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An Investigative Study of the Mobile Operating System and Handset Preference

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Abstract

Objectives: The primary objective of the study is to identify the factors influencing the handset purchase decision by considering the most commonly applicable factors in the region. There are various parameters range from Mobile operating system to brand of the handset and to features like visual appeal of the product to price of the mobile handset. This research will also discuss the role of branding of mobile operating system and mobile handset to understand which one is the most decisive factor in purchase decision in current times. With branding requirement of customers the study will also establish the role of loyalty in the handset arena. **Methods/Statistical Analysis**: To collect the data a structured questionnaire was used to personally interview the mobile users of Delhi/NCR region. The sample consisted of almost equal no of male and female respondents; 88 male (50.3%) and 87(49.7%) female. Independent t-test and ANOVA were used to examined whether the means of two or more groups, were statistically different from each other on the parameters such as Influencing factors of Handset purchase decision and perception on various aspects of mobile operating systems. **Findings:** Results shows that, there is a clear sign of the shift in mobile handset market, users are swiftly shifting from traditional Symbian mobile OS to a more user friendly interface. The users in India are willing to spend Rs. 10,000 to Rs. 20,000 for them the look and feel of the handset is still an important aspect along with features but, the concept of mobile handset loyalty is diminishing. The concept of loyalty is not limited to just mobile handset arena it covers the mobile OS as well. As per the findings less than 30% would stay with their present mobile OS. When considering the demographic perceptions of influencing factors in mobile purchasing decisions some significant differences have appeared in the study which may offer a marketer with insight and understanding of what offering is to be delivered to whom. **Applications/ Improvements:** Brands must realize that marketing promotions are playing fewer roles in consumer attraction as many consumers purchase handsets based on their opinion of mobile OS or mobile handset. As highly qualified people prefer handset brands, manufacturers may work towards this area of branding as it implicates trust, reliability and a reduced psychological risk. Considering the mobile features it is becoming highly essential for younger generation to stay connected on the go, this requires a handset with all the essential connectivity tools like Wi-Fi network, instant messaging, social networking, web browser all along with one of the most essential component of a mobile 'The Camera'.

Keywords: Mobile Technology, Mobile Handset, Mobile Operation System, Mobile Loyalty

1. Introduction

Ever since the inception of commercial mobile phones in the 1970s the mobile handset has gone through a great leap in evolution. Today's mobile handsets are capable of much more than just connecting two people over a wireless line, they can connect with the world instantly process data like a computer and all the more while getting slimmer, fancier, and more robust. All this has been possible due to the innovation in the Mobile operating system (Mobile OS). Mobile OS has gone through the evolution same as the handset and is now the most important ingredient in separating mobile capabilities from each other. Mobile OS was an embedded system till 1992. The initial phase of smart phone Mobile OS were applied on Palm top devices like PDAs. By 2000 Symbian became the first modern mobile OS on a smart phone. By 2002 blackberry had joined the smart phone segment.

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Till 2007 Symbian enjoyed a lot of popularity and was de facto mobile OS before Apple and Google came out with their respective versions of Mobile OS. There was lot of speculation that Symbian has met its match and that Nokia (owner of Symbian) has lost its glory days and will decline in its market presence. In January 2010 IDC predicted that Android will be the No. 2 Mobile OS in the world by 2013. In 2012 IDC announced that Android is the most preferred Mobile OS with Apple iOS at second spot and also predicted that windows mobile OS will see the best growth till 2016. With all the innovation in design, functionality and value for money many handsets are focusing on dominating the market with their products whereas Mobile OS developers are finding new ways to enhance the Mobile OS experience to gain or maintain supremacy.

From the curious premise of Mobile OS evolution and the trends in market preference that followed the study seeks to explore the current preference of Mobile OS and understand the coming trend in the Mobile OS space, also cross checking its consistency with the predictions laid down by notable researchers like IDC. By understanding the consumer preference the study would aid in identifying the possible cause of success of a Mobile OS. By understanding the factors responsible for a mobile purchase the research attempts to understand the most influential factor for a handset purchase among thedemography. By capturing the purchase pattern the study will enable to point the role of Mobile OS in the purchase of Mobile Handset.

The boom in the market is currently battled by many players all attracting the customers towards their product with various features to differentiate among themselves. The study intends to analyze this feature pull towards a handset and identify the most influential feature driving the consumer to a mobile handset.

Considering the recent developments in the stylizing of the mobile handset many mobile manufacturers are trying to cash in on the aesthetic appeal of a handset be it a larger size of the screen.

The importance of branding had a new meaning when Apple jumped in to the mobile business with its iPhone and likewise Microsoft came for some action in the Mobile OS space by tie-up with Nokia to capture the thriving Mobile OS market being enjoyed by Google and Apple. Microsoft has bet a lot on it brand power to make a success story for Nokia and the study aims to find out the same by understanding the impact of branding in the purchase decision.

The mobile users have become more tech savvy and are looking for more and more quality in their handsets and always looking for value for money products. The 'value' offered by a mobile handset differs among demography. We start our base for market players from a study of IDC a world renowned research organization which has done a lot of researches in the area of technology. It was year 2012 and the tech world was going gaga over the seemingly unstoppable rise of Android in the mobile operating space which left behind the Symbian numbers, which were decreasing day by day. During this time IDC came out with and interesting finding that by 2016 Windows Phone will pick up the market with a growth of 46% but still staying behind current world dominant Android at 19% global presence.

This thought provoking finding by IDC raises a lot of questions on the future of Android market in the coming years. To validate this finding we look into the various aspects that drive mobile sales. In[1] suggested the link between perceived risk and loyalty of mobile phone users and understanding the most significant value affecting the mobile handset consumer. In 2008, a team of researchers[2] concluded that the choice of mobile phone is subjective choice situation, there are some general factors that seem to guide the choices. The study was in two parts where the second part concluded that price, brand, interface, and properties are the most influential factors affecting the actual choice between brands for a student's purchase decision of a handset. A study to understand the Indian mobile purchase pattern was done in the year 2009 which revealed that the mobile handset users of age group of 18-30 years are less price sensitive than consumers of other groups; rather they consider 'physical appearance', 'brand', 'value added features', and 'core technical features' more important than users of any other age groups. On the contrary, the consumers of age group 50 years and above have given greater importance to 'price' than consumers of other age groups. The difference was highest for the 'brand' closely followed by 'core technical features' of the handset. Gender differences have also existed for these factors[3]. CMR researched the mobile usage and satisfaction study[4] which revealed that 64% users were happy with mobile handset performance. The brands Blackberry, Nokia, Samsung, Micromax achieve higher overall satisfaction. Customers expect features like MP3 players, Digital Cameras in entry level phones. Times of India[5] came out with a list of popular phones in the Indian market which consisted of handset from brands like Nokia, Samsung, Palm, Apple, HTC, Sony Ericsson. No LG handset featured in this list of popular handsets. New Technology in its daily update of[6] phones places Apple iphone5 at the top of the list with the price range above Rs 44,000/- followed by Samsung Galaxy Note 2 above Rs. 34,000/-. In a list of top mobile brands in India 91mobiles.com [7] rating for top mobile brands for past 3 months shows more domestic brands in the running with Micromax Mobile Phone in the lead followed by Samsung, Karbon, Nokia, Sony, Celkon, Lava, LG, Lenovo, Spice. These ratings are based on sales from the website and its associate channel partners. The most voted mobile brands include Micromax, Samsung, Nokia, HTC, Bravura, LG, Karbonn, Sony Ericsson, Motorola and Spice mobile.As per a 2011 study on Mobile OS market in India[8] Symbian OS held a prominent position in India's mobile OS world with a lion's share of 71.13% at this point Android and iOS where starting with their baby steps at 1.35% and .72% share respectively. As per a 2012 study on Mobile OS market India[9] Symbian OS sees a rapid decline from the month of March to April 2012 and nose diving further in coming months of 2012. At the same time Android picks up pace and ends up with a rise of 15% market share in the country as Symbian falls below 25% market share in India. This study also highlights the Samsung phones increasing presence in the Indian market with an increase of 25% by the end of 2012. ZeeBiz[10] places Android as the market leader with 75% presence in the world. The reason for this rise is due to the rival OS brands like Symbian and BlackBerry. The second major market share went to iOS with nearly 15% share. These were followed by BlackBerry, Symbian OS, Windows Phone OS and Linux OS. The article also suggests the possibility of Windows Phone giving tough completion to Android. Many people closely follow and analyze every aspect of their mobile phone some of the key features that a mobile buyers looks for are Network, Price, Handset, Multimedia Capabilities, Customer Service[11]. Network feature suggests the kind of activities that are support by the mobile on the network like in business scenario the network capability of reliability of call connectivity, call conferencing and video conferencing. Price an obvious measure as people look for value for money. The handset part suggests the affinity towards a certain brand or the handsets attractive looks which sets it apart from peers and contributes to the style quotient of the user. The multimedia capability is considering more than just basic feature of text messaging, it caters to the growing popularity of the internet and mobile applications and gaming. Customer service covers the aspect of after sales comfort, no mobile is damage proof and the hassles of getting a mobile repaired can end up being a nightmare. In[12] identified the role of selection factors like Price, Size or Shape, New technology features and brand name in the selection process of mobile purchase. From this list consumers prefer new feature as the most valued feature in selection process of a new handset. A study in[13] highlighted the major branded mobile Operating systems at student campuses are iPhone (iOS), BlackBerry, Android, Windows Mobile OS and palm. The use of mobile phone is more than just calling it includes surfing the internet like email checking and reading news online, for music playing also for shopping and watching TV. The size of the screen does not deter the usage of mobile handset. A survey by[14] to know your mobile reveals that Android OS is the most favored mobile OS and majority would like to purchase a mobile with Android over iOS in their next purchase. 87% respondents suggested that Mobile OS drives the sales rather than Handset. Features like Internet browsing and high resolution camera followed the list of driving factors. Interestingly Price being a dominant factor in the price conscious country but it was not considered the deciding factor to purchase a mobile phone. This may be attributed to the changing mindset of people due to disposable income who prefer a quality product over cheap products. Features like free minutes, multi-SIM and radio were also not enough influencing in purchase decision. Nearly 30% people upgraded to a new phone within a year. **i**dentified the importance of customized applications for students and its limited usage due to expenditure in prepaid mobiles service[15]. The study also identifies the growing shift from SMS to MMS and to Internet messaging. This is due to increasing capabilities of the mobile phones. The growing trend is of Instant messaging is here to stay. Students are more aware of the application being used on mobile phones. Major uses of application are personal, emergency and entertainment. The entertainment applications majorly involve gaming applications.Many mobile manufacturers are increasingly working on providing handset accessories as the opportunity to earn high margins from the sale of handset accessory products is becoming an increasingly attractive proposition, not only for OEMs, ODMs, distributors, and retailers, but also for handset vendors and mobile operators as well[16]. Handset vendors are realizing that accessories can lead to higher ARPUs as they provide better comfort, convenience, and user experiences of mobile services. Also, handset accessories provide handset vendors and mobile operators further opportunities in brand building and promotion, as well as in expanding their product offerings. The study on Indian demographic revealed the importance of features like Battery backup, instant messaging, Music applications, touch screen, blue tooth and Customer support[17]. Touch screen as a feature was considered least important by the respondents. Apple[18] is well ahead of rivals in building brand loyalty among its users in a mobile market where the key brands are rushing to build as large a foothold as possible. Some 84 percent of iPhone users would pick iPhone also when they replace their cell phone, while 60 percent of consumers who use smart phones running Google's Android suggested they would stick with phones using the same software. Only 48 percent of people using Research in Motion's cell phones indicated they would stay loyal to their Blackberrys. More than 70 percent of consumers would stick with their phones due to their seamless integration of features and access to content. The loyalty of the users depends on the harmonious experience that the smart phone can provide. There the study reveals that the growing importance of influencing factors in mobile purchase decision[19]. The study identifies brand image, product knowledge, product quality, brand loyalty, and product price as factors for consumers purchase intention. The study conceptualizes the factors that could influence the intention to purchase a mobile phone. This was done by underpinning the consumer behavior theories as well as technology acceptance related ideas. A mobile OS comparison requires a lot of parameters to be rated upon. The study by Victor H has considered Windows Phone 8, iOS 6 and Android 4.1 as the study subjects. The various parameters used for comparative study include Application available, Multitasking, Widgets, Expandable storage, Multi-core processors, High-resolution displays, File manager, Drag and drop file management, Intelligent voice assistant, Side loading apps, Centralized notifications, Flash support, Native screenshots, Offline maps, Core, USB Host[20]. These may be broaden to Applications available, Displays, Processing capability, customizing ability, usage flexibility. HTC a major provider of Android mobile OS[21] and also a provider on Windows mobile OS to some extent has been contemplating buying its own mobile OS. Even Samsung[22] is going to launch its own mobile OS Tizen to gain independence from Google and compete with Android. The finding of upgrading a mobile within a year is suggestive of positive outlook for most manufactures as the saturation of mobile handset is still away.

Author in[23] conducted a survey of 500 customers to find out the factors which affect customer loyalty towards a specific brand of prepaid mobile cellular service provider. Based on factor analysis outcome, they came up with the five main factor: Brand oriented behavioral factor, brand oriented attitudinal factor, individual oriented behavioral factor, Individual oriented attitudinal factor and affective component factors together all these five statistically significant factors explain 86.20% of the variation. This indicates that 86.20% of the influence of branding factors on customer loyalty towards a specific brand can be explained by these five factors[21]. Customer support, corporate image, and speed are among service quality factor which significantly influence customer satisfaction. Also, customer satisfaction has a strong relationship with continuous use intention[22]. Another research to understand the respondent's opinion towards mobile marketing identified four major factors: Interest and acceptability, active involvement and usage, security and privacy concerns and prefer internet via mobile phone. These factors found significantly different among male and females[23]. Customer support, corporate image, and speed are some of the service quality factor which significantly influences customer satisfaction[24]. Mobile phones now have a much greater penetration in common man's life and can act as a very important tool for the marketers and a platform for mobile marketing communications[25].

2. Research Methods

2.1 Research Objectives

- To identify the factors influencing the handset purchase decision.
- To analyze the differences regarding these factors across various demographics.
- To study the role of brand loyalty for mobile operating system and mobile handset.

2.2 Research Design

The methodology adopted for studying the objective was surveying the users of mobile phones and their perception on what influences them to make a purchase decision. Their current and aspired Mobile OS. Their preference of various features in a handset and their preference to various Mobile OS based on various parameters. The research design of the study was descriptive as it attempted to understand the causes and the characteristics associated with the population. It focused on primary data and involved describing the preference of various mobile users and identifying the influencing factors in mobile purchase decisions. Respondents were personally approached and explained in detail about the survey also an online version of the questionnaire was distributed to capture responses from online networks. They were asked to assess their perception of various factors influencing a buyer of mobile handset, rating of various mobile OS based on various parameters and loyalty towards current mobile OS and Mobile Handset. Total 220 college students were approached, however, in the process of cleaning, 45 incomplete responses were removed, resulting in a study sample of 175 student participants for analysis. The sample consisted of almost equal no of male and female respondents; 88 male (50.3%) and 87(49.7%) female. The sample ranged from new comer in graduate programme to Ph.D Scholars, however the majority of the respondents were Post-Graduates (65.1%) see (Table 1). In addition 105 students (60%) has above 5 Lakh family income.Independent t-test and ANOVA were used to testhypothesis. The t-test examined whether the means of two groups, were statistically different from each other, whereas ANOVA does it for more than two groups.

3. Data Results

From the above pie chart (Figure 1.), it is quite visible that Samsung has the most presence with 38% than any other mobile handset brand. This is followed by Apple and Nokia both at 15%. This chart is indicative of the rising popularity of Samsung as mobile handset brand and also a decline for Nokia from its previous leadership in the mobile handset. Apple is picking pace and has made a surprising market share in the region.

Table 1. Worldwide smartphone operating system 2012 and 2016 market share and 2012-2016 compound annual growth rate

Smartphone OS	2012 Market Share	2016 Market Share	2012 - 2016 CAGR
Android	61.0%	52.9%	9.5%
Windows Phone 7/ Windows Mobile	5.2%	19.2%	46.2%
iOS	20.5%	19.0%	10.9%
BlackBerry OS	6.0%	5.9%	12.1%
Others	7.2%	3.0%	-5.4%
Total	100.0%	100.0%	12.7%

*Source: IDC Worldwide Mobile Phone Tracker, June 6, 2012

As per the Figure 2, Android (51%) has the Lion's share in the Mobile OS being used by the consumersinterestingly followed by iOS (15%). Symbian is on a decline with just 11% presence which is at par with Blackberry OS. Windows mobile OS has made its presence felt with 6% share. This pie chart is an interesting revelation for all the Mobile OS providers, coders, develops and present and potential Application developers. This information would aid developers to create customized applications for Mobile OS leaders and may provide them with foresight to create applications for upcoming mobile operating systems in the region like iOS and Windows Mobile OS which show some potential to grow. By tapping to this information marketers may develop products or offerings like applications that cater to these Mobile OS and help them in their business.

The Figure 3 sheds light on the facilities attained on purchase of a mobile handset. The major chunk of feature that a consumer attains by purchasing a mobile is by getting a Camera (86.3%). The next feature that a mobile

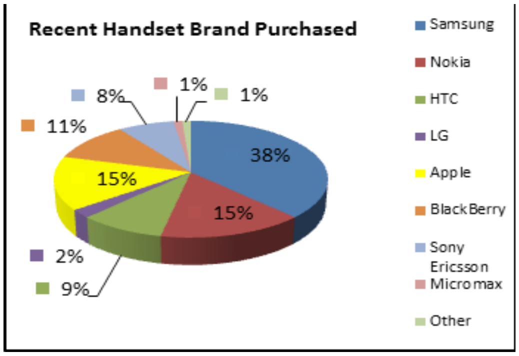

Figure 1. Pie Chart of recent handset brand purchased.

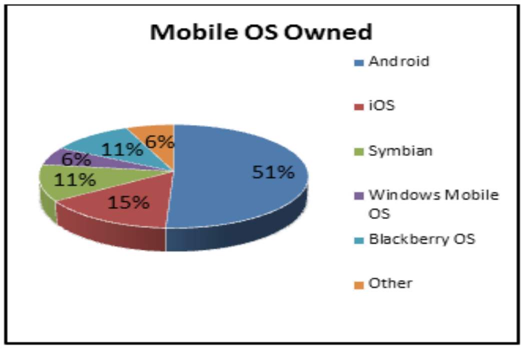

Figure 2. Pie chart of recent mobile OS owned bar chart for frequency of features present in current mobile handset.

handset buyer identifies is the music playing feature of the handset which stands around 78.9% of all respondents.

In today's modern world of technology and connectivity a mobile handset user is likely to go for an Internet Connectivity and a Touch Screen Interface both at 77.7%.

Network fidelity which enables a mobile user to transfer or connect other electronic output devices with the mobile devices is featured at the bottom. The possible cause of this feature being not covered in mobile phones is due to the lack of awareness in the consumer about the feature. Gaming Applications (65.1%) rule over Instant messenger (58.9%) and customized applications (54.9%).

Many mobile OS providers and mobile handset manufacturers are constantly working on innovation offering in the mobile space by using this information like affinity for gaming applications, mobile makers and developer may target more specific offering to consumers. The use of camera has now become a standard in the mobile handset without which is it considered an incomplete mobile but makers of handset may capitalize on the growing advancement in communication and need for connectivity to offer consumers with more dual camera (video calling) at a lower price. This would create an entire segment for the mobile makers as dual camera is more preferred by business users who like to be connected on the go and for crucial meetings which require face to face interaction will not be missed due to absence of a nearby laptop with internet connectivity. Similarly for mobile OS makers or developers, this may be utilized to create mobile apps which serve specific purpose.

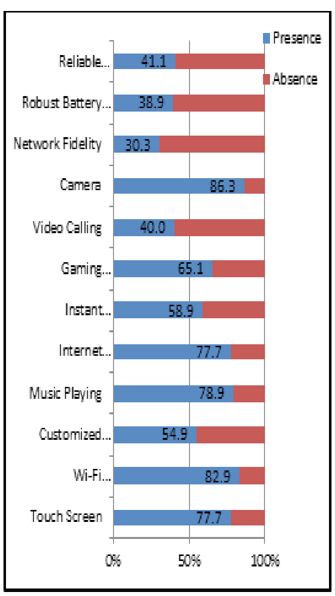

Figure 3. Bar chart for frequency of features present in current mobile handset.

The Figure 4 bar chart of price range suggests that the majority of the mobile handset purchases are done in the price range of Rs. 10,000-Rs. 20,000. This is followed by the price band of Rs. 20,000-Rs. 30,000. There is a notable mention of mobile handsets being purchased with a price band above Rs. 50,000.

Mobile manufacturers and marketers may apply this information in creating pricing strategy for their product offerings. As most of the mobile phone purchased are in the range of Rs. 10,000-Rs 20,000, manufacturers know the level of sacrifice the consumer is willing to take while purchasing a mobile handset. For branded mobile makers new products may be launched at prices higher than Rs. 20,000 to skim the segment and new technology offered by the handset. The handsets which need to capture more on the mass market may use this price range to generate revenues. The issue with launching a mobile handset in this price band is the depreciating value of the mobile handset. As the value of mobile phones reduces in the market over weeks the risk of launching a handset in this price band is that it will end up in the price band of less than Rs. 10,000 in few months.

As seen in the Figure 5 Bar chart, most mobile owners have kept the mobile phones with them for less than a yearmeaning 52.6% people have changed their mobile or upgraded their mobile phone within a year, followed by people keeping mobile for almost 1 to 3 years since purchase. Very less people have kept mobile handset ownership exceeding 3 years. This shows that the concept of loyalty towards a handset is slowly becoming a myth. With increasing disposable income many consumers of

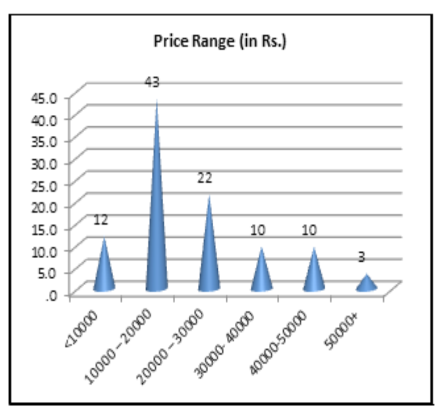

Figure 4. Bar chart for price range of handset purchased.

mobile handset are upgrading themselves with the latest offerings from the market.

This shows that the concept of loyalty has little significance in the present mobile market. Many manufacturers have to work harder to outdo each other in providing a feasible mobile solution to consumers.

From the Figure 6 many insights are revealed, when considering a change of mobile handset in the near future a majority of respondents suggested changing their existing handset for a new one (44%) followed by those who wished to stick with their existing mobile handset (36%). As good as 20% could not decide, as of yet, on purchasing a handset in the near future of say a year or so.

From the 44% who would change their handset in the near future, 51% suggested they would get a mobile OS as per the requirement of the handset whereas 28% suggested they would like to have their present mobile OS in the future handset as well. It was noted that 18% of people who wish to purchase a new handset in the near future want to have a mobile OS of their preference.

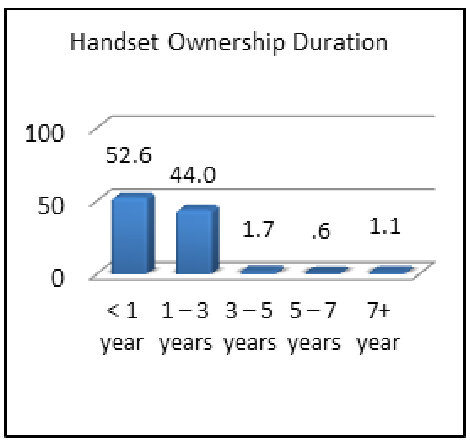

Figure 5. Bar chart for current handset ownership.

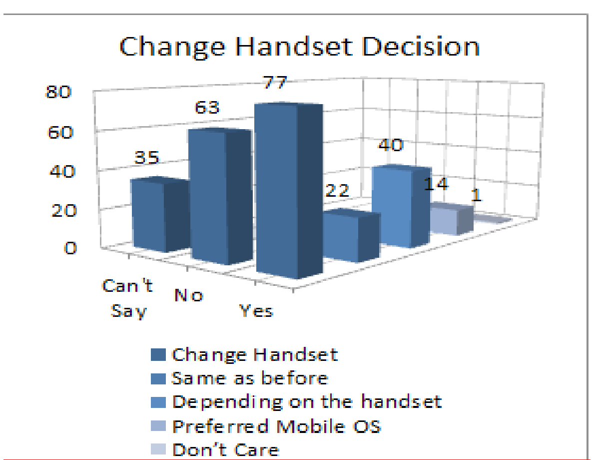

Figure 6. Bar chart for handset change in future with OS prefrence.

This information is best for mobile manufacturer to decide future alliance with Mobile OS. If Samsung is enjoying an increase in brand value then it may look for its own Mobile OS to be paired with its upcoming mobile handsets. Manufacturers like HTC may use this information to strategize its alliances for future offerings, either to keep going with Android or partner with Windows mobile OS. This information is also sign of relief for the mobile manufacturers as it suggests more people are still willing to purchase new handsets hence the mobile market saturation is not yet here. Mobile manufacturers may identify the level of loyalty of users is now starting to shift from handset dependent Mobile OS to preferred Mobile OS.

From the stacked bar chart Figure 7, it is indicative that Android is the most used mobile OS in market with 72% having a hands-on experience of the mobile OS. This is followed by Symbian with 38.3% hands-on usage which is quite low considering the dominance Nokia had few years ago.

Surprisingly many mobile users have tasted the mobile OS experience of Apple's iOS at 28.6% which is above blackberry (24.6%). The new Mobile OS on the block, Windows mobile OS has garnered a substantial usage experience with users at 24.6%.

The Android penetration is further due to the familiarity with the mobile OS just like the case of Symbian many years ago. This sense of familiarity also helps derive sales for Android based devices. For iOS, this surprising number in the region is suggestive that many people are getting more accustomed to the way of the iPhone/iPad etc. The decline in Symbian hands on experience might be a bad news for Nokia but on a brighter side the Windows mobile OS has gained a significant user experience which

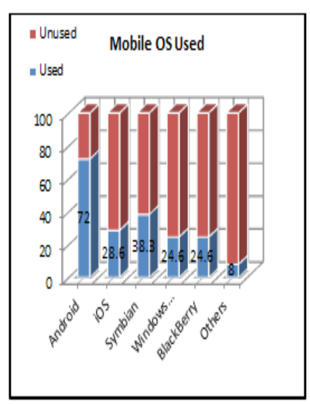

Figure 7. Bar chart for hands-on usage of various mobile OS.

will help sales of not just Nokia handset but also the desktop, laptops and tablets supported by Windows version 8, which comprises of tile display, which is trending among youth.

Blackberry still needs to work on a lot as it is still slipping in its position from top 3 to top 5. Another issue with the blackberry OS is the lower ease of use as compared to that offered by Android, iOS or Symbian. This sophistication might come as both boon and bane for RIM (makers of blackberry) as they have worked hard to re-position themselves from a business class mobile phone to an everybody or anybody's mobile phone.

Other notable information that the study picked up were of Bada and Palm OS, Bada is present in older versions of Samsung phones and Palm OS in LG phones, though both have opted for Android as a Mobile interface but their non-touch screen offerings still have these Mobile OS as Android is more limited to the touch environment.

One of the main driving factors for Android and iOS alike is the touch feature which compared to clicking on multiple buttons to reach desired menu option (like in most Blackberry mobile OS) these mobile OS have made it much more simple, convenient and faster for users to access their required menu option from the spring board feature of iOS to Cubic home display of Android.

3.1 Influencing Factors of Handset Purchase Decision among Various Age Groups

To see is there a statistical significant difference between various age groups regarding handset purchase influencing factors. A one-way ANOVA between subjects was conducted.

There was a significant effect of Mobile OS on the purchase decision for various age groups at the $p<.05$ level for the three conditions [$F(3, 175) = 2.985$, $p = 0.033$] as shown in Table 2. Post hoc comparisons using the LSD test indicated that the mean score for the age group less than 18 years (M = 3.00, Sig. = .005, SE = .365) was significantly different than age group more than 18 years to 35 years (M = 4.03, Sig. = .007, SE = .393). However, the age group 35 years to 45 years (M = 3.50, Sig. = .458, SE = .672) did not significantly differ from the age group less than 18 years.

Taken together, these results suggest that age group do have an effect on mobile handset purchase decision. Specifically, our results suggest that age group less than 18 years and age group above 35 years do not consider mobile OS as a driving factor for making handset purchase decision as they seek more benefit from handset rather than a mobile OS.

Table 2. Age wise summary of means and ANOVA of dimensions influencing handset purchase

ANOVA (Age Group)						
	<18	18 – 25	25 – 35	35 – 45	F	Sig.
Mobile OS drives the purchase decision rather than the handset	3.00	4.03	4.08	3.50	2.985	.033*
Look and feel of the handset is a very important feature of your handset while purchasing	4.60	4.10	4.04	4.50	1.029	.381NS
Brand image of the handset is an important reason to buy a handset	4.40	4.04	4.36	4.00	1.589	.194NS
Price of the handset is very important while making a purchase decision	3.80	3.86	3.80	4.50	.417	.741NS
Brand image of the mobile OS is an important reason to buy a handset	3.40	3.69	3.84	3.00	.682	.564NS

*Significant NS – Non-Significant

3.2 Influencing Factors of Handset Purchase Decision among Various Income Group

To see whether there is a statistical significant difference between various incomes group regarding handset purchase influencing factors. Again one-way ANOVA between subjects was conducted.

From the Table 3, it could be seen that none of influencing factors vary among income group as all the p-values are > 0.05.

3.3 Influencing Factors of Handset Purchase Decision among Various Qualification Groups

To see whether handset purchase factors differ among students of various levels. Analysis of variance was conducted.

As visible from Table 4, there was a significant effect of Mobile OS on the purchase decision for various qualification

Table 3. Income wise summary of means and ANOVA of dimensions influencing handset purchase

ANOVA (Income Group)					
	< 1 Lac	1 Lac - 5 Lac	5 Lac and Above	F	Sig.
Mobile OS drives the purchase decision rather than the handset	4.17	4.06	3.93	1.106	.364^{NS}
Look and feel of the handset is a very important feature of your handset while purchasing	3.91	3.98	4.21	2.614	.076^{NS}
Brand image of the handset is an important reason to buy a handset	4.17	4.04	4.10	.250	.779^{NS}
Price of the handset is very important while making a purchase decision	3.96	3.96	3.79	.795	.453^{NS}
Brand image of the mobile OS is an important reason to buy a handset	4.09	3.74	3.59	2.608	.077^{NS}

*Significant NS – Non-Significant

Table 4. Qualification wise summary of means and ANOVA of dimensions influencing handset purchase

ANOVA (Qualification Group)						
	School	UG	PG	Ph.D.	F	Sig.
Mobile OS drives the purchase decision rather than the handset	3.17	3.88	4.10	4.00	3.066	.033*
Look and feel of the handset is a very important feature of your handset while purchasing	4.33	4.13	4.09	4.00	.261	.854^{NS}
Brand image of the handset is an important reason to buy a handset	4.33	4.19	4.04	4.00	.686	.562^{NS}
Price of the handset is very important while making a purchase decision	3.67	4.04	3.78	4.00	1.213	.307^{NS}
Brand image of the mobile OS is an important reason to buy a handset	3.50	3.71	3.69	4.00	.183	.908^{NS}

* Significant NS – Non-Significant

groups at the p<.05 level for the three conditions [F (3, 175) = 3.066, p = 0.033]. Post hoc comparisons using the LSD test indicated that the mean score for the qualification group High School (M = 3.17, Sig. = .039, SE = .346) was significantly different than qualification group of Graduates and Post Graduates (M = 4.10, Sig. = .006, SE = .336). However, the qualification group Doctorate (M = 4.00, Sig. = .144, SE = .567) did not significantly differ from the qualification group School. These results suggest that qualification group do have an effect on Mobile handset purchase decision. Specifically, our results suggest that qualification group of high school and doctorate do not consider mobile OS as a driving factor for making handset purchase decision as they seek more benefit from handset rather than a mobile OS.

3.4 Influencing Factors of Handset Purchase Decision among Male and Female

An independent sample t-test was conducted to compare the factors among Male and Female.

The results shows (Table 5.) that there was a significant effect of Brand Image of Mobile OS on the purchase decision for different gender at the p<.05 level for the three conditions [F (1, 175) = 10.800, p = 0.002]. Mean comparisons using the descriptive indicated that the mean score for the gender Male (M = 3.48, SD = 1.072) was significantly different than gender Female (M = 3.92, SD = .796).

Taken together, these results suggest that different gender do have an effect on mobile handset purchase decision. Specifically, our results suggest that female gender considers brand image of mobile OS as a driving factor for making handset purchase decision as it reduces perceived risk.

Table 5. Gender wise summary of means and T-test of dimensions influencing handset purchase

	Male	Female	F	Sig.	Sig.
Mobile OS drives the purchase decision rather than the handset	3.94	4.06	4.814	.030	.355^{NS}
Look and feel of the handset is a very important feature of your handset while purchasing	4.07	4.15	.266	.607	.464^{NS}
Brand image of the handset is an important reason to buy a handset	4.11	4.08	.547	.461	.770^{NS}
Price of the handset is very important while making a purchase decision	3.81	3.91	3.441	.065	.43^{5NS}
Brand image of the mobile OS is an important reason to buy a handset	3.48	3.92	10.800	.001	.002*

* Significant NS – Non-Significant

3.5 Perception on Processing Speed of Branded Mobile OS among Age Groups

One-way ANOVA between subjects was conducted to compare the perception of Processing Speed of various Mobile OS brands among various age groups.

Table 6 shows that, there was a significant effect of Android Mobile OS on the perception of processing speed for various age groups at the p<.05 level for the three conditions [F (3, 175) = 3.699, p = 0.013]. Post hoc comparisons using the LSD test indicated that the mean score for the age group less than 18 years (M = 3.00, Sig. = .011, SE = .449) was significantly different than age group more than 18 years to 35 years (M = 1.60, Sig. = .004, SE = .484). However, the age group 35 years to 45 years (M = 3.00, Sig. = 1.000, SE = .826) did not significantly differ from the age group less than 18 years.

Taken together, these results suggest that age group do have an effect on perception of processing speed for various brands of Mobile OS. Specifically, our results suggest that age group less than 18 years and age group above 35 years do not consider Android mobile OS as having a good processing speed compared to other age group from 18 years to 35 years, as they consider other brand of Mobile OS having better processing speed.

3.6 Perception about Customization Level of Branded Mobile OS among Age Group

The Table 7 shows that there was a significant effect of Symbian Mobile OS on the perception of customizable level for various age groups at the p<.05 level for the three conditions [F (3, 175) = 2.998, p = 0.032]. Post hoc comparisons using the LSD test indicated that the mean score for the age group less than 18 years (M = 2.00, Sig. = .012, SE = .553) was significantly different from age group more than 25 years to 45 years (M = 4.00, Sig. = .036, SE = .944). However, the age group 18 years to 25 years (M = 2.94, Sig. = .068, SE = .513) did not significantly differ from the age group less than 18 years. Taken together, these results suggest that age group do have an effect on perception of customization level for various brands of Mobile OS. Specifically, our results suggest that age group less than 18 years to age group 25 years consider Symbian mobile OS as having a good customization level compared to other age group from 25 years to 45 years, as they consider other brand of Mobile OS having better customization level.

Table 6. Age wise summary of means and ANOVA of perception on processing speed of branded mobile OS

ANOVA (Age Group& Processing Speed)						
Branded Mobile OS	<18	18 – 25	25 – 35	35 – 45	F	Sig.
Android	3.00	1.85	1.60	3.00	3.699	.013*
iOS	2.00	2.00	1.84	2.00	.167	.919NS
Symbian	3.00	2.85	3.12	4.00	.913	.436NS
Windows Mobile OS	3.20	2.52	2.56	3.50	1.155	.328NS
BlackBerry OS	2.40	2.87	2.56	2.50	.655	.581NS

* Significant NS – Non-Significant

Table 7. Age wise summary of means and ANOVA of perception on customization level of branded mobile OS

ANOVA (Age Group & Customization Level)						
Branded Mobile OS	<18	18 – 25	25 – 35	35 – 45	F	Sig.
Android	1.40	1.62	1.48	2.50	.856	.465NS
iOS	1.80	2.21	2.08	2.00	.324	.808NS
Symbian	2.00	2.94	3.40	4.00	2.998	.032*
Windows Mobile OS	2.60	2.69	2.80	3.50	.402	.752NS
BlackBerry OS	2.40	3.13	2.96	2.50	.700	.553NS

* Significant NS – Non-Significant

3.7 Gender Wise Perception on Applications Available of Branded Mobile OS

In order to find out whether there is a statistical significant difference between different genders regarding perception of applications available of a branded Mobile OS, Independent t-test was conducted

The results in Table 8 clearly shows that here was a significant effect of different gender on the perception of applications available with the mobile OS at the p<.05 level for the three conditions [F (1, 175) = 5.167, p = 0.039]. Mean comparisons using the descriptive indicated that the mean score for the gender Male (M = 3.24, SD = 1.250) was significantly different than gender Female (M = 2.87, SD = 1.065).

Taken together, these results suggest that gender do have an effect on perceived opinion of applications available. Specifically, our results suggest that female gender considers Symbian mobile OS as having more applications available than their male counterparts while forming mobile OS opinion.

Table 8. Gender wise summary of means and T-test of perception in applications available for branded mobile OS

Branded Mobile OS	Male	Female	F	Sig.	Sig. (2-tailed)
Android	1.51	1.55	.495	.483	.768^{NS}
iOS	1.99	2.06	.350	.555	.652^{NS}
Symbian	3.24	2.87	5.167	.024	.039*
Windows Mobile OS	2.76	2.77	.016	.900	.956^{NS}
BlackBerry OS	3.20	2.92	.196	.658	.124^{NS}

* Significant NS – Non-Significant

4. Discussion

The rise of Samsung and Apple market share is a clear sign of the shift in mobile handset users from traditional Symbian mobile OS to a more user friendly interface. Windows mobile OS is making its presence felt which is indicative of the possible shift in the trend just like Android offered when it came in 2007. The findings of the study about windows mobile OS position in terms of presence and usage by users is resonating with the reports of IDC **(IDC, 2012)** which predicts the growth of Windows mobile OS to increase market presence and come second to Android in the world mobile OS market.

The popularity of a handset brand only adds to the growing demand of the handset in these competitive times as many handset users would prefer reduced risk on mobile handset purchase so this is in coherence with the our aim to identify the influencing factors of the mobile purchase decision. By identifying the brand power of the handset manufacturers like Samsung may come out with offerings with more variety to further capture the market as price is not a dominant feature to make a purchase decision.

Recent player in the mobile manufacturers like Micromax, Lava and Karbonn may understand this branding advantage and can strategize more branding activities to capture the price band of Rs. 10,000 to Rs. 20,000. The look and feel of the handset is still an important puller for most consumers and brands may use this to their advantage in offering more innovative designs.

Brands must realize that marketing promotions are playing fewer roles in consumer attraction as many consumers purchase handsets based on their opinion of mobile OS or mobile handset. As highly qualified people prefer handset brands, manufacturers may work towards this area of branding as it implicates trust, reliability and a reduced psychological risk. Considering the mobile features it is becoming highly essential for younger generation to stay connected on the go, this requires a handset with all the essential connectivity tools like Wi-Fi network, instant messaging, social networking, web browser all along with one of the most essential component of a mobile 'The Camera'. A good resolution camera may offer manufacturers differentiating benefits and an edge over competitors. Music playing option is now a must have and so are the gaming applications. These small features might not be a great puller towards a mobile handset but none the less a great nullifier of what is expected from a decent 20K mobile handset with touch screen and internet connectivity. These features alone may create an entire mix for mobile manufacturers.

From the past studies and present findings it is evident that price conscious India is willing to spend Rs. 10,000 to Rs. 20,000 for a decent handset consisting of all the expected feature like a good resolution camera, music playing options, applications, accessories and connectivity options with a branded mobile OS. Branded handset manufacturers may skim the market as in the case of Apple, which is costlier than all its rivals and yet it is still able to make a significant market presence in sample region. Pricing strategies need to be planned properly due to handset value depreciation over months rather than years.

These revelations are useful for many in the mobile industry and associated industries. Mobile application developer may now look upon upcoming mobile operating systems as the new platform to deliver their products. Create customized applications, products or offerings that cater to these mobile OS and help them in their business.

Most users have upgraded their handsets within a year and many are planning to upgrade their mobile handsets in the future. This shows the concept of mobile handset loyalty is diminishing, gone are the days when Nokia loyalty **(ben-Aaron, 2011)** was envied by many mobile makers. This piece of information is both good and bad for the mobile manufacturers as people may shift their purchase preference if provided with value for money rather than staying loyal to their brands, so manufactures may see hope to capture customer base or loose customer base to competition if not providing quality product.

The concept of loyalty is not limited to just mobile handset arena it covers the mobile OS as well. As per the findings only 28% would stay with their present mobile OS. The fine line between offerings by many mobile OS brands is visible from this findings as windows was able to carve a niche of its own by coming out with the tile display while Android and iOS are still struggle to differentiate their mobile OS working and appeal. Based on the mobile OS loyalty mobile manufactures may decide their alliances with mobile OS.

A good influencer towards purchase making decision of a mobile handset of selecting a mobile OS may be the familiarity with the device or working with the interface. Android is present in most of the mobile handset brands in the market and this creates a lot of coverage for the mobile OS and gains more acceptance and reduces technological risk. Similarly iOS was able to capture the usage preference due to its presence in other Apple devices like iPad and iPod (touch). Blackberry still struggles to reduce that complexity of use and lack of familiarity. The key pad feature of most blackberry phones might play hindrance to its growth as touch screens offer user to access desired menu option or destination faster, simpler and with fewer clicks or touch points.

When considering the demographic perceptions of influencing factors in mobile purchasing decisions some significant differences have appeared in the study which may offer a marketer with insight and understanding of what offering is to be delivered to whom. For age group of 18 years to 35 years mobile OS derives the purchase decision but not for age group below 18. This finding is indicative of the knowledge and the interest level of the consumers of the age group. Age group less than 18 years of age is more contented with the handset and careless about the mobile OS and may not be able to differentiate well between the various mobile OS but the same group is more willing to purchase a handset based on its brand, say Apple, as it is a brand people are talking about in the mobile arena. A marketer may come up with a product for this age group which is high on brand value of handset but less on cost or features. For age group 18 to 35 years products need to be more mobile OS specific, as in the handset hardware should fulfill the requirement of the user to interface with the mobile OS. This preference is the leading cause of mobile application development as many users in this age group rely on customization to their taste.

Income groups do not show significant impact of influence of mobile handset purchase as supported by other finding of this study look and feel, mobile OS brand and handset brand are the current norm in purchase influence.

The qualification group resonates with the findings for age group and their preference would be similar to those of the age group. Gender has played a significant role in influence factor as females prefer branded mobile OS while deciding to purchase a mobile handset. Mobile manufacturers who might incorporate a new mobile OS in their handset should get vary of this finding as they would be required to create more branding effort for their mobile OS.

The perception of the consumers on parameters like processing speed, customization levels and applications available among other parameters is also useful for a marketer to understand its position and deliver the expected feature. Android is perceived to have a good processing speed by age group less than 18 years and age group above 35 yearsthis might be attributed to the knowledge or the kind of exposure that the consumer had with the mobile OS. While age group 18 years to 35 years is more exposed to these interfaces they have a fair idea of how the speed works out with different environment. Other brands must work on their perception building to regarding processing speed.

Symbian mobile OS has good customizable level as age group less than 18 years to 25 years and females consider it to have most applications available. Despite Symbians decline these may add feathers to the cap. As Nokia is trying to strengthen its Lumia series they may want to consider these perceptions in bringing out the an offering that enables them to keep these opinions and derive sales.

5. Conclusion and Recommendations

Samsung has created substantial presence and might be the right time to experiment independence from Google. Nokia need to find back lost glory with Windows mobile OS and generating a positive buzz in the market about their new alliance. Android should be vigilant of all the upcoming competition it might get from branded handset manufacturers, as they are teaming up with other mobile OS. Google should work faster in providing its own handset solution to the market or risk losing share to rising popularity of iOS and Windows.Consumer preferred features in mobile handset combined with the handset brand and mobile OS brand within an acceptable price range is the normal course of action for most manufacturers of mobile phones. Mobile handset loyalty programs might be passé as focus must be given to product quality, innovation and differentiation to provide value for money to mobile consumers. Mobile OS like Windows should work more towards customized application development to come at par with the level of application that is available for mobile OS like Android. Mobile manufacturers must understand the importance of mobile OS in their phone which is considered an influencing purchase factor in certain age groups and qualification groups and promote their mobile OS, if not established, then work their way to mobile handset features. Mobile maker and mobile OS maker alike may attract more female mobile consumers by making them aware of the mobile OS brand and how female can customize it to their tastes. Android might need to work on promoting its processing speed among various age groups. Nokia needs to replicate the perception of customization level, applications available in their Windows mobile OS offerings.

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