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Factors Influencing Mobile Phone Purchasing Decision in Delhi

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ABSTRACT

Purpose: Market share of various brands had sharply declined over time and many new entrants had disrupted the market over the observation time period from 2013-2020. This project focuses on analysing the stability of brands market share in Indian mobile phone industry using various indices, Determine the factors that influence the mobile phone purchasing decision among Delhi's people by using principal component analysis and analysing the impact of marketing strategy of various brands on their market share in the mobile phone industry.

Design/Methodology/Approach: Descriptive statistics, Growth Trend, Growth Trend (Year-on-Year), Herfindahl Hirschman Index and Instability Index were used for analyzing the stability of market share over time. Multiple Regression, Principal component analysis, andMultinomial Regression were used for determining the factors that influence the mobile phone purchasing decisions.

Findings: The results show that the mobile phone industry in India is very unstable and has seen various ups and downs since 2013-2020. There's been a drastic decline in market share of Nokia and a n acute increase in market share of Xiaomi. Cheap devices with latest specs may be a reason for rise of Xiaomi in India. The results of survey show us that there are total 13 factors that influence the purchasing decision of an individual and to reduce the number of factors in our model we performed PCA which gave us 5 components that captured the features of all 13 variables in just 5 components.

Paper Type: Empirical Research Paper

KEYWORDS Mobile Phone | Purchasing Behavior | Smartphones | Principal Component Analysis

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Introduction

In the fast-paced technologically evolving world, Mobile Phones have become an essential commodity for all but a significant inclination can be seen among millennials because of their distinctive features which makes things easier and provides access to a gamut of services at hand instantaneously. Mobile phones have become smarter with time and with technological advancements, they have the capabilities of mini computers which a consumer can carry anywhere, anytime. These devices are not only being used for making calls or sending text messages, but with the use of internet, these devices have evolved as ways to connect with friends and loved ones through online mediums such as Facebook, Twitter, WhatsApp, Telegram, etc. along with other audio-video services and other services. Such features differentiate the normal mobile phones from the smart devices that we possess today which are more user friendly and provide more utility to its user.

The Mobile Phone industry is seen as a game changer in terms of growth, demand and technology, with an unprecedented growth, it has already made its mark in the Asian economy with a growth rate of 80% since early 1990's to 2001. With time, this industry has intensified with an increase in number of firms and the model's at offer. China has around 140 mobile phone manufacturers and more than 600 devices available in the market at any time (Motsay,2004). Not only that, India is on the same track and has more than 90 manufacturers competing for the market with around 360 mobile phone models available in market for sale.

Since Manufacturers have realised the potential in Asian markets, they've started to move east and India has been their preferred market and manufacturing destination after China. Indian market has seen an increased entrant in the industry with players such as Apple, Microsoft, Nokia, etc. setting up their manufacturing units in the country. To capture the market, domestic as well as international producers have used different marketing strategies such as promoting their devices as having high-tech features, using celebrity endorsing strategies, etc and have made lucrative offers to attract consumers. To attract consumers, companies have come up with attractive and aesthetic devices in different shapes, sizes, colour and more premium devices which offer customizations.

Mobile phone manufacturers have well understood the importance of factors & have been incorporating such in their marketing & advertising strategies, for example manufacturers are providing the consumers with an option to get custom designs for their phone.

India has got special attention of these manufacturers due to its huge population; the number of smartphone users have grown significantly in the past decade and it is expected to grow further. India is expected to become the largest smartphone market in coming decade following US (Kaushal S. K., 2016). India has seen a growth of 8.8% YoY in past decade and in year 2019 the industry grew at 9.9% with a 14.5% growth quarter by quarter. A total of 6.93 Crore units were consumed in the last quarter which is a 7.7% increase from last quarter.

A report by McKinsey said that If Indian industry start exporting more, then it could create demand for 125 crores more devices by 2025 & create value addition of more than INR 17.4 lakh crore.

Literature Review

With an increasing demand for mobile phones in communication industry, there has been increase in the literature pertaining to various issues related to mobile phone industry & mobile commerce (Barnes and Corbitt, 2003; Siau and Shen, 2003; Scornavacca and Barnes, 2004; Laukkanen and Lauronen, 2005). For example, In a research titled "Mobile Communications: Global Trends in 21st century" by (Kumar,2004), he studied the competitive environment of mobile phone industry by analysing the competitive & rich standards, service providers and device manufacturers, and based on the significant factors then compared the mobile phone markets in US, Europe & Asia. Massoud and Gupta (2003) analyse the consumer acumen & belief towards mobile phones using consumer survey. Disputing that lucrative solutions to e-commerce does not necessarily yield fruitful results in m-commerce. In the similar way, Wen and Mahatanankoon (2004) assess the operating methods and their applications in m-commerce for both industrial & domestic use, Chan & Chen (2003) targeted the trends of online support systems in mobile phone purchasing and deduced five key points that influence any person's mobile phone purchasing decision: Quality of Signal Transmission, Product Shape & Colour, Size & Weight, Price & the associated additional charges, and ease of use. They concluded that a robust online support system can enhance the service experience of customers and can help in increasing the trust among them, luring them to select a particular brand ultimately leading to increased sales.

It is believed that the traditional marketing techniques along with modern factors like new technology, handset design, appearance, size, price & network reception influence the consumer behaviour in mobile phone purchasing decision. A research on consumer behaviour indicated that mobile purchasing decisions are highly influenced by the surrounding people such family, Friends, Colleagues, etc. esp. on which brand to purchase and which model will be best fit for them.

Social & Interpersonal research is being conducted since 1942 when Hyman performed an experiment and explained

the term "Reference Group" when respondents answered questions on by whom they compare the most and are influenced by the most. This term evolved with time and now has an extensive definition – The reference group refers to the groups used by an individual that influences their purchasing attitude in various positions. The reference group not only includes the frequent contacts, but also the group that they do not have a membership or direct contact (Hawkins et al., 1998). Bourne (1957) studied the influence of group on marketing & behavioural research, and concluded that reference group has significant persuasive influence impact on purchasing behaviour.

Reference group from the point of consumer behaviour has been studied extensively and there are many reports published that give a broad definition of the concept. Witt and Bruce (1972) found that factors such as risk perception regarding a purchase, other person's expertise in the area, and societal approval are major influencers of a reference group.

Methodology

Mobile phone was introduced in the Indian market by Motorola in early 1990's and it revolutionised the telephone and communication industry. Initially, the call rates were high and the infrastructure was inadequate. With limited number of mobile phone users, having a mobile phone was considered a privilege and mobile phone users were associated with having high status. The number of firms in the market and devices offered were limited.

Analyse the stability of market share over time

The first step is to analyse the stability and volatility in the mobile phone industry. To understand the market and study the instability & volatility in market share of various companies, we collected secondary data from various sources and we performed various statistical methods to find the instability and growth trend of industry.

To understand the Growth of mobile phone industry, we took data from year 2013-2019 and studied the 6 major industry players in this time period namely Apple, Nokia, Micromax, Sony, Xiaomi and Samsung.

To perform analysis for our first objective, we performed the following statistical measures upon the data collected:

a. Descriptive statistics

b. Growth Trend

c. Growth Trend (Year-on-Year)

d. Herfindahl Hirschman Index

e. Instability Index

Determine the factors that influence the mobile phone purchasing decisions

- Coming to our second objective, that is to determine the factors that influence the mobile phone purchasing decisions of consumers, we performed a primary survey on the consumers in Delhi and collected a total of 156 samples from consumers of all gender, profession and age.
- Upon the data collected, various statistical measures such as:

a. Multiple Regression

b. Principal component analysis, and

c. Multinomial Regression

Were applied and based upon this analysis, we found the factors that were significantly impacting the consumer's mobile phone purchasing decision.

Ordinal Multiple Regression

In order to find the significant variables, we perform multiple regression analysis on our dependant and independent variable.

- **Dependant Variable:** BrandDecision
- **Independent Variable:** we've 16 variables that consumers say impact their purchasing decision. These are:
- Screensize: Screen size of a mobile device
- Processor: Processor Used in the mobile device
- Aesthetics: looks of the mobile device
- OriginCountry: country where the mobile device is assembled/manufactured
- Camera: camera quality of mobile device
- Speaker: Speaker quality of mobile device
- Ram: Memory available in mobile device
- Battery: Battery capacity/backup of mobile device
- Brand: Brand of mobile device
- HandsetPrice: Price of mobile device
- Discount: Discount given on a particular model of mobile device
- GamingCompatibility: Whether mobile device is gaming compatible
- Memory: Storage capacity of the mobile device
- SocialStatus: If you use the device to maintain status in society
- TechnologyUsed: if latest technology used impacts the mobile device
- AfterSalesSupport: how important is after sales support for mobile device

Principal component analysis

Principal component analysis (PCA) is a technique of dimensionality reduction using which we can reduce the number of variables in our model.

By reducing the number of variables to consider in our system, we are reducing the relationships in our variables and preventing our model from overfit.

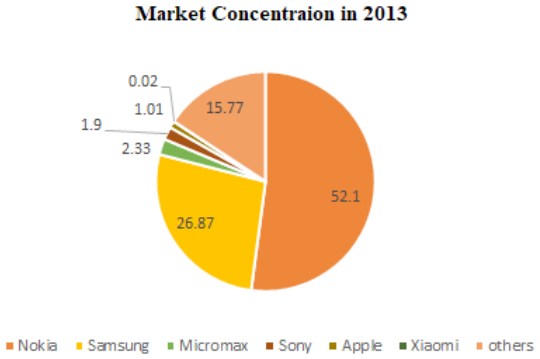
This dimensionality reduction can be achieved in two ways:

a. Either we eliminate the features (Feature Elimination), or

b. We extract the relevant features (Feature Extraction)

Data Analysis

- When we started with the motive to assess the mobile phone industry in India, we considered three major objectives in mind of which the first objective was to analyse the stability of mobile phone market share of companies over time.
- To analyse the mobile phone industry's market share, we used data collected from a secondary source and performed various statistical tests upon it.
- For our data analysis we considered the major players in Indian market which had significantly large market shares in 2013 and the ones which have good market share in last quarter of 2019. So namely the companies in assessment are: **Nokia, Samsung, Micromax, Sony, Apple** and **Xiaomi**, and to take all other companies in Indian market we took a variable "**Other**".
- For initial analysis let's first visualise the data into graphs to understand the trends, from the line graph below we



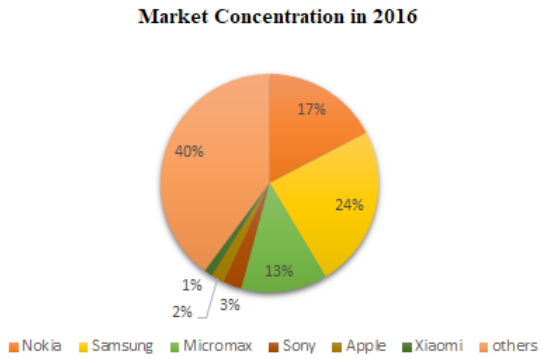


Figure 1 Representation Market share (in %) data of brands

Source: Statcounter.com

Nokia has followed a downward trend in sales and market share has decreased at a fast rate.

- Samsung has maintained its market share quiet impressively and can be seen to have a market share in the range 20% - 30%.
- Micromax has an interestingly good launch into the market and gained market at significant pace in 2014-15 but it had a short lifespan in the market and soon exited the market.
- Sony has been a minor player in India's mobile phone industry has never crosses
- 10% market share mark with a maximum of 9.46% market share.

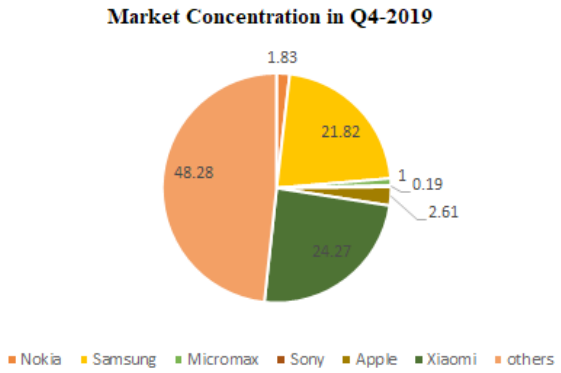


Figure 2 Representation Market share (in %) data of brands

Source: Statcounter.com

- Apple has served the premium segment customers in the industry and has made significant improvements in market share over time but it's market share has also been minuscule.
- Xiaomi which entered the Indian market in 2013 has made a fast growth and has gained a market share of more than 25% in just 5 years of its launch.

It was imperative from the visualization that there has been a constant change in the industry and it needs to be assessed. So, the first test we performed was the simple descriptive statistics test.

We got some interesting outcomes for the observed companies.

- Nokia was a big brand back in early 2000's and was looked upon as a status symbol. It can the go to brand for almost every Indian customer. In its prime, it ruled the market and had almost established monopoly in the market with a market share of 88% in Q4-2012.
- Samsung has had an almost constant market share in the observation period with a small deviation of 5.95 lakh units in sales, and over
- the period it has maintained its market share of above 24%.
- Micromax on an average made sales of around 5 lakh units per year but when we compare its standard deviation, we notice that it is very high for its share. It has shown a degrading over in its market share over time.
- Sony has statistics similar to that of Micromax, it has an average annual sale of around 2.54 lakh units per year and a high standard deviation of 1.9 lakh units which shows us the uncertainty in its sales. It also has shown a degrading market share trend.
- Apple has a separate consumer target segment which is affluent and more design savvy, in that segment apple has made average sales of around 1.74 lakh units per year in the observation period.
- Xiaomi is comparatively a new entrant in the mobile phone industry and has made a name for itself in a very short time span. In the observed time span it has an average annual sales of 5 lakh units and what we need to focus on is the standard deviation here, Xiaomi has a higher deviation in sales than the average an annual sales which is due to low sales in initial year of entering the market and then gaining the market as time passed. It has an increasing sales trend per year with a steep slope. It has progressed over time and in Q4-2019 it had a market share of 24% which was at par with Samsung, which was an early entrant in the industry and a well-established brand.

Trend Growth Rate:

Yearly Trend Growth Rate

Period	Nokia	Samsung	Micromax	Sony	Apple	Xiaomi	Others
2013-19	-14.86%	-6.57%	-27.35%	-16.18%	28.68%	256.79%	19.21%

Table *Growth Trend Rate of market share*

Source: Statcounter.com & Authors computation

The above table gives us the three-year growth trend of each company in observation and from the results we can make some observation such as:

- Nokia has had a negative growth in both time periods in observation. In period 2013-15 Nokia lost around 65.30% of its market share to competitors followed by another market share cut in subsequent period 2016-19 of 89.45% and in observation period 2013-19 it has overall negative growth of 96.49%
- Samsung has shown a similar trend as Nokia but the magnitude of negative growth is small compared to Nokia. In period 2013-15 it lost around 9% of its market share and in period 2016-2019 it lost a 9.3% market share with overall of around 18% of its market share from 2013-19.
- Micromax was a top Indian firm in mobile phone industry and in the period 2013-15 it had a great business and it grew at around 450% in this period but in subsequent period its market share fell 99.18% of the previous period and it had to close its shop in the Indian industry.
- Sony followed similar steps as that of Micromax, in the first period from 2013-19 Sony had a growth rate of around 48% but in later period 2016-19 it had a negative growth of approx. -94% and in the period from 2013-19 it had an aggregate negative growth of -90%.
- Apple has had a very promising growth in the Indian industry which can be seen from the growth trend rate. In first period 2013-15 it had a positive growth of around 80% and in second period 2016-19 it had a further growth of more than 150% with an overall growth rate of around 160% from 2013-19.
- Xiaomi is a new entrant in Indian industry and has grown at a drastic rate in the country. In period 2013-15 it grew 5900% since their entry in Indian market where initially they had a market share of 0.02% in 2012 which grew exponentially. In period 2016-19 it further had a growth of 1800% which made the overall growth from period 2013 to 2019 at 121250% which clearly shows how Xiaomi grew exponentially in Indian Industry.

Herfindahl-Hirschman Index (HHI):

Year	Market Concentration
2010	7101
2013	3621
2016	1802
2017	1114
2019	1410

Table Herfindahl-Hirschman Index for market concentration

Source: Statcounter.com & Authors computation

From the above table we can see that in 2010, the Indian mobile phone industry was highly concentrated and had an HHI of over 7000 which is a very high value of this scale. In 2010, Nokia a dominant player in Indian market with a total control of the industry, it had an 88% market share in the mobile phone sales in the Indian market. But this trend was soon reversed as new and powerful entrants entered the industry.

In 2011, Apple made entry into the market with their premium smartphones. Micromax, Xiaomi entered the industry with cheap devices for the masses. Samsung and Sony entered the market with more consumer centric approach and various other brands entered the prosperous market to take benefit of the increased demand in Indian market. These entrants led to a sharp decrease in the market share of Nokia and making the market less concentrated.

In 2013, the market concentration reduced to 3600 which is a still very high concentration in this industry, this was due to the aggressive strategy of Samsung which had flooded the market with its cheap and affordable devices centred towards the millennials. At this time, Samsung had a major share in the industry and gave strong competition to Nokia.

It was only in 2016 that the industry was finally deconcentrated and had a healthy competition. At this time, it was majorly competed by Xiaomi and Micromax but Micromax later lagged behind.

In 2017, various other brands like OnePlus, Redmi, Oppo, Gionee had entered the industry and further made the environment competitive and further reduced the HHI index to 1100. This a very promising time for Indian consumers as they had the power to choose from the devices and brand that offered them the best product at best price but there was a strong race among the competitors for gaining market share in the market.

By 2019, even though there was a good competition and the market was not concentrated, the HHI index had increased from 1100 to 1400 this was due to the diversification approach of Xiaomi which had launched various child brands into the market by various other names like Redmi, Poco, etc. and making the market less competitive.

From the above table we find that there have been fluctuations/Variations in the market shares of companies in observation which we will discuss below:

- Nokia has a small variation in market share in year 2013-14 and with time this variance has increased with time. As can be seen from above table, Nokia's market share saw high instability in year 2016-17 with a little ease in 2017-18 and again a very high instability in year 2018-19. The instability in year 2019-2020 is very small compared to previous year the reason for such small instability or good stable market for Nokia is that it had already lost more than 99% of its market share and any further loss was negligible because there was a change of ownership and various new devices with latest specifications were launched in order to revive the brand and this strategy has seemed to work in favour of Nokia as whatever market share it had in this year it managed to maintain that share. But when we talk about the overall stability of Nokia in market, it has come down a rough path that high instability in observation period.
- Samsung is a well-known brand in the mobile phone industry and from the above table we can see that it has sporadic fluctuations in its market share in all the periods. But over the time is has maintained its market share with a small instability in its control over the market share.
- Micromax on the other hand can be observed to have high fluctuations in its instability index which can be explained by its short life span in the industry. It had entered the market with a n aggressive strategy and had launched affordable devices that targeted the masses and their sales boomed initially, which explains the high instability in initial periods but over time they lacked on after sales support and it led to their downfall. After 2017, their market share fell to almost zero and from 2017 to 2020 had a rough terrain to sail as their market share fell at a steep rate and they had to shut their operations

Instability Index

	Nokia	Samsung	MMX	Sony	Apple	Xiaomi	Other
2013-14	1.69	1.69	4.15	3.13	5.88	20.90	4.67
2014-15	3.20	3.06	3.02	9.72	4.32	40.13	4.44
2015-16	3.41	1.78	2.05	3.63	6.20	6.91	0.91
2016-17	6.50	3.72	3.09	5.10	9.19	20.39	3.37
2017-18	4.77	1.19	2.19	2.56	5.74	3.87	1.23
2018-19	9.64	1.29	5.05	5.46	7.42	5.70	1.05
2019-20	2.42	2.76	5.02	8.96	5.51	2.34	2.11
Overall (2013-2020)	6.54	5.51	6.67	7.50	6.41	21.65	3.22

***Table** Instability Index of market share*

Source: Statcounter.com & Authors computation

The above table gives us an index known as Instability Index; it measures the volatility in market to give us how the dynamics in industry has caused the changes in industry.

in Indian industry. This trend can be clearly observed in their overall high instability index.

- Sony is a well-known brand that excels in music devices, Sony had entered the Indian mobile phone industry with their Walkman series which was a big hit but over the time, but their strategies to capture the Indian market failed miserable & their popularity shrunk as their devices were overpriced and uncompetitive.
- Apple entered Indian market in 2011 with their iPhone 3G which was a premium device of that time. They targeted the high-income consumers in the industry and made an image of a reliable & consumer centric brand. In year 2013-14 they can be observed to have high instability in their market share, this instability can be explained by their launch of first affordable iPhone 5C & iPhone 5S which were a grand success. People in India associated apple with a brand that relates to prestige and hence bought more apple devices which were now being offered at affordable prices. This led to an increased popularity and more demand for apple products. Another high instability was again be seen in year 2018-19 when they launched iPhone SE which was yet another affordable smartphone from apple, along with this they changed their iconic design of their premium smartphones and launched iPhone X with complete bezel less screen that attracted consumers from both segments, upper middle class and upper class leading to increased sales of their devices.
- Xiaomi is among the latest entrants in Indian mobile phone industry and has the most aggressive strategy to acquire the market share. It entered India in 2012 with cheap phones with latest tech specs which attracted the Indian youth towards it. They entered Indian market with their Xiaomi Mi-1 device which at that time had the latest specs that matched the smartphones of range thrice the cost of a Mi-1 device. This led Indian youth to buy Xiaomi. The consumers liked the high processing power offered by these devices at dirt cheap prices and this was a grand success. They acquired a market share of 10% in their first year of launch and gained 18% market segment in subsequent years. When we look at overall stability of Xiaomi, we see it has the highest Instability index of all the other brands this mainly is due to the devices they offered and the efficient way they advertised their offerings.

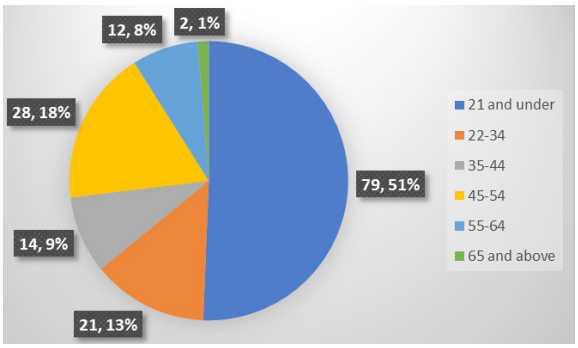
Determine the factors that influence mobile phone purchasing decisions

In order to determine the mobile phone purchasing factors, we collected primary data from people of different age, educational background, Profession, income, etc. We collected a total of 156 samples and on the basis of that we performed our factor analysis and principal component analysis to determine the factors.

Demographic Analysis:

Age of respondents:

Table 1 Age Distribution of Respondents



Source: Authors computation

We had a total of 156 respondents of which were from various age groups as shown in the chart. I took responses from all age groups. In our data, 51% of the respondents are youngsters under 21, 13% of the respondents are from age 22-34 year, 9% are from age group 35-44 year, 18% are from age group 45-54 years 8% are from age group 55-64 years and 1% are above 65 years of age.

Gender Division:

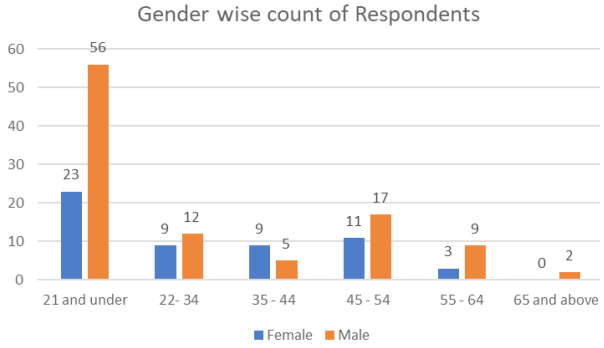


Figure 3 Gender division of respondents

Source: Primary Survey

While collecting data, we included both genders in almost all age categories. We collected a total of 156 samples from 6 are groups with a total of 55 females and 101 males. Most of the females and males were below 21 of age.

Educational & Salary analysis:

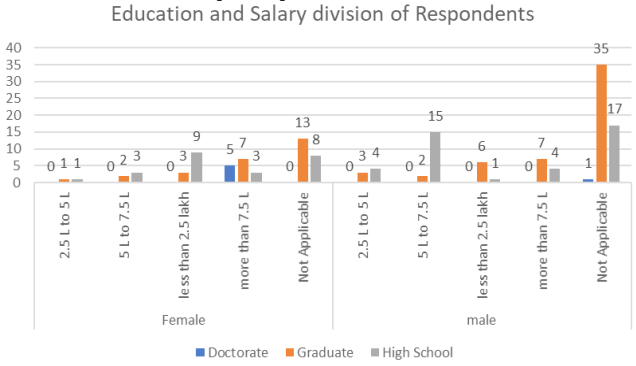


Figure 4 Education and Salary division of the Respondents

Source: Primary Survey

While conducting the survey, we collected data from all kind of people ranging from uneducated, High School, Graduates, Doctorates. In our sample, we have 12 respondents with Doctorate, 79 having a graduate degree or pursuing a graduation and 65 respondents with a high school level education.

In the survey, we took their income estimates as well and found that 38% of females were not earning while 52% of males were not earning anything and yet possessed a mobile phone. In case of females, some were house-wives and some were students but in case of males mostly were students with some having hardship in finding jobs and looking for it.

Ordinal Multiple Regression Analysis:

In the study, we've considered 13 independent variables which are considered to influence the mobile phone purchasing decision. To perform the regression analysis on the data, we first checked for correlation between the factors to check for multicollinearity and no high correlation was found so we proceeded with our analysis.

	Coef.	Std. Err.	p>|t|
Screensize	0.9165465	0.997441	0.032
Processor	-1.5165151	0.975788	0.044
Aesthetics	1.5165211	0.601361	0.153
Origin Country	-1.0263541	0.233982	0.137
Camera	2.475399	0.62378	0.015
Speaker	0.325495	0.571687	0.049
Ram	1.957852	0.659627	0.029
Battery	0.685475	0.605586	0.018
Brand	0.691723	0.221142	0.047
Handset Price	-2.3219785	0.517698	0.001
Discount	0.953642	0.74402	0.021
Gaming Compatibility	0.3975124	0.066468	0.183
Memory	1.482685	0.240752	0.036
SocialStatus	1.059635	0.735353	0.021
Technology Used	-1.861549	0.090333	0.028
After Sales Support	-0.712965	0.438614	0.019
_cons	0.0274547	0.311494	0.009
Dependant Variable	Brand Decision		
Pseudo R2	0.088		
Log-Likelihood	-204.86		

Table *Ordinal Regression of Brand decision w.r.t. Independent*
Source: Field Survey & Authors computation

From the above table we can see that there are 13 variables that are significant and influence the mobile phone purchasing decision in Delhi. Out of 16, Aesthetics, OriginCountry and Gaming Compatibility does are insignificant and we ignore these variables in further analysis.

Marginal Effect of Independent variables on our Dependant variable:

The Signs of these marginal effect tell us impact of a unit change in the factor under on the choice of the brand. For example, an increase in ScreenSize of a mobile device will lead to lesser chance of users selecting an apple phone whereas an increase in ScreenSize of Samsung, Vivo and Xiaomi will increase the chance of users buying these devices.

Hence, depending upon the sign of marginal effect we can get how the probability of a brand getting selected changes with there's one-unit increase in an independent variable.

Dimensionality Reduction:

The motive of our study is to determine the factors that influence the mobile phone sales, in order to get that we performed Principle component analysis on the primary data. The factors that are considered for PCA are:

- Screen Size: Screen size of device
- Processor: Processor used in device
- Camera: Camera quality in device
- Speaker: Speaker quality in device
- Ram: Ram size in device
- Battery: Battery quantity and backup
- Brand: Brand value
- Price: Price competitiveness
- Discount: Discount offered on device
- After Sales Support: Service provided by brand
- Technology: Tech used in device
- Memory: Internal memory provided
- Social Status: Social Status associated with brand

To check for sampling adequacy, we performed KMO test and found the following result:

Kaiser-Meyer-Olkin Measure of Sampling Adequacy:
KMO = 0.719

Which is a good measure so we decided to proceed with PCA.

Summary of factors:

To test for correlation between the factors we computed the correlation matrix that shows how much a factor is associated with the other. From the above table we can clearly

see that the factors are not strongly related to each other and we can proceed for PCA process.

Principal Component Analysis:

We get five factors that have eigen value greater than 1 and only these components will be used in analysis. There are five components into consideration and only the factor loading with value greater than 0.3 are being considered. The principal component loading of our components and the factors which give us the measure of each factor that goes into each component calculated by PCA.

Based upon these loadings we finally predict the principal components for our model based on the loading scores calculated.

Scoring coefficients for orthogonal varimax rotation
sum of squares(column-loading) = 1

Variable	Comp1	Comp2	Comp3	Comp4	Comp5
Screensize	0.3951	0.1136	0.0395	-0.2301	0.1040
Processor	0.0129	0.4654	0.3017	-0.2288	-0.2136
Camera	0.5401	0.0316	0.0221	-0.1188	-0.0538
Speaker	0.5163	0.0921	-0.1649	0.0355	0.1508
Ram	0.0244	0.5796	-0.0098	0.1528	0.0845
Battery	0.1644	0.4590	-0.0399	0.1817	0.0498
Brand	0.3888	-0.2707	-0.0539	0.4136	-0.2526
Handsetprice	0.1144	-0.0416	0.1341	-0.0185	0.6643
Discount	0.1835	-0.3392	0.4114	0.0254	0.2484
Aftersales~t	-0.0578	0.0279	0.2464	0.4193	0.2604
Techused	0.2052	-0.0831	0.3649	0.0560	-0.5213
Sociastatus	-0.1014	0.0708	0.7026	-0.0012	0.0136
Memory	-0.0650	0.1076	-0.0193	0.6870	-0.0410

Figure Orthogonal Varimax Rotation matrix for components and factors Source: Authors computation

After the calculation of orthogonal rotation matrix, we get 5 Principal Components which contain all features from all 13 of our original factors and we reduce our components from 13 to 5 easing the computation expenses and processing times.

So, from the above PCA, we get 5 components which can be used in place of 13 original factors and we can state our model as:

$$Y = \theta_0 + \theta_1 * pc11 + \theta_2 * pc22 + \theta_3 * pc33 + \theta_4 * pc44 + \theta_5 * pc55 + \mu$$

Multinomial Logistic Regression:

From the survey, we found that people are influenced by other people while choosing a brand based upon past experience of a user so to find how many socio-economic factors affect our respondents, we performed a multinomial logistic regression.

There is considerable difference in respondents taking a purchasing advice from other people as from 1-unit salary increase the multinomial log likelihood of no relative to maybe decreases by 0.34 units stating that people are less likely to take purchasing advice from others if their salary increases by 1 unit.

The multinomial log likelihood is expected for no relative to maybe when

- *Sal* is a multinomial logit estimate for one-unit increase in salary for not taking advice to maybe taking advice keeping other variables constant. People are more likely not to take advice from others if they are earning well, for every 1-unit increase in salary please a person is less likely to take advice from others by 0.34 units keeping all other factors constant
- As people get old, they are more likely to purchase devices advised by others

- As education level increases among the people, they are more likely to take advice before purchasing mobile device.

Similarly, when we consider the multinomial log-likelihood of Yes relative to Maybe, we notice that

- As the people's salary increase by 1 unit their multinomial log-likelihood is expected to increase by 0.53 unit while holding all other variables in the model constant.

	Log Likelihood	**-104.84482**	**Pseudo R2**	**0.161**
	purc_advise	Coef.	std.err	p>|z|
No	sal	-0.34	0.3	0.029
	occu	0.18	0.61	0.408
	Gender	0.58	1.18	0.323
	Age	2.28	0.59	0.045
	educ	0.58	0.32	0.026
	other_source	0.94	0.14	0.146
	_cons	3.66	0.38	0.032
Yes	sal	0.53	0.24	0.021
	occu	0.22	0.43	0.137
	Gender	-0.52	0.48	0.283
	Age	-0.66	0.36	0.412
	educ	0.8	0.51	0.251
	other_source	0.14	0.61	0.22
	_cons	3.45	2.5	0.001
Maybe				

Table Multinomial log-likelihood for purchasing advise
Source: Field Survey & Authors computation

Impact of Covid-19 on Mobile Phone industry and Market

Statistics for the First quarter of 2020 are released by various global mobile phone manufacturers, though they have different models & features to offer one thing that they all have in common is that their decline in demand and decline in production of mobile phones.

Global smartphone shipments have declined at a steep rate of 13% YoY and has reached 250 million units in Q1-2020. This is the first time after Q4-2013 that the production has come below 300 million units in any quarter.

This decline has come from all the economic regions like ***APAC, LATAM, Europe & North America*** but its impact was very significant when looked at from country's perspective. As china was the epicentre of the pandemic, it recorded -26% decrease YoY production of mobile phones in the quarter. Many companies had to stop production due to Covid-19 leading to shortage of components and accessories for various brands. Many of the manufacturers shifted to Indian manufacturers to fulfil their requirements and this led to increase in mobile phone production in India which grew at 5% in the quarter, similar growth was seen in Russian where mobile phone industry grew at 8% YoY in the quarter.

What's interesting is that Apple managed to maintain its inventory and production even in the pandemic due to various new factories set up in India and other developing countries. Its overall production declined 5% in the quarter compared to other manufacturers which had to shut operations due to covid-19 pandemic.

Xiaomi on the other hand grew at 7% in the quarter due to their aggressive expansion across the globe. Their investments in various countries paid off as it helped them in continuing their production even in the pandemic outbreak.

Samsung is among the worst hit manufacturers in the industry with 19% decline in production and demand for their products.

Feature phones production has also declined in the pandemic by 12% annually in with just 84 million units being produced in Q4-2019 but demand for feature phones grew surprisingly by 9% in Middle East countries which alone reported for 41% of the overall demand amid pandemic.

Indian mobile phone industry was heavily dependent on china for raw material, components and other cellular accessories like earphones, chargers and charging cables. In the first quarter of 2020, India saw a 15% drop in overall components required in a smartphone. This shortfall was due to the shutdown in china in the first quarter and the mobile phone industry is a JUST-IN-TIME industry and hence has a very low inventory when compared to other industries.

Industry is expected to have had a hit of around $2 Billion (Rs. 15,196 crores) due to declined shipments in the month of March and April due to nationwide Lockdown, the impact was mild during the two months and has worsened since then as the pandemic has stopped international movements of freights and carriers across the globe.

Indian mobile phone industry has seen a decline of 3% as total production declined from 158 million units to 153 million units. The industry was already facing a tough time because to give boost to "*Make in India*" initiative the government has increased import duty on all kind of mobile phone components and accessories which led to increased production price and more burden on consumers pocket.

But due to halted mobile phone/Component manufacturing industry in China, India's industry has seen a demand in production of various smartphones and their components, this has led to decrease in domestic sales but increased export for the industry.

This boost in international shipments was before the complete lockdown was announced in Indian on 24 March, after that, the Indian industry's scenario changed and took a U-turn. The production halted in India and zero shipments were made in lockdown period as all the factories were shut.

The period of lockdown saw a decline of 19% in smartphone shipments. As the factories are shut, retail shops and E-commerce were closed for non-essential items the demand came became zero. As the month of April and May saw zero demand amid lockdown, Q2-2020 is going to be a tough challenge for the industry. If they plan to restart production, they'll have to:

- Create demand, as most people are not willing to spend and are in a mood to save their money for future
- Face acute labour shortage as skilled, semi-skilled & unskilled labour is gone due to covid-19
- Restart the production process with limited resources leading to longer production time, delayed deliveries and increased cost
- Restarting the production will take more than 3-4 weeks as machines need to be overhauled, and
- Create a conducive environment for the customers to make purchases.

The hardest challenge for the industry to restart is for them from the demand side. The demand is not expected to be optimistic as the people don't enough cash to spend and are saving for future. For economy to recover and the demand to increase, government will have to intervene and will have to give more money into the hands of people through open market operations.

Conclusion

Nokia has seen an overall decrease in market share of above 96% since 2013, Samsung has also lost 18% of its market share, Micromax lost 67%, and Sony lost 90% of its market share from 2013-2019. On the other-hand Apple grew in market its market share by 158% in the period and Xiaomi which is an absolutely new entrant in 2012 grew its market share by 121250% from 2012 to 2019.

HHI market concentration index found that in year 2010 the market was highly concentrated, had low competition and was controlled by Nokia but over time this concentration reduced and market became more competitive. In mere three years from 2010 to 2013, the HHI index fell by more than half from 7800 to 3600 and by this time the market had two major players i.e. Nokia and Samsung which were now controlling the market. But soon new entrants came and the market got decongested and competitive with an HHI index of as low as 1100.

Instability Index found that since 2013 Nokia had a very unstable market and its market share has seen constant ups and downs (with more downs than ups), Samsung has a relative low instability indexes in observation period while Micromax had seen very acute instability in many periods which led to its downfall. Also, Sony had a very rough terrain in market as its instability index was very high over the period and further analysis showed that it had been losing market in past. Apple and Xiaomi also had very unstable market but the trend growth rate that these two brands had was in the reverse direction to that of previous four, these two brands were gaining market share at very steep rate while others were losing their market.

Hence from the results of these Indices, we find that the mobile phone industry market has been very unstable in India.

The primary survey found that there are the 13 factors that influence mobile purchasing decision in Delhi, to reduce the dimension of our model we performed principle component analysis which is a technique of dimensionality reduction upon the collected data and then processed the data to reduce the features from 13 to just 5, these 5 components contain all the features of our 13 variables in standardised format and hence will save computation time and resources.

Bibliography:

- Masay Sata (2013): "Factors Affecting Consumer Buying Behavior of Mobile Phone Devices", *Mediterranean Journal of Social Sciences*
- Yang & Kim (2012): "Mobile shopping motivation: an application of multiple discriminant analysis", *International Journal of Retail & Distribution Management*
- Shabrin et. Al. (2017): "Factors Affecting Smartphone Purchase Decisions of Generation-Y", *The Journal of Contemporary Issues in Business and Government*
- Vishesh Et. Al. (2018): "Factors affecting consumer buying behaviour towards mobile phones", *Journal Of Management*
- Vashisht, Anil (2013): "Study of Factors Influencing Smart Phone Purchase by Consumers in Gwalior City", *International Journal of Science and Research (IJSR)*
- Arnold & Reynolds (2003): "Hedonic shopping motivations", *Journal of Retailing*
- Hazarika et.al. (2019): "A comparison of hedonic and utilitarian digital products based on consumer evaluation and technology frustration", *Journal of Information Systems and Technology Management – Jistem USP*
- Dziwornu (2013): "Factors Affecting Mobile Phone Purchase in the Greater Accra Region of Ghana: A Binary Logit Model Approach", *International Journal of Marketing Studies*

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Annexure 1

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Reviewers Comment

Reviewer's Comment 1: For determining the factors influencing the mobile phone purchasing decisions of the consumers, the author surveyed 156 samples in Delhi, which is a smaller sample. Therefore the results of the study cannot be generalized for a larger sample.

Reviewer's Comment 2: The title of paper is quite interesting. Mobile Phones have become an essential commodity for all but a significant inclination can be seen among millennial because of their distinctive features which make things easier and provide access to a gamut of services at hand instantaneously. Therefore it is quite significant to study the factors influencing mobile phone purchasing decision.

Reviewer's Comment 3: The paper is rich in literature. Also it has been presented in a structured manner. The use of tables and pictures make it more presentable and easy to understand.

Citation

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Editorial Excerpt

The article has 0% of plagiarism which is the accepted percentage as per the norms and standards of the journal for the publication. As per the editorial board's observations and blind reviewers' remarks the paper had some minor revisions which were communicated on a timely basis to the authors (Chander & Akhil) and accordingly all the corrections had been incorporated as and when directed and required to do so. The comments related to this manuscript are noticeably related to the theme "**Mobile Phone Purchasing Decision**" both subject-wise and research-wise.: The present research article finds analysing the stability of brands market share in Indian mobile phone industry using various indices, Determine the factors that influence the mobile phone purchasing decision among Delhi's people by using principal component analysis and analysing the impact of marketing strategy of various brands on their market share in the mobile phone Industry. Overall, the paper promises to provide a strong base for the further studies in the area. After comprehensive reviews and editorial board's remarks the manuscript has been categorised and decided to publish under "**Empirical Research Paper**" category.

Acknowledgement

The acknowledgment section is an essential part of all academic research papers. It provides appropriate recognition to all contributors for their hard work and effort taken while writing a paper. The data presented and analyzed in this paper by (Chander & Akhil) were collected first handily and wherever it has been taken the proper acknowledgment and endorsement depicts. The author is highly indebted to others who had facilitated in accomplishing the research. Last but not least endorse all reviewers and editors of GJEIS in publishing in a present issue.

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