**CELL PHONE**

**Conjoint Analysis Project**

MAR 6936 – Marketing Analytics

Prof. Sajeev Varki

**INTRODUCTION**

There are numerous smartphones available out there in the market. These devices are no longer used just for making phone calls and messaging; as a result, people tend to choose a smartphone according to their need.

Having a domain knowledge is the key element to solve any business problem. We asked few retailers about what factors their customers look while buying a new smartphone.

According to experts, customer focuses on 11 factors:

1. **Phone Brand** (Apple, Samsung, LG, Others)
2. **Battery Life** (<12h, >13h)
3. **Unlock Feature** (Face, Fingerprint)
4. **Camera** (Excellent/Professional, Good, Average)
5. **Price Range** (<=500, 501-1000, >=100)
6. **Storage** (64GB, 128GB, 256+GB)
7. **Preferred Purchase Type** (Instore, Online)
8. **Display Size** (Small, Medium, Large)
9. **Mode of Charging** (Wireless, Wired)
10. **RAM** (6GB, 8GB, 12GB)
11. **Color** (Black, Gray, Other)

According to, [Counterpoint](https://www.counterpointresearch.com/us-market-smartphone-share/), A global industry analysis firm, **Apple** dominates the highest market share 46% in the US and **Samsung** rules 27%. Other companies such as LG, OnePlus, Lenovo combined has 27% market share.

For our analysis, our target audience is **students and professionals** between the **age of 18 to 30**, since **94% of people** between that age range have smartphones.

For narrowing down the factors for our analysis we have selected following attributes:

1. **Preferred OS**: iOS and Android are the most popular OSs
2. **Unlock Feature:** Price of a phone depends on the unlocking feature. Face Unlocking cell phones are usually costlier than just Fingerprint unlocks
3. **Price Range:** Price is deciding factor while choosing a new cell phone
4. **Storage:** Even though cloud storages are popular, people tend to prefer having a good amount of internal storage

The reason for **discarding** other factors:

1. **Battery Life:** Usually these days battery life is 13h+ in all the smartphones
2. **Camera:** Since our target audience are students, they don’t require professional camera
3. **Preferred Purchase Type:** Even though people tend to enquire in-store about the smartphone, they tend to buy it on-line due to promotions
4. **Display Size:** Too many sizes don’t affect theperformance of the product
5. **Mode of Charging:** There are very few new smartphones which provides wireless charging so we decided to not include this factor in our analysis
6. **Color:** It’s irrelevant for our analysis since we don’t have any gender specific survey

We created a ranking survey based on following factors and their specifications:

|  |  |  |  |
| --- | --- | --- | --- |
| **Preferred OS** | **Unlock Feature** | **Price Range (in USD)** | **Storage** |
| Android | Fingerprint | <=500 | 64GB |
| iOS | Face | 501-1000 | 128GB |
|  |  | >=1001 | 256GB |

|  |  |
| --- | --- |
| **Factors** | **Categories** |
| Preferred OS | 2 |
| Unlock Feature | 2 |
| Price Range (in USD) | 3 |
| Storage | 3 |

Thus, we have 2\*2\*3\*3 = **36 profiles** to choose from.

We’ve performed Conjoint Analysis on **10 profiles** which are as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Observations** | **Preferred OS** | **Unlock Feature** | **Price Range (USD)** | **Storage** |
| Profile 1 | iOS | Face | 501-1000 | 128GB |
| Profile 2 | iOS | Fingerprint | >=1001 | 64GB |
| Profile 3 | Android | Fingerprint | 501-1000 | 128GB |
| Profile 4 | iOS | Face | <=500 | 256GB |
| Profile 5 | Android | Face | 501-1000 | 64GB |
| Profile 6 | iOS | Fingerprint | <=500 | 128GB |
| Profile 7 | iOS | Fingerprint | 501-1000 | 256GB |
| Profile 8 | Android | Fingerprint | <=500 | 64GB |
| Profile 9 | Android | Fingerprint | >=1001 | 256GB |
| Profile 10 | Android | Face | >=1001 | 128GB |

Since the first level of each attribute is specified to be 0 (a1=0 in options of Conjoint analysis),

the results of the conjoint analysis demonstrate the following:

* **Android** is defined to be preferred over iOS, with iOS average part-worth of -0.085
* **Fingerprint unlock feature** is preferred over Face unlock feature, with Fingerprint unlock feature average part-worth of 0.169
* **Price below $500** is preferred over price ranges $501-$1000 and above $1001, with price below $500 average part-worth of 0.247 and price above $1001 average part-worth of -0.575
* **Storage 128GB** is preferred over Storages 64GB and 256GB, with Storage 128GB average part-worth of 0.153 and Storage 256GB average part-worth of -0.108

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Utilities (Descriptive statistics):** |  |  |  |  |
|  |  |  |  |  |
| Source | Minimum | Maximum | Mean | Std. deviation |
| Intercept | -5.967 | 13.483 | 5.481 | 3.465 |
| Preferred OS-Android | 0.000 | 0.000 | 0.000 | 0.000 |
| Preferred OS-iOS | -5.333 | 5.167 | -0.085 | 2.465 |
| Unlock Feature-Face unlock | 0.000 | 0.000 | 0.000 | 0.000 |
| Unlock Feature-Fingerprint unlock | -5.867 | 4.467 | 0.169 | 1.881 |
| Price Range (in USD)-501-1000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Price Range (in USD)-<=500 | -5.533 | 6.667 | 0.247 | 2.646 |
| Price Range (in USD)->=1001 | -7.867 | 7.733 | -0.575 | 2.649 |
| Storage-64GB | 0.000 | 0.000 | 0.000 | 0.000 |
| Storage-128GB | -7.983 | 8.633 | 0.153 | 3.037 |
| Storage-256GB | -8.400 | 9.100 | -0.108 | 4.244 |

From the results mentioned above we can conclude that **Profile 3 – Android, Fingerprint unlock feature, Price below $500, Storage 128GB – is the most preferred phone** set of characteristics for 100 people we interviewed.

**The least preferred profile is Profile 10 – OS-iOS, Face unlock feature, Price above $1001, Storage 256 GB.**

From the importance of analysed attributes, **Storage is defined to be the most important factor** to influence the choice of the customer (36.766%), the price is of the secondary importance (33.476%), while OS and unlock feature are 18.277% and 11.481% accordingly.

Chart, pie chart

Description automatically generated

* **Simulated market** (as per Operating System preference, Unlock features, Price Range, Storage)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Product ID | Preferred OS | Unlock Feature | Price Range (in USD) | Storage |
| Product 1 | Android | Fingerprint | <=500 | 64GB |
| Product 2 | Android | Face | 501-1000 | 128GB |
| Product 3 | iOS | Face | 501-1000 | 128GB |
| Product 4 | iOS | Fingerprint | >=1001 | 256GB |

This tool helps us to project a market share for a new product or a brand with a competitive set of other brands or products. This table will assist a manager or a company in the market simulation process to derive a combination of different attributes which will provide an estimate of the market share of various competitive brands or products.

Let’s assume that **Product 4 here is the new hypothetical product** which we plan to launch. Below we have attached tables and graphs showing the market share of the above-mentioned products/Brands.

|  |  |
| --- | --- |
| Market share: | |
|  |  |
| Product ID | Market share (Total) |
| Product 1 | 44.000 |
| Product 2 | 12.000 |
| Product 3 | 16.000 |
| Product 4 | 28.000 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Utilities estimated with method First choice:** | | |  |
|  |  |  |  |
| Utilities / Market share: | |  |  |
|  |  |  |  |
| Product ID | Utilities | Market share | Standard error |
| Product 1 | 0.440 | 44.000 | 49.889 |
| Product 2 | 0.120 | 12.000 | 32.660 |
| Product 3 | 0.160 | 16.000 | 36.845 |
| Product 4 | 0.280 | 28.000 | 45.126 |

Product 1 which consists of an Android operating system, fingerprint unlock, a 64 GB storage, and a price range of $500 - $1000 is the most preferred. It has a market share of 44% whereas product 2 is least preferred by the individuals. Product 4 which we intend to launch has managed to achieve the second highest market share at 28%.

* **What if scenario** *–* While playing with product 4 which is to be launched and running the analysis with different factor combinations, we found out that by offering following configuration to our target customers would increase the market share **of Product 4 from 28% to 33%:**

1. iOS operating system
2. fingerprint unlock
3. price less than $500
4. 256GB storage space

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Simulated market: | |  |  |  |
|  |  |  |  |  |
| Product ID | Preferred OS | Unlock Feature | Price Range (in USD) | Storage |
| Product 1 | Android | Fingerprint unlock | <=500 | 64GB |
| Product 2 | Android | Face unlock | 501-1000 | 128GB |
| Product 3 | iOS | Face unlock | 501-1000 | 128GB |
| Product 4 | iOS | Fingerprint unlock | <=500 | 256GB |

|  |  |
| --- | --- |
| Market share: | |
|  |  |
| Product ID | Market share (Total) |
| Product 1 | 42.000 |
| Product 2 | 12.000 |
| Product 3 | 13.000 |
| Product 4 | 33.000 |

Before running the “what-if analysis” the majority number of individuals preferred product one with a market share of 44%. You can see in the tables below, the results of the first five individuals and the product they prefer before and after the what-if analysis.

Before running What-if analysis

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Utilities (Individual data): | | |  |  |  |
|  |  |  |  |  |  |
| Product ID | Individual 1 | Individual 2 | Individual 3 | Individual 4 | Individual 5 |
| Product 1 | 100.000 | 100.000 | 0.000 | 100.000 | 100.000 |
| Product 2 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Product 3 | 0.000 | 0.000 | 100.000 | 0.000 | 0.000 |
| Product 4 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

After running the What if analysis

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Product ID | Individual 1 | Individual 2 | Individual 3 | Individual 4 | Individual 5 |
| Product 1 | 100.000 | 100.000 | 0.000 | 100.000 | 100.000 |
| Product 2 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Product 3 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Product 4 | 0.000 | 0.000 | 100.000 | 0.000 | 0.000 |

After changing the price factor to less than $500 for product 4, the third individual started preferring product 4 and in the same way, many of the individuals ( shown in the excel sheets) selected product 4 which led to an increase in its market share to 33%.