

A Comparative Study over Android and Windows 8 Mobile OS

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Abstract

Today in present era, the usage of cell phones which also called as mobile phones is increasing day by day throughout the world. The same thing is also happening in India. There are various technologies are introduced in cell phones day by day. According to India, there are so many marketers/ companies are producing various mobile phones with different operating system and technologies. The main popular OS used in India are Android, Symbian, and Apple OS etc.

The mobile operating system had clearly a big impact over the smart phone market, additionally with a lot of users down the line and also some tech giants like Google and apple OS are yet top of the marketing chain. This survey paper talks about which mobile OS is dominant with customer and marketer.

As considering India, Android OS has a great leap in sale when comparing other OS in market. The next largest smart phone OS in India is claimed by windows Phone. Nokia has introduced Lumia series, which has Windows OS whereas Samsung and Sony have android as their OS.

This paper outlets the major difference in Android and Windows 8 OS. A mini survey has been taken among the people who are using this two OS

KEYWORDS: Mobile OS, Marketing, Technology, R&D in Mobile.

INTRODUCTION – Mobile Operating System

Today the world wide smart phones have a number of operating systems which make the mobiles user friendly approach over the customers. The mobile operating systems are growing rapidly over the past two years throughout the world. Some of the mobile operating systems are Windows 8, Symbian OS, Blackberry OS, Linux OS, Apple OS and Android OS.

In India, a research survey from research firm IDC's top operating systems based on worldwide smart phone and market share over 2012¹. Throughout the world Google Android has a market share of 57.5%. Out of four phones three of them are powered with Android mobile operating system. Last quarter year the Android operating system has raised to 75% from 57.5%. The big giants Samsung, Sony, HTC have launched their smart phones in variety of models which is consisting of Android mobile OS¹.

Next when considering Apple iOS has a 13.8% market share. The Apple's share has increased to 14.9% a change of 1.9%, which has a lowest improvement over android¹. BlackBerry OS has a market share of 9.5% last year which has decreased to 7.7% in the third quarter of the year 2012¹.

When comparing, Nokia's Symbian OS has market share of 14.6% in the year 2012. Even though Nokia has models of smart phones using Symbian Software, which has later moved to Microsoft Corporation's software¹.

Windows Phone OS has just started the launching of Windows 8 powered smart phones by Nokia with collaboration of Microsoft. The Nokia's Lumia Smart phones have given a boost up in the market share of 1.2% throughout the world market. The research firm has concluded that the smart phones with Windows 8 OS will improve its position in the fast growing market¹.

From the all above said OS, Linux mobile OS has a market share of 3.3%¹. When comparing all the five mobile OS, Android stands in the first, and Apple stands in the second, Windows 8 is in the order three. The Symbian OS has degradation over other OS.

In this paper the comparative study over Windows 8 phones with Android phones sales, technical aspects, growth, and developments has been discussed.

Android Operating System

Android was founded by Andy Rubin, Rich Miner, Nick Sears, Chris White at Palo Alto, California in the year 2003. Android is an operating system primarily designed for touch screen smart phones and tablet computers. Android is based on Linux kernel which is developed by Android, Inc which was later finally bought by Google in the year 2005. The first Android powered phone was sold in the year 2008. Android allowed users to customize their home screens with shortcuts to applications and widgets. Android is open source software under the license of Apache.

Android has a large community of developers writing applications which is called as "apps", which extends the functionality of devices which is primarily written in JAVA programming language. In the mid of the year 2012 approximately 7, 00,000 apps are available for android. Google play is the Android's primary application store has nearly about 25 billion applications for the functionality of Android smart phones.

Android has the advantage of a ready-made, low cost, customizable, light weight operating system for the hand held devices. In the year Nov 2007, the Open Handset Alliance, Consortium which develop open standards for mobile devices. The first Android mobile was HTC Dream.

Android as a user interface which is based on direct manipulation, haptic feedback and also internal hardware's like accelerometers, gyroscopes and proximity sensors. Android versions consist of a kernel based on Linux kernel version 3.X. The versions and code name of Android is given below. The android OS is used in not only in smart phones where it includes laptops, net books, smart books, smart TV's, Galaxy camera, portable media players.

From the year 2011, "Android @Home", a home automation technology which uses Android to control a range of household devices including light switches, power sockets and thermostats. Prototype light bulbs were announced that could be controlled from an Android phone or tablet, but android head Andy Rubin was cautious to note that "turning a light bulb on and off is nothing new", pointing to numerous failed home automation services.

Code Name	Version	Year of Release
Cupcake	1.5	2009
Donut	1.6	2009
Eclair	2.0-2.1	2009
Froyo	2.2	2010
Gingerbread	2.3-2.3.2	2010
Gingerbread	2.3.3-2.3.7	2011
Honeycomb	3.1	2011
Honeycomb	3.2	2011
IceCream Sandwich	4.0.3-4.0.4	2011
Jelly Bean	4.1x	2012
Jelly Bean	4.2x	2012
Jelly Bean	4.3X	2013
KitKat	4.4	2013

Table: I Versions of Android

Windows Mobile operating system

Windows 8 is the second generation mobile operating system from Microsoft in the 2012. The predecessor of Windows 8 is Windows 7. Windows 7 cannot be extended or updated to Windows 8. The applications which are called as apps developed can be used by both the platforms. Some of the companies like HTC, Samsung, Nokia and Huawei released Windows based smart phones².

Apollo is the code name for Windows 8 from Microsoft during the year 2012. Windows 8 has replaced its old CE-based architecture by Windows NT kernel. Windows 8 phones with larger screens and multi-core processors. Windows 8 phones include the features like device management, Bit Locker encryption and also the ability to create a private market place to distribute apps to employees. Also has the feature of over-the-air updates².

For the smart phones with Windows 7.x, Microsoft has released the General Distribution Release 1 (Portico), General Distribution release 2 (GDR 2) and latest General Distribution Release (GDR 3). Up to 2016, the updates for Microsoft Windows 8 are available.

Windows 8 has improved file system file system, drivers, network stack, security components, media and graphics support. Windows smart phones support multi-core CPUs of up to 64 cores. Windows 8 also supports NTFS. Internet Explorer 10 is the browser in Windows Phone 8 which is used in Windows 8 desktop series².

Windows 8 uses multitasking which allow developers to create apps that can run in the background and resume instantly. The main interesting factor of Windows 8 phone is Kids corner. The main data in the phone is not touched while playing games. Data Sense is the app to select the data usage according to our data plan which can be feeded in advance as a setting².

Some of the other features in Windows 8 series are Xbox SmartGlass, Xbox Music, Xbox Video, Native Code Support, Simplified Porting, and Remote Device Management, VoIP and Video Chat app, Firmware over the air, Camera app, native screen capture and Hebrew language support. Zune Software is the sync app to transfer music, videos and other multimedia files and office documents².

Nearly 1, 10,000 certified apps on the worldwide market place (and growing) most of which are free. NFC (Near Field Communication) Built-in allowing for mobile payments, Business-ready with Office Mobile, Outlook Mobile and On-device encryption capability³.

In this paper, how Android Smartphone has an impact over Windows 8 Smartphone is discussed.

Android OS Architecture³

Figure-I: Given below shows the architecture of the Android OS, which referred as a software stack with different layers. Each layer is a group of several program components. The various layers of Android OS are

- Linux Kernel
Android OS is built on top of the Linux 2.6 Kernel with some architectural changes made by Google. Linux interacts with the hardware.
- Libraries
Is the Android's native libraries. The device handles different types of data. These libraries are written in C or C++ language.
- Android Runtime
Android Runtime consists of Dalvik Virtual machine and Core Java libraries. It is a type of JVM used in android devices.
- Application Framework
These programs manage the basic functions of phone like resource management, voice call management etc.
- Applications
Applications are the top layer in the Android architecture. They are SMS client app, Dialer Web browser, Contact manager.

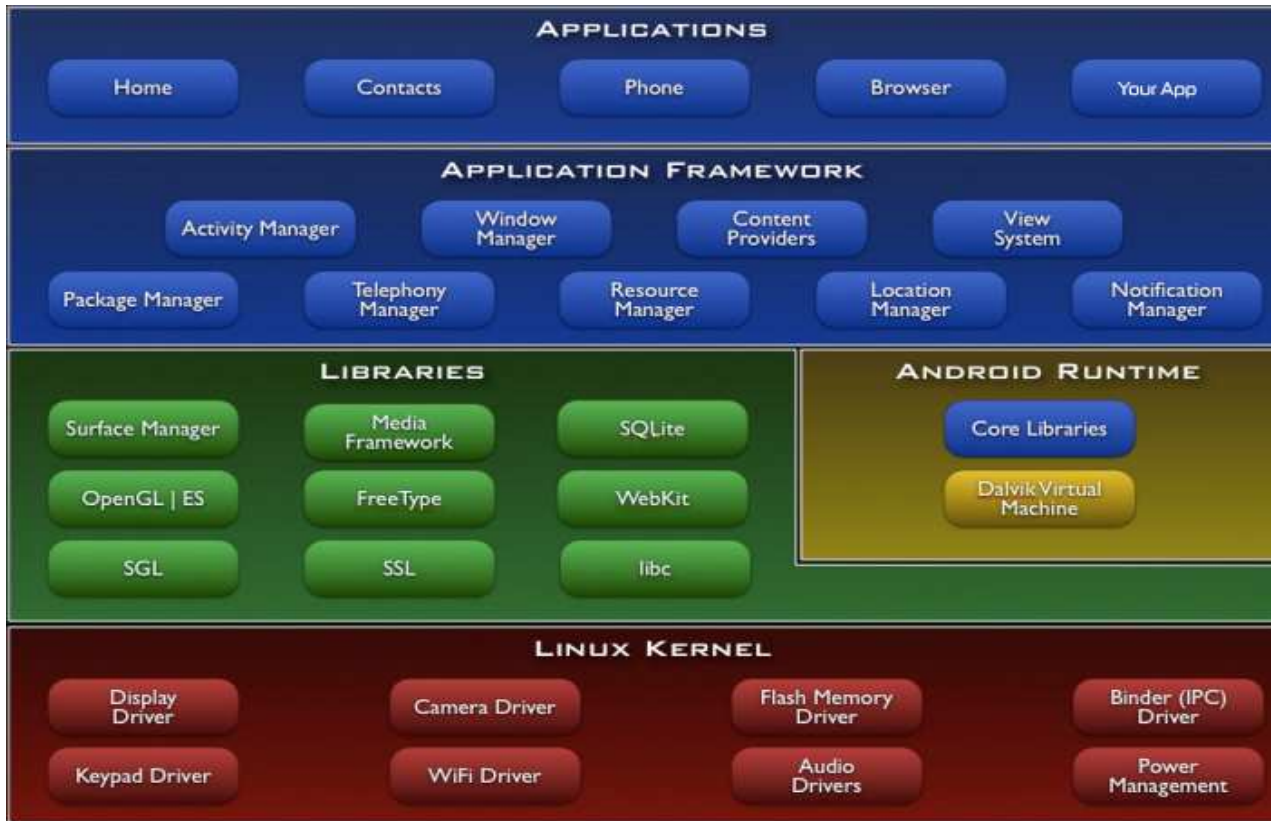


Figure – I: Android Architecture³

Windows 8 OS Architecture⁵

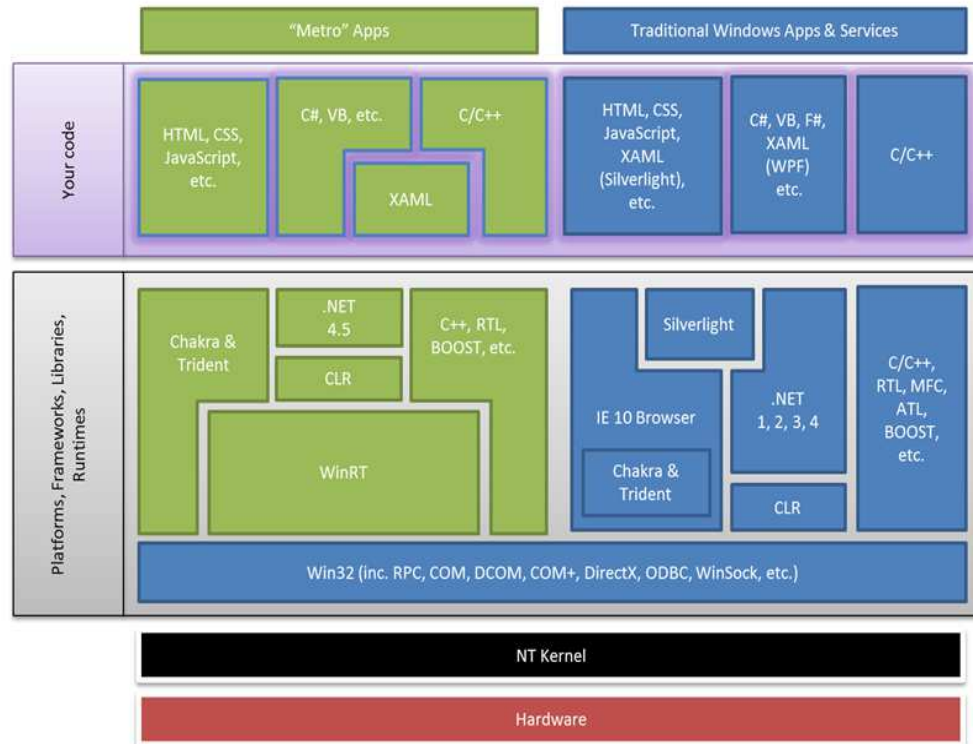
Figure – II: The architecture Windows 8 is divided into five layers which are listed below. Windows 8 is an Operating System for Touch Screens and Cloud Computing.

- Hardware
- NT Kernel
- Platforms, Frameworks, Libraries, Runtimes
- Your Code
- Traditional Apps / Metro Apps

Windows 8 is the first to use Windows NT Kernel. The operating system adds improved file system, drivers, network stack, security components, media and graphics support. Using the NT kernel, Windows Phone can now support multi-core CPUs of up to 64 cores, as well as 1280x720 and 1280x768 resolutions².

File History is a continuous data protection component. File History automatically creates incremental backups of files stored in Libraries and user-specified folders to a different storage device. Windows 8 incorporates improved support for mobile broadband as a "first-class" method of internet connectivity².

Windows 8 App Platform Architecture



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Figure – II: Windows 8 Architecture ⁶

Hardware Requirements for Android OS⁷

- The absolute minimum requirements for Android were originally a 200 MHz processor, 32 MB of RAM, and 32 MB of storage.
- Out of the box, Android is incompatible with ARMv4 or lower; ARMv5 or higher is needed to run native code without modifications.
- Android 4+ requires an ARMv7 processor. Custom versions of Android 4+ have been made for ARMv6 however.

Hardware Requirements for Windows 8 OS⁸

- Qualcomm Snapdragon S4 dual-core processor or Snapdragon 800
- Minimum 512 MB RAM for WVGA phones; minimum 1 GB RAM for 720p / WXGA / 1080p
- Minimum 4 GB flash memory
- GPS and A-GNSS; GLONASS is supported if OEMs decide to include it

- Support for micro-USB 2.0
- 3.5mm stereo headphone jack with three-button detection support
- Rear-facing AF camera with optional LED or Xenon flash, optional front-facing camera (both need to be VGA or better) and dedicated camera button
- Accelerometer, proximity and ambient light sensors, as well as vibration motor (magnetometer and gyroscope are optional)
- 802.11b/g and Bluetooth (802.11n is optional)
- DirectX graphics hardware support with hardware acceleration for Direct3D using programmable GPU
- Multi-touch capacitive touch screen with minimum of four simultaneous points

Survey Results

In the time of study, we have collected primary data by issuing questionnaire to nearly 200 respondents by E-Mail, Phone and sent printed questionnaire to the known respondents throughout the states in India. From the collected data, the following results have been generated.

a) User's Knowledge over Operating System (200 Respondents in numbers)

Android	Windows 8	Apple iOS	Blackberry	Symbian
164	18	4	4	200

Table –II: User Knowledge over Operating System

b) User Satisfaction over Operating System (200 Respondents in percentage)

Users	Android	Windows8
Ease of Use	80	10
Ease of Understanding	80	10
Satisfaction	100	05
S/W Up gradation	80	02
Software Help	100	100
Online Support	100	100
Storage and View	75	12
Cost Factor	60	20
Brand Models	80	02
User Taste	95	12
App Store	80	01

Table – III: User Satisfaction over Operating System

c) Brand Preference based on OS (200 Respondents in percentage)

BRAND	Android	Windows 8
Samsung	74	01
Sony	20	--
HTC	06	--
Nokia	--	10

Table – IV: Brand Preference based on OS

Reported Problems on Windows 8 Phone⁹

Some of the problems are listed below which the users feel Windows Phone has to come over

- Multitasking is the biggest problem to know about which app is "currently running" list of apps.
- Email threading not works properly.
- Lots of features, including Rooms are Windows Phone exclusives.
- Speech recognition is lousy.
- No place to see notifications. Bing Maps doesn't have public transit directions, let alone bike directions.
- It's not easy to share photos to services like Twitter and Facebook; Android and iOS let you do that in one touch, but not Windows Phone.

Reported Problems in Android Phone¹⁰

The following are the some android problems listed down

- The battery runs flat too fast
- A small popup menu doesn't appear after holding the power button
- Backlight turns on and off on its own
- The phone doesn't respond at all
- Android corrects my words without even asking
- Third party launcher - it occasionally switches back to the default one. (e.g. HTC Sense)
- Someone's bothering me. How do I block them?
- The screen orientation changes too often

Findings

From the study about the comparison of Windows 8 phone and Android Phone over Indian market, the main 10 points have been noted down. The points are

1. Indian Customers are seeking Model change often
2. Brand makes the Indian customer to choose the Operating System
3. Knowledge over Operating System is nearly new for them to change
4. Swift from one OS to another OS takes time.
5. Windows Phone has to simplify their User Intervention and make the user to feel relax.
6. Android's user interface is good when comparing Windows Phone
7. Price factor also plays a vital role over phone market.
8. Android phones are available in market from Rs.3000 ranges higher
9. Windows Phone are higher in cost
10. Samsung, Sony , HTC are releasing new models often to cover customers
11. Only Nokia is concentrating in Windows OS.
12. Takes time to understand the background concept of Windows phone than Android.

Future Directions

In India, day-by-day new phones are introduced with various Operating Systems. A study over the technical and comparison over OS, technology used, brand, models can be carried over the period. Researchers for Management, Commerce, Computer Science, Self- Motivated research workers and people of Information Technology can carry their research work over this platform. This is a vast area where there is a key for broad research.

Conclusion

From this study, it is concluded that by present day Android has a big leap over Windows phone in Indian market. But there is really a big challenge is going to occur between Microsoft and Google. Today Windows Phone may sell less in number but there is a sales increase in the year 2013 than 2012. This increase is the positive approach for the companies to get into Windows phone segment. At present Nokia is the only one company trying to boost up Windows Phone by presenting its Lumia series in Indian market.

In future market there is will high competition between Windows 8 phone and Android phone. Both the products will offer their full-fledged innovations to the customer and try to satisfy them. Windows 8 is the best competitor to Android rather than other Operating System.

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