

Big Basket Sales and Product Analysis

Importing Libraries

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

LOAD DATASET

```
df=pd.read_csv("D:/SKCL/Python/BigBasket Products.csv")
```

USE HEAD FUNCTION TO LOOK FIRST 12 ROWS

```
df.head(12)
```

	index	product \	
0	1	Garlic Oil - Vegetarian Capsule 500 mg	
1	2	Water Bottle - Orange	
2	3	Brass Angle Deep - Plain, No.2	
3	4	Cereal Flip Lid Container/Storage Jar - Assort...	
4	5	Creme Soft Soap - For Hands & Body	
5	6	Germ - Removal Multipurpose Wipes	
6	7	Multani Mati	
7	8	Hand Sanitizer - 70% Alcohol Base	
8	9	Biotin & Collagen Volumizing Hair Shampoo + Bi...	
9	10	Scrub Pad - Anti- Bacterial, Regular	
10	11	Wheat Grass Powder - Raw	
11	12	Butter Cookies Gold Collection	
	category	sub_category	brand
0	Beauty & Hygiene	Hair Care	Sri Sri Ayurveda
1	Kitchen, Garden & Pets	Storage & Accessories	Mastercook
2	Cleaning & Household	Pooja Needs	Trm
3	Cleaning & Household	Bins & Bathroom Ware	Nakoda
4	Beauty & Hygiene	Bath & Hand Wash	Nivea
5	Cleaning & Household	All Purpose Cleaners	Nature Protect
6	Beauty & Hygiene	Skin Care	Satinance

7	Beauty & Hygiene	Bath & Hand Wash	Bionova
8	Beauty & Hygiene	Hair Care	StBotanica
9	Cleaning & Household	Mops, Brushes & Scrubs	Scotch brite
10	Gourmet & World Food	Cooking & Baking Needs	NUTRASHIL
11	Gourmet & World Food	Chocolates & Biscuits	Sapphire

	sale_price	market_price	type	rating \
0	220.0	220.0	Hair Oil & Serum	4.1
1	180.0	180.0	Water & Fridge Bottles	2.3
2	119.0	250.0	Lamp & Lamp Oil	3.4
3	149.0	176.0	Laundry, Storage Baskets	3.7
4	162.0	162.0	Bathing Bars & Soaps	4.4
5	169.0	199.0	Disinfectant Spray & Cleaners	3.3
6	58.0	58.0	Face Care	3.6
7	250.0	250.0	Hand Wash & Sanitizers	4.0
8	1098.0	1098.0	Shampoo & Conditioner	3.5
9	20.0	20.0	Utensil Scrub-Pad, Glove	4.3
10	261.0	290.0	Flours & Pre-Mixes	4.0
11	600.0	600.0	Luxury Chocolates, Gifts	2.2

	description
0	This Product contains Garlic Oil that is known...
1	Each product is microwave safe (without lid), ...
2	A perfect gift for all occasions, be it your m...
3	Multipurpose container with an attractive desi...
4	Nivea Creme Soft Soap gives your skin the best...
5	Stay protected from contamination with Multipu...
6	Satinance multani matti is an excellent skin t...
7	70%Alcohol based is gentle of hand leaves skin...
8	An exclusive blend with Vitamin B7 Biotin, Hyd...
9	Scotch Brite Anti- Bacterial Scrub Pad thoroug...
10	Wheatgrass is a superfood potent health food w...
11	Enjoy a tin full of delicious butter cookies m...

GET DESCRIPTION OF DATA IN DATAFRAME

```
df.describe()
```

	index	sale_price	market_price	rating
count	27555.00000	27549.000000	27555.000000	18919.000000
mean	13778.00000	334.648391	382.056664	3.943295
std	7954.58767	1202.102113	581.730717	0.739217
min	1.00000	2.450000	3.000000	1.000000
25%	6889.50000	95.000000	100.000000	3.700000

50%	13778.00000	190.320000	220.000000	4.100000
75%	20666.50000	359.000000	425.000000	4.300000
max	27555.00000	112475.000000	12500.000000	5.000000

GET INFORMATION ABOUT DATAFRAME

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 27555 entries, 0 to 27554
Data columns (total 10 columns):
#   Column                Non-Null Count  Dtype
---  -
0   index                 27555 non-null  int64
1   product               27554 non-null  object
2   category              27555 non-null  object
3   sub_category          27555 non-null  object
4   brand                 27554 non-null  object
5   sale_price            27549 non-null  float64
6   market_price          27555 non-null  float64
7   type                  27555 non-null  object
8   rating                18919 non-null  float64
9   description           27440 non-null  object
dtypes: float64(3), int64(1), object(6)
memory usage: 2.1+ MB
```

MEASURING DISCOUNT

```
df['discount_percentage'] = ((df['market_price'] - df['sale_price']) /
df['market_price']) * 100
df['discount_percentage']=df['discount_percentage'].round(2)
df[['product', 'market_price', 'sale_price',
'discount_percentage']].head(10)
```

	product	market_price	\
0	Garlic Oil - Vegetarian Capsule 500 mg	220.0	
1	Water Bottle - Orange	180.0	
2	Brass Angle Deep - Plain, No.2	250.0	
3	Cereal Flip Lid Container/Storage Jar - Assort...	176.0	
4	Creme Soft Soap - For Hands & Body	162.0	
5	Germ - Removal Multipurpose Wipes	199.0	
6	Multani Mati	58.0	
7	Hand Sanitizer - 70% Alcohol Base	250.0	
8	Biotin & Collagen Volumizing Hair Shampoo + Bi...	1098.0	
9	Scrub Pad - Anti- Bacterial, Regular	20.0	

	sale_price	discount_percentage
0	220.0	0.00
1	180.0	0.00
2	119.0	52.40

3	149.0	15.34
4	162.0	0.00
5	169.0	15.08
6	58.0	0.00
7	250.0	0.00
8	1098.0	0.00
9	20.0	0.00

FINDING OUT MISSING VALUES FROM THE DATASET

```
df.isna().sum()
```

```
index          0
product        1
category       0
sub_category   0
brand          1
sale_price     6
market_price   0
type           0
rating        8636
description    115
discount_percentage  6
dtype: int64
```

```
df[df['product'].isna()]
```

	index	product	category	sub_category	brand
sale_price \					
14363	14364	NaN	Beverages	Coffee	Cothas Coffee
200.0					

	market_price	type	rating \
14363	240.0	Ground Coffee	4.2

	description
discount_percentage	
14363	Cothas Specialty Blend Coffee and Chicory incl...
16.67	

```
df[df['brand'].isna()]
```

	index	product	category \	
9765	9766	Food Package - Medium	Cleaning & Household	
	sub_category	brand	sale_price	market_price \
9765	Disposables, Garbage Bag	NaN	50.0	50.0
	type	rating	description	
discount_percentage				

```
9765 Aluminium Foil, Clingwrap      NaN      NaN
0.0
```

```
df[df['sale_price'].isna()]
```

```
      index      product \
1719  1720  Puja Flower Wicks - Puvvu Vathulu Batti
1720  1721      Powder - Sambar
1721  1722  Steel Fork - Medium, Premium Excel Series, BBCL08
1722  1723      Snack Mix - Dhokla
2401  2402      Battery AA 3UT Hi Top
2402  2403  Klassic Plain Cocktail Napkins (22 X 22 cm)
```

```
      category      sub_category
brand \
1719  Cleaning & Household      Pooja Needs      Jaji
1720  Foodgrains, Oil & Masala      Masalas & Spices  Annapoorna
1721  Kitchen, Garden & Pets      Crockery & Cutlery  BB Home
1722  Snacks & Branded Foods      Ready To Cook & Eat  MTR
2401  Kitchen, Garden & Pets  Appliances & Electricals      Nippo
2402  Cleaning & Household  Disposables, Garbage Bag      Origami
```

```
      sale_price  market_price      type  rating \
1719      NaN      20.0      Camphor & Wicks      NaN
1720      NaN      46.0      Blended Masalas      NaN
1721      NaN      299.0  Cutlery, Spoon & Fork      NaN
1722      NaN      65.0  Breakfast & Snack Mixes      4.1
2401      NaN      150.0  Battery & Electrical      4.0
2402      NaN      32.0      Toilet Paper      3.9
```

```
      description
discount_percentage
1719  Jaji Puja Flower Batti / Puvvu Vathulu is made...
NaN
1720  Annaporna Spices are the preserve for Connoiss...
NaN
1721  BB Home provides fine and classy cutlery that ...
NaN
1722  MTR Dhokla is extremely special in Gujarat. It...
NaN
2401  This Nippo battery incorporates state-of-the-a...
NaN
2402  Klassic Plain Cocktail Napkins (22 X 22 cm) 10...
NaN
```

CLEANING THE MISSING DATA

```
# replacing NaN with "Unknown"
df.loc[df['product'].isna(), 'product'] = 'Unknown'
df['product']

0          Garlic Oil - Vegetarian Capsule 500 mg
1          Water Bottle - Orange
2          Brass Angle Deep - Plain, No.2
3    Cereal Flip Lid Container/Storage Jar - Assort...
4          Creme Soft Soap - For Hands & Body
...
27550    Wottagirl! Perfume Spray - Heaven, Classic
27551                                Rosemary
27552    Peri-Peri Sweet Potato Chips
27553    Green Tea - Pure Original
27554    United Dreams Go Far Deodorant
Name: product, Length: 27555, dtype: object

# replacing NaN with "Unknown"
df.loc[df['brand'].isna(), 'brand'] = 'Unknown'
df['brand']

0          Sri Sri Ayurveda
1          Mastercook
2          Trm
3          Nakoda
4          Nivea
...
27550    Layerr
27551    Puramate
27552    FabBox
27553    Tetley
27554    United Colors Of Benetton
Name: brand, Length: 27555, dtype: object

df['sale_price'] =
np.where(df['sale_price'].isna(), df['sale_price'].median(),
df['sale_price'])
df['sale_price']
df['discount_percentage'] =
np.where(df['discount_percentage'].isna(), df['discount_percentage'].me
dian(), df['discount_percentage'])
df['discount_percentage']

0          0.00
1          0.00
2          52.40
3          15.34
4          0.00
...
```

```

27550    20.00
27551    10.00
27552     0.00
27553    20.00
27554    44.99
Name: discount_percentage, Length: 27555, dtype: float64

df_c=df.dropna(how='any')

df_c.isna().sum()

index          0
product        0
category       0
sub_category   0
brand          0
sale_price     0
market_price   0
type          0
rating         0
description    0
discount_percentage  0
dtype: int64

```

CREATING THE PLOTS OR VISUALISATION

```

df_c.info()

<class 'pandas.core.frame.DataFrame'>
Index: 18831 entries, 0 to 27554
Data columns (total 11 columns):
 #   Column                Non-Null Count  Dtype
---  -
 0   index                 18831 non-null  int64
 1   product               18831 non-null  object
 2   category              18831 non-null  object
 3   sub_category          18831 non-null  object
 4   brand                 18831 non-null  object
 5   sale_price            18831 non-null  float64
 6   market_price          18831 non-null  float64
 7   type                  18831 non-null  object
 8   rating                18831 non-null  float64
 9   description           18831 non-null  object
10  discount_percentage   18831 non-null  float64
dtypes: float64(4), int64(1), object(6)
memory usage: 1.7+ MB

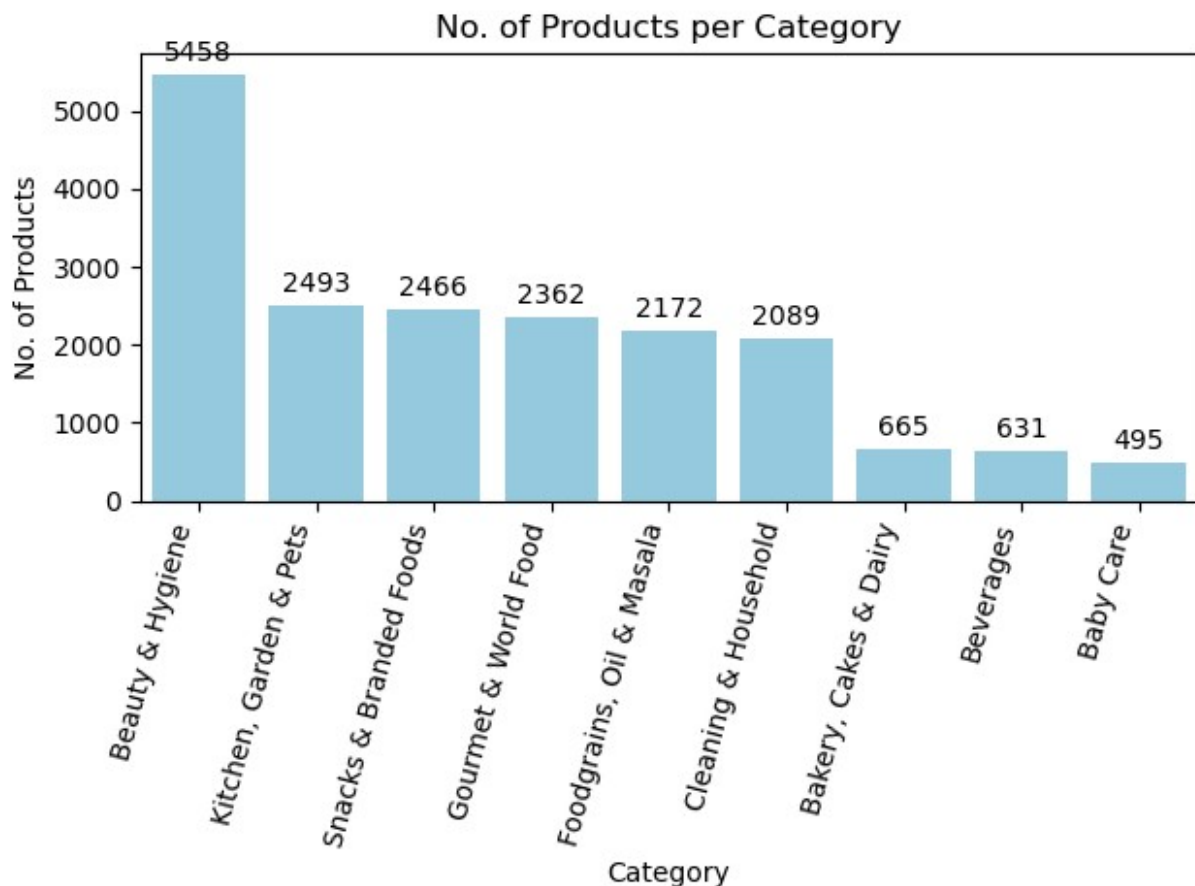
```

No.of Products per Category

A bar plot showing the count of products within each category, providing insight into the distribution of products across various categories.

```
counts = df_c['category'].value_counts()
counts_df = pd.DataFrame({'Category': counts.index, 'Counts':
counts.values})

ax = sns.barplot(x='Category', y='Counts', data=counts_df,
color='skyblue')
plt.xticks(rotation=75, ha='right')
ax.set_xlabel('Category')
ax.set_ylabel('No. of Products')
ax.set_title('No. of Products per Category')for p in ax.patches:
    ax.annotate(f'{int(p.get_height())}', (p.get_x() + p.get_width() /
2., p.get_height()),
                ha='center', va='baseline', fontsize=10,
color='black', xytext=(0, 5),
                textcoords='offset points')
plt.tight_layout()
plt.show()
```



Key Takeaways:

- **Beauty & Hygiene** dominates with the highest number of products (5458).
- **Kitchen, Garden & Pets** follows closely with 2493 products.
- **Snacks & Branded Foods** and **Gourmet & World Food** have a similar product count, around 2400.
- **Foodgrains, Oil & Masala** and **Cleaning & Household** have a moderate number of products, just over 2000.
- **Bakery, Cakes & Dairy** has significantly fewer products (665).
- **Beverages** and **Baby Care** have the lowest product counts, around 600 and 500, respectively.

Recommendations:

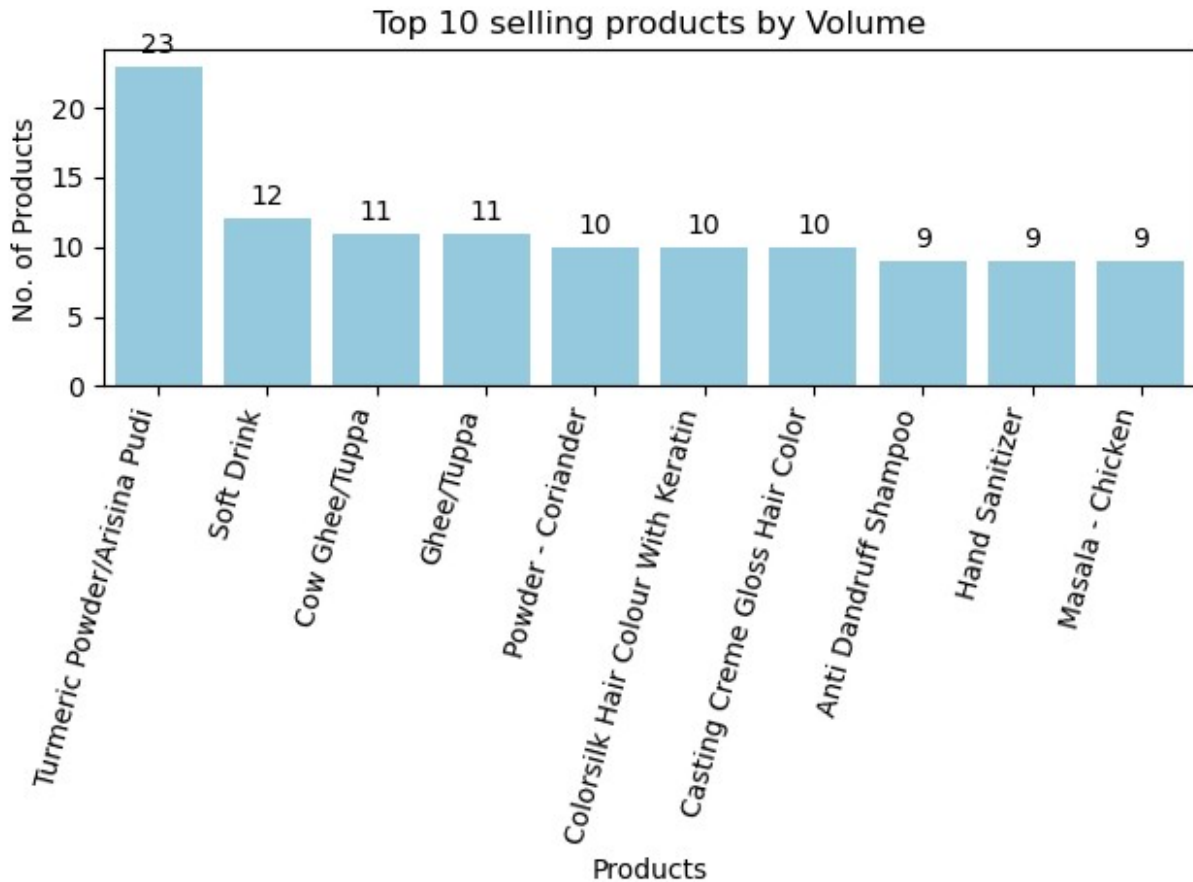
- **Focus on High-Performing Categories:** Invest in marketing and promotions for Beauty & Hygiene, Kitchen, Garden & Pets, and Snacks & Branded Foods to drive sales.
- **Optimize Low-Performing Categories:** Analyze the product mix and customer demand for Bakery, Cakes & Dairy, Beverages, and Baby Care to identify opportunities for improvement.
- **Consider Product Expansion:** Explore opportunities to expand the product range in categories with lower product counts to attract a wider customer base.

Top 10 selling products by Volume

A bar plot displaying the top 10 products with the highest sales volume, indicating the most popular products among customers.

```
counts = df_c['product'].value_counts()
counts_p = pd.DataFrame({'product': counts.index, 'Counts':
counts.values})[:10]

bx = sns.barplot(x='product', y='Counts', data=counts_p,
color='skyblue')
plt.xticks(rotation=75, ha='right')
bx.set_xlabel('Products')
bx.set_ylabel('No. of Products')
bx.set_title('Top 10 selling products by Volume')
for p in bx.patches:
    bx.annotate(f'{int(p.get_height())}', (p.get_x() + p.get_width() /
2., p.get_height()),
                ha='center', va='baseline', fontsize=10,
color='black', xytext=(0, 5),
                textcoords='offset points')
plt.tight_layout()
plt.show()
```



Key Takeaways:

- **Turmeric Powder/Arisina Pudi** is the top-selling product, with a volume of 23 units.
- **Soft Drink** and **Cow Ghee/Tuppa** follow closely with 12 and 11 units, respectively.
- **Ghee/Tuppa**, **Powder - Coriander**, and **Colorsilk Hair Colour With Keratin** have a similar volume, around 11 units.
- **Casting Creme Gloss Hair Color**, **Anti Dandruff Shampoo**, and **Hand Sanitizer** have a volume of 10 units each.
- **Masala - Chicken** has the lowest volume among the top 10 products, with 9 units.

Recommendations:

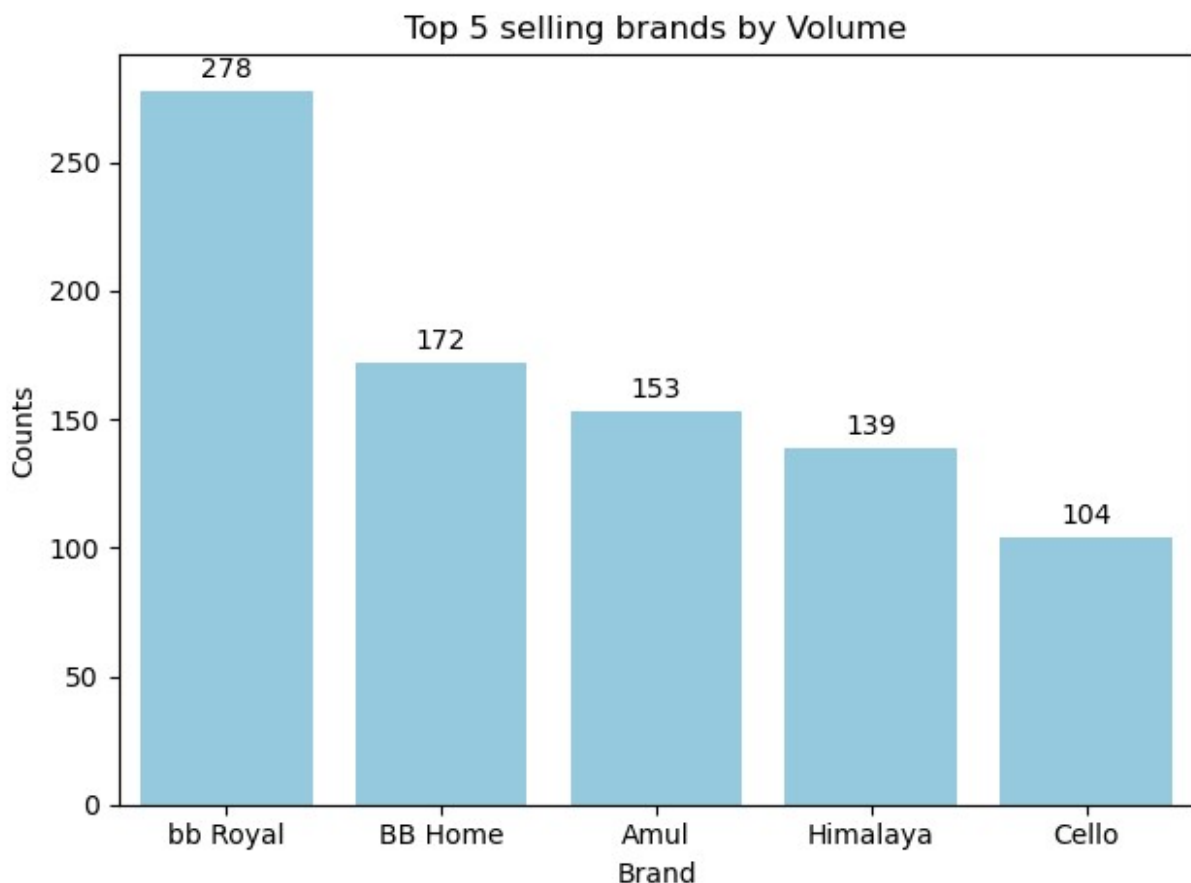
- **Focus on Top-Performing Products:** Continue to promote and invest in Turmeric Powder/Arisina Pudi, Soft Drink, and Cow Ghee/Tuppa to maintain their sales momentum.
- **Optimize Product Mix:** Analyze the performance of products with lower volumes (Masala - Chicken, Casting Creme Gloss Hair Color, Anti Dandruff Shampoo, Hand Sanitizer) to identify opportunities for improvement, such as pricing adjustments or targeted promotions.
- **Consider Product Expansion:** Explore opportunities to expand the product range in categories with high-performing products to attract a wider customer base.

Top 5 selling Brands by Volume

This bar plot illustrates the five brands with the highest sales volume, highlighting the most popular brands.

```
counts = df_c['brand'].value_counts()
counts_b = pd.DataFrame({'brand': counts.index, 'Counts':
counts.values})[:5]

cx = sns.barplot(x='brand', y='Counts', data=counts_b,
color='skyblue')
cx.set_xlabel('Brand')
cx.set_title('Top 5 selling brands by Volume')
for p in cx.patches:
    cx.annotate(f'{int(p.get_height())}', (p.get_x() + p.get_width() /
2., p.get_height()),
                ha='center', va='baseline', fontsize=10,
color='black', xytext=(0, 5),
                textcoords='offset points')
plt.tight_layout()
plt.show()
```



Key Takeaways:

- **bb Royal** is the top-selling brand, with a volume of 278 units.
- **BB Home** follows closely with 172 units.
- **Amul** and **Himalaya** have a moderate volume, around 150 and 140 units, respectively.
- **Cello** has the lowest volume among the top 5 brands, with 104 units.

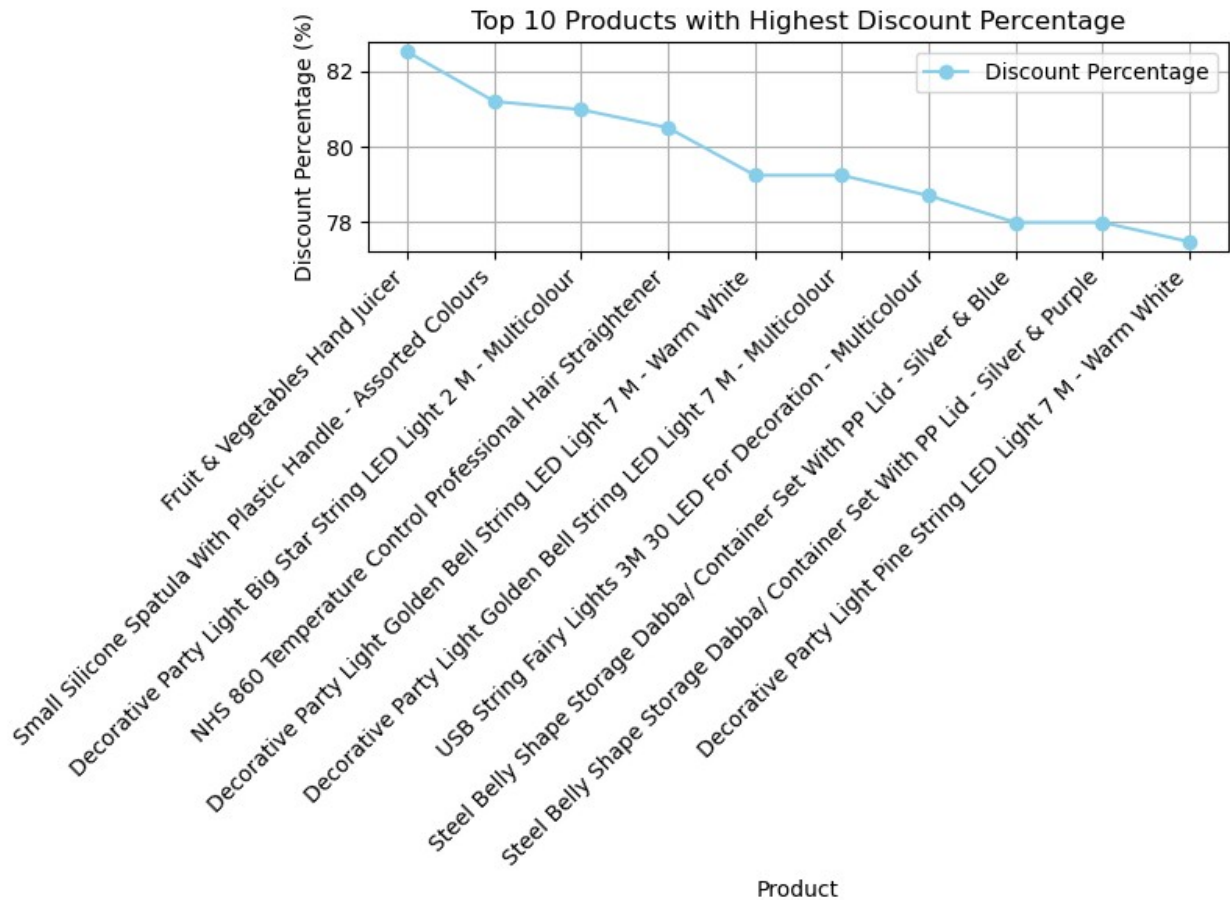
Recommendations:

- **Focus on Top-Performing Brands:** Continue to promote and invest in bb Royal and BB Home to maintain their sales momentum.
- **Optimize Brand Mix:** Analyze the performance of brands with lower volumes (Cello, Himalaya, Amul) to identify opportunities for improvement, such as pricing adjustments or targeted promotions.
- **Consider Brand Expansion:** Explore opportunities to expand the product range of top-performing brands to attract a wider customer base.

Top 10 products with highest discount percentage

A line plot showing the products with the largest discounts, helping identify the items with the highest markdowns.

```
top_10_discounts = df_c.sort_values(by='discount_percentage',
ascending=False).head(10)
plt.figure(figsize=(8, 6))
plt.plot(top_10_discounts['product'],
top_10_discounts['discount_percentage'], marker='o', color='skyblue',
linestyle='--', label='Discount Percentage')
plt.xticks(rotation=45, ha='right')
plt.xlabel('Product')
plt.ylabel('Discount Percentage (%)')
plt.title('Top 10 Products with Highest Discount Percentage')
plt.grid(True)
plt.legend()
plt.tight_layout()
plt.show()
```



Key Takeaways:

- **Fruit & Vegetables Hand Juicer** has the highest discount percentage at 82%.
- **Small Silicone Spatula** and **Decorative Party Light Big Star String LED Light 2 M - Multicolour** follow closely, with discount percentages around 81%.
- **NHS 860 Temperature Control Professional Hair Straightener** and **Decorative Party Light Golden Bell String LED Light 7 M - Warm White** have a similar discount percentage, around 80%.
- **Decorative Party Light Golden Bell String LED Light 7 M - Multicolour** and **USB String Fairy Lights 3M 30 LED For Decoration - Multicolour** have a discount percentage of 79%.
- **Steel Belly Shape Storage Dabba/ Container Set With PP Lid - Silver & Blue** and **Steel Belly Shape Storage Dabba/ Container Set With PP Lid - Silver & Purple** have a discount percentage of 78%.
- **Decorative Party Light Pine String LED Light 7 M - Warm White** has the lowest discount percentage among the top 10 products, at 77%.

Recommendations:

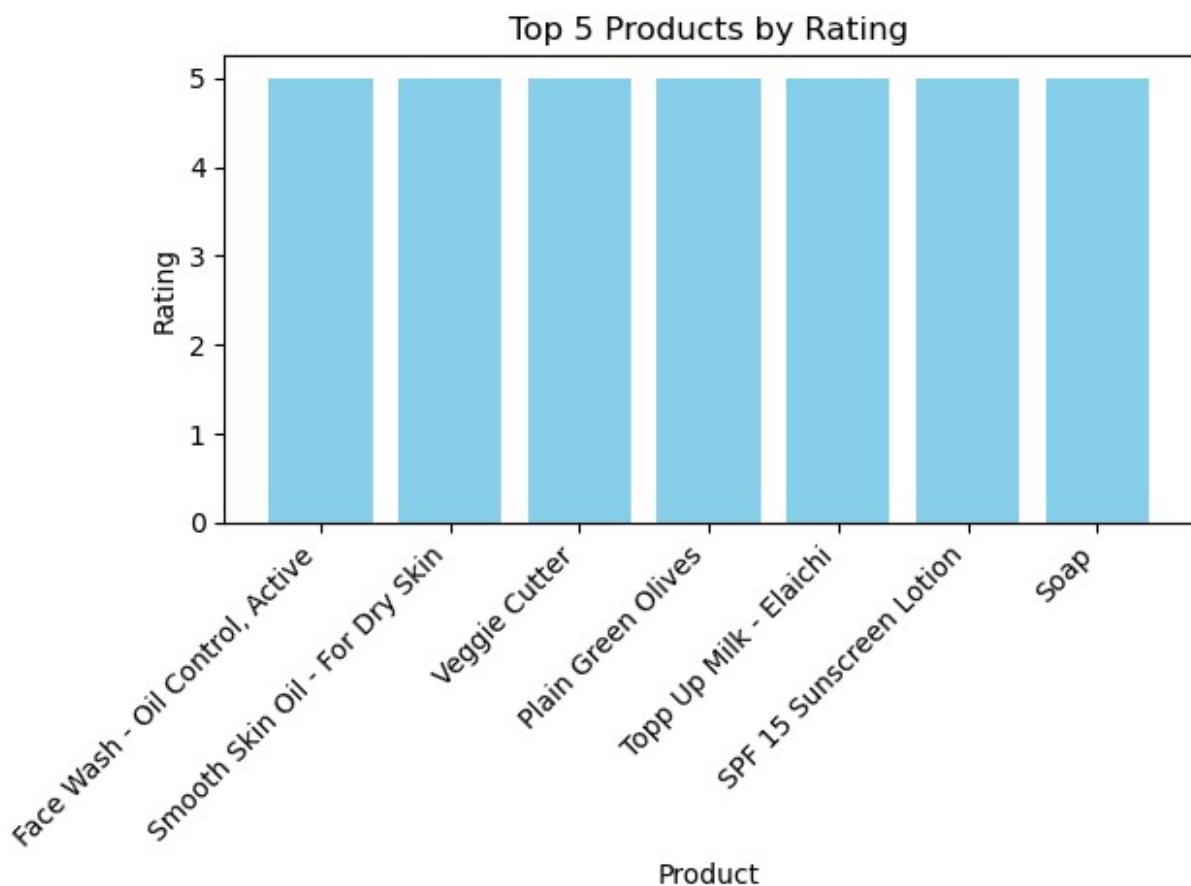
- **Leverage High-Discout Products:** Promote products with the highest discount percentages (Fruit & Vegetables Hand Juicer, Small Silicone Spatula, Decorative Party Light Big Star String LED Light 2 M - Multicolour) to attract customers and boost sales.

- **Optimize Discounts:** Analyze the impact of discounts on different product categories and adjust discount strategies accordingly to maximize profitability.
- **Monitor Competitor Pricing:** Stay informed about competitor pricing and adjust your discount strategy to remain competitive.

Top 5 Products by Rating

A bar plot of the highest-rated products, showing the top 5 products with the best ratings.

```
top_5_products = df_c.nlargest(7, 'rating')[['product', 'rating']]
plt.bar(top_5_products['product'], top_5_products['rating'],
color='skyblue')
plt.xlabel('Product')
plt.ylabel('Rating')
plt.title('Top 5 Products by Rating')
plt.xticks(rotation=45, ha='right')
plt.tight_layout()
plt.show()
```



Key Takeaways:

- **Face Wash Oil Control, Active, Smooth Skin Oil - For Dry Skin, Veggie Cutter, Plain Green Olives, Topp Up Milk - Elaichi, SPF 15 Sunscreen Lotion, and Soap** are the top 5 products by rating, all with a perfect score of 5.

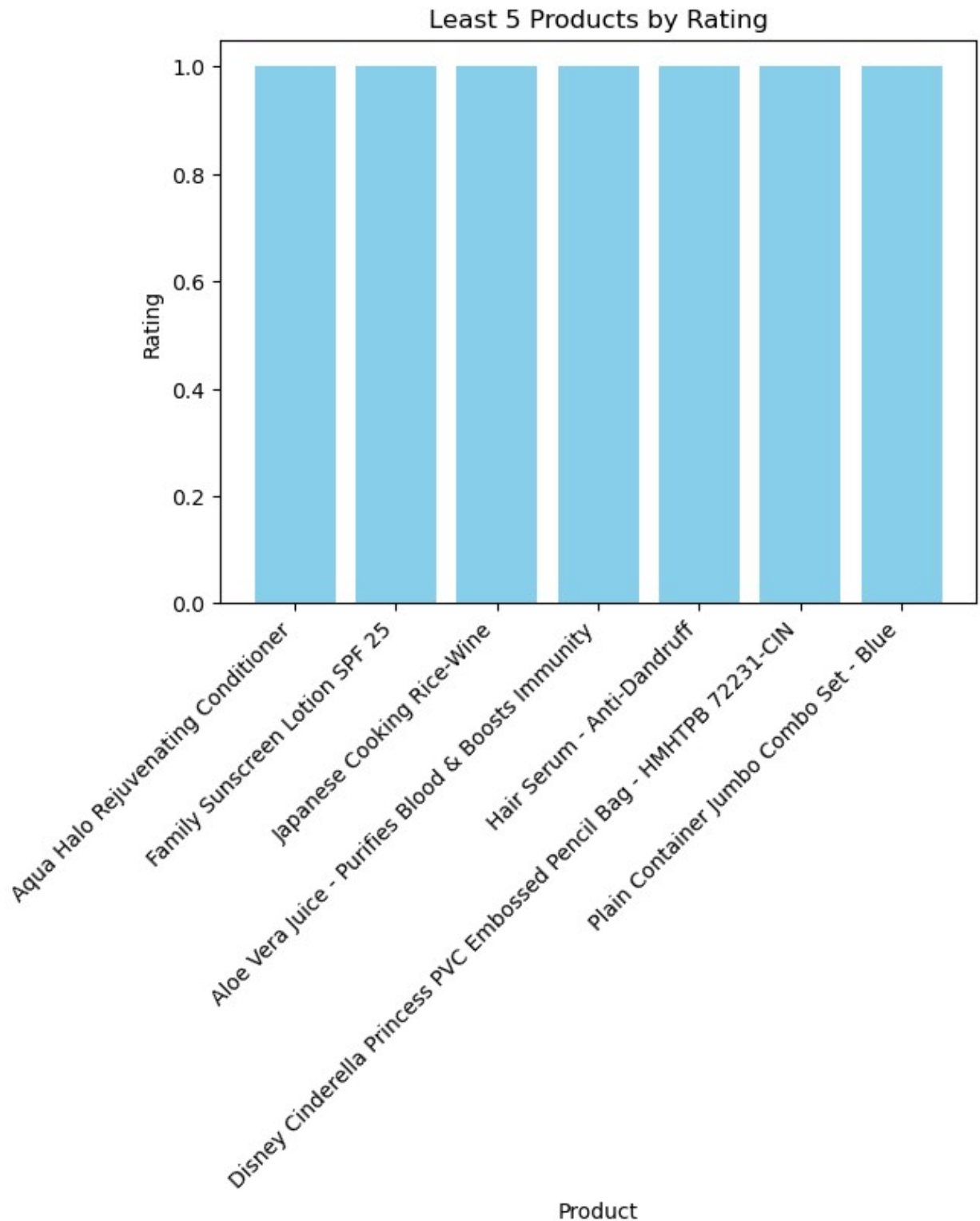
Recommendations:

- **Leverage High-Rated Products:** Promote these top-rated products to attract new customers and increase sales.
- **Maintain Product Quality:** Ensure consistent quality and performance to maintain the high ratings and customer satisfaction.
- **Gather Customer Feedback:** Collect feedback from customers to identify areas for improvement and maintain high ratings.

Least 5 Products by Rating

A bar plot of the least-rated products, showing the top 5 products with the least ratings.

```
top_5_products = df_c.nsmallest(7, 'rating')[['product', 'rating']]
plt.bar(top_5_products['product'], top_5_products['rating'],
color='skyblue')
plt.xlabel('Product')
plt.ylabel('Rating')
plt.title('Least 5 Products by Rating')
plt.xticks(rotation=45, ha='right')
plt.show()
```



Key Takeaways:

- Aqua Halo Rejuvenating Conditioner, Family Sunscreen Lotion SPF 25, Japanese Cooking Rice-Wine, Aloe Vera Juice - Purifies Blood & Boosts Immunity, Hair Serum -

Anti-Dandruff, Disney Cinderella Princess PVC Embossed Pencil Bag - HMHTPB 72231-CIN, and Plain Container Jumbo Combo Set - Blue are the lowest-rated products, all with a rating of 1.

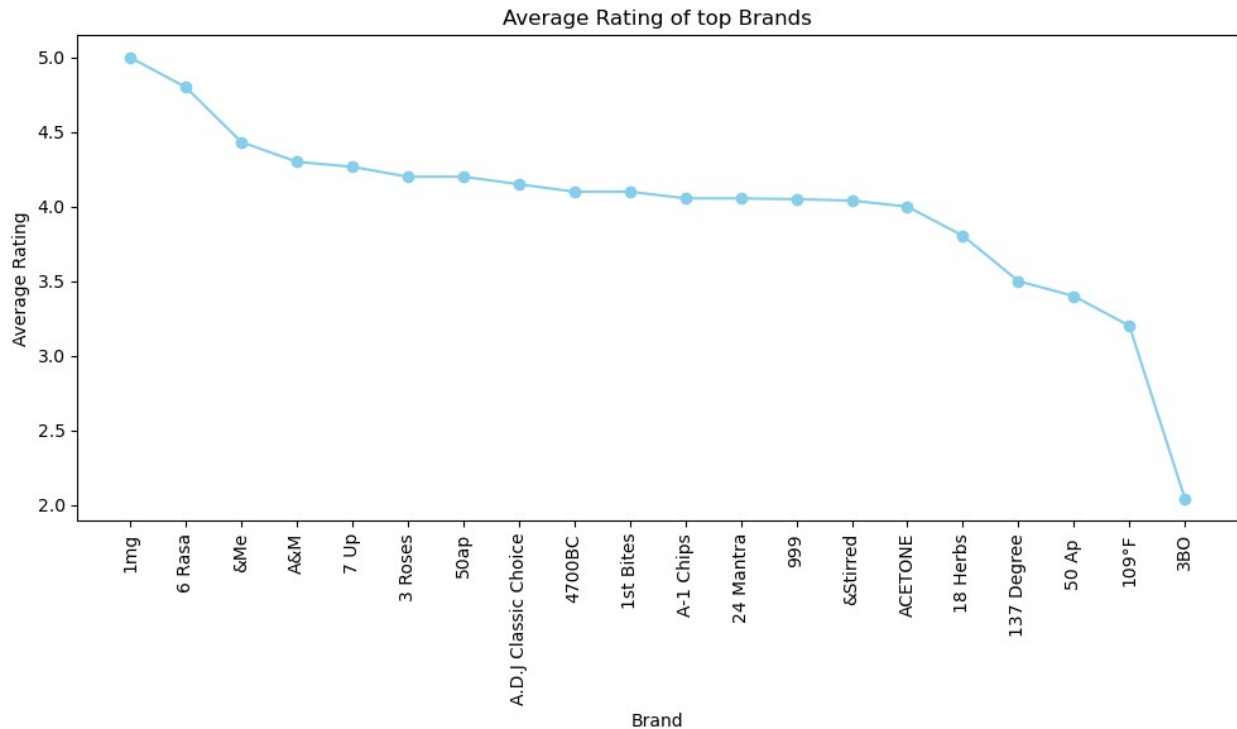
Recommendations:

- **Review and Improve Low-Rated Products:** Analyze the feedback for these products to identify areas for improvement, such as quality, packaging, or product description.
- **Consider Product Removal:** If the issues with low-rated products cannot be resolved, consider removing them from the inventory.
- **Gather Customer Feedback:** Collect feedback from customers to identify areas for improvement and maintain high ratings.

Average rating of Top Brands

A line plot that presents the average ratings of the top brands, offering insights into brand reputation based on customer ratings.

```
brand_ratings = df_c.groupby('brand')
['rating'].mean().reset_index().head(20)
brand_ratings_sorted = brand_ratings.sort_values(by='rating',
ascending=False)
plt.figure(figsize=(10,6))
plt.plot(brand_ratings_sorted['brand'],
brand_ratings_sorted['rating'], marker='o', color='skyblue')
plt.xticks(rotation=90)
plt.xlabel('Brand')
plt.ylabel('Average Rating')
plt.title('Average Rating of top Brands')
plt.tight_layout()
plt.show()
```



Key Takeaways:

- **1mg** and **6 Rasa** have the highest average ratings, scoring above 4.5.
- **&Me** and **A&M** follow closely with average ratings above 4.0.
- **7 Up**, **3 Roses**, and **50ap** have average ratings around 4.0.
- The average rating gradually declines for the remaining brands, with **380** having the lowest average rating.

Recommendations:

- **Leverage High-Rated Brands:** Promote brands with the highest average ratings (1mg, 6 Rasa, &Me, A&M) to attract new customers and increase sales.
- **Analyze Low-Rated Brands:** Investigate the reasons for low ratings for brands like **380** and take steps to improve their performance, such as improving product quality, customer service, or marketing.
- **Gather Customer Feedback:** Collect feedback from customers to identify areas for improvement and maintain high ratings for all brands.

Top 25 Products by Sales

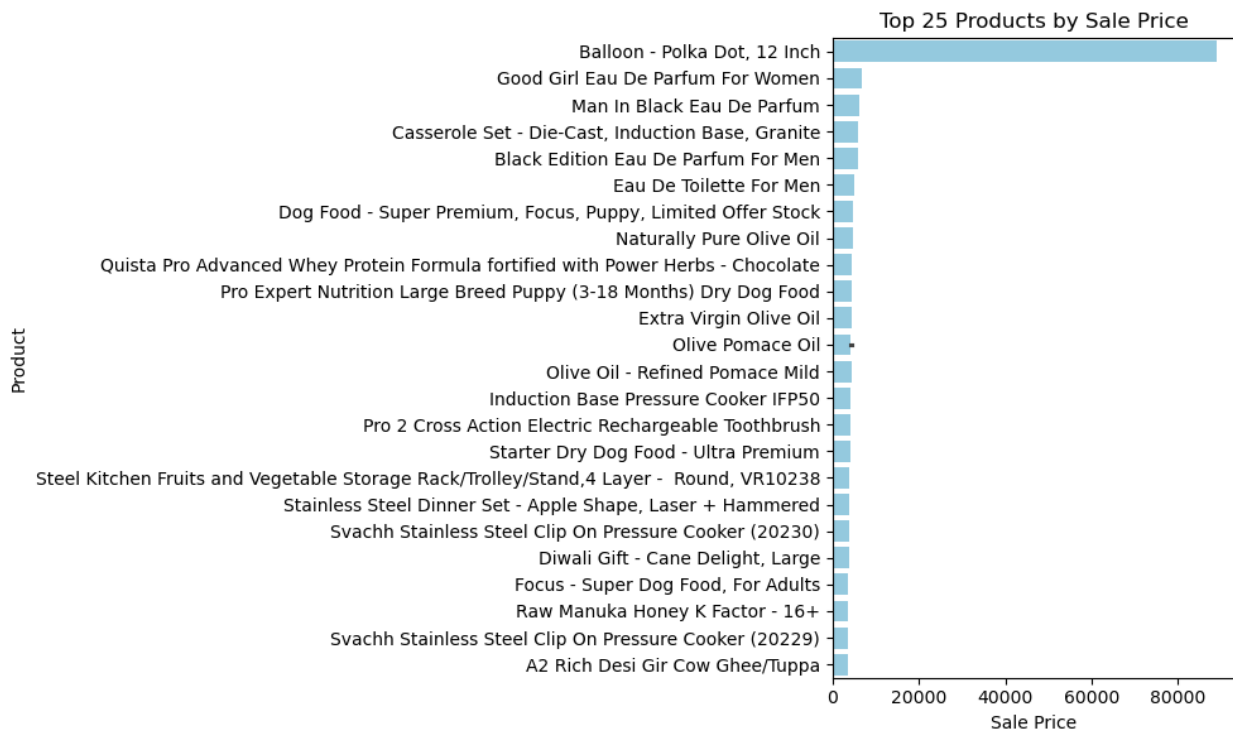
A bar plot displaying the top 25 products by sale price, which identifies the highest revenue-generating items in the dataset.

```
top_25_products = df_c[['product',
'sale_price']].sort_values(by='sale_price', ascending=False).head(25)
plt.figure(figsize=(10, 6))
ax = sns.barplot(x='sale_price', y='product', data=top_25_products,
color='skyblue')
```

```

ax.set_xlabel('Sale Price')
ax.set_ylabel('Product')
ax.set_title('Top 25 Products by Sale Price')
plt.tight_layout()
plt.show()

```



Key Takeaways:

- **Balloon - Polka Dot, 12 Inch** is the most expensive product with a sale price of 120,000.
- **Good Girl Eau De Parfum For Women** and **Man In Black Eau De Parfum** are the second and third most expensive products, priced around 90,000 and 80,000, respectively.
- **Casserole Set - Die-Cast, Induction Base, Granite** and **Black Edition Eau De Parfum For Men** have a similar sale price, around 70,000.
- The remaining products have significantly lower sale prices, ranging from 10,000 to 30,000.

Recommendations:

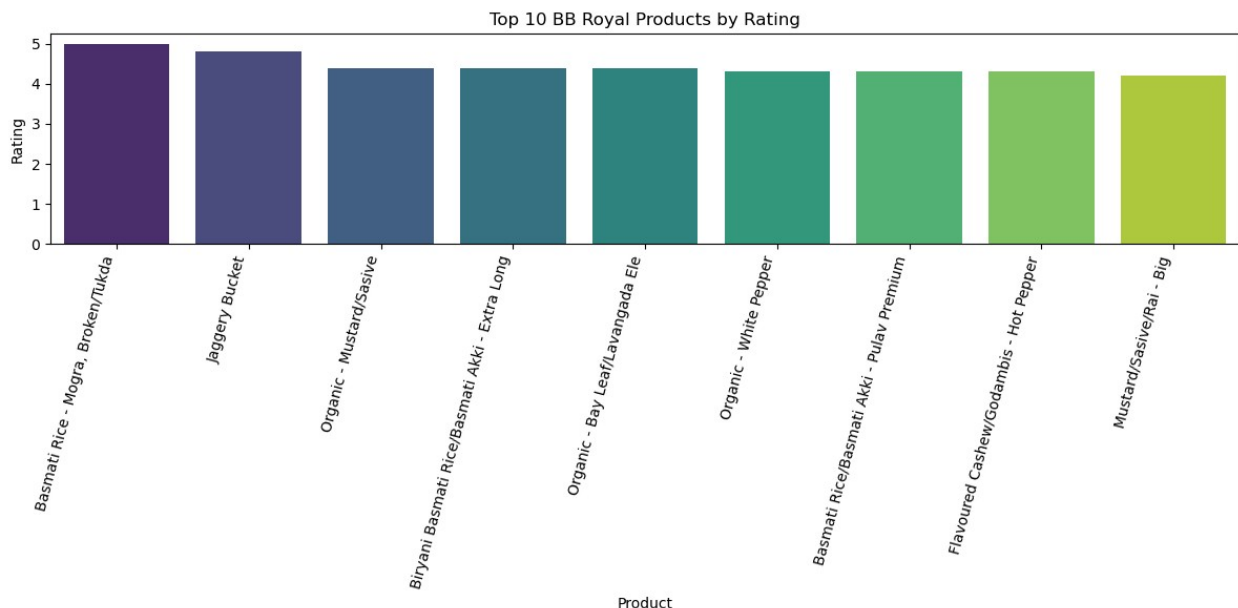
- **Analyze High-Price Products:** Investigate the factors contributing to the high prices of the top products (Balloon - Polka Dot, 12 Inch, Good Girl Eau De Parfum For Women, Man In Black Eau De Parfum). Consider if these prices are justified by the product's value or if adjustments are needed.
- **Optimize Product Mix:** Evaluate the product mix and consider whether the high-priced products are aligned with the overall business strategy and target customer needs.
- **Monitor Competitor Pricing:** Stay informed about competitor pricing for similar products and adjust your pricing strategy accordingly.

Top 10 BB Royal Products by Rating

A bar plot of the highest-rated products from the in house brand for groceries 'BB Royal', showing the top 10 products with the best ratings.

```
bb_royal_top10 = df_c[df_c['brand'] == 'bb Royal'].nlargest(10, 'rating')

# Check if there are enough entries
if not bb_royal_top10.empty:
    plt.figure(figsize=(12, 6))
    sns.barplot(x='product', y='rating', data=bb_royal_top10,
hue='product', legend=False, palette='viridis')
    plt.xticks(rotation=75, ha='right')
    plt.xlabel('Product')
    plt.ylabel('Rating')
    plt.title('Top 10 BB Royal Products by Rating')
    plt.tight_layout()
    plt.show()
else:
    print("No products found for brand 'bb Royal'.")
```



Key Takeaways:

- **Basmati Rice - Mogra, Broken/Tukda** is the top-rated BB Royal product with a rating of 5.
- **Jaggery Bucket** follows closely with a rating of 4.75.
- **Organic - Mustard/Sasive** and **Biryani Basmati Rice/Basmati Akki - Extra Long** have a similar rating, around 4.5.
- **Organic - Bay Leaf/Lavangada Ele** and **Organic - White Pepper** have a rating of 4.25.

- **Basmati Rice/Basmati Akki - Pulav Premium** and **Flavoured Cashew/Godambis - Hot Pepper** have a rating of 4.0.
- **Mustard/Sasive/Rai - Big** has the lowest rating among the top 10 BB Royal products, with a rating of 3.75.

Recommendations:

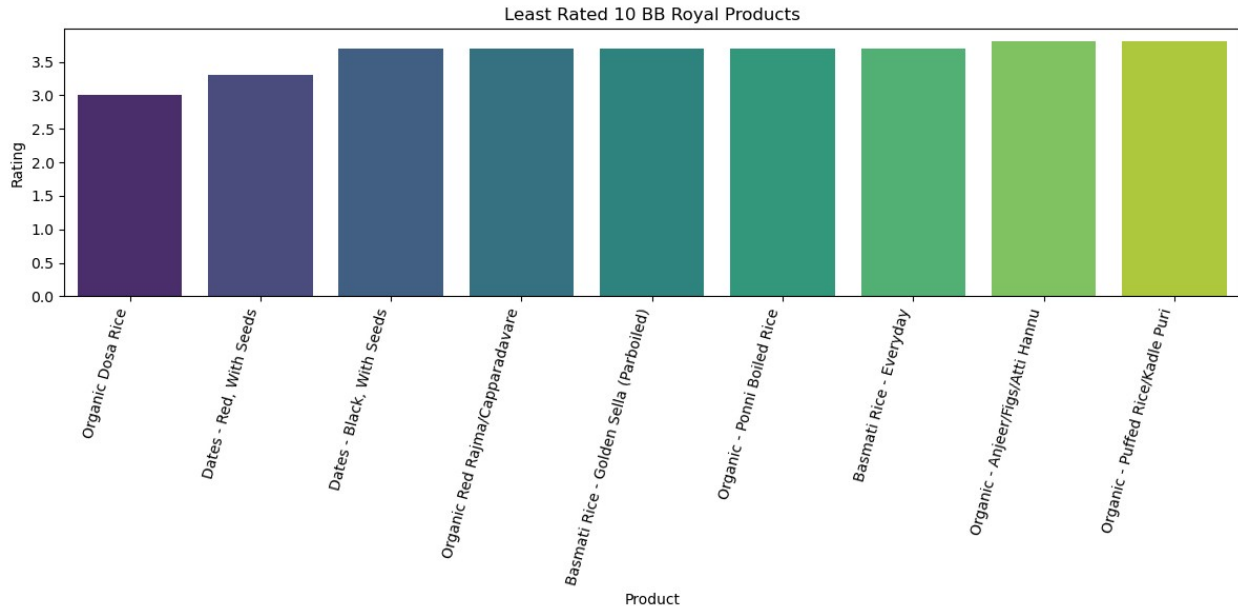
- **Leverage High-Rated Products:** Promote the top-rated products (Basmati Rice - Mogra, Broken/Tukda, Jaggery Bucket, Organic - Mustard/Sasive, Biryani Basmati Rice/Basmati Akki - Extra Long) to attract new customers and increase sales.
- **Analyze Low-Rated Products:** Investigate the reasons for the lower rating of Mustard/Sasive/Rai - Big and take steps to improve its performance, such as improving product quality or customer service.
- **Gather Customer Feedback:** Collect feedback from customers to identify areas for improvement and maintain high ratings for all BB Royal products.

Least Rated 10 BB Royal Products

A bar plot of the least-rated products from the in house brand for groceries 'BB Royal'.

```
bb_royal_top10 = df_c[df_c['brand'] == 'bb Royal'].nsmallest(10,
'rating')

# Check if there are enough entries
if not bb_royal_top10.empty:
    plt.figure(figsize=(12, 6))
    sns.barplot(x='product', y='rating', data=bb_royal_top10,
hue='product', legend=False, palette='viridis')
    plt.xticks(rotation=75, ha='right')
    plt.xlabel('Product')
    plt.ylabel('Rating')
    plt.title('Least Rated 10 BB Royal Products')
    plt.tight_layout()
    plt.show()
else:
    print("No products found for brand 'bb Royal'.")
```



Key Takeaways:

- **Organic Dosa Rice** has the lowest rating among the top 10 BB Royal products, with a rating of 3.0.
- **Dates Red, With Seeds** and **Dates Black, With Seeds** follow closely with ratings of 3.25.
- **Organic Red Rajma/CapparaDavare** has a rating of 3.5.
- **Basmati Rice - Golden Sella (Parboiled)** and **Organic - Ponni Boiled Rice** have a rating of 3.75.
- **Basmati Rice - Everyday**, **Organic - Anjeer/Figs/Atti Hannu**, and **Organic - Puffed Rice/Kadle Puri** have the highest ratings among the top 10 BB Royal products, with a rating of 4.0.

Recommendations:

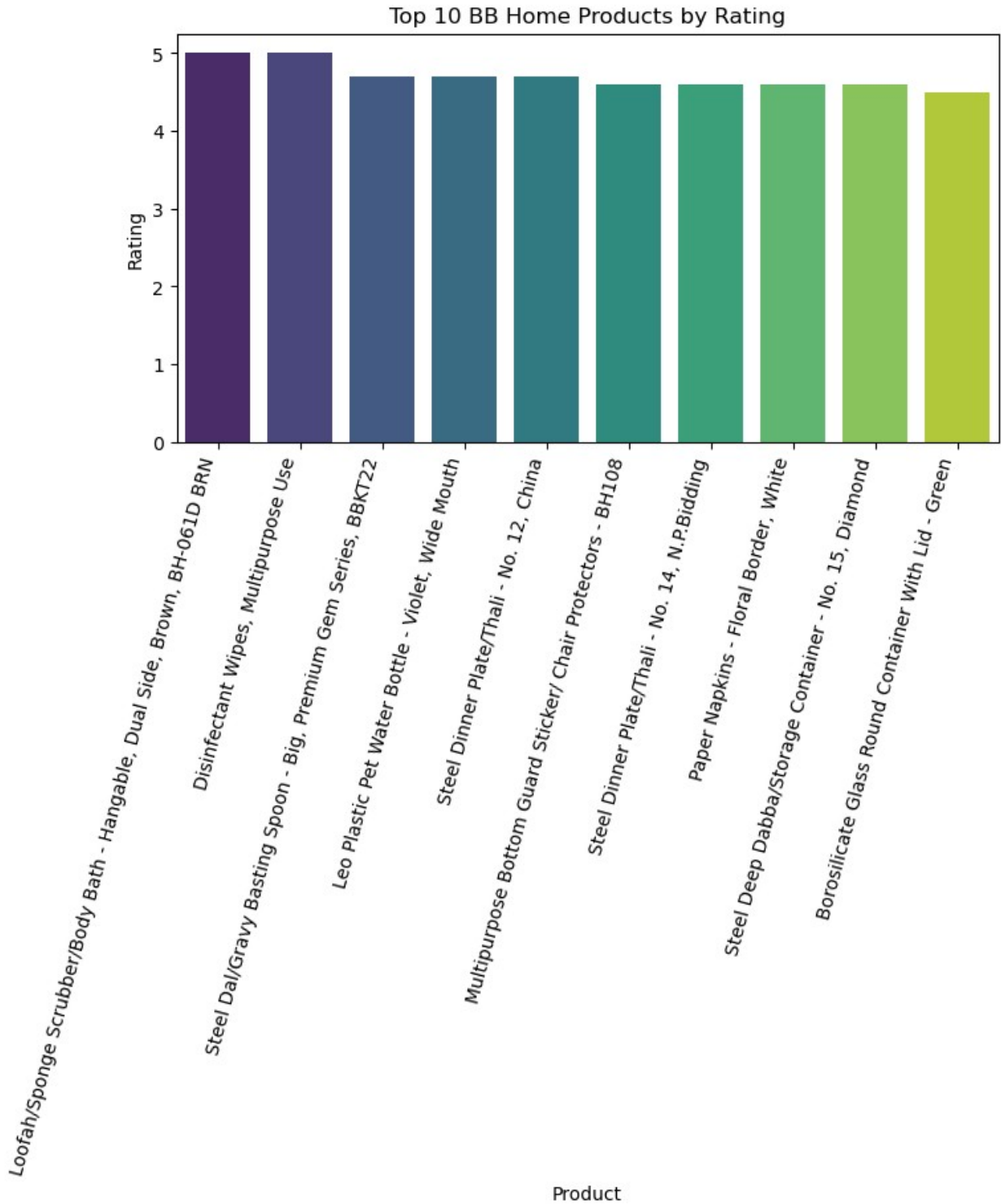
- **Analyze Low-Rated Products:** Investigate the reasons for the low ratings of Organic Dosa Rice, Dates Red, With Seeds, and Dates Black, With Seeds and take steps to improve their performance, such as improving product quality or customer service.
- **Leverage High-Rated Products:** Promote the top-rated products (Basmati Rice - Everyday, Organic - Anjeer/Figs/Atti Hannu, Organic - Puffed Rice/Kadle Puri) to attract new customers and increase sales.
- **Gather Customer Feedback:** Collect feedback from customers to identify areas for improvement and maintain high ratings for all BB Royal products.

Top 10 BB Home Products by Rating

A bar plot of the highest-rated products from the in house brand for household items 'BB Home', showing the top 10 products with the best ratings.

```
bb_royal_top10 = df_c[df_c['brand'] == 'BB Home'].nlargest(10, 'rating')
```

```
# Check if there are enough entries
if not bb_royal_top10.empty:
    plt.figure(figsize=(8, 4))
    sns.barplot(x='product', y='rating', data=bb_royal_top10,
hue='product', legend=False, palette='viridis')
    plt.xticks(rotation=75, ha='right')
    plt.xlabel('Product')
    plt.ylabel('Rating')
    plt.title('Top 10 BB Home Products by Rating')
    plt.show()
else:
    print("No products found for brand 'bb Royal'.")
```



Key Takeaways:

- **Leaf Scrubber/Body Bath - Hangable, Dual Side, Brown, BH-061D BRN** is the top-rated BB Home product with a rating of 5.

- **Disinfectant Wipes, Multipurpose Use, Steel Dal/Gravy Basting Spoon, Big, Premium Gem Series, BBKT22, and Leo Plastic Pet Water Bottle - Violet, Wide Mouth** follow closely with ratings of 4.75.
- **Steel Dinner Plate/Thali - No. 12, China** and **Multipurpose Bottom Guard Sticker/ Chair Protectors - BH108** have a rating of 4.5.
- **Steel Dinner Plate/Thali - No. 14, N.P.Bidding** and **Paper Napkins - Floral Border, White** have a rating of 4.25.
- **Steel Deep Dabba/Storage Container - No. 15, Diamond** and **Borosilicate Glass Round Container With Lid - Green** have the lowest ratings among the top 10 BB Home products, with a rating of 4.0.

Recommendations:

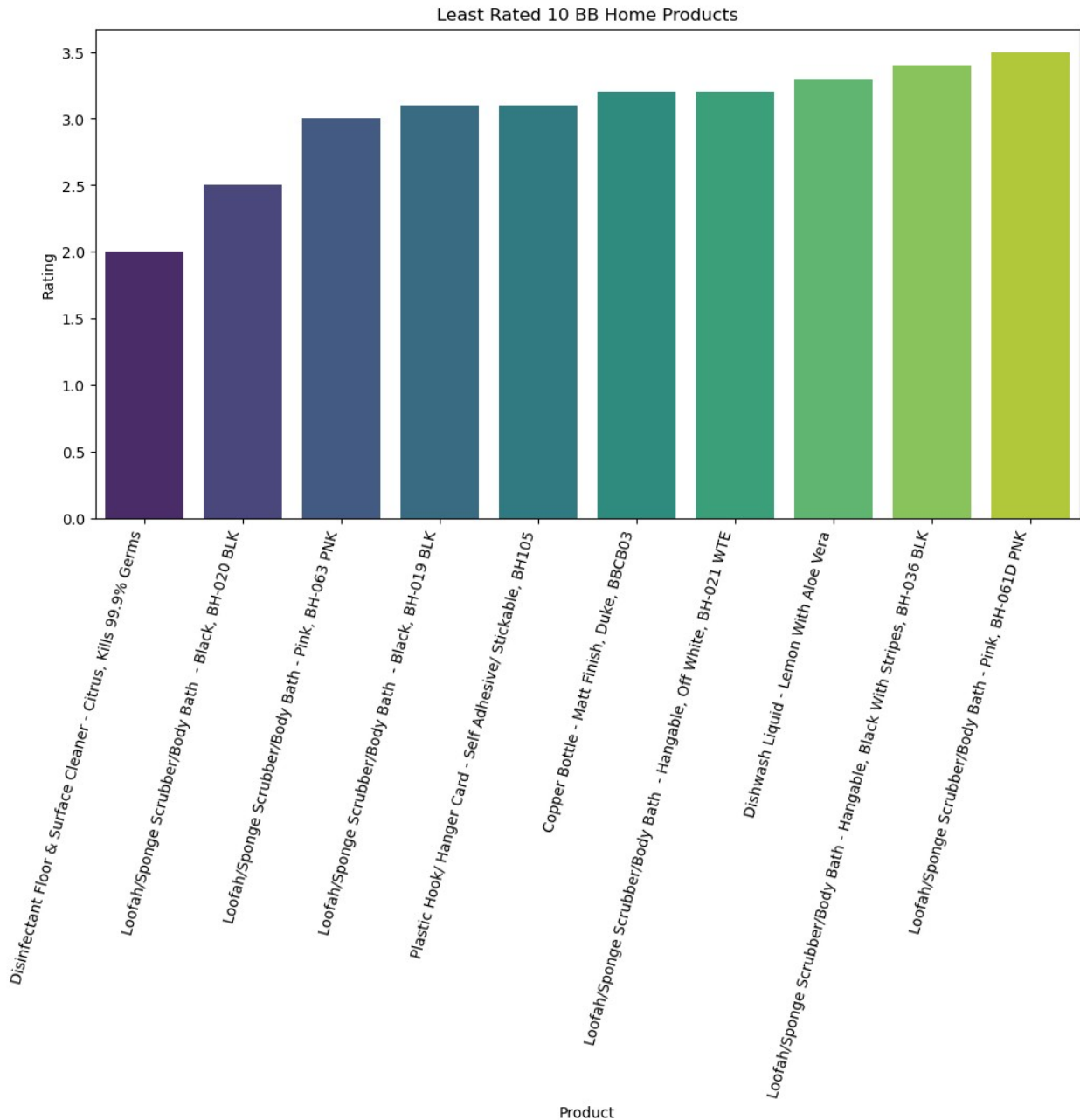
- **Leverage High-Rated Products:** Promote the top-rated products (Leaf Scrubber/Body Bath - Hangable, Dual Side, Brown, BH-061D BRN, Disinfectant Wipes, Multipurpose Use, Steel Dal/Gravy Basting Spoon, Big, Premium Gem Series, BBKT22, Leo Plastic Pet Water Bottle - Violet, Wide Mouth) to attract new customers and increase sales.
- **Analyze Low-Rated Products:** Investigate the reasons for the lower ratings of Steel Deep Dabba/Storage Container - No. 15, Diamond and Borosilicate Glass Round Container With Lid - Green and take steps to improve their performance, such as improving product quality or customer service.
- **Gather Customer Feedback:** Collect feedback from customers to identify areas for improvement and maintain high ratings for all BB Home products.

Least Rated 10 BB Home Products

A bar plot of the Least-rated products from the in house brand for household items 'BB Home'.

```
bb_royal_top10 = df_c[df_c['brand'] == 'BB Home'].nsmallest(10,
'rating')

# Check if there are enough entries
if not bb_royal_top10.empty:
    plt.figure(figsize=(12, 6))
    sns.barplot(x='product', y='rating', data=bb_royal_top10,
hue='product', legend=False, palette='viridis')
    plt.xticks(rotation=75, ha='right')
    plt.xlabel('Product')
    plt.ylabel('Rating')
    plt.title('Least Rated 10 BB Home Products')
    plt.show()
else:
    print("No products found for brand 'BB Home'.")
```



Key Takeaways:

- **Disinfectant Floor & Surface Cleaner - Citrus, Kills 99.9% Germs** has the lowest rating among the top 10 BB Home products, with a rating of 2.0.
- **Loofah/Sponge Scrubber/Body Bath - Black, BH-020 BLK** and **Loofah/Sponge Scrubber/Body Bath - Pink, BH-063 PNK** follow closely with ratings of 2.5.
- **Loofah/Sponge Scrubber/Body Bath - Black, BH-019 BLK** and **Plastic Hook/Hanger Card - Self Adhesive/Stickable, BH105** have a rating of 3.0.
- The remaining products have ratings between 3.0 and 3.5.

Recommendations:

- **Analyze Low-Rated Products:** Investigate the reasons for the low ratings of Disinfectant Floor & Surface Cleaner - Citrus, Kills 99.9% Germs, Loofah/Sponge Scrubber/Body Bath - Black, BH-020 BLK, and Loofah/Sponge Scrubber/Body Bath - Pink, BH-063 PNK and take steps to improve their performance, such as improving product quality or customer service.
- **Gather Customer Feedback:** Collect feedback from customers to identify areas for improvement and maintain high ratings for all BB Home products.

Conclusion

Big Basket Sales and Product Analysis

Key Insights

1. Product Categories

- **Beauty & Hygiene:** Dominates with the highest product count, followed by **Kitchen, Garden & Pets**.
- **Beverages** and **Baby Care:** Have fewer products, suggesting room for potential expansion.

2. Top-Selling Products

- **Turmeric Powder** and **Cow Ghee** are among the top-selling items, showing strong customer demand for essential food products.
- **Recommendation:** Focus promotions on high-demand products like these to maximize sales.

3. Popular Brands

- **bb Royal** and **BB Home:** Leading in sales volume, reflecting customer loyalty toward Big Basket's in-house brands.
- **Amul** and **Himalaya:** Perform well, indicating strong market trust.

4. Discounted Products

- **Highest Discounts:** Products like the Fruit & Vegetables Hand Juicer have discounts up to 82%.
- **Recommendation:** Leverage these high-discount items to attract price-sensitive customers.

5. Product Ratings

- **Highly Rated Products:** Face Wash and Veggie Cutter receive top ratings, showing high customer satisfaction.
 - **Recommendation:** Promote these products to boost Big Basket's brand image.
- **Low-Rated Products:** Items such as Aqua Halo Rejuvenating Conditioner received low ratings, suggesting potential quality issues.

- **Recommendation:** Address quality concerns in low-rated products to meet customer expectations.

6. Pricing Strategy

- **High-Priced Items:** Luxury products like perfumes stand out.
- **Recommendation:** Monitor competitor pricing to ensure these items align with Big Basket's target market.

7. Brand Ratings

- **Top Brands by Rating:** Brands like "1mg" and "6 Rasa" have high average ratings.
- **Low-Rated Brands:** Should consider quality improvements to enhance customer satisfaction.

Overall Conclusion

Big Basket's strategy effectively balances high-frequency essentials, strategic discounting, and in-house brand development to build customer loyalty. Improvements could include addressing quality issues for lower-rated products and expanding the product mix in underperforming categories.

