

Innovative Products, Processes and Practices: Evaluation of Smartphone based Operating Systems and their Market Shares

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Nowadays rapidly increasing technology i.e. smart phone technology is fulfilling the growing need of instantaneous communication and data access. A smart phone is a mobile phone with a highly developed mobile operating system which combines characteristics of a personal computer operating system with other characteristics useful for mobile or handheld use. Smartphone technology has great effect on humans' life. This technology has reduced the burden of individuals in their daily life. To deal with the rising demand for such smart phone devices, people have numerous operating system choices than ever. Customers may or may not be aware of these operating systems i.e. which is appropriate for their needs. In order to solve this issue, the purpose of this paper is to examine the most famous smart phone operating systems to decide which operating system is most appropriate for business applications, developers, as well as casual use. In this paper the market share of different operating systems have been compared and the assessment of most popular operating systems of smart phone devices available in the business market has been made. This study is based upon secondary data collected from various journals, magazines and newspapers. Data related to the market share of Smartphone Operating Systems has been collected form online Statista portal and market share hits link. Finally on the behalf of such assessment we distinguish that which operating system is much useful for its particular characteristics compared with other systems.

Keywords: Market share, Operating system, Smartphone

INTRODUCTION

A smart phone is a mobile phone **with an advanced** mobile operating system **which includes the features of a personal computer operating system and other features useful for mobile or handheld use.** Smart phones usually combine the features of a cell phone with those of other popular mobile devices, such as media player, personal digital assistant (PDA), and GPS navigation unit. A mobile operating system, also called as mobile OS, is an operating system that is exclusively designed to run on mobile devices such as smart phones, mobile phones,

tablet computers, personal digital assistants (PDAs), and other hand held devices. When it's time to buy a new smart phone, there are two things we require to consider before making the selection. One is the device particulars such as its performance details, the aesthetic look of the product, hardware features included such as camera, brand name and type of ports present. The second important detail to consider is the kind of mobile operating system used by the device.

The progress of mobile phone operating system has rapidly improved to contain challengers such as Android, Google, Apple, Symbian, BlackBerry, Palm, Microsoft etc. Such operating system's platforms have come in a very extended way because no company offer a operating system that is ideal for the mobile phone users. These companies claim that their

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platforms of operating system for mobile phones perform the best in all ventures and also these companies definitely do not publicize any weak point of their systems. These circumstances create complexity for the mobile phone users, because they do not know which company's platform is the most appropriate for their requirements. In order to resolve this issue, the present study focuses on a broad investigation of popular operating systems of mobile phones in order to find out their strong point. After examination of such operating systems for mobile devices it is very simple to get a real idea about which mobile phone is the most appropriate for end users, gaming, business application, and also for multimedia. On behalf of the specific features and functions it is easy to find out which operating system is the most appropriate for the users.

Literature Review

Kaur et al. (2014) explained the android operating system, android architecture and its key features. They have also compared android with different OSs like iOS (Apple), Blackberry OS (RIM) and Symbian OS (Nokia). Their survey resulted that android is better than all other operating systems. However due to open source OS and unique features, android has some drawbacks which lead to malware attacks like virus, spyware, worms, Trojan horse and adware.

Okediran et al. (2014) described a review and comparative analysis of various technological platforms. They mainly reviewed six Smartphone based OSs like iOS-Apple, Android-Google, Windows Phone-Microsoft, web OS, Blackberry OS and Symbian OS-Nokia. They established that an android can run on all mobile devices and has become the most accepted operating system all over the world. Ahmed et al. (2014) compared two most accepted mobile operating system android and iOS in terms of security. On the basis of comparison, they concluded that iOS

is more secured than android OS. They have also described some security points to keep the user- sensitive data safe in the respective Smart phones.

Objectives of the Study

1. To examine and compare the features and functions of various smart phone operating systems.
2. To compare and evaluate the market share of top operating systems in use.

Research Methodology

The present study makes an extensive use of secondary data gathered from various journals, magazines, newspapers and individual smart phone operating system's websites. Web based data related to market share of smart phone operating systems have been gathered from online Statista portal and net market share hits link to compare and examine the most famous smart phone operating systems. Data related to operating system's features and functions have been collected from individual smart phone operating system's official websites to decide which operating system is most suitable for customers to use.

Mobile phone Operating Systems

With increasing trend of mobile phones in customers, we regularly see a wave of confusion for selection of the finest phone in their minds. Competition in mobile industry is increasing day by day. All mobile companies want to offer best features in their mobiles. As a result, one can observe that various mobile companies provide with diverse mobile operating systems, having diverse features on a competitive edge. In this research, authors have evaluated various mobile operating systems, together with their features and functions.

TABLE 1
Comparison of some well-known operating systems which are in competition
(* = 1st, ** = 2nd, *** = 3rd, **** = 4th)

OS Features & Functions	Android OS	iOS	Symbian OS	Windows Phone OS	Blackberry OS
Programming Language	Java	Swift, Objective-C	Python, Java ME, C++	Visual C#/C++	Java
Apps	**	*	***	****	****
Interface	*	*	*	**	**
Battery Life	*	**	**	***	***
Updates	**	*	***	***	***
Customizability	*	***	*	**	**
Calls & Messaging	*	*	*	*	*
Email	*	*	*	*	*
Peripherals	**	*	**	***	***
Cloud Services	*	***	*	**	**
Connectivity	*	*	*	*	*
Security	***	*	***	**	**
Camera	**	*	**	***	**
Simplicity	*	*	*	**	**

Source: digital trends.com

Above table shows the features and functions of some popular operating systems. * denotes the rankings of operating systems on the basis of popularity.

Analysis and Discussion

Quarterly market share of some popular operating systems are depicted in the table for comparison from March, 2013 to August, 2015.

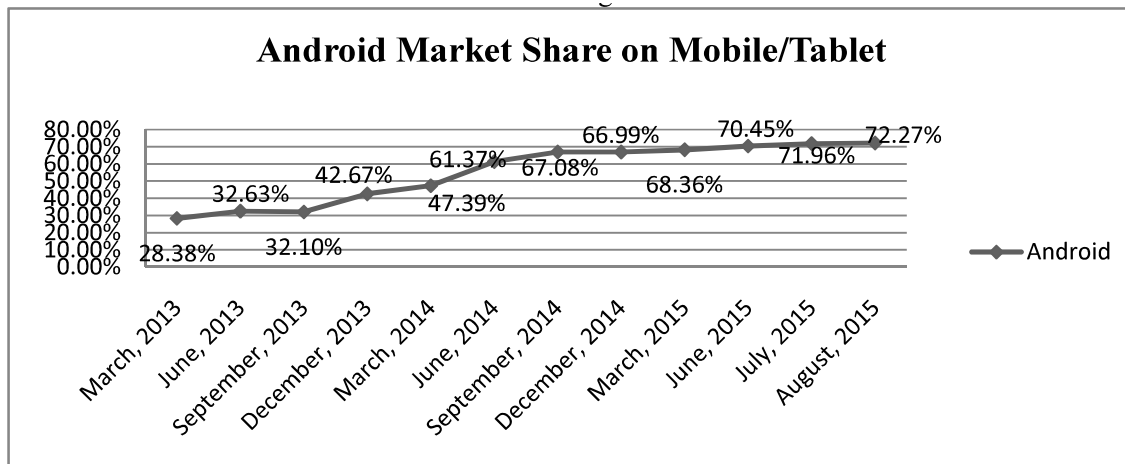


Fig. 1:

Source: www.netmarketshare.com

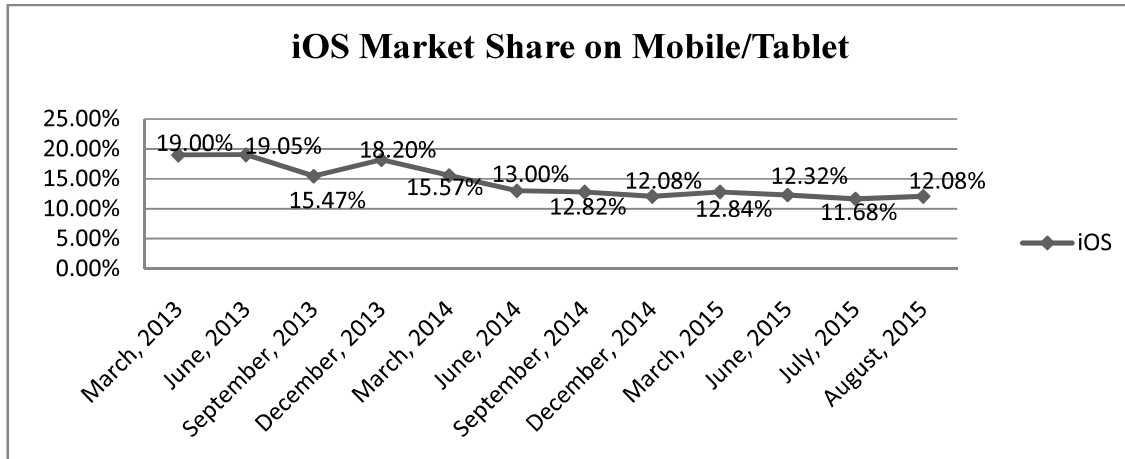


Fig. 2

Source: www.netmarketshare.com

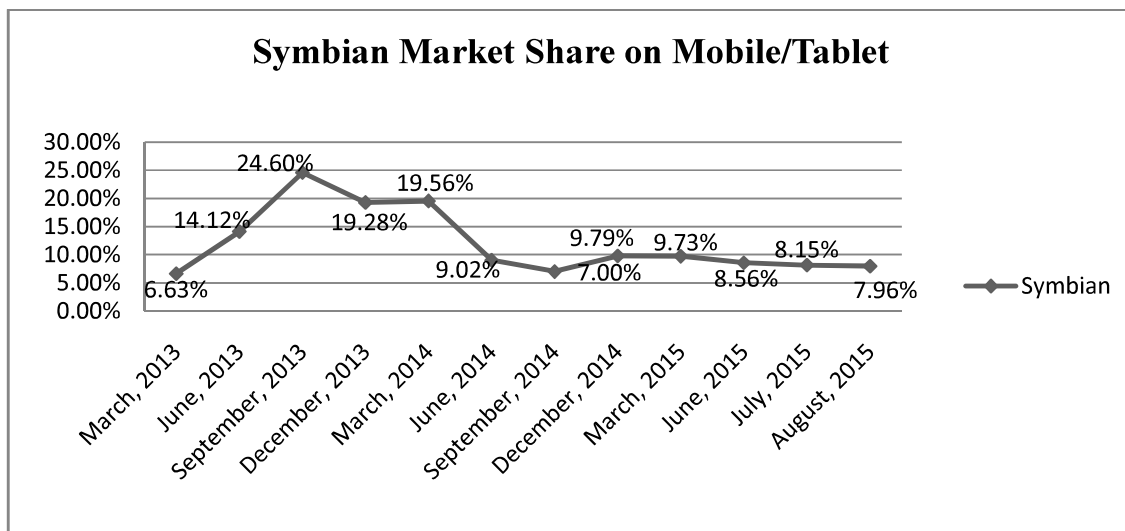


Fig. 3

Source: www.netmarketshare.com

Fig. (2) shows the market shares of Android operating system. Market share of Android OS has increased very much from March, 2013 to August, 2015. It was just 28.38% in March, 2013 which has been increased to 72.27% up to August, 2015. As we can see that all quarters are showing an increasing trend except Sept, 2013 and Dec, 2014.

Fig. (3) shows the market shares of I phone operating system. Overall market share of iOS has been decreased from March, 2013 to Aug, 2015. Market share of iOS was 19 % in the month of March, 2013 which has been decreased to 12.08% in the month of Aug, 2015. June, Dec 2013 and March, Aug 2015 are showing the increasing

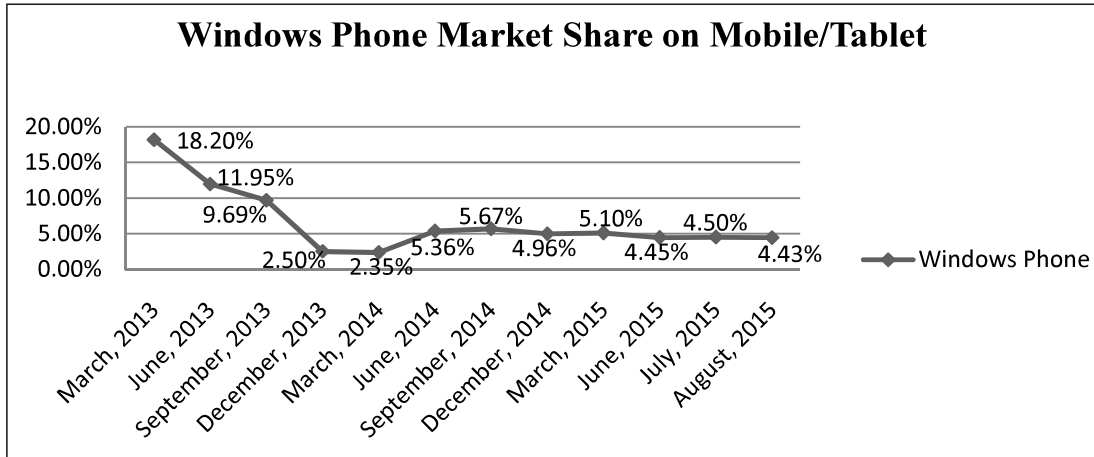


Fig 5.

Source: www.netmarketshare.com

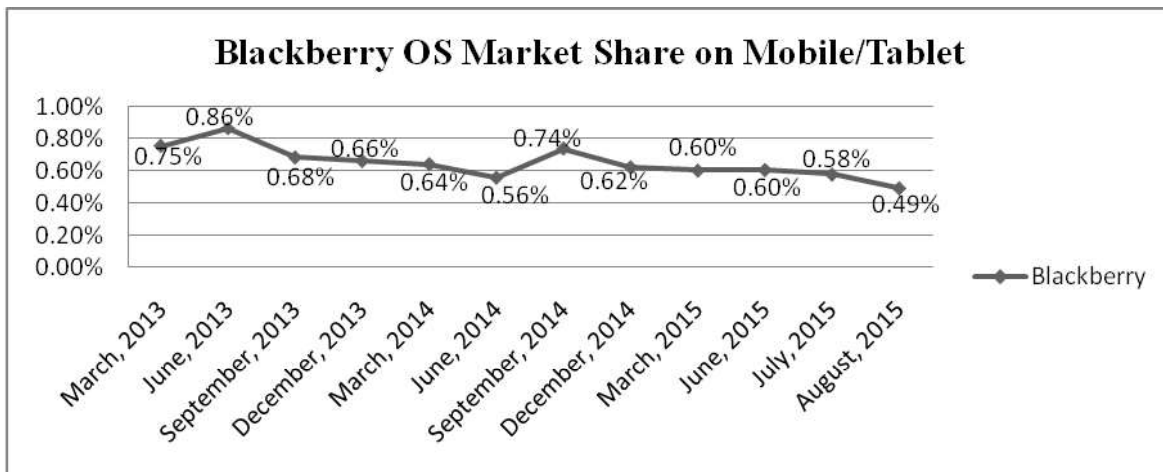


Fig. 6

Source: www.netmarketshare.com

trend while all other quarters are showing declining trend.

Fig (4) shows the market shares of Symbian operating system. Overall market share of Symbian OS remains almost same from March, 2013 (6.63 %) to August, 2015 (7.96%). No doubt that the market share of Symbian OS has been increased very much in June, 2013 and Sept, still overall market share has not been increased so

much. Major declining trend is shown by the quarter Dec, 2013 and June, 2014. Market share in Sept, 2013 was 24.60% which was decreased to 19.28% in Dec, 2013 and to 9.02% in June, 2014.

Fig. (5) shows that overall market share of Windows phone has been decreased very much from March, 2013 (18.20%) to August, 2015 (4.43%). Major declining changes took place in the month of June, 2013 i.e. from 18.20 % in

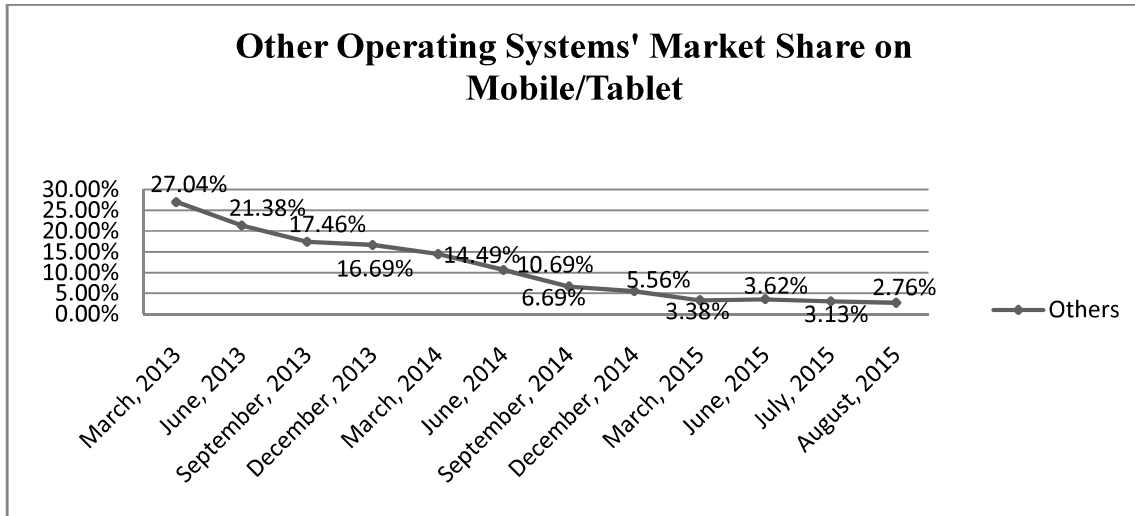
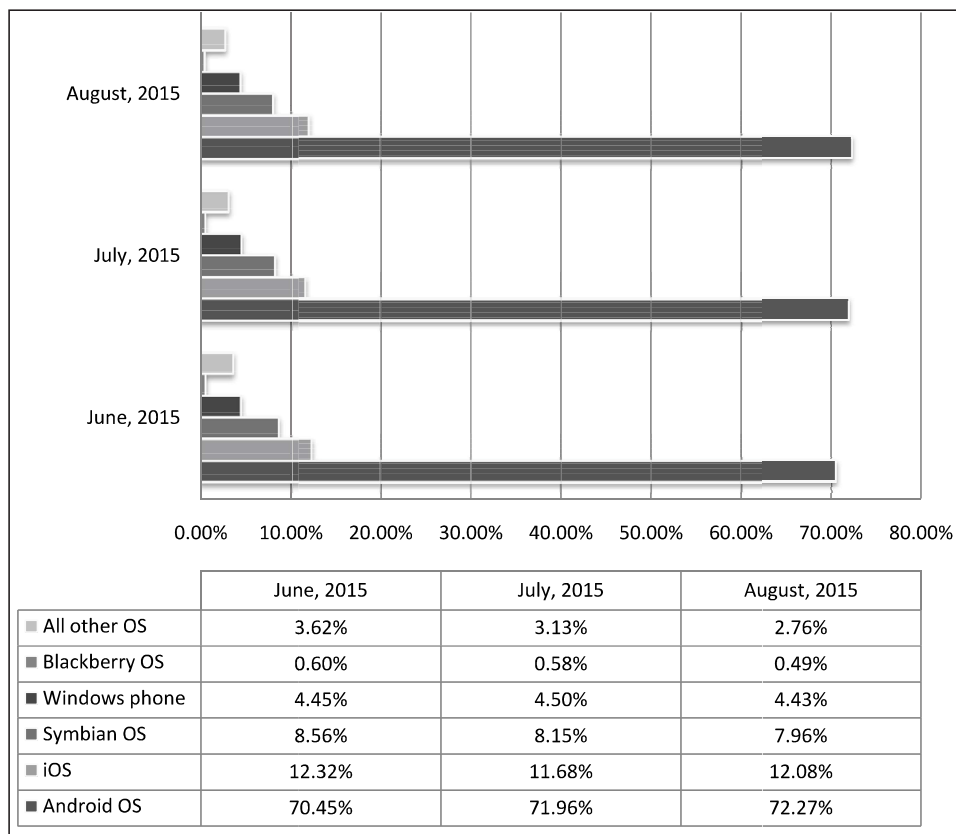


Fig. 7

Source: www.netmarketshare.com

TABLE 2
Market Share of Smartphone Operating Systems



Source: www.netmarketshare.com

March, 2013 to 11.95% in June, 2013 and in Dec, 2013 i.e. from 9.69% in Sept, 2013 to 2.50% in Dec, 2013. After Dec, 2013, change in market share of Windows phone takes place at a very low rate; it has been increased or decreased in zigzag motion.

Fig. (6) shows the market shares of Blackberry operating system quarterly form March, 2013 (0.75%) to Aug, 2015 (0.49%). Market share of Blackberry OS has continuously been less than 1 % since March, 2015. Only June, 2013 and Sept, 2014 are showing increasing trend, except these market share of Blackberry OS are declining quarterly, still there is no major change in its market shares.

Fig. (7) shows the market shares of all other operating systems. Market share of all other operating systems have been continuously decreasing from March, 2013 to August, 2015, except in June, 2015 which is showing an increasing trend.

Above table shows the market share of Smart phone Operating Systems in % in the month of June, July and August, 2015. Android OS has the largest market share and showing the increasing trend from June, 2015 to August, 2015. Market share of Android OS was 70.45% in June, 2015, 71.96% in August, 2015 and 72.27% in August, 2015. Symbian OS and Blackberry OS are showing a decreasing trend from June, 2015 to Aug, 2015. Market share of Symbian OS was 8.56% in June, 2015, 8.15% in July, 2015 and 7.96% in August, 2015. Market share of Blackberry OS was 0.60% in June, 2015, 0.58% in July, 2015 and 0.49% in August, 2015. Windows phone and iOS are showing a mixture of increasing and decreasing trend from June, 2015 to August, 2015.

CONCLUSION

Every operating system has been developed by keeping in mind the targeted customers. Every Operating System provides competitive and unique features for their customers. However,

iOS came out to be ever enhancing operating system with a great evolution chart over the years; it is also one of the reasons that the iOS has the second highest share in the market after Android OS. On other hand, Android, being an open source operating system enjoys addition of new ideas every day by various Android lovers due to which it has the highest market share. Symbian lacked the continuous updates. It creates a large loophole for Symbian to match the latest advancements; this is one of the reasons of decreasing market share of Symbian OS. iOS supports a super user friendly GUI, making it a prominent choice among the users. Though Android is not much far behind, Symbian suffers with an outdated GUI. As we talk about the hardware support, Apple celebrates to be the most trusted brand for hardware support. Its devices provide a best running experience with full hardware acceleration. Android is still struggling for a better hardware support. Symbian though also provides a great platform for different applications in terms of hardware support. Being an end user customer, price is the main concern for every person. Apple costs far more in terms of price as compared to Android and Symbian, thus restricting its customers to Upper or upper middle class families. Symbian on other hand has been a first choice for a variety of sections due to its seller, Nokia, one of the most trusted brands in mobiles. But now things are changing. Android is growing very fast to become the heartbeat of mobile users (Jindal, 2012).

As the market share of most popular operating system have been depicted, it is very much clear that the Android operating system is continuously having the highest market share followed by I phone operating system. Market share of Android OS has increased very much from March, 2013 to August, 2015. It was just 28.38% in March, 2013 which has been increased to 72.27% up to August, 2015. One of the reasons of having highest market share is that the android

have a series of versions, supported both by a low cost as well as high end mobiles, making it more approachable among all sections of society. Symbian operating system faces a major decline in market share from Sept, 2013 to June, 2014 because of unavailability of latest updates. Market share of Windows phone declined at very greater pace from March, 2013 to Dec, 2013 because of lack of apps, updates and peripherals. iOS is the costliest OS among all, which is the most basic reason that the overall market share of iOS is decreasing Market share of iOS was 19 % in the month of March, 2013 which has been decreased to 12.08% in the month of Aug, 2015. Market share of Blackberry OS has continuously been less than 1% because only connectivity, call & messaging and email services of Blackberry OS are comparable with other Operating Systems.

Overall market share of only android operating system is increasing gradually; all other operating systems are having a declining trend from March, 2013 to Aug, 2015.

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