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## Smartphones, tablets and the mobile revolution

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The mobile market is substantially penetrated globally with approximately 6 billion mobile subscribers, or 87 percent of the world's population. In the United States there are 325 million mobile subscriptions, a 103 percent penetration rate.

The rapid adoption of smartphones continues, representing greater than 50 percent of mobile handsets in the U.S. currently with further penetration gains anticipated. The smartphone is effectively a powerful mobile computer and its adoption and evolving use, along with tablets and e-readers, is resulting in new consumer behavior and expectations related to the consumption of information and the purchase of goods and services.

At the same time, the rapid emergence and consumer adoption of Facebook and other social networks is a sociological phenomenon unparalleled in human history.

Early in October the number of active users of the Facebook network surpassed 1 billion, one-seventh of the world's population, and nearly half of global Internet users.

Each day, Facebook processes 2.7 billion "Likes," 300 million photo uploads, 2.5 billion status updates and check-ins, among other countless bits of data.

There are approximately 600 million people using Facebook on mobile phones and, as

smartphones further penetrate, Facebook expects even more mobile usage and greater engagement. "It's just this massive opportunity," said Facebook founder/CEO Mark Zuckerberg.

Consumer services, including Facebook, Pandora and YouTube, among many others, are racing to monetize their very significant and rapidly growing mobile user base.

Mobile applications continue to proliferate and the mobile advertising market has finally taken off as advertisers, brands, marketers and publishers rush to deliver relevant targeted messages to mobile consumers based, in part, on location and type of device.

Similarly, retailers are adapting to shopping research on smartphones and tablets and in-store mobile usage while mobilizing their Web sites to optimize the mobile consumer and commerce experience.

As smartphones and tablets enter the global mainstream, an entire ecosystem of services and technologies are emerging to capitalize on the trend. We are in the early innings of a mobile revolution engendered by increasingly faster, more affordable mobile Internet access on a global basis.

### How the iPhone changed the mobile game

The mobile revolution really started in 2007 with Apple's introduction of the iPhone. The iPhone radically and irreversibly redefined mobile devices with relatively fast and simple Web access, an innovative and intuitive touch screen, and the creation/promotion of mobile applications and a mobile app marketplace.

Previously, wireless devices largely functioned as wireless telephones or wireless email devices.

With the iPhone, the world's first consumer smartphone, mobile devices became mobile computers that also serve as voice and text communication devices.

The iPhone, handsets powered by Google's Android mobile operating system and other smartphones have provided consumers around the globe the first affordable, personal computer, driving one of the largest and fastest shifts in consumer behavior ever.

Equally importantly, while perhaps less well understood, is how Apple caused a fundamental shift in the balance of power among wireless industry behemoths, similar to how it upended the music industry earlier in the decade with the introduction of the iPod.

The iPhone enabled its users to directly surf the Internet through its mobile Safari browser instead of using the mobile carrier's own portal, providing device manufacturers direct customer and revenue relationships.

By allowing Internet access and portal competition wireless carriers ceded control of their own customers, engendering the dumb pipes descriptor in the process.

The success of the iPhone has resulted in less control by the wireless carriers, more innovation in mobile operating systems by device manufacturers and developers and

more affordable and increasingly more powerful mobile computing products for consumers.

The iPhone also led directly to Apple's design and introduction in April 2010 of the iPad, its subsequent consumer electronic category creator and blockbuster.

### Success of Android

The iPhone ushered in a new mobile era and growing unit sales continue to generate incredible financial returns for Apple. It also generated an immediate competitive response from Google.

In 2008, Google launched Android as an alternative mobile operating system through a no-fee, open-source licensing model, providing device manufacturers and mobile carriers significant freedom and flexibility to design products while relying on manufacturers to build and promote Android devices and the carriers and other retailers to sell them to consumers.

Google's no-fee licensing model has resulted in rapid adoption in the smartphone market such that Android is now the leading mobile operating system globally.

In fact, the Android OS accounted for 72 percent of all smartphone shipments in the third quarter of 2012. Samsung is the leading Android smartphone manufacturer by a large margin, accounting for 34 percent of global smartphone shipments in the third quarter of 2012.

While Android is now the dominant smartphone OS, the tablet market has proven more difficult to penetrate.

In the third quarter of 2012, the Apple iPad maintains a 50 percent market share, followed by Samsung at 18 percent and Amazon at 9 percent (both Samsung and Amazon use the Android OS).

The recent introduction for the holiday selling season of the iPad Mini and a slew of new Android-based tablets will make for interesting market share comparisons in January.

Apple is a manufacturer and retailer and generates revenue and a solid margin on the sale of each and every Mac, iPod, iPhone, iMac and iPad.

Google generates no direct revenue through the adoption by manufacturers of the Android OS.

On the other hand, all these devices are optimized for Google applications generating an enormous amount of consumer usage data that Google then monetizes through the sale of advertising.

Google also generates revenue through third party and direct sales of Nexus smartphones and tablets, although these Google devices are contract manufactured by third-parties.

Mobile subscriber stats

As noted earlier, at the close of 2011 there were approximately 6 billion mobile subscribers on a global basis. This represents a penetration rate of approximately 87 percent based on a current global population of 7 billion.

Developed countries represent 25 percent of these subscriptions with 122 percent penetration, while developing countries represent 75 percent of the subscriptions and 78 percent penetration.

Global subscribers are forecasted to grow at 5.4 percent from 2012-2016 according to Portio Research.

Smartphone and tablet subscriptions growing rapidly

In a June 2012 report from Ericsson, at year-end 2012 there will be approximately 1 billion smartphone subscribers and 250 million mobile PC and tablet subscribers globally.

These segments are projected to grow at 30 percent and 25 percent CAGR, respectively, through 2017 such that smartphone and mobile PC/tablet subscriptions (data-heavy devices) total 3.8 billion in 2017, 43 percent of mobile subscriptions.

The segment identified as HT smartphones refers to High-Traffic devices, which typically generate 5-10 times more traffic than low-traffic devices. It is estimated that the HT share of total smartphones reached 50 percent at the end of 2011, and will represent the vast majority in 2017.

The Ericsson report also tracks and forecasts mobile broadband subscriptions, which includes those devices using a Wi-Fi network and a declining number of feature phones with a mobile Web browser. This subscriber base is also anticipated to grow at a 30 percent CAGR through 2017 to 5.1 billion, a 57 percent penetration rate of total mobile subscriptions.

In the U.S. there are approximately 115 million smartphone and 74 million tablet users currently.

Smartphones now comprise in excess of 50 percent of the mobile handsets in the U.S., while tablets have penetrated to approximately 31 percent of the U.S. Internet population ages 8-64 and are found in approximately 25 percent of U.S. homes.

Substantial growth in both smartphone and tablet unit sales remains for the U.S. market, although projected growth outside the U.S., particularly in the Asia-Pacific region, is even greater.

Over the next five years mobile subscriptions will continue to grow modestly, while the penetration of smartphones, HT smartphones and mobile broadband subscribers is forecast to increase rapidly and substantially. Consider that slightly more than half of the world's population will have access to the Internet on their mobile device by 2017.

Mobile data overtakes voice

As smartphones have penetrated the consumer market global traffic on mobile networks

has changed dramatically since 2007.

Consistent with the shift in usage to Internet access and information/entertainment consumption, voice traffic has grown modestly, while data traffic has exploded with rapid growth commencing in the second half of 2008. Mobile data traffic now exceeds mobile voice traffic by a four times multiple.

Mobile traffic reflects individual usage, which derives, in part, from the screen size of the mobile device.

Generally, the larger the screen the more time spent watching video, one of the most traffic consumptive activities.

By the end of 2011, an average mobile PC/tablet generated approximately four times the mobile data traffic produced by an HT smartphone, which, in turn, generated two times the traffic of an average smartphone.

Mobile data traffic is expected to continue to grow rapidly, increasing at a 60 percent CAGR from 2011 to 2017, while voice traffic remains stable.

Forecasted data traffic in 2017 will be 15 times greater overall compared to 2011, reflecting both subscription and usage growth, particularly of mobile video, a significant bandwidth hog.

On average, a mobile PC generates approximately four times more traffic than a HT smartphone.

By the end of 2011, an average mobile PC generated approximately 2 GB per month versus 500 MB per month produced by HT smartphones.

An average smartphone generates approximately one-half the volume of an HT smartphone. By the end of 2017, it is estimated that a mobile PC/tablet will generate 8 GB of traffic per month, and a smartphone just above 1 GB, such that mobile PCs/tablets generate slightly more than one-half of mobile data traffic in 2017.

In 2017, approximately one-third of the installed base of mobile PCs is estimated to have a broadband subscription, with the remaining using Wi-Fi or Ethernet to connect or assumed not to connect.

At the same time, approximately one-half of tablets are expected to have a built-in broadband modem, though not all will have an active subscription. It is estimated that currently only 13 percent of tablet users worldwide have a data subscription, choosing to connect via Wi-Fi rather than the cellular mobile networks.

Entertainment and mobile video rules

There are a number of ways to express consumer behavior on mobile devices. One way is to analyze the type of traffic generated by mobile devices.

From this perspective and measuring traffic during peak period, real-time entertainment is the dominant traffic category on the mobile network, accounting for 49.9 percent of all

bytes sent and received, followed by Web browsing at 16 percent and social networking at 10.5 percent.

Social networking apps typically generate far less traffic than real-time entertainment apps that stream audio and video, underscoring further their popularity and usage.

YouTube has become the dominant app on mobile networks (Netflix dominates on fixed networks) with a 28 percent aggregate traffic share, Facebook is ranked fourth with an 8 percent share and Pandora is now ranked sixth in upstream-downstream traffic usage. Facebook accounts for 15.4 percent of the upstream traffic on the mobile network, the largest single share.

From a traffic perspective, Cisco estimates that mobile video will grow at a 90 percent CAGR between 2011 and 2016, the highest growth rate of any mobile app category forecasted, generating over 70 percent of mobile data traffic by 2016. The mobile Web is forecast to generate 20 percent of mobile data traffic in 2017, the second largest category after mobile video.

Cloud apps globally will account for 71 percent of total mobile data traffic in 2016, compared to 45 percent at the end of 2011. Mobile cloud traffic is projected to grow 28-fold from 2011 to 2016, a compound annual growth rate of 95 percent.

### How we spend our time

Mobile traffic is one means of identifying consumer mobile behavior, but since different apps generate greater/lesser amounts of traffic it is also important to understand how much time we spend on each app.

According to eMarketer, time spent on mobile devices has increased from 22 minutes per day in 2009 to an estimated 82 minutes a day in 2012, a nearly four times increase.

In October 2011, McKinsey & Co. published minute-by-minute mobile device usage based on findings from its iConsumer survey.

Out of a total of 119 minutes of reported daily use in the U.S., 32 percent of time was spent on entertainment, nearly one-third of that playing games, while another 32 percent of time was spent talking or instant messaging.

Further, we spend 10 percent of our time on social networks and a nearly equal amount, 8.4 percent, either browsing/searching on the Internet or shopping/researching and searching locally.

Across most retail categories, mobile accounts for about a third of online consumer research and 44 percent of the time this research is done inside the physical store – to check out the competition, to compare prices, or to use mobile-specific tools such as bar code scanners.

Usage does differ modestly from one country to the next and varies considerably by demographic.

## Demographics matter

American youths, ages 13-34, have digital lives distinct from older U.S. consumers.

According to another McKinsey report using the same iConsumer survey data, this age group prefers smartphones or tablets and eschews PCs and many laptops. Landline telephones are considered almost a curiosity as are CDs and most hard-copy media such as newspapers, magazines and books.

Compared to consumers ages 35-64, the younger age group is 1.5 times to two times more likely to own a smartphone, tablet, Internet-enabled gaming console or Internet video box.

Similarly, the 13-34 age grouping is more than 1.5 times more likely to go online to communicate through social networks and VoIP/video chat or to access entertainment online or on-demand.

Further, compared to the 35-64 age group, this cohort uses their mobile devices 3x longer each day and, as a proportion of aggregate time spent, spends twice as long engaged with applications on mobile versus on the PC.

This tech-savvy cohort is entering its prime spending years and the cultural and consumptive behavior of this younger generation has important implications for emerging and established information, lifestyle and technology brands, in particular.

### Tablets are not as mobile as smartphones

According to the Online Publishers Association, tablet owners are slightly older, more female and wealthier compared to smartphone owners.

The average age of a tablet owner is 34, compared to 30 for smartphones, while smartphone owners skew more male at 56 percent male ownership compared to 51 percent male ownership of tablets. Tablets are more of a shared device and less “personal” than smartphones while the larger screen enables more multimedia consumption.

According to Nielsen data, 70 percent of consumers’ time spent with tablets occurs at home. Tablets are used an average of 13.9 hours per week and more frequently at night, particularly during the 7 p.m. to 10 p.m. prime-time television viewing hours.

Forrester Research has recently reported that 85 percent of U.S. tablet owners use their devices while in front of the television, while 57 percent of smartphone and tablet owners checked email, 44 percent visited a social network and 19 percent searched for product information while watching TV.

Tablet usage behavior goes beyond interaction with the TV. Research indicates that 30 percent of tablet users actually spend more time reading news compared to before purchasing the tablet.

While free streaming makes up the majority of content consumed across all platforms, TV has the highest share of paid content (35 percent), followed by the tablet (29 percent),

smartphones (19 percent) and PCs (17 percent).

Consumers spend more time using tablets for more immersive activities with games, social networking and entertainment categories accounting for 86 percent of consumption.

Smartphones claim a higher proportion of communication and task-oriented activities with social networking (24 percent), utilities (17 percent), health and fitness (3 percent) and lifestyle (3 percent) commanding nearly half of all usage on smartphones.

Social networking is altering the way users communicate. Games are the most popular category on both form factors with 67 percent of time spent using games on tablets and 39 percent of time spent using games on smartphones.

More broadly, social networking is altering the way users communicate.

According to McKinsey, since 2008 social networking has almost doubled its share of consumer communications time, from 15 percent to 29 percent, mostly at the expense of the phone.

This change in behavior is even more pronounced when generational differences are considered as consumers under the age of 25 spend nearly 40 percent of their communications time on social networks, double the rate of those over age 45.

Wrap-up and looking ahead

The rapid proliferation of smartphones and tablets is profoundly changing the way that we behave, consume content and conduct commerce.

The ubiquity of wireless connectivity combined with increasing functionality and speed of connected devices and mobile networks will further drive consumer demand for media, content and advertising while monetization models continue to evolve.

The smartphone and tablet are going mainstream. We have watched mobile usage and uses grow dramatically since the introduction of the iPhone in 2007, the Android OS in 2008 and the iPad in 2010.

The research of Cisco, Ericsson, Sandvine and others provides reasonable visibility regarding continued growth and adoption of smartphones and tablets, their population and household penetration five years from now and growth in data consumption. We know that time spent on these devices has increased substantially and that mobile consumption of video and social networks will continue to expand.

The McKinsey study on the digital consumption behavior of the 13-34 age grouping provides insights as to consumer behavior in the future.

We know that consumer behavior on a smartphone is different than on a tablet. We know that tablets are increasingly becoming available in different sizes, potentially representing additional distinct consumer use cases.

It is also apparent that mobile consumers are becoming active mobile shoppers. As



smartphones and tablets go mainstream and consumers spend more time engaging on their devices, publishers continue to explore various monetization models, while advertisers, brands, and marketers shift increasing advertising budgets and spend, both response and brand, through the mobile medium.

Media, entertainment and information companies are investing to mobilize their Web sites and in new services and technologies to capitalize on resulting fundamental shifts in consumer behavior.

Established and emerging mobile advertising technology companies are also developing and providing solutions to enable marketers and advertisers to reach cost-effectively this vast mobile audience on a targeted basis at scale.

The mobile market is complex, fragmented and both growing and evolving rapidly. We are in the early innings of a mobile revolution engendered by more affordable mobile computing and Internet access on a global basis.

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