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Factors Affecting the Choice of Mobile Phones: A Factor Analysis Based on Pilot Study

Anupama Chirag Dave¹

Research Scholar, Gujarat university.

Asst. Professor, Marwadi Education Foundation's Group of
Institution, Rajkot, GujaratDr. Mamta Brahmhatt²

Ph.D. Supervisor/Guide-- Gujarat University

Associate Professor, B.K. School of Business Management
Department of Gujarat University, Ahmedabad, Gujarat

Abstract: Purpose: Mobile phone choice is affected by enormous factors but major shift has been observed in priority of these factors over the period of time. Once owning of mobile was considered to be a matter of prestige and status while today it's just a device which serves our basic functions of day to day life. This paper has focused 30 such factors which have been considered as very important in past empirical studies. The paper tries to investigate upon the relative significance of these factors and thereby analyze the influence of age and gender on the significant factors.

Design/Methodology/Approach: Data has been gathered from 105 respondents via a structured questionnaire. SPSS has been used for analyzing the data and Principle Component Analysis has been performed to find relative importance of these factors. Influence of age and gender on the principle component has been measured using Two Way ANOVA.

Findings: The analysis has fragmented 30 items into 6 components which account for 74.85 % of variance in buying behavior for mobile phone. Analysis has revealed that age and gender did not have any significant effect on these factors but interaction of age and gender had influence on them.

Keywords: Factor analysis, Factors affecting, Mobile phone, Two-way ANOVA

I. INTRODUCTION

The Indian mobile industry is the fastest growing in the world and India continues to add more mobile connections every month than any other country in the world. According to the survey by Ficci -EY the demand of domestic market for mobile handsets is expected to cross 300 million devices in 2015 and while locally only 46 million devices are manufactured. The following table & graph shows the scenario pertaining to mobile phone users in India.

TABLE: 1

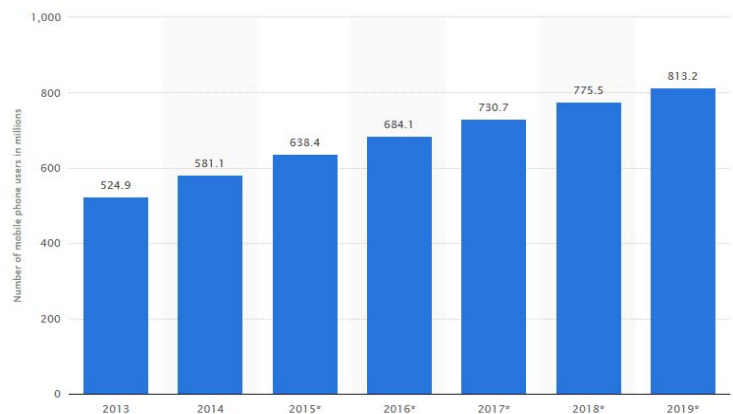
Top 25 Countries, Ranked by Smartphone Users, 2013-2018 millions						
	2013	2014	2015	2016	2017	2018
1. China*	436.1	519.7	574.2	624.7	672.1	704.1
2. US**	143.9	165.3	184.2	198.5	211.5	220.0
3. India	76.0	123.8	167.9	204.1	243.8	279.2
4. Japan	40.5	50.8	57.4	61.2	63.9	65.5
5. Russia	35.8	49.0	58.2	65.1	71.9	76.4
6. Brazil	27.1	38.8	48.6	58.5	66.6	71.9
7. Indonesia	27.4	38.3	52.2	69.4	86.6	103.0
8. Germany	29.6	36.4	44.5	50.8	56.1	59.2
9. UK**	33.2	36.4	39.4	42.4	44.9	46.4
10. South Korea	29.3	32.8	33.9	34.5	35.1	35.6
11. Mexico	22.9	28.7	34.2	39.4	44.7	49.9
12. France	21.0	26.7	32.9	37.8	41.5	43.7
13. Italy	19.5	24.1	28.6	32.2	33.7	37.0
14. Turkey	15.3	22.6	27.8	32.4	37.2	40.7
15. Spain	18.9	22.0	25.0	26.9	28.4	29.5
16. Philippines	14.8	20.0	24.8	29.7	34.8	39.4
17. Nigeria	15.9	19.5	23.1	26.8	30.5	34.0
18. Canada	15.2	17.8	20.0	21.7	23.0	23.9
19. Thailand	14.4	17.5	20.4	22.8	25.0	26.8
20. Vietnam	12.4	16.6	20.7	24.6	28.6	32.0
21. Egypt	12.6	15.5	18.2	21.0	23.6	25.8
22. Colombia	11.7	14.4	16.3	18.2	19.7	20.9
23. Australia	11.4	13.2	13.8	14.3	14.7	15.1
24. Poland	9.4	12.7	15.4	17.4	19.4	20.8
25. Argentina	8.8	10.8	12.6	14.1	15.6	17.0
Worldwide***	1,311.2	1,639.0	1,914.6	2,155.0	2,380.2	2,561.8

Note: individuals of any age who own at least one smartphone and use the smartphone(s) at least once per month; *excludes Hong Kong; **forecast from Aug 2014; ***includes countries not listed
Source: eMarketer, Dec 2014

Source: www.emarketer.com

GRAPH: 1

Number of mobile phone users in India from 2013 to 2019 (in millions)



Source: Statista 2015

This growing demand highlights the importance of the device in life of people. Previously it was price which affected the choice of mobile phones as then it was a product of luxury, but today owing to high competition various cheap options with same features are open for consumers. Hence understanding the factors that influence the buying intention of this device is of an at-most importance owing to shift in buying patterns of consumers from marketers perspective. This research aims at uncovering the opinion of respondents pertaining to priority given by them for such factors.

II. LITERATURE REVIEW

Aftab Uddin, M., Xu, H., & Tahlil Azim, M. (2015) explored the factors that were affecting mobile handset buying pattern among 21 items that were identified from previous literature. Responses were collected from 432 people using convenience and snowball sampling techniques. Factor analysis was performed on 21 items, KMO was 0.869 which means the sample were adequate to perform factor analysis. Through factor loading the findings reveal that seven features i.e., physical attributes, brand image, uniqueness, emotional appeal, ease of operation, social identity, and price, turn out to be the major determinants of purchase decision.

Alshurideh M. et al.(2015) tried to examine influence of Behavioral Perspective Model (BPM) which consisted of variables physical setting, social setting, temporal setting and regulatory setting on mobile brand choice. Data was gathered from 410 respondents using structured questionnaire, hypothesis were tested using multinomial logistic regressions. The analysis revealed that among the four variables it was regulatory and social setting that affected mobile brand choice. In regulatory setting it was warranty condition and after sale service, phone warranty duration was a parameter of temporal behavior setting factor which influenced mobile brand choice. While in physical setting it was sales person explanation, friend opinions and recommendations that played a vital role in influencing mobile brand choice.

Sama R. & Jani M (2014), aimed at investigating consumer buying motives in mobile phone markets, using non-probability convenience sampling data was gathered from 190 customers. The result signified that while price and properties were the most influential factors affecting the purchase of a new cell phone, audibility and friends' recommendation were regarded as the prominent factors in the choice of the mobile phone operator.

Uddin, M. R., Lopa, N. Z., & Oheduzzaman, M. (2014), conducted a research to uncover factors that could affect the buying behavior of customers living in Khulna city. Data was collected from 160 respondents via a structured questionnaire. To extract the major factors influencing the buying decision of people factor analysis was conducted on the data. Kaiser-Mayer-Olkin (KMO) measure of sampling adequacy was applied to determine the suitability of using factor analysis, KMO score was 0.877 which indicated that data was adequacy for testing. The result of factor analysis showed 'physical attributes' as a prominent factor influencing the buying decision which accounted for 30.99 percent of total variance in customer decisions of mobile purchasing. Physical attributes included variables such as physical characteristics of mobile phone like camera, Bluetooth, color, weight and others.

Sata M & Belete S. (2013), tried to investigate the factors affecting the decision of buying mobile phone devices a sample of 246 consumers were taken by using simple random sampling technique. Correlation and multiple regression was done on the data to find the relationship of factors affecting mobile purchase decision. The results revealed that all factors have a positive and significant relationship with the decision to buy a mobile phone. Though the degree of correlation was different e.g. price (0.900) followed by product feature (0.876) durability (0.557) and brand image (0.555). Regression analysis revealed that all the six independent variables (price, social influence, durability, brand name, product feature and after sales service) combined significantly influence the consumers buying decision of mobile phone devices. The leading factor is price followed by product features and durability.

Akarte, A, & Amishi, A. (2012), aimed at understand different aspects of rural consumer in comparison with urban consumers buying behaviour. The study considered five major parameters like functions, price, quality, brand, style and current

trends. Data was collected from 400 mobile users, 200 from rural and 200 from urban via convenience and judgement sampling method. Independent t-test is used for analysis and it was revealed that rural consumers are less motivated by functionality and brand of mobile phone while making a buying decision as compare to their urban counterparts.

Singh, J., & Goyal, B. B. (2009) conducted a survey to understand the variation in importance to be given to various factors by different age and gender group. Sample was gathered from 240 respondents via convenience sampling method and two-way ANOVA was applied for the data analysis to draw conclusion. The study concluded that people in the age group of 18-30 years were less price sensitive for them 'physical appearance', 'brand', 'value added features', and 'core technical features' were more important. While those in the age group of 50 years and above have given greater importance to 'price'. Results of ANOVA proved that all the variables under study were independent as none of them were affected by age, gender nor its interaction.

Mallenius, S., Rossi, M., Tuunainen, V.K (2007) in a research aiming at identifying factors that determine the adoption and usage of mobile devices and services by elderly population. Data for research was collected using a semi-structured interviews with persons who represented different focus groups: mobile device manufacturers, mobile operators, voluntary organizations aiming at educating elderly people, public and private home care and nursing homes, as well as welfare development institutions. Interview was counted among 16 persons, including four males and twelve females. The interviews revealed that functional capacity plays a very vital role in case of elderly people and hence mobile should have such capacity that they are able to understand it and use properly. Mobile phones offer some sense of security to elderly people leading to purchase of mobile phones, from interviews it was observed that many a times children buy mobile phones to their elderly parents, but the devices are unfortunately often left in drawers because of the usability problems. Thus, the results of our study indicate that elderly people are interested in using mobile phones and services, but these services need to deliver real value for them.

III. HYPOTHESIS

Ho: Age has no significant effect on principle component influencing the buying decision of mobile handset

Ho: Gender has no significant effect on principle component influencing the buying decision of mobile handset

Ho: Age and Gender interaction has no significant effect on principle component influencing the buying decision of mobile handset

IV. OBJECTIVES OF STUDY

This study was conducted to identify the major factors that affect consumers decisions while buying mobile phone. It also tried to examine the impact of age, gender and its interaction on the principal components which influenced the buying decision of mobile phones.

V. RESEARCH METHODOLOGY

The study aimed at identify the factors that are very crucially considered by customers while selecting their mobile phones. Data was collected from both primary and secondary sources. From secondary sources i.e. past literature and empirical data factors which influence buying decision of mobile phones have been adopted for study. On basis of identified factor a structured questionnaire with five point likert scale was used to collect the opinions of respondents. Responses have been gathered from 105 respondents using convenience sampling method. The data was collected for the purpose of pilot study for thesis .Factor analysis was applied with SPSS to identify principal component among the 30 variables under study. Two Way ANOVA was performed to identify relationship of age and gender on the principal components identified via factor analysis. The approach was chosen to understand both main independent impacts as well as interaction effects of demographic variables i.e. age and gender.

VI. ANALYSIS & RESULTS

The data presented in the Table 1 - indicates demographic profile of the respondents. Age analysis of respondents indicates that most of the respondents fall in the age group 25-35, number of males and female in the survey was almost equal and occupational bifurcation shows that majority of them belonged to service category followed by professional category. Most of the respondents were post graduate and maximum respondents were having income of more than 40,000 p.m.

TABLE: 2

Demographic characteristics of respondents

Age of respondent	Classification	Frequency	Percent
	15-25	40	38.1
	25-35	57	54.3
	35-45	7	6.7
	55 and more	1	1
	Total	105	100
Gender of respondents	Classification	Frequency	Percent
	Male	53	50.5
	Female	52	49.5
	Total	105	100
Occupation of respondent	Classification	Frequency	Percent
	Student	28	26.7
	Service	42	40
	Professional	29	27.6
	Business Man	5	4.8
	House wife	1	1
	Total	105	100
Educational Qualification of respondents	Classification	Frequency	Percent
	Under graduate	9	8.6
	Graduate	23	21.9
	Post Graduate	73	69.5
	Total	105	100
Income (p.m.)	Classification	Frequency	Percent
	Less than 10,000	3	2.9
	10,000-20,000	10	9.5
	20,000-30,000	15	14.3
	30,000-40,000	9	8.6
	40,000 or more	68	64.8
	Total	105	100

Source: From analysis of primary data

KMO and Bartlett's Test:

Appropriateness of factor analysis is to be assessed before performing analysis which has been done using Kaiser-Mayer-Olkin (KMO) statistic. The KMO measures the sampling adequacy which should be greater than 0.5 for a satisfactory factor analysis to proceed. From the table 2 value of KMO has been obtained as 0.887 which is acceptable as it indicates that pattern of correlation are relatively compact and factor analysis can yielded distinct and reliable results. Barlett test result is significant ($P < .0001$) represent that factor is acceptable.

TABLE: 3

KMO and Bartlett's Test for factors affecting mobile phone buying decision

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.887
Bartlett's Test of Sphericity	
Approx. Chi-Square	2793.053
df	435
Sig.	.000

Principal component analysis (PCA) involves a mathematical procedure that transforms a number of possibly correlated variables into a smaller number of uncorrelated variables called principal components. The principal component analysis (PCA) was carried out to explore the underlying factors associated with 30 items. Before extraction 30 items were identified in the data set and after extraction only those component having eigen value of 1 or more than 1 has been identified (Table 3: Total Variance Explained).

TABLE:4

Total Variance Explained

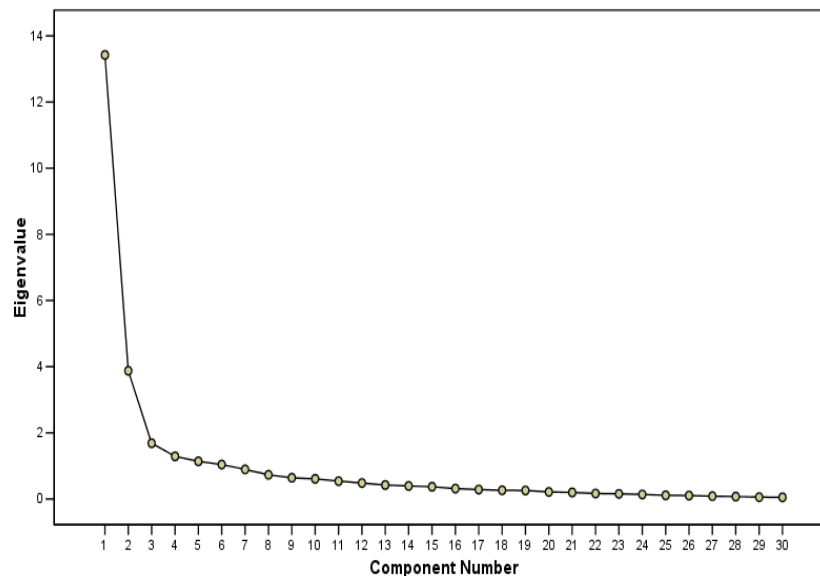
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	13.424	44.746	44.746	13.424	44.746	44.746	9.479	31.597	31.597
2	3.876	12.92	57.666	3.876	12.92	57.666	4.581	15.269	46.866
3	1.686	5.62	63.286	1.686	5.62	63.286	3.557	11.857	58.724
4	1.289	4.297	67.582	1.289	4.297	67.582	2.221	7.403	66.126
5	1.139	3.795	71.377	1.139	3.795	71.377	1.43	4.768	70.894
6	1.041	3.469	74.847	1.041	3.469	74.847	1.186	3.953	74.847
7	0.894	2.98	77.827						
8	0.731	2.438	80.265						
9	0.641	2.136	82.401						
10	0.608	2.028	84.429						
11	0.539	1.796	86.225						
12	0.482	1.607	87.832						
13	0.422	1.407	89.239						
14	0.394	1.313	90.551						
15	0.37	1.233	91.784						
16	0.314	1.046	92.831						
17	0.285	0.952	93.782						
18	0.262	0.874	94.656						
19	0.257	0.857	95.513						
20	0.213	0.709	96.222						
21	0.198	0.661	96.882						
22	0.165	0.55	97.432						

23	0.156	0.52	97.953						
24	0.137	0.456	98.409						
25	0.111	0.37	98.779						
26	0.104	0.346	99.125						
27	0.085	0.283	99.408						
28	0.073	0.242	99.65						
29	0.055	0.183	99.834						
30	0.05	0.166	100						

The table of total variance explained (Table 3) shows all the factors extractable from the analysis along with their eigenvalues, the percent of variance attributable to each factor, and the cumulative variance of the factor and the previous factors. Six major factors have been identified wherein first factor accounts for 44.746 % of variance, second factor contributes 12.920 % of variance, third contributing 5.620 % of variance in mobile purchasing decision.

The scree plot is a graph of the eigenvalues against all the factors (Graph: 1 - Screen Plot). The graph is useful for determining how many factors to retain. The point of interest is where the curve starts to flatten. The graph shows that the curve has started flattening from point 7 and hence in our case as shown in table above (Total variance explained) we are retaining 6 factors.

GRAPH: 2
Screen Plot



The below table indicates the number of factors those affect customers to choose mobile phone brands. From the rotation method the following six factors (table 4) may be obtained. Table 4 represents rotated component matrix representing matrix of factor loading for each variable on to each factor.

TABLE: 5

Rotated Component Matrix(a)

Factors	Component					
	1	2	3	4	5	6
Battery Life	0.914		0.134			
Phone Call Quality	0.892	0.115	0.107	0.172		
Operating System	0.839		0.285			
Processor	0.838		0.271		-0.126	
GPRS	0.824		0.15	0.122	0.118	
Input Method	0.777	0.16	0.193	0.11		
Phone book Function (Storage & Manipulation)	0.751	0.266	0.117		-0.156	
Company Name	0.739	0.113	0.201	0.19		-0.106
Connectivity	0.73	0.162	0.285		0.249	
After sales services	0.716		0.203	0.368	0.374	
Screen Display	0.702	0.12	0.423			0.279
Accessories	0.686	0.207	0.266	0.121	0.222	0.224
Guarantees	0.657		0.225	0.451	0.328	
Short Message Function	0.635	0.447			-0.359	
Jingle		0.858		0.235		0.122
Adv campaign	0.164	0.835	0.152		0.127	
Tagline	0.241	0.799		0.194	-0.227	
Product Placement		0.796	0.215		0.125	-0.3
Celebrity endorsing the product		0.758	0.253		0.252	-0.157
Logo of company	0.28	0.534	0.316	0.265	-0.275	-0.178
Color Availability	0.37	0.239	0.752			-0.113
Apperance design	0.436	0.198	0.698		0.222	0.193
Weight	0.384	0.189	0.666	0.257		
Material of mobile body	0.212	0.203	0.639	0.458		
Size	0.498	0.157	0.633	0.219	0.107	
Exclude mobiles from certain country	0.149	0.149	0.241	0.821		
Packaging	0.18	0.477		0.577	0.283	0.141
Choose mobile from certain country	0.225	0.228	0.421	0.488	-0.236	-0.318
Word of mouth	0.374	0.282	0.213		0.653	-0.194
Price	0.158	-0.139				0.804

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a Rotation converged in 11 iterations.

Factor : 1 - Common Functions : The first factor has been named as common function as it contains 14 component that are common in all mobile phones and as per this factor analysis they are very vital variable impacting their decision to buy mobile. They has the following factor loads: Battery Life .914, Phone Call Quality .892, Operating System .839, Processor .838, GPRS

.824, Input Method .777, Phone book Function (Storage & Manipulation) .751, Company Name .739, Connectivity .730, After sales services .716, Screen Display .702, Accessories .686, Guarantees .657 and Short Message Function .635

Factor 2: Advertisement & Promotion: Second factor encompasses six variables all of them are more into advertisement and promotional aspects and hence it has been named as 'advertisement & Promotion' The factor loads for the variables are : Jingle .858, Adv campaign .835, Tagline .799, Product Placement .796, Celebrity endorsing the product .758 and Logo of company .534

Factor 3: Appearance function: Third factor consist of five components which have been categorized as appearance function as they are items which are talking about looks of the mobile phone. The factor loads for those variables are Color Availability .752, Apperance design .698, Weight .666, Material of mobile body .639 and size .633.

Effect of Age, Gender, Age & Gender on importance of factors influencing buying decisions of Mobile: Based on the factor analysis done above only for the first factor i.s. Common function which consisted of 14 components which accounted for 44.746 variance in the data summation was done and mean for these 14 variables was found. Two way ANOVA was done on this principle component to find the influence of age, gender and intercept of age & gender. Table 5 shows the summary of analysis and the results thereof.

TABLE :6

Tests of Between-Subjects Effects

(Age, Gender, Age & Gender on the principle component influencing buying decision of mobile handset)

Factors	Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Result
Principle component - common function	Age	1.503	3	.501	.485	0.693	P>.05, Failed to reject Ho
	Gender	.979	1	.979	.948	0.333	P>.05, Failed to reject Ho
	Age * Gender	7.308	2	3.654	3.538	0.033	P<.05, reject Ho
	Error	101.210	98	1.033			
	Total	2454.332	105				

From the test result it could be observed that in case of respondents belonging to different age group the importance of factors remained same and hence null hypotheses has not be rejected. Significant difference was not observed among males and females with regards to these principal component. While the interaction of age and gender together was observed as having influence on the importance of these components.

VII. CONCLUSION

The study identifies the principle components consisting 14 items out of the 30 items that were used in the study. Practicing managers can use these results while devising appropriate strategy. The results of two-way ANOVA proves that their was not influence of age and gender on the principle component while interaction of both had significant impact on them. Thus, while framing strategy marketer must consider age & gender of their target audience so as to get fruitful result in terms of increased sale.

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