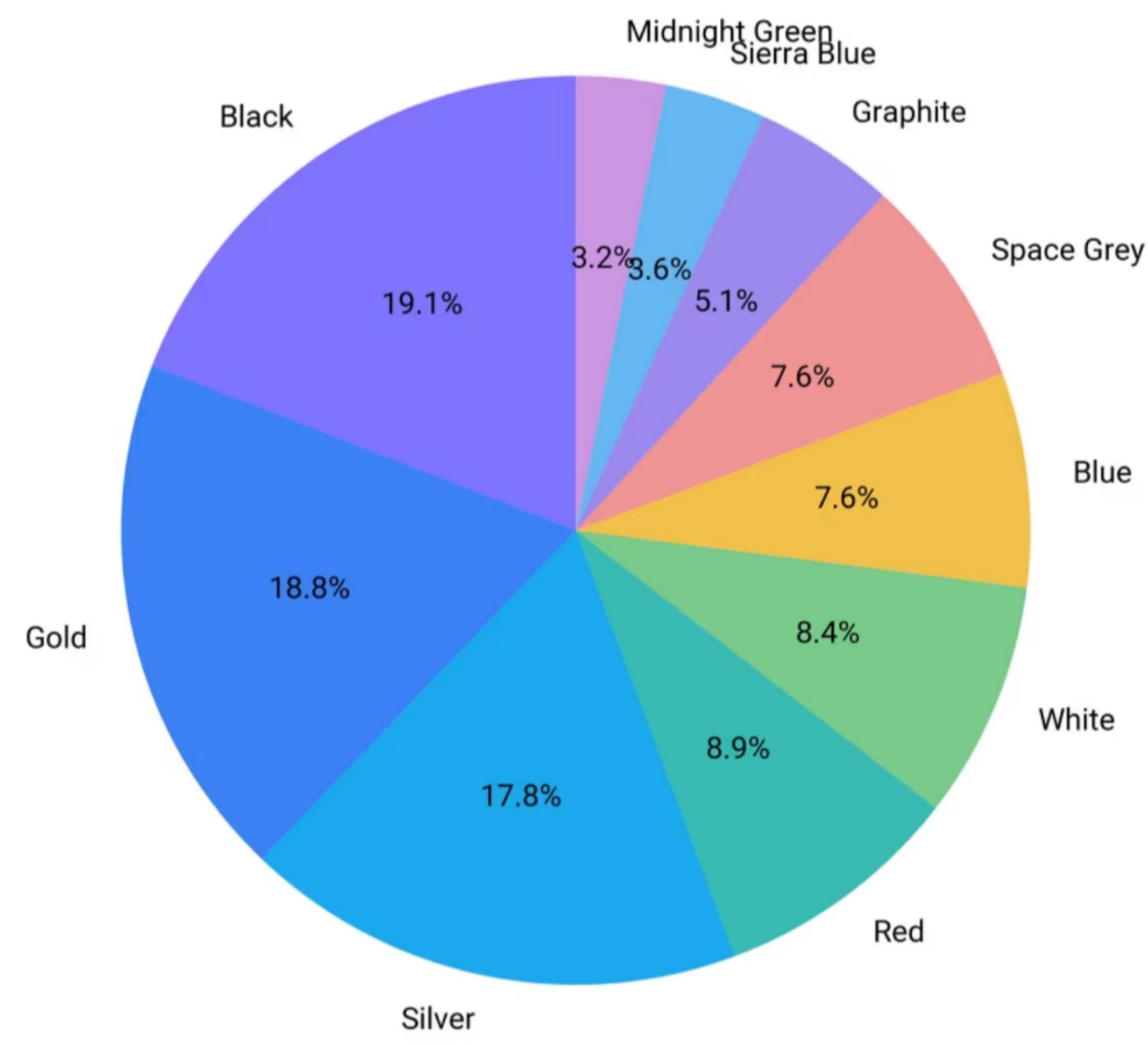
Visualization

- **Histogram:** The histogram shows a significant skew towards higher prices, with the maximum price being much higher than the median and other percentiles.

Conclusion and Insights

- **Skewed Distribution:** The selling prices are heavily skewed towards higher values, as indicated by the large difference between the median and maximum prices.
- **Wide Range:** The wide range and high standard deviation suggest significant variability in product prices.

Q10. What is the sales composition by product color?



Analysis of Sales by Color

- **Data Preparation:** The sales data was grouped by the 'Color' column, and the total selling price for each color was calculated.
- **Sample Data:** Examples include 'Tornado Black' with a total selling price of 39,990 and 'AURORA SILVER' with 29,999.
- **Statistics:** The mean total selling price is 131,908.15, with a standard deviation of 537,045.18.

Visualization of Sales Composition

- **Pie Chart Representation:** The pie chart illustrates the proportion of sales attributed to each color.
- **Key Colors:**
 - **Black:** 19.1%
 - **Gold:** 18.8%
 - **Silver:** 17.8%
 - **White:** 8.9%
 - **Red:** 8.4%
 - **Blue:** 7.6%
 - **Space Grey:** 7.6%
 - **Graphite:** 5.1%
 - **Sierra Blue:** 3.6%
 - **Midnight Green:** 3.2%

Conclusion and Insights

- **Dominant Colors:** Black, Gold, and Silver are the top contributors to sales, collectively accounting for over 55% of the total sales.
- **Diverse Preferences:** The distribution indicates a variety of color preferences among customers, with several colors contributing significantly to sales.