SMARTPHONE AS A DISRUPTIVE DEVICE IN LIFESTYLE OF CONSUMER: A STUDY OF CONSUMER SATISFACTION TOWARDS SMARTPHONE OPERATING SYSTEMS

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Abstract: Purpose: With ever changing technology, innovation in Smartphone has witnessed a remarkable transformation. The innovation not only in the hardware but software has brought disruptive changes in the lives of customers. People are increasingly becoming dependent on mobiles not only for communication but shopping, banking and entertainment as well. Many companies focus only on the Smartphone hardware features whereas Operating system has become a major platform for choosing the Smartphone's by the customers these days because of the increasing awareness on technological developments. Hence companies can use this study to know various parameters of the Operating Systems which can lead to satisfaction of the user. Research Design/Methodology: This paper is based on various literatures and articles published in journals and magazines. Along with this a quantitative approach is also used in which a sample of 300 respondents using Smartphone's has been drawn and the data collected has been analyzed with the help of various statistical techniques. Findings: By applying the Factor analysis, there are six factors which have been extracted that form the basis of choosing an Operating system i.e. 1. Basic usage 2. Reliability 3. Brand name 4. Techno-savvy needs 5. Ease of usage 6. Security. Further analysis using Chi-square, cross tabulation and descriptive analysis, it is found that Android and iOS are the most satisfying operating systems for the users and Symbian is the least. The study also found that Value for money, Ease in e-mailing and Reliability of the operating systems are the most satisfying factors for the users. Practical Implications: This study can be used by managers and developers to know various aspects of customer's satisfaction specific to Operating System and hence can work on these factors to develop better operating systems for increased customer satisfaction.

Keywords: Smartphone, Smartphone Operating Systems, Consumer satisfaction.

JEL Classification: M3

INTRODUCTION

Smartphone and their operating systems have undergone a remarkable change in past few years. This change in Smartphone's has brought disruptive change in the lives of the consumers. People are increasing becoming dependent on mobiles not only for communication but shopping, banking, education, medical and

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entertainment as well (Alt 2012, Roig 2014, Abbas 2014, Johnson 2015). Consumer's Needs and Preferences have changed drastically over the time due to "Digital Activities". The time period of five years has witnessed major disruptive changes taking place in telecom, media and technology sector which includes few major trends. First trend can be observed as the Device shifting from Personal Computers to Smartphone's which has seen double growth since 2008. Second is communication shift from voice to data and video which again utilizes Smartphone's which enables consumers help in browsing websites, playing games, streaming videos. Third is Content Shift i.e. bundled to fragmented shift. Smartphone's now are enabled with various fragmented applications which are typically used for one single purpose specifically which has eradicated the market of Newspapers, Network TV stations etc. Fourth is Social Shift from growth to Monetization. Social Networking websites signify most of the internet time. Many businesses all of the kinds now focus on social networking as a part of their marketing strategies and have achieved extraordinary growth and revenues and last one is Retail shift from Channel to Experience, the retails industry will witness a remarkable growth in e-commerce as the Smartphone users number is increasing (Mckinsey, 2014).

The increasing awareness among consumers regarding technological developments has made the Smartphone operating system as major platform for selecting a Smartphone. A mobile operating system (OS) is software that allows Smartphone's, Tablet PCs and other such devices to run programs andapplications. When a device powers on the mobile OS starts up and presents a screen which consists of tiles and icons providing access to applications and present information. Phone access, cellular and wireless network connectivity is also managed by the mobile operating systems. Some of the prominent mobile operating systems are Google Android,Apple iOS, Research in Motion's BlackBerry OS, Nokia's Symbian, Hewlett-Packard's web OS (formerly Palm OS) and Microsoft's Windows Phone OS. Some, operating systems such as Microsoft's Windows 8, function both as a mobile operating system and a traditional desktop OS. Following is brief description of popular operating systems:

Android: The Android OS has been developed by Google and is an open source for the manufacturers of Smartphone's to use it for free on their hardware. This model helps the manufacturers to have low cost of entry, and customizability. The prominent manufactures of android Smartphone's are Sony, Samsung, HTC and few others. **iOS:** The iOS is a closed model mobile operating system. It has been developed by Apple and is used only in iPhones. The application store in this OS is one of the largest and has approx 30,000 applications. The applications of this iOS works only iOS and hence limits there use only to iPhones. Blackberry OS: The Blackberry OS follows the model of iOS and can be used only with Blackberry Smartphone's. The Blackberry OS is available with different hardware

configurations and hence gives some choice to customers. Windows OS: Windows mobile operating system has been developed by Microsoft, and is licensable by any Smartphone manufacturer. It is not fully customizable and also it is having very less applications as compared to Apple or Android. Symbian OS: Symbian was the most popular Smartphone OS until the end of 2010, when it was overtaken by Android. Nokia was the one which was using it to manufacture Smartphone's. Nokia decided to shift from Symbian to Windows OS on 11 February 2011, after it was evident that Symbian has lost popularity.

India is emerging as a major market place of Smartphone's and is third largest Smartphone market after China and USA in terms of volume. The Smartphone Industry in India was a market of INR 50 billion in 2010 and by 2018; this market is expected to grow with a CAGR of 10.95%. Potential of Indian Smartphone industry can be observed by the fact that Smartphone's made up 40% of total handset sales during Q3 2015. Samsung remained the leader amongst all Smartphone vendors but many Chinese and Indian brands are now giving a tough competition to Samsung and it is expected that by 2018, the market share of Samsung will be decreasing whereas Micromax will lead the market (Research and Markets 2015a, 2015b, 2012).

REVIEW OF LITERATURE

The review of literature is concentrated around the previous researches regarding Smartphone effects on lifestyle, various factors affecting the preference towards the Smartphone operating system and consumer satisfaction towards various Smartphone operating systems.

2.1. Smartphone as a disruptive device

Alt and Puschmann (2012) in their study have argued that banking industry is one of the major industries which have experienced a disruptive change in its functioning and customer experience due to the major innovations in the Information technology. Over last decades, banks have invested a lot in information technology and adopted these changes at a major front. The main drivers which are considered behind the adoption of such changes are changing behaviour of banking customers, the rate of diffusion of innovation of Information technology solutions and various non-banking IT based business models providing enhanced financial services to the customers. Majority of the banking innovations are based on Mobiles and computers. Development of various banking applications has provided an ease to customers for their personal finance management and closer interactions with the banking services. Various Smartphone platforms such as Apple and Google have provided banking solutions to the customers. Roig et.al (2014) found that Smartphone technology has influenced the physical activity and sports industry to huge extent. In the research it is seen that Smartphone technology

has been widely developed and been accepted by the society and the Smartphone applications help people to regularly monitor their physical activity such as sitting, standing, jogging and walking to a great extent of accuracy. Major other behaviour changes also have been seen in people regarding their weight management, improved quality of life, reduced risk to cardiovascular diseases. Future advancements of Smartphone technology will lead to more engagement of audience and longer term interventions in their behaviour. Another disruptive change in education industry has been argued by Abbas *et al.* (2014) in their research study conducted throughout UK of Law students which included the information seeker's behaviour as well as the Librarian's perspective towards the use of Smartphone's for information seeking. The results depict that the use of Smartphone's is welcomed for seeking its benefits of flexibility, variety and promptness of information, but on other hand they librarians have a view point that excessive relying on the Smartphone's may lead to poor research skills in students and selecting poor information sources for their subject. The field of medicine has also been affected by the Smartphone's as found out by Johnson *et al.* (2015) whose study focused on the relevance of usage of Smartphone's in medicine at work. It finds out that the physicians make the decision of usage of Smartphone on the basis of its relevance to the work of the patient care, the impact of the usage of Smartphone in front of the patients and to see the level of the disruptiveness of the behaviour of the physicians towards the patient's care.

2.2. Consumer preference and Operating System

Dawson (2011) observed that the world is moving at a pace where technology is on a day to day upgrade. Up to date mobile OS products of five companies dominate the mobile application development market, namely Nokia (Symbian), Microsoft (Windows Mobile), RIM (Blackberry OS), Apple (iPhone OS), and Google (Android). The development of mobile applications is characterized by three factors: maturity of the mobile network infrastructure, advanced mobile hardware and an increasing demand for mobile applications/services.Through the ongoing development of mobile applications, everything can basically be done through cellular phone. Gadhavi & Shah (2010) in their study of iOS and Android, analyzed that the Android platform is made by keeping in mind various sets of users who can use the available capacity within Android at different levels; like basic users who demand only calling option, going one step higher, users who use many of the available applications up to a certain extent, and going even higher, the ones who use all of the available applications and also want to develop or suggest their own multipurpose applications or tools which can be useful not only to them, but also to their peers. The Android source code is available to all the software developers for future upgrades and addition to the existing platform or code. Unlike with the iPhone App Store, there is no requirement that Android apps should be acquired from Android Market. Android apps may be obtained from any source

including a developer's own website. Sharma (2011) in a comparative study ofAndroid and other available OS's, indicated that because of androids certain highlighting features, it is competitive against mobile platforms from Apple iOS, Microsoft windows, HP Palm, Research in Motion Blackberry and Nokia Symbian. Various features that make difference in Android and iOS are: Language, Performance, Open vs. close **(**platform approach), Choice of carrier and handsets, Runs Flash, Notification system, Voice-to-Text, Syncing, Application publication charges, Browsing, Development environment, Security, Google benefit and Market growth. In some points iPhone is ahead from android but due to some extraordinary features such as open source provided by android makes it a leader. Speckmann (2008) in a study **c**lassified the operating systems for the purpose of comparison. It includes various aspects along with user needs. Some of the critical factors for operating systems **(**Android, Windows and Symbian) in this market which differentiate them from each other are as follows: Classification based on main criteria, Technical criteria, Usability criteria and User Interface criteria. With regard to the main criteria the new Android mobile platform gets most points. It is the only truly "open system" which makes the major difference. User groups such as normal user, advanced user and technical user are also attracted by Android. Kumar (2012) in his study observed **a**ndroidhas big advantages over the other Operating System makers. Android OS targets the common man who wishes to get maximum features at a low price. **Christopher** *(*2012) indicated that even now many people think iPhone is for rich. These common men who wish to have their own Smartphone's can own Android powered Smartphone which comes under their budget. The reasons because it is popular; android is free, it is an open source, one can create own apps and has an application store named Google Play. Jain & Sharma (2013) worked on consumer's preferred operating system: Android or iOS with the help of 200 respondents from Delhi & NCR and the factors influencing customer's purchase decisions were studied with the help of paired T-test and the factors were- Usability, Variety available, File size, Number of free applications available and number of times suggestive applications downloaded. It was found out with the help of analysis that Android OS is much easier to use than iOS. Along with this some other findings reveal that customers are engaged with iOS and will prefer iOS due to its touch screen quality, features, brand name and prestige attached with this rather Android is seen as a value for money product.

2.3. Consumer Satisfaction with Operating Systems

Apple Survey (2012)as per an internal survey carried out by Apple it was revealed the 36% popularity of Android due to the reason that they trusted the Google brand and 27% said they prefer Android's apps along with a larger screen and quarter of the surveyed people wanted to get better access to Google's features**.** Gandhewar & Shiekh (2010) in a comparative study of Android, Symbian and Windows operating system on the ground of portability, reliability**,** connectivity,

open system, kernel size, standards and special features showed that Android had been a superior performer than its competitive operating systems. Android acts as an emerging software platform for mobile devices and Android will become a leader in mobile platform. Lenin (2012) in a customer think survey with an objective to assess satisfaction found that Windows Phone 7 ended up being the most satisfying operating system followed by Blackberry, then Apple's iOS, then Android, with Symbian at last position. Only a few were using windows phone but those persons were highly satisfied. The features users felt most important in affecting satisfaction were reliability and usability. Price was second to last on the list of determining factors with music player functionality being last.Hsu et.al (2013) conducted a study on usability evaluation and correspondence analysis of Smartphone operating systems in which 48 participants of Taiwan were grouped on the basis of age, gender and with IT and non IT backgrounds. In this experimental research, five tasks were given to the respondents representing the effectiveness, efficiency and satisfaction towards operating systems of iOS and Android Operating systems. It was found out that for iOS people have positive evaluations in games, appearance, battery endurance and negative for applications and price whereas Android has positive evaluations for performance, price, specifications and jailbreaks but negative at battery endurance and appearance. Overall satisfaction from iOS is more than the Android Operating System. Chun et.al (2013) conducted a study to find out consumer's satisfaction with the use of Smartphone apps in which the factors affecting consumer satisfaction were studied on 200 college students. It was an outcome that there were four major factors which affected the satisfaction of consumers and these factors are- Usefulness of the app, Easy to use, Security and Privacy and Social Conformation and the consumer with age group of 20-35 and frequent users of apps were more satisfied than other groups. It was also found out that consumers of iOS and Android were satisfied than other operating systems. Kulkarni and Kulkarni (2015) studied on Android Operating systems' user satisfaction on various parameters such as User interface, multitasking, applications, games, hurdles and updation. Most of the users have an excellent experience and highest satisfaction from the use of this Operating system. Gerogiannis et.al (2012) identified factors of customer satisfaction from Smart-phones using a fuzzy cognitive map approach which showed both positive and negative causal relationships between factors which influence the Smartphone users' overall satisfaction. Out of 40 Smartphone the users' satisfaction was rated on four factors- Service Quality, 3G services, Perceived enjoyment and Available memory in the device. Malviya & Saluja (2013) studied factors influencing consumer's purchase decision towards Smartphone's in Indore. By using various statistical techniques, it was found out thatfour factors price, brand preference, social influence and features play a major role while choosing the Smartphone for the customers. Pandey and Nakra (2014) in their study has found out thatAndroid and iOS are the most preferred Operating systems and Samsung is most preferred

brand for an Android platform, customers look for price, screen size and RAM size as most important factors while choosing a Smartphone.

NEED OF THE STUDY

As consumers increasingly seek a single converged device to support multiple functionalities on the go, the spotlight will invariably fall on Smartphone's. These devices cater to both individual and enterprise users due to their consumer and productivity-centric approaches (Frost & Sullivan, 2011). With end users' need for converged devices and original equipment manufacturers' accelerated adoption of open-source operating systems such as Android and Symbian, the mobile handset-Smartphone combination is emerging as the future growth engine of the telecom industry. (Business Today, 2013) quoted Ravi Kunwar (RGM, Nokia India) that in 2015, the Smartphone market is expected to see almost a three times increase in the number of participants.The Smartphone's Industry in India is expected to grow up till 30 million units by 2016 (Research and Markets, 2012). One of the major components while choosing a Smartphone is its Operating System. Major players in this market are- Android, iOS, Symbian, Blackberry and Windows. Android is one of these platforms which has become very popular among the customers and it has covered almost half of the market share which was earlier dominated by Symbian or iOS. Therefore, this study includes the consumer satisfaction regarding the Smartphone Operating system of the Smartphone users.

1. Objectives

1. To study the factors that influence the choice of the Smartphone Operating System
2. To study the consumer satisfaction from the current Smartphone Operating System

RESEARCH METHODOLOGY

The research design is Exploratory cum Descriptive in nature and has used a survey technique for collection of data.

Sampling: The population of our study contained all Smartphone users in Punjab region of India. A sample of 300 respondents served the purpose of the study. The sample size has been determined from the previous studies of the scholars.The technique is used non-random sampling in which quota sampling cum judgemental sampling method is used for the data collection which helped in reducing the non response errors and to reduce time and cost of the research.

Data Collection: The data for the study is collected via two sources: Primary data and secondary data. The primary data is collected using Questionnaire and the secondary data is used in the form of various articles and research papers.

Validity and Reliability: The questionnaire draft is validated through various marketing experts and an average score of 7.5 is received. Reliability is measured through Cronbach's Alpha.

Table 1
Reliability Statistics

Name	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Consumer purchase behavior of Smartphone OS	.724	.738	20
Smartphone OS satisfaction	.823	.825	14

Analysing table 1 (Reliability statistics) the Cronbach's Alpha value comes out to be 0.724 and 0.823, hence it can be interpreted that the scales are reliable for the purpose of the research (Nargundkar, 2008).

DATA ANALYSIS AND INTERPRETATION

The responses were analyzed from data collected from 300 respondents. The demographic of the data varied on gender, age, occupation and income.

6.1. Factor influencing the choice of Smartphone operating system

To find out the factors influencing the choice of Smartphone operating system, factor analysis has been employed and it includes KMO and Bartlett's Test, Eigen value, Rotated component matrix.

KMO and Bartlett's Test: KMO gives us the adequacy of the sample taken. The significant KMO value is regarded to be optimal when it is above 0.50, (Nargundkar, 2008) so that factor analysis is applicable.

Table 2
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.760
Bartlett's Test of Sphericity	Approx. Chi-Square	960.520
	Df	190
	Sig.	.000

From the Table 2, we can interpret that the KMO value comes out to be .760 which depicts that sample is adequate and factor analysis is reliable.

Eigen Value: Higher is Eigen value, higher is amount of variance explained by the factor. There are six factors considered which have Eigen values more than one. **Rotated Component Matrix:** After the extraction of the factors decided from

the rotated component matrix, the next task is to interpret and name the factors. It is identified by looking at the factor loadings of each variable on each of extracted factors. Values close to 1 have high loading and close to 0 have low holdings. The objective is to find variables which have a high loading on one factor but low loadings on other factors (Nargundkar, 2008).

Table 3
Analysis of Rotated Component Matrix

Statement	Value	Factor name
I don't use apps at all,	.724.731	*Basic usage*
I don't consider the security level of the OS		
I want all my contacts, messages and other data to be safe,	.626.672	*Reliability*
Faster the performance is, more reliable will be the OS		
Smartphone brand acts as an important factor for choosing	.629.682	*Brand name*
the OS,Presence of preinstalled features do not impact my		
purchase decision		
I need the support for continuous updation of my OS	.675.580	*Techno Savvy*
I am a heavy user in terms of applications		
Ease of browsing internet reflects my choice of Smartphone OS	.693.509	*Ease of Usage*
Ease of texting		
I prefer to have a more secure OS rather than its popularity,	.545.783	*Security*
I am seeking a better security level than my current OS		

Table 3 gives the six factors extracted from the rotated component matrix. These factors are Factor 1: ***Basic usage*** which do not require the usage of applications and also does not consider any security level for an Operating System. Factor 2: ***Reliability***, were the customers are looking for a reliable Operating System which can make their data safe and shall perform faster. Factor 3: ***Brand name***, because the customers heavily depend upon the brand name and they ignore any preinstalled features while choosing Operating System. Factor 4: ***Techno Savvy***, are those who look for technical features and large amount of applications for their Operating System. Factor 5: ***Ease of Usage*** represents the liking for easy browsing and texting. Factor 6: ***Security***, because the customers look for a better security system rather than the popularity.

Therefore, it can be observed that there are certain factors which affect the choice of the customers for choosing a Smartphone Operating System.

6.2. Current operating system and consumer satisfaction

The relationship between current operating system and consumer satisfaction has been assessed with the help of various hypotheses.

Ho1: There is no significant relation between current OS and satisfaction from overall performance.

For testing the hypothesis H_O1 Chi-Square test is applied between current OS and satisfaction from overall performance.

Table 4
Current OS and Opinion about Overall performance

Chi-Square Tests			
	Value	*df*	*Asymp. Sig. (2-sided)*
Pearson Chi-Square	65.738	16	.000
Likelihood Ratio	62.181	16	.000
Linear-by-Linear Association	18.191	1	.000
N of Valid Cases 300			

Table 4 shows the Pearson Chi square value to be .000 which is less than 0.05. It means that there is significant relationship between the two variables. It is further explained with the help of descriptive analysis.

Table 5
Overall performance of Current OS

		Cross tabulation					
		What is the opinion about overall performance of your current OS					
		Highly satisfied	*Satisfied*	*Neutral*	*Dissatisfied*	*Highly Dissatisfied*	*Total*
Which OS is	Android	36	106	8	0	0	150
currently installed	Blackberry	11	15	5	0	2	33
on your	iOS	17	15	1	0	0	33
Smartphone	Windows	7	11	5	0	1	24
	Symbian	6	34	13	5	2	60
Total		77	181	32	5	5	300

From *Table no. 5* it is interpreted that 95% of Android users are satisfied with the overall performance of their operating system while 5% have a neutral view point over this.The responses of the Blackberry users show that 79% of users are satisfied from the overall performance while 15% have a neutral view point whereas 6% are highly dissatisfied from its performance. The responses of the iOS users depict that 97% of the users are satisfied from its performance and only 3% users have a neutral view point.The responses of Windows users depict that overall 75% of the users are satisfied from its performance and 21% have a neutral opinion while 4% are highly dissatisfied from its performance.The responses of the Symbian users show that 67% are satisfied from its performance while 22% have a neutral view point and 11% are dissatisfied from its performance.

Hence considering table 4&5, H_O1 is rejected and there is higher probability of a significant relationship between the current operating system and consumer satisfaction from overall performance of the current OS. Android and iOS users are highly satisfied whereas Windows and Symbian users are less satisfied.

Ho2: There is no significant relation between current Operating System and consumer requirement being met by the OS.

Hypothesis H_O2 is tested with the help of Chi Square test by establishing a significant relationship between the Current Operating system and their requirements being met by the same.

Table 6
Current OS and requirements being met by the OS
Chi-Square Test

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	27.391	16	.037
Likelihood Ratio	31.098	16	.013
Linear-by-Linear Association	4.283	1	.038
N of Valid Cases	300		

From table 6 it is interpreted that Pearson Chi-Square value is .037 which is less than 0.05 hence it shows that there is significant relationship among two variables. Further it is proven with the help of table 7.

Table 7
Requirements being met by current OS
Which OS is currently installed on your Smartphone * Do you think your requirements were met by your current OS

Count				Cross tabulation			
		Highly Agree	Agree	Neutral	Disagree	Highly Disagree	Total
Which OS is	Android	26	88	30	6	0	150
currently installed	Blackberry	5	17	5	4	2	33
on your	iOS	7	21	1	3	1	33
Smartphone	Windows	8	9	5	1	1	24
	Symbian	6	34	9	8	3	60
Total		52	169	50	22	7	300

Table 7 shows the responses that 76% Android users have an opinion that their requirements were met by their OS, 20% have a neutral view point and 4% are highly disagreed to this. From the responses of Blackberry users and it is seen that collectively 67% users agree that their requirements were met by their OS,

18% users don't agree at all and 15% have a neutral view point. The responses of iOS users depict that 85% user's requirements were met by their OS and only 12% disagree to this and 3% have a neutral view point. Responses of the windows users shows that 71% users have an opinion that their requirements were met and 21% have a neutral say and 8% say that they were not agreed to this statement. From Symbian users, 67% users said that their requirements were met and 18% disagreed to this statement and 15% have a neutral view point.

Interpretation of Table 6&7, H_O2 is rejected and there is higher probability of a significant relationship between the current OS and the consumer requirements being met by the current OS. Android and iOS were able to meet the requirements of the users more in comparison to Blackberry and Symbian.

Ho3: There is no relation between current Operating System and their behaviour towards the same for recommendation to others.

The hypothesis H_O3 is tested with the help of Cross Tabulation by establishing a significant relationship between the Current Operating system and their behaviour towards the same Operating System i.e. they would like to recommend the OS to others or not.

Table 8
Current OS and recommendation to others
Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	25.623	4	.000
Likelihood Ratio	25.530	4	.000
Linear-by-Linear Association	17.487	1	.000
N of Valid Cases	300		

Table 8 shows that the Pearson Chi Square value is .000 which is less than 0.05. Hence it can be stated that there is a significant relationship among the two variables. It is further explained with table 9.

Table 9
Recommending to others

		Would you like to recommend it others		
		Yes	No	
Which OS is currently installed	Android	113	37	150
on your Smartphone	Blackberry	15	18	33
	iOS	23	10	33
	Windows	13	11	24
	Symbian	26	34	60
Total		190	110	300

From *Table 9* it can be interpreted that 75 percent users of Android would like to recommend it to others whereas 70 percent iOS users would recommend it to others. Also it can be seen that 54 percent of Windows, 45 percent of Blackberry, and 43 percent Symbian would recommend to others.
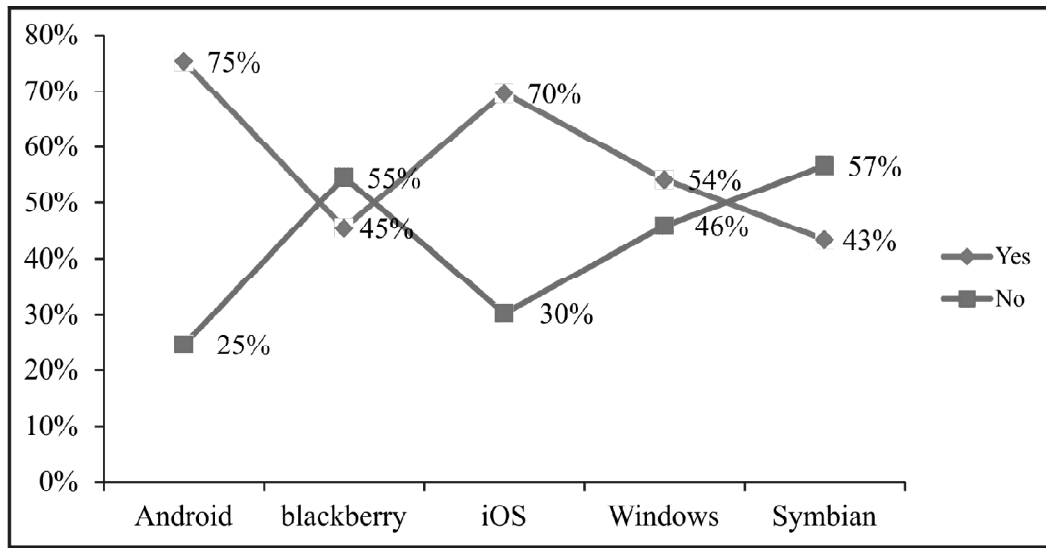

Figure 1: Recommendation to others

Fig. 1 shows different responses by different OS users. The highest percentage i.e. 75% Android users and 70% iOS users have a positive word of mouth and highest percentage of negative word of mouth i.e. 57% is by Symbian users.

Considering Table 8&9 and Fig.1 the Ho3 is rejected and there is a higher possibility of significant relationship between current OS and recommendation to others. Android and iOS users are highly recommending there OS to others whereas Symbian is the least recommended by its users.

Ho4: There is no relation between features of current Operating System and consumer satisfaction

For testing the hypothesis Ho4 summated mean of every feature is calculated.

From Table 10 we can interpret that the mean values closer to 1 depict the most satisfying feature whereas values closer to 5 are most dissatisfying features. Therefore, Value for *Money, Security and Ease of Emailing* are three top most Satisfying features, whereas *Accuracy of Maps, Preinstalled Applications and Inclusion of GPS* are least Satisfying parameters for the Operating Systems of Smartphone.

Hence we can reject the Ho4 and there is a higher likelihood of a significant relation between features of current Operating System and consumer satisfaction.

Table 10
Summated Mean of Operating system features

S.No.	Factors	Summated Mean
1	Value for money	1.86
2	User interface	2.07
3	Availability of applications in the application store	2.26
4	Response time for opening of any application	2.22
5	Internet Browser	2.08
6	Accuracy of Maps	2.31
7	Inclusion of GPS, if any, gives accurate information with almost zero error.	2.37
8	Pre installed Applications	2.34
9	The level of Battery consumption	2.16
10	Multitasking	2.21
11	Security	1.96
12	Ease of Emailing	2.01

Features like Value for Money, Security and Ease of Emailing are highly satisfying features to the consumers and Accuracy of Maps, Preinstalled Applications and Inclusion of GPS are least satisfying features of Smartphone Operating system.

Considering Ho1, Ho2, Ho3, and Ho4 it can be interpreted that consumer satisfaction differs for different OS. Android and iOS users are highly satisfied whereas Blackberry, Windows and Symbian users are comparatively less satisfied from their OS.

2. RESULTS AND DISCUSSIONS

The first part of data analysis using factor analysis and it is found that there are six major factors which are named as: *Basic Usage, Reliability, Brand Name, Techno Savvy, Ease of usage and Security.* For the Basic Usage, the basic functions of the Smartphone are more important than other major things such as Security, use of Applications. In reliability, the users seek a reliable operating system which keeps data safe and should not crash and should perform faster also. In the Brand Name, the user seeks only brand name rather than any else features of the OS. For the Techno Savvy users, large amount of applications and updating support is very necessary. In the Ease of usage, user seeks ease of texting and ease in emailing functions and for Security, the user seeks a better security level with passwords rather than the popularity of the OS.

The second part of data analysis has been analysed with ***Ho1,Ho2, Ho3, and Ho4.*** Chi-Square, cross tabulation and descriptive analysis has been used to test the hypothesis. Here a significant relationship is being established among the Current Operating System and the Consumer Satisfaction. It is found that majority

of iOS and Android users are highly satisfied from their current operating system. Windows and Blackberry users have an average satisfaction while least satisfaction is from the Symbian users. It is also found that top three satisfying features of mobile operating systems for the consumers are Value for Money, Security and Ease in E-mailing whereas Accuracy of Maps, Preinstalled Applications and GPS were three lesser satisfying features for the consumers.

3. CONCLUSION

Around six years back (Girèys, 2010) has identified that Apple and Google as two companies which brought disruptive innovations to mobile operating system business. He argued that just like in the cases of IBM and Compaq (when Compaq brought PCs to home users the IBM was protecting its mainstream market) or Xerox and Canon (while Canon brought a copy machine to every small business company the Xerox was still building bigger and better copiers for their mainstream customers), Apple with Google will take over Nokia's, Blackberry's and Microsoft's positions in the mobile operating system market as Apple and Google target casual users instead of business ones that are the mainstream customers of Nokia's and Blackberry's Smartphones. He concluded in his study that the interesting thing was that despite the fact that history was once again repeating itself, Nokia and Blackberry doesn't see it coming.

The purpose of the present research was to study the consumer satisfaction regarding Smartphone Operating systems. Operating system is one of the most important aspects in the Smartphone's. It helps to run applications, and handle other operations of the Smartphone. It also provides access to various applications developed by various users. In the study it is found out that there are six factors which are the basis while choosing an Operating system and also it is seen that Android and iOS has been satisfying most of the expectations of the users whereas Symbian being abandoned by many people these days. The top most satisfying features of the mobile operating systems are value for money, Security and Ease in e-mailing.

4. MANAGERIAL IMPLICATIONS

The study can help Smartphone OS manufacturers to understand the needs of the consumers and incorporate features such as high quality basic usage features, security, ease of usage, applications, and reliability which are most satisfying for the consumers. These factors can further be used as a Segmenting, Targeting and Positioning guideline for the Smartphone manufacturers. Operating system developers can concentrate on any one or combination of these factors to innovate in Smartphone OS. This innovation can help them to target the suitable consumers or create a new set of consumer in Smartphone market. Considering the case of Symbian, other mobile operating system developers can take a leaf out of Android

and iOS book to innovate in mobile operating systems, so that it can create better satisfaction for its consumers.

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