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WHITEPAPER SERIES:

Smart Phone Platform Comparison

US Smart Phone Platforms

A Comparative Analysis

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This document contains a comparison matrix of current smart phone platforms targeting the United States market. The report is segmented into several sections including feature/system information, market share, application distribution, and technical details. The data for this paper was gathered from online sources. The intended audiences are marketing, IT project managers, IT analysts, and developers who are interested in developing for smart phones.

GENERAL INFORMATION AND MARKET TRENDS

As we step into a new decade, the smart phone application development market is expected to grow significantly. Based on market analysis this report identifies the six most popular smart phone platform Operating Systems, which dominate United States marketplace. The list includes iPhone, Android, Palm WebOS, Windows Mobile, SymbianOS and RIM Blackberry. Note the list does not include the Nokia Qt OS which is dominant in the European Market.

MARKET SHARE

Currently the Symbian OS is the top used OS in the world, which held the majority of the market share as of November 2009. In the US RIM Blackberry held the major market share through October 2009. As can be seen in Figure 1 and Figure 2, major market share analysis, it is clear the smart phone market in the US is different from the world market trend. Moreover, Symbian OS phones cover only three to four percent of the US market. Nevertheless, Apple iPhone ranks third in both the US and worldwide markets.

FIGURE 1: TOP RUNNING OS WORLDWIDE FOR SMART PHONE MARKET SHARES Q3, 2009 BY CANALYS

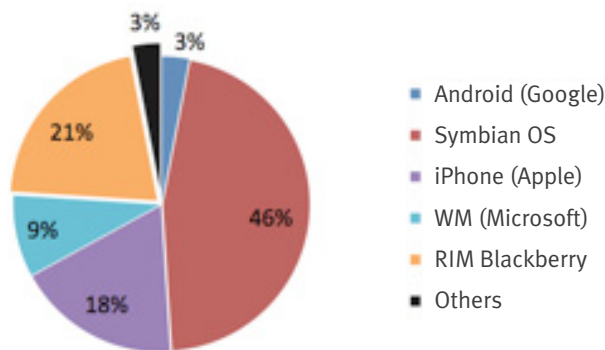
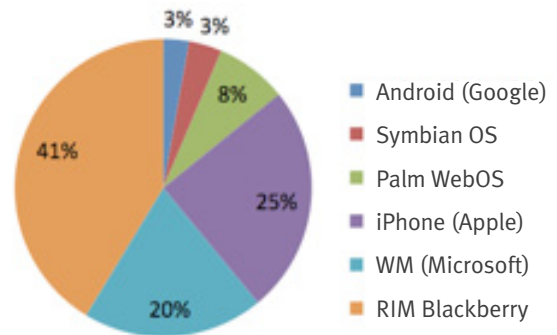
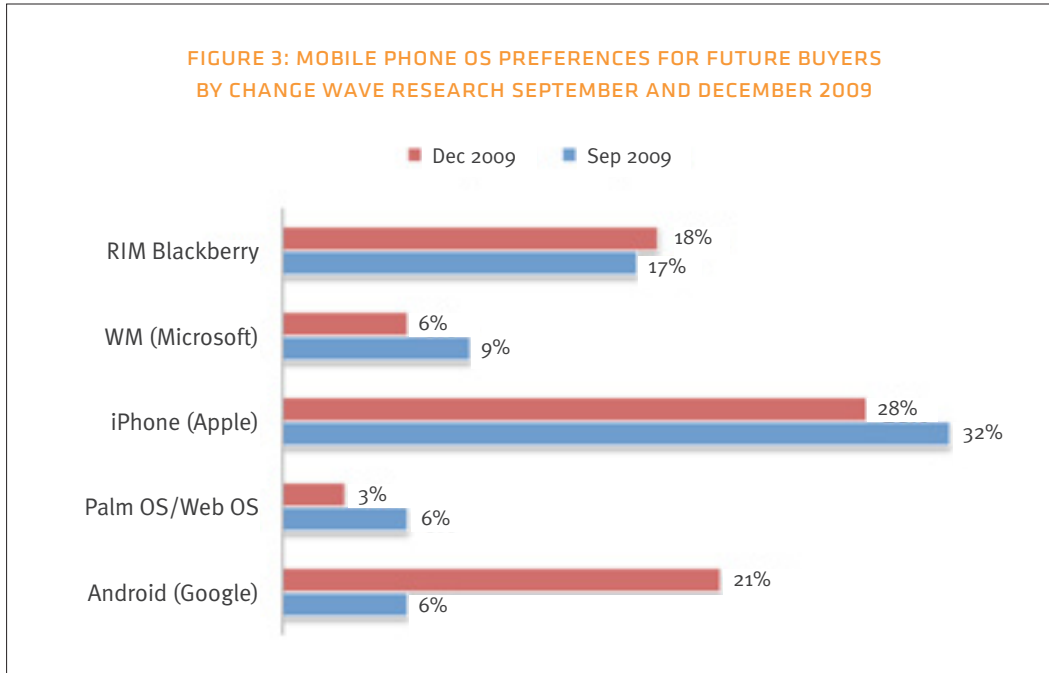


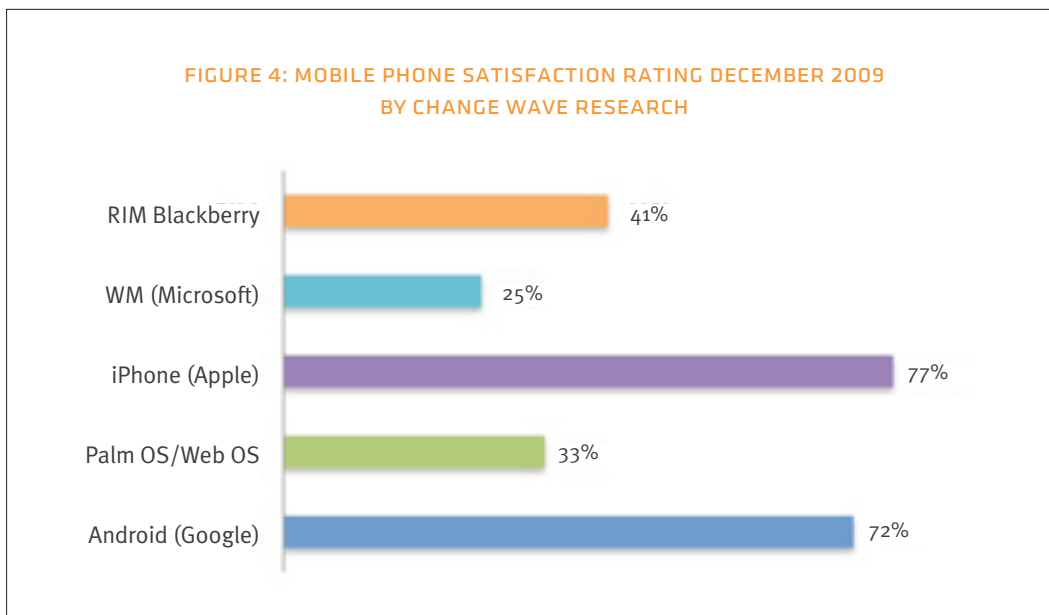
FIGURE 2: US SMARTPHONE MARKET SHARES OCTOBER 2009 BY FIERCEDEVELOPER



The smart phone survey conducted by ChangeWaveResearch (Figure 3) shows that the number of smart phone buyers who prefer to have Android in December 2009 increased by 15% from September 2009 (www.changewaveresearch.com), whereas iPhone preference dropped by four percent.



In the customer satisfaction survey, iPhone OS leads with 77% of owners reporting to be very satisfied with their phone and Google Android ranks second with a 72% satisfaction rate (Figure 4).



DISTRIBUTION

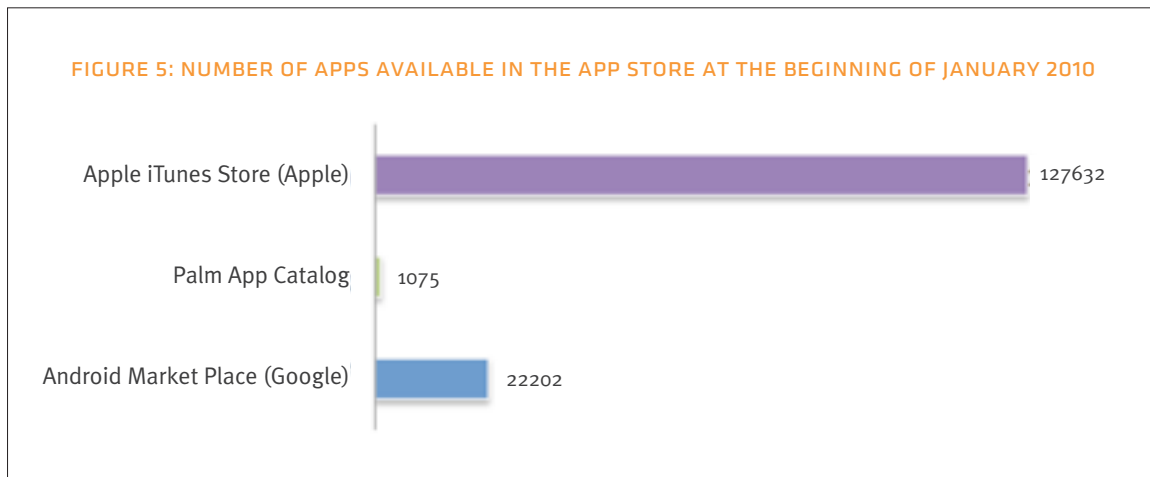
There are multiple players in the mobile market place. According to the mobile application distribution, the Apple application store has the highest number of applications. The Apple store has the most application downloads since its inception in 2008.

While Apple is still the leader in terms of application distribution, Android has the steepest and most rapid growth in terms of worldwide handset distribution. In the US, most phone distribution depends on an exclusive network carrier where most smart phone service plans last for two years. Currently (as of January 2010), iPhone is available through one carrier only: AT&T. Palm WebOS is available through Sprint and Palm Pre Plus will be available on Verizon's network late January 2010. Android, RIM BlackBerry, Symbian OS, and Windows Mobile are supported via multiple carriers.

APPLICATION DISTRIBUTION

There are currently 32 app stores available identified by WIP (Wireless Industry Partnership – www.wipconnector.com). A detailed comparison table is provided via the [Smart Phone Comparison Matrix](#). Apple is the first company to launch its own app store in July 2008. Though iPhone native applications can only be downloaded and distributed on Apple iTunes, third party iPhone and iPod Touch app stores are also listed among the 32 app stores by WIP. The iPhone and iPod touch applications in these stores are available via Web portal and iTunes app store.

Android, RIM BlackBerry, Palm WebOS (Palm Pre), Symbian OS, and Windows Mobile applications can be distributed and downloaded via third party market place. Nevertheless, the Apple iTunes store still holds a very impressive record in terms of app distribution and app downloads in the two year period. The store has more than 127,632 apps and 2 billion downloads. Following the Apple success story, other companies launched their own app stores between the fourth quarter of 2008 and the beginning of 2009. Figure 5 shows the number of apps available in the Apple iTunes store, Palm WebOS catalog, and Android market place in the beginning of January 2010. Android market place is one of the fastest growing market portals. According to Flurry, Android market downloads increased 22 percent between November 2009 and December 2009.





One of the key success factors of the Apple app store is the adoption by iPod touch users and the teenage demographic (Flurry, Inc - www.flurry.com). Unlike other smart phone companies, Apple provides alternative smart mobile devices without a phone service – iPod touch. iPod touch users are responsible for the highest number of apps downloaded per month compared to iPhone and Android as identified by admob (metrics.admob.com) and Flurry, Inc. Flurry reports that approximately 40% of iPhone OS-based devices sold worldwide are iPod touch. Four other main factors of the Apple store are the effective user interface of iPhone and iPod touch; iPhone application developers; quality and quantity of the apps distributed in the store; and on the device portal distribution system.

For the distribution statistics in January 2010, the number of free apps distributed compared to paid accounts for about 61% of the Android market place (www.androlib.com). On the other hand, free apps account for only about 25% of total app distribution on the iPhone app store (<http://148apps.biz>). The most popular application distribution category in Apple, Android, and Palm WebOS app stores is games with 16% for the Apple store and Android market place, and 22% for the Palm WebOS catalog.

APPLICATION DEVELOPMENT

In general, there are three different solutions for smart phone development – native, worldwide Web, and hybrid. Native app is the application that works natively. Native app code is written specifically for a particular phone’s operating system. Web app is the application that renders via a Web browser using Web application solutions including HTML, CSS, and JavaScript. Hybrid app is the combination of a native app and a Web app. Some hybrid apps that are non-native apps are developed using JME, .NET CF (Compact Framework), and BREW (Binary Runtime Environment for Wireless).

One of the important factors in choosing features to integrate into an application is selecting those features that are unique and useful to target users. There are many hardware features available for smart phones, of which the three important and unique features are touch screen, GPS integration, and built-in Wi-Fi. Other features include camera, phone, address book, e-mail, and location tracking.

Percentage of touch screen, GPS, and Wi-Fi use (Canalys):

Touch Screen Worldwide	GPS Integration	Built in Wi-Fi
45%	80%	> 75%

Four out of the six mobile OS can be developed using Open Source platforms except iPhone and Microsoft Windows mobile. Three of the major running OS can be developed using Java.

iPhone is based on Objective-C, Palm WebOS is based on Web base environment, and Windows mobile is based on the .NET, C# or Visual Basic environment (see [Smart Phone Comparison Matrix](#)). Palm WebOS has its own software development kit (SDK) which is called Mojo SDK, though Palm WebOS is based on Web base ideas. Palm WebOS app is not a Web app.



Cross platform development allows a single mobile app to work across multiple OSes. Currently there are limited solutions and most of the cross platform solutions do not support each of the main platforms and only a subset. In addition there are constraints to be considered in selecting a native platform compared to the cross platform. Table 1 shows the advantages and disadvantages of using native platform versus cross platform environments.

TABLE 1
Native Platform versus Cross platform development solutions

	Native	Cross Platform
Advantages	<ul style="list-style-type: none"> Library update Direct technical support Code size Stable App store and device portal solution Existing User Interface (UI) standard for mobile users Better UI design result, can take full advantage of display 	<ul style="list-style-type: none"> Open Source solution One programming language family for all Common user interface design could be implemented for multiple OSes Fast development
Disadvantages	<ul style="list-style-type: none"> Not all have Open Source solution Different programming language Different UI design pattern Slow development time 	<ul style="list-style-type: none"> Library update Limited direct technical support Library is limited Code size Unstable Not suitable to adopt one UI guideline for all UI design depends on the platform and is limited

MOBILE VERSUS DESKTOP APPLICATIONS

Many features that are available on personal computers are not available on mobile devices. Table 2 shows the comparison between mobile and desktop environments. The differences should be considered when developing an app for a smart phone. See [Smart Phone Comparison Matrix](#) for a smart phone OS feature comparison.

TABLE 2
Developing for Mobile versus Desktop Applications

	Mobile	Desktop
Memory	Limited	Larger size
Bandwidth	Limited	Higher Bandwidth
Processor Speed	Limited	Significantly faster
Internet Connection	Limited, Wi-Fi, Carrier network dependent (data plan)	Faster speed, Wi-Fi or cable, many Network options
Battery	Limited	Longer battery hours
Hardware Features	Limited	Advanced
Screen Size	Small size	Large size
Resolution	Low	Mostly high
Keyboard Size	Small size	Large size
Keyboard Type	Touch screen, virtual keyboard, full QWERTY, character recognition, triple tap	Full QWERTY, Dvorak
Layout	Varies	Few standards
User and Environment	Mostly mobile, outdoor and indoor, unpredictable	Mostly stable, mostly indoor, predictable
Main OS	Android, Symbian OS, Palm WebOS, iPhone OS, Windows Mobile, and RIM BlackBerry (and more)	Windows, Linux, Mac OS, Unix
OS Update	Requires device sync with software on a computer	Can be scheduled and can be run in the background
Multitasking	Depends on the OS, limited	Available, advanced
Web Browser	Limited and sometimes OS dependent	Multiple
Most adopted browser	Based on WebKit	Internet Explorer, Firefox, Safari and Google Chrome
CSS styling for Web application	Limited, OS and browser dependent	Advanced, and mostly standard across major browsers
Code Size	Should be small and each mobile application catalog has a maximum file size limitation	No limitation
Flash Support	Depends on the OS, capability limited	Available and can be manually setup
Multimedia	Limited, depends on OS and devices	Advanced and can be manually setup
User Interface Design (UI)	Should follow mobile device and each OS standard guidelines	One UI could be adopted across different platforms
Distribution	Depends on the OS	Free to distribute, and many options are available



MOBILE APPLICATIONS IN 2010

This generation of smart phone device has been on the market for over two years now. Nevertheless, 2008 was the year the mobile world made a mark with the introduction of iPhone new generation and the iTunes app store. The next generation of the mobile world arrived in 2009 with the Android and Palm WebOS. 2010 is believed to be the year of rapid mobile maturity. We will see more people adopt Google Android phones. Google has an advantage with the number of operators and carriers compared to iPhone. However, the price of the Google Android phone is still relative high. Consequently, we will continue to see the growth of the number of app downloads via Apple iTunes app store. Apart from iPhone and Google, the Palm WebOS catalog that will officially launch in 2010 will slowly contribute to the tough competition among the OS.

In terms of Web application and content providers, we will see more transformation of normal desktop Web site content to a mobile Web app and native app. In addition, though some experts believe that 2010 will be the year that social media will slow in terms of growth, people have adopted the social networking tools; Twitter, Facebook, Youtube, or Google Friend Connect and these embedded apps will continue to grow in use for mobile applications. An example of such application is Time app for iPhone and iPod touch. The Time app (www.time.com) not only provides content but also allows users to share the content by posting a link via Twitter.

Another social networking function is an application for suggestion with rating and voting to assist people with everyday decisions. A simple feedback submission will be something of the past, as we see more and more companies adopt the customer feedback system with vote capability. The voting system is a seamless brand integration technique by giving power to people in order to start conversations with a target group while capturing their feedback and engaging them. Customers can propose their own ideas and share with the rest of the community. Top ideas or feedback can be used to improve services and the product itself. An example of such application is iVote (www.ivotemobile.com). iVote has an iPhone app solution that allows users to vote in a poll. One of iVote's important features is the graphical comparison mechanism that shows results of the vote by cities and countries.

Data and interactive visualization graphical based features will also be utilized more and more for business intelligence applications to take advantage of the phone touch capabilities and to present data to mobile users in a small screen in the most meaningful way.

Last but not least, it would be an interesting year to see how Mobile TV and video content will be modeled outside of the existing providers. Those companies who can take advantage the user experience would definitely benefit. However, as the screen technology for mobile devices is getting better, network speed and other hardware limitations (e.g. battery life, processor speed, and memory) will still be key factors in executing such applications.

MORE INFORMATION

For more information and useful links, please refer to the comparison matrix at www.r2integrated.com/MobileComparison.aspx.



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- o More links to data source URL can be found at www.r2integrated.com/MobileComparison.aspx

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