Smartphone Market & Value-for-Money Analysis

Project Overview

This project analyzes low Budget smartphone market online Retail store in Nigeria data to understand pricing strategies, brand performance, hardware specifications, discounts, and value-for-money across different phone models. The goal is to uncover insights that help consumers identify the best-value smartphones among brand such as Itel, Samsung, Poco, Xiaomi etc. and help businesses understand competitive positioning within the mobile phone market.

Dataset Summary

Rows: 11

Columns :7

Key feature:

Dataset Name: Smartphone Dataset (Phone CSV)
Data includes phone brands, models, prices, discounts, RAM, ROM, and derived pricing segments.

Data Preparation

I collected data from Jumia by performing web scraping using Python. I utilized libraries such as Beautiful Soup for parsing HTML content, Pandas for data manipulation and storage, and Time for managing delays during the scraping

```
import requests
from bs4 import BeautifulSoup
import csv
import time
import re

HEADERS = {
    "User-Agent": "Mozilla/5.0 (Windows NT 10.0; Win64; x64) "
                  "AppleWebKit/537.36 (KHTML, like Gecko) "
                  "Chrome/120.0.0.0 Safari/537.36"
}

BASE_DOMAIN = "https://www.jumia.com.ng"


def parse_price(text):
    if not text:
        return None
    cleaned = re.sub(r"[^\d]", "", text)
    return float(cleaned) if cleaned else None
```

The final dataset was extracted from an online retail store using Python-based web scraping techniques and subsequently ready for cleaning and structured for analysis.

]:

	name	brand	price	old_price	discount_percent	rating	specs
0	XIAOMI REDMI A5 - 6.88 4GB RAM/128GB ROM -...	XIAOMI	102000	111742.0	8.7	NaN	—
1	XIAOMI Redmi 15C 6.9'' 4GB RAM/128GB ROM Andro...	XIAOMI	123643	136125.0	9.2	NaN	—
2	XIAOMI REDMI A5 - 6.88 3GB RAM/64GB ROM --...	XIAOMI	91634	98036.0	6.5	NaN	—
3	itel 2165 Wireless FM, Torch, Dual SIM Phone +...	itel	8950	18000.0	50.3	NaN	—
4	XIAOMI Redmi 15C 6.9'' 4GBRAM/128GB ROM Androi...	XIAOMI	123643	144235.0	14.3	NaN	—
5	XIAOMI Redmi 15C 6.9'' 8GBRAM/256GB ROM Androi...	XIAOMI	161778	175642.0	7.9	NaN	—
6	Samsung Galaxy A07 6.7" 4GB RAM/64GBGB ROM - B...	Samsung	121011	135476.0	10.7	NaN	—
7	Sunelan S8 1.8" Screen Phone, Dual SIM, Game, ...	Sunelan	6646	7188.0	7.5	NaN	—
8	itel City 100 7.65mm" Slim Design 5200mah And...	itel	109900	120910.0	9.1	NaN	—
9	Poco C71 6.88" 3GB RAM / 64GB ROM Android 15 ...	Poco	81316	92732.0	12.3	NaN	—
10	Samsung Galaxy A06 6.7" 4GB RAM/64GB ROM Andro...	Samsung	97632	118264.0	17.4	NaN	—
11	Samsung Galaxy A07 6.7" 4GB RAM/128GB ROM - Bl...	Samsung	135000	150150.0	10.1	NaN	—
12	itel City 100 7.65mm" Slim Design 5200mah And...	itel	109900	110910.0	0.9	NaN	—
13	itel City 100 7.65mm" Slim Design 5200mah And...	itel	109900	114800.0	4.3	NaN	—
23	FreeYond FreeYond M5,8GB+128GB,4G 6.52" Smartp...	FreeYond	92763	194872.0	52.4	NaN	
24	Samsung Galaxy A07 6.7" 4GB RAM/ 128GB ROM And...	Samsung	147990	180000.0	17.8	NaN	
25	itel A100 6.75'' 90hz Bright Display IP65 5000...	itel	103000	111280.0	7.4	NaN	
26	Nokia 105_African Edition 1.77" 4MB/4MB 800 MA...	Nokia	12790	24000.0	46.7	NaN	
27	XIAOMI Redmi 15 6.9'' 8GBRAM/256GB ROM Android...	XIAOMI	206513	216839.0	4.8	NaN	
28	XIAOMI Redmi 15 6.9'' 6GBRAM/128GB ROM Android...	XIAOMI	180808	189848.0	4.8	NaN	
29	XIAOMI Redmi 15C 6.9'' 6GBRAM/128GB ROM Androi...	XIAOMI	147173	154532.0	4.8	NaN	
30	Oukitel C61, 6.88" HD+, 5150mAh, 16GB RAM + 12...	Oukitel	125287	160284.0	21.8	NaN	
31	Samsung Galaxy A06 4GB RAM + 128GB ROM BLACK	Samsung	127990	180000.0	28.9	NaN	
32	Samsung Galaxy A06 4GB RAM + 64GB ROM BLACK	Samsung	107990	165000.0	34.6	NaN	
33	Philips Fun100 Wireless FM,2.0'' Big Screen,4M...	Philips	9050	12300.0	26.4	NaN	
34	redbeat D5 Smartphone 6.52inch IPS HD 4GB + 64...	redbeat	80037	108500.0	26.2	NaN	
35	Poco C61 6.71" 3GB RAM / 64GB ROM Android 14 -...	Poco	81476	92732.0	12.1	NaN	
36	Samsung Galaxy A06 4GB RAM + 128GB ROM LIGHT BLUE	Samsung	127990	180000.0	28.9	NaN	
37	itel A100C 90hz 6.6" Super Clear Display 5000m...	itel	82800	105000.0	21.1	NaN	
38	Poco C85 6.9" 6GB RAM / 128GB ROM Xiaomi Hyper...	Poco	136779	148868.0	8.1	NaN	
39	AGM Note N1 6.52" 8GB Base RAM/8GB Extended RA...	AGM	99615	153063.0	34.9	NaN	

Exploratory Data Analysis Using Python

We began data cleaning with python

- **Initial exploration**: used df.info () to check structure. describe() for summary statistics

```
df.describe()
```

	price	old_price	discount_percent
count	11.000000	11.000000	11.000000
mean	122613.727273	134805.545455	9.590909
std	35129.198021	34401.057589	3.533116
min	81316.000000	92732.000000	4.800000
25%	99816.000000	115003.000000	8.400000
50%	123287.000000	135997.000000	9.200000
75%	135889.500000	149509.000000	11.100000
max	206513.000000	216839.000000	17.400000

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 22 entries, 0 to 38
Data columns (total 7 columns):
 #   Column            Non-Null Count  Dtype
---  ------            --------------  -----
 0   name              22 non-null     object
 1   brand             22 non-null     object
 2   price             22 non-null     int64
 3   old_price         22 non-null     float64
 4   discount_percent  22 non-null     float64
 5   RAM               22 non-null     object
 6   ROM               22 non-null     object
```

• **Missing Data Handling:** Checked for null values and dropped rows and columns containing NaN values.

```
df = df.drop(['rating', 'specs'], axis=1) # drop multiple column
```

```
df
```

	name	brand	price	old_price	discount_percent

• **Column dropping and Standardization:** Renamed columns to **snake case** for better readability and documentation

old_price	discount_percent

Feature Engineering

Created RAM and ROM features to evaluate cost efficiency based on phone specifications.

```
df['RAM'] = df['name'].str.extract(r'(\d+)\s*GB\s*RAM', expand=False) # create new column for RAM
```

```
df
```

	name	brand	price	old_price	discount_percent	RAM
0	XIAOMI REDMI A5 - 6.88 4GB RAM/128GB ROM -...	XIAOMI	102000	111742.0	8.7	4
1	XIAOMI Redmi 15C 6.9" 4GB RAM/128GB ROM Andro...	XIAOMI	123643	136125.0	9.2	4
2	XIAOMI REDMI A5 - 6.88 3GB RAM/64GB ROM --...	XIAOMI	91634	98036.0	6.5	3

```
df['ROM'] = df['name'].str.extract(r'(\d+)\s*GB\s*(?:ROM|Storage)', expand=False) # create a new column for ROM
```

```
df
```

	name	brand	price	old_price	discount_percent	RAM	ROM
0	XIAOMI REDMI A5 - 6.88 4GB RAM/128GB ROM -...	XIAOMI	102000	111742.0	8.7	4	128
1	XIAOMI Redmi 15C 6.9" 4GB RAM/128GB ROM Andro...	XIAOMI	123643	136125.0	9.2	4	128
2	XIAOMI REDMI A5 - 6.88 3GB RAM/64GB ROM --...	XIAOMI	91634	98036.0	6.5	3	64

Cleaned the **name column** to standardize phone brand description and covert it to CSV file

```
df['name'] = (
    df['name']
    .str.upper()
    .str.replace(r'\s*\d+(\.\d+)?\".*', '', regex=True)  # remove screen size
    .str.replace(r'\s*\d+GB.*', '', regex=True)          # remove RAM/ROM
    .str.replace(r'\s*ANDROID.*', '', regex=True)        # remove Android text
    .str.replace(r'\s*-.*', '', regex=True)              # remove hyphen text
    .str.strip()
)
```

```
df
```

	name	brand	price	old_price	discount_percent	RAM	ROM
0	XIAOMI REDMI A5	XIAOMI	102000	111742.0	8.7	4	128
1	XIAOMI REDMI 15C 6.9"	XIAOMI	123643	136125.0	9.2	4	128
2	XIAOMI REDMI A5	XIAOMI	91634	98036.0	6.5	3	64

41]:
```
df
```

41]:

	name	brand	price	old_price	discount_percent	RAM	ROM
0	XIAOMI REDMI A5	XIAOMI	102000	111742.0	8.7	4	128
1	XIAOMI REDMI 15C 6.9"	XIAOMI	123643	136125.0	9.2	4	128
9	POCO C71	Poco	81316	92732.0	12.3	3	64
10	SAMSUNG GALAXY A06	Samsung	97632	118264.0	17.4	4	64
11	SAMSUNG GALAXY A07	Samsung	135000	150150.0	10.1	4	128
15	TECNO SPARK 40	Tecno	144210	151422.0	4.8	4	128
16	XIAOMI REDMI A3 PRO	XIAOMI	116895	127990.0	8.7	4	128
21	ITEL POWER 70 6.67" HD	itel	123287	135997.0	9.3	8	128
27	XIAOMI REDMI 15 6.9"	XIAOMI	206513	216839.0	4.8	8	256
35	POCO C61	Poco	81476	92732.0	12.1	3	64
38	POCO C85	Poco	136779	148868.0	8.1	6	128

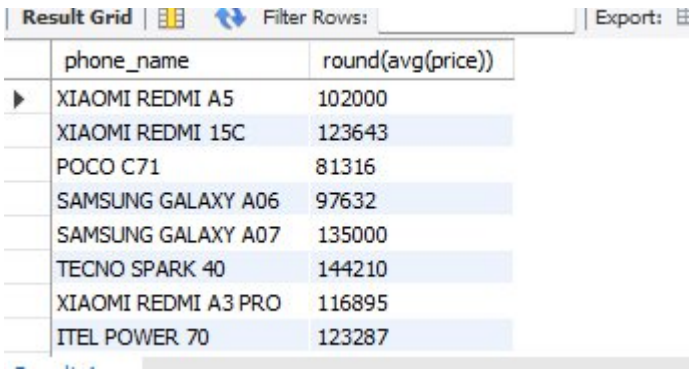
42]:
```
df.to_csv('cleaned_phones.csv', index=False)
```

43]:
```
df.to_excel('clean_phone.xlsx',index=False)
```

MySQL Data Analysis

Performed descriptive analysis, brand performance evaluation, pricing segmentation, discount behavior analysis, and value-for-money ranking using structured SQL queries.

1. **Average price amount** - Calculating average purchase amounts of the phone



Result Grid | Filter Rows: | Export:

phone_name	round(avg(price))
XIAOMI REDMI A5	102000
XIAOMI REDMI 15C	123643
POCO C71	81316
SAMSUNG GALAXY A06	97632
SAMSUNG GALAXY A07	135000
TECNO SPARK 40	144210
XIAOMI REDMI A3 PRO	116895
ITEL POWER 70	123287

2. **Expensive phone** – The Most Expensive Phones

phone_name	brand	price
XIAOMI REDMI 15	XIAOMI	206513
TECNO SPARK 40	Tecno	144210
POCO C85	Poco	136779
SAMSUNG GALAXY A07	Samsung	135000
XIAOMI REDMI 15C	XIAOMI	123643

3. **Cheapest phone** – The Cheapest Phones

phone_name	brand	price
POCO C71	Poco	81316
POCO C61	Poco	81476
SAMSUNG GALAXY A06	Samsung	97632
XIAOMI REDMI A5	XIAOMI	102000
XIAOMI REDMI A3 PRO	XIAOMI	116895

4.**Best deal phone** - Which Phone Offers the Best deal?

XIAOMI	102000	0.0007
XIAOMI	206513	0.0007
XIAOMI	123643	0.0006
XIAOMI	116895	0.0006
itel	123287	0.0006
Samsung	135000	0.0005
Tecno	144210	0.0005
Poco	136779	0.0005

5.**Best valued brand** which brand offers the best value?

	brand	avg_value_score
▶	XIAOMI	0.0006
	itel	0.0006
	Poco	0.0005
	Samsung	0.0005
	Tecno	0.0005

6.**ROM and RAM domination**: which RAM–ROM combination dominates the market?

	rom	ram	phone_count
▶	128	4	5
	64	3	2
	64	4	1
	128	8	1
	256	8	1
	128	6	1

7.Price drop- Which brands reduce prices the most

	brand	price_drop
▶	Samsung	17891.0000
	itel	12710.0000
	Poco	11587.0000
	XIAOMI	10911.2500
	Tecno	7212.0000

8. **Discount Effect** – Do High Discounts Actually Mean Cheaper Phones?

brand	avg_discount	avg_price
Poco	11	99857
Samsung	14	116316
itel	9	123287
XIAOMI	8	137263
Tecno	5	144210

9. **Extra RAM increase** - How much does price increase per extra GB of RAM?

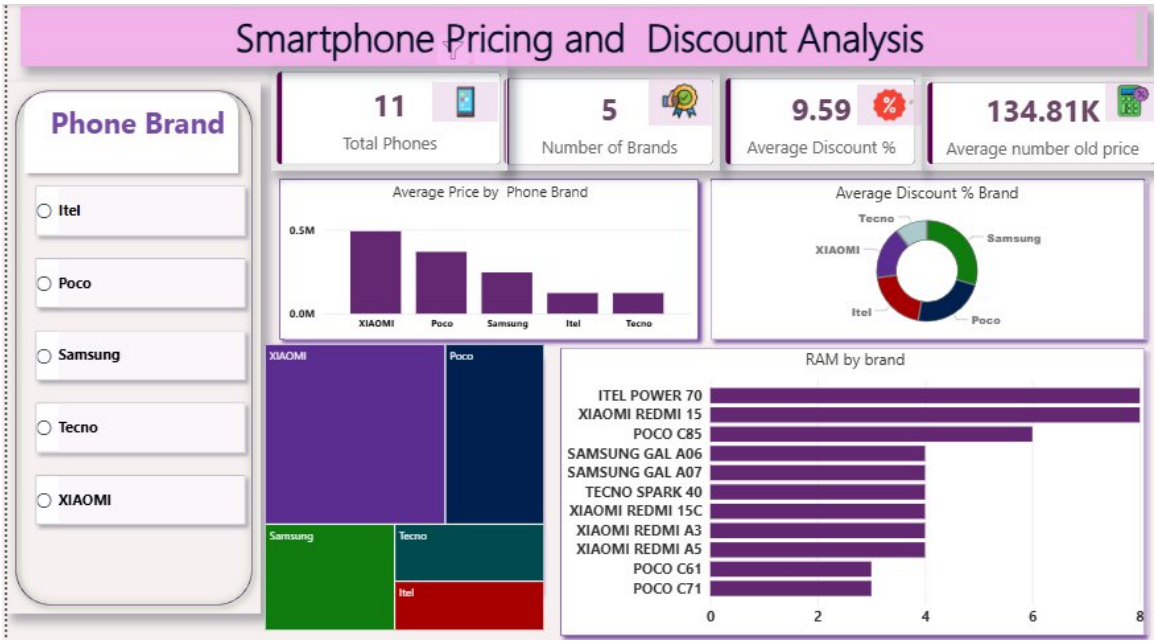
ram	avg_price
3	81396.0000
4	119896.6667
6	136779.0000
8	164900.0000

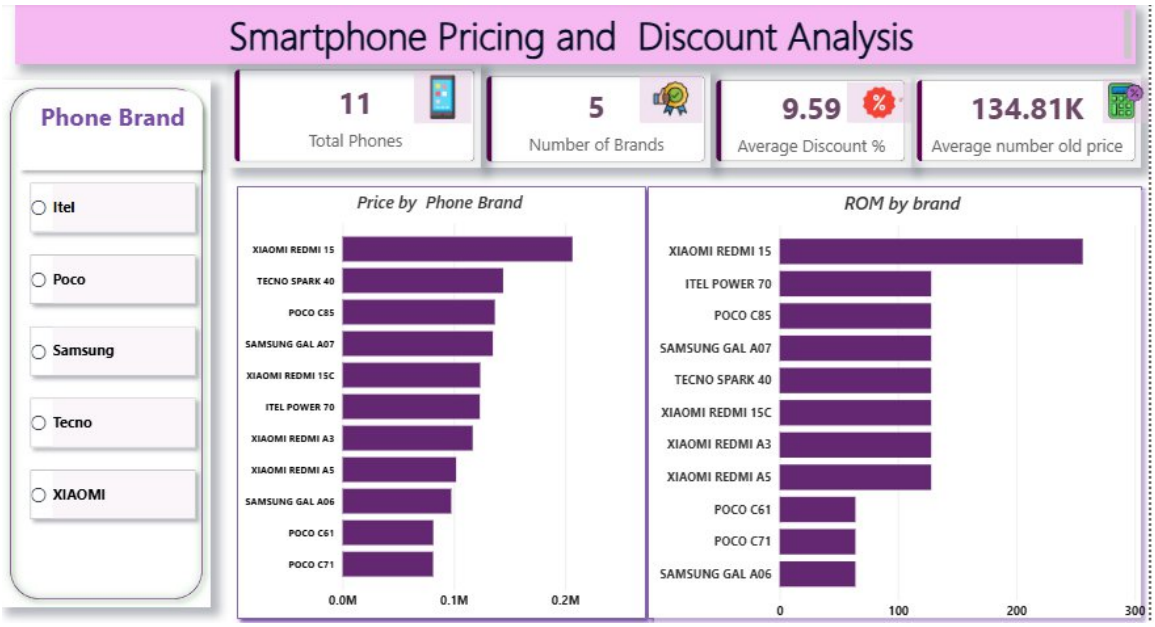
10. **Average maximum and minimum price**- what is the average maximum and minimum price of phone

avg_price	min_price	max_price
122613.7273	81316	206513

Power BI Visualization

Built an interactive Power BI dashboard featuring KPI cards, bar charts, treemaps, scatter plots, histograms, and ranking tables with slicers for brand, RAM, ROM, and price segment.





Key Insights

Key Insights (Dashboard + MySQL Analysis)

1. Xiaomi is a premium segment leader

From the Power BI dashboard and MySQL analysis, Xiaomi has the highest average price among the brands. In addition, Xiaomi has the largest storage or ROM size compared to the other brands. Therefore, Xiaomi is a premium segment leader in the Nigerian smartphone industry.

Business implication: Xiaomi targets high-income individuals and relies on its brand image for premium quality.

2. Poco and Itel provide the best value for money

From the SQL value ranking and the price charts for the dashboard, it is clear that Poco and Itel provide cheaper phones that have competitive RAM and ROM.

Business meaning: This is because these two brands are best for people on a tight budget and first-time buyers.

3. More value for money can be obtained in mid-range devices

From both analyses, it is clear that mid-range devices have better hardware for price efficiency compared to expensive devices.

Business meaning: More value for money is obtained in mid-range devices compared to premium devices.

4. **Discounts do not guarantee affordability**

The MySQL discount analysis and Power BI discount donut chart show that the phones with the deepest discounts are the more expensive phones.

Business meaning: The discounts are simply a marketing tool and do not necessarily mean that the phone is affordable.

5. **RAM is a significant price factor**

The SQL “extra RAM increase” analysis dashboard RAM bar chart confirms that the price increases with the RAM size.

Business meaning: The RAM size is a significant factor in determining the price of the phone.

6. Xiaomi offers the deepest discounts

The price drop analysis query confirms that Xiaomi offers the deepest discounts but still remains a premium product.

Business meaning: Xiaomi offers the deepest discounts to stay competitive in the premium segment of the market.

7. Market demand is for phones with balanced specs

The ROM/RAM dominance analysis confirms that the 4GB-64GB and 6GB-128GB RAM-Storage configurations of the phones are the dominant ones in the market.

Business meaning: The customers prefer the mid-range phones with balanced specs rather than extreme high-end specs.

8**. Samsung is a mid-range brand**

This is confirmed by the SQL averages query and the visuals.

Business Meaning: Samsung is a mid-range brand, and it is neither high-end nor low-end.

9. **There is a significant price gap between the brands**

This is confirmed by the SQL max/min price comparison query.

Business Meaning: The market is highly segmented, catering to both low-end and premium customers.

Business Recommendations (Strategic)

1. **Focus on Mid-Range High-Value Models**

The focus should be on Poco and Itel mid-range models, which have the highest conversion potential.

2. **Improve Pricing Alignment**

The premium brands need to ensure that the price reflects the hardware superiority so that customers do not get dissatisfied.

3. Smart Discounting

There should be discounts on:

a. Overpriced products

b. Slow-moving products

c. Not all products.

4. Bundle instead of price cutting

Offer:

Free accessories

Warranty extensions

Data bundles

To increase perceived value without reducing price.

5. Inventory optimization

More phones in stock with:

4GB-64GB

6GB-128GB

These configurations have the highest demand.

Business Recommendations

Based on the analysis carried out using Power BI, Python and MySQL tools, the final conclusion is that even as Xiaomi leads in terms of premium pricing and storage capacity, Poco and Itel lead in terms of value for money. Mid-range smartphones have better hardware efficiency compared to premium ones. RAM is a major contributor to the pricing of smartphones. Discounts are marketing strategies and do not necessarily mean that the product is affordable.

The Nigerian market is highly segmented, and the demand is high for well-balanced mid-range smartphones. Business strategies should be based on value-based pricing and smart discounting strategies with an emphasis on mid-range smartphones with high specifications. Tools Used