



Mobile industry 2012 segment analysis

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Introduction

Few industries change at the pace mobile does. Whether it's the iPhone 5, the importance of LTE, or BYOD trends disrupting the enterprise, there are always new technologies, trends, and companies changing the way we define mobile. Here, GigaOM Pro highlights a few segments of the mobile industry that will be important to watch in the coming months.

Tara Seals points out new opportunities for handset OEMs to differentiate their devices and remain relevant, including social TV and emerging markets.

Derek Kerton discusses how the mobile app market is still dominated by Apple and Google but identifies trends that are making space for a third player to gain ground.

GigaOM Pro's mobile curator, Colin Gibbs, looks at new business models in the wireless service provider space, where the rise of unsubsidized handsets and non-cellular devices could disrupt traditional carriers.

Monica Paolini outlines the transition from voice- to data-centric usage models and the challenges mobile networks face as they adapt to this change.

Finally, Laurie Lamberth writes about the location-based shopping market, which has an expected growth rate of more than 90 percent through 2016.

Certainly our list does not cover every single segment in the mobile industry, and we encourage readers to weigh in with their own thoughts, questions, and predictions in the comments section of this report.



Fresh opportunities for the mobile handset market — by Tara Seals

The growth in the mobile handset market has created a hypercompetitive hardware market in which manufacturers must innovate and differentiate more than ever. Handset exclusivity has waned as an issue, given that the availability of the iPhone has been extended across carriers and that most operators offer at least one high-end Android device. Also becoming more widespread is 4G, which means greater network compatibility.

All of this means OS providers and OEMs alike need to find new ways to differentiate their handsets in order to capture revenue premiums: namely through tighter integration with apps and content. Personalization continues to be an important issue for mobile users, who look to access their content and applications wherever and whenever.

Trends to watch

Smartphones grow dominant earlier than expected

Notably, global smartphone shipments are expected to eclipse feature phones for the first time next year, creating a new revenue opportunity across the value chain.

According to shipments research firm IHS iSuppli, smartphones will account for 54 percent of the total handset market next year, up from 46 percent by the end of 2012 and 35 percent in 2011. And smartphone shipments as a share of the overall handset market will continue to rise, reaching 67.4 percent of the total cell phone market in 2016.

The reason for this premature growth is multipronged: Smartphone pricing has fallen across the board as the volume of shipments ramps up, while advanced functionality and better app availability allow for true personalization for both businesses and



consumers. Android shipments continue to grow, with a raft of vendors providing a range of models for the industry – including low-end smartphones that appeal to emerging markets. And as carrier networks get faster and data-plan pricing rationalizes, the user experience improves, which translates to an even greater demand and uptake for advanced gadgets.

Emerging markets matter

Asia-Pacific, the Middle East, Africa, and Latin America are all seeing increased buildouts of mobile broadband networks, which in many cases are greenfield plays that provide the only form of internet connection to the population. That makes the growing handset market notable not only as a cultural shift but also as an important economic factor. First-time consumers with low-end smartphones will represent about 43 percent of the total smartphone market by 2016, according to IHS.

The ongoing reduction of service and device prices also means adoption in price-sensitive emerging markets. The wider availability of handsets that lack some of the higher-end specs, like quad-core processors, is not a hindrance to the most-sought-after apps in these markets, which include important community-focused mobile applications like microbanking and health-care-supply tracking. The latter has become critical in places like sub-Saharan Africa, where aid shipments need careful distribution tracking. This segment is led by affordable Android, RIM, and Nokia and Windows smartphones.

Next year smartphones built on Intel's new 1 GHz Z2000 processor will debut, offering a price point below \$150 before subsidies, which is well-suited to rapidly expanding emerging regions.



Video and the connected home

In the higher end of the market, there are two related trends: the ongoing rise of video consumption on smartphones and tablets, both inside and outside the home, and the mobile device becoming more than just a communications device (voice, text, email, chat, and social networking). Increasingly smartphones are taking on an ancillary, administrative role within the connected-home experience.

All of this translates into an important market opportunity for device manufacturers and operators, which have an opportunity to position their devices, based on specs and horsepower, within a holistic, multiscreen package of apps and content.

Pay-TV operators across the globe are rolling out the ability to use one's subscriber credentials to authenticate an account and gain access to content, both linear and on-demand, across computers, smartphones, and tablets within the home. Meanwhile over-the-top (OTT) providers like Netflix and Hulu and premium services like HBO Go offer streaming video anywhere and anytime to any screen. In each case, regardless of the network, the more video-friendly the end device, the greater the attractiveness it holds for the consumer.

Social TV (especially apps with Facebook and Twitter integration that automatically sync with what's on the living room screen) and other so-called second-screen apps like Shazam's content-identification service are being increasingly adopted, as are viewing-management apps from service providers. They look to complement and enhance the TV experience while making consumers more comfortable with using devices for activities like programming a DVR.

To support these viewing and entertainment environments, handset specs are becoming a differentiator on the video front. For instance, quad-core processors and larger screens with top-end resolution will result in better performance for full-motion video games, streaming video, and on-demand viewing of professional broadcast content in a TV Everywhere context.



Alongside a powerful quad processor, devices with big screens (4.7 inches to 5 inches) and top-end HD resolution (1280 by 720 pixels) are making it to market. Here, devices like the LG Optimus 4X HD and Optimus Vu, the HTC One X, and Samsung's flagship, the Galaxy S III (which features a super-AMOLED screen for maximum brightness), are leading the pack — for now.

Sony, meanwhile, has announced its Xperia line of smartphones (and a tablet), which showcases how an OEM can bring together the device, other screens, and entertainment for a holistic user experience and brand positioning. Xperia smartphones are at the heart of Sony's mobile strategy of delivering a consistent user experience across devices, enabling consumers to easily and quickly access Sony studio entertainment from a range of Sony hardware. It's much like Apple's vertically integrated, closed ecosystem, which has worked well in bolstering subscriber loyalty. The difference is that Sony benefits from a clear leadership role in connected TVs and licensable content from the studio side.

Companies to watch

Apple and Samsung

Apple, which has a rumored iPad mini on the horizon and just released an iPhone 5 in early September, carries a No. 2 overall global market share in handsets, behind Samsung. Samsung and Apple combined now account for over half of all smartphones shipped worldwide, up from around one-third a year ago, according to research from Strategy Analytics. But an ongoing global patent-infringement battle between the two threatens to change the landscape significantly.

Apple was recently awarded \$1.05 billion in a patent-infringement case against Samsung in the United States. The alleged infringement now affects 21 Samsung devices, including the Droid Charge, Epic 4G, Galaxy S II, and the Infuse 4G. If successful, Samsung's Android-based products — Apple's closest competitors in the



tablet space — will effectively disappear from the U.S. market, leaving Apple with a blue-sky opportunity for a further market share grab.

On a global level, Apple is faring less successfully against Samsung, losing in Tokyo and The Hague. In the coming months the two will face off in the Netherlands, Germany, France, and Italy.

Consumers have come to expect certain intuitive types of interactions with touchscreens, like touching to magnify and finger pinching to zoom and widen. The technology that Apple is claiming ownership over includes many of these assumed features. If Apple prevails on a broad level, other manufacturers will be forced into new innovation cycles, which will require dreaming up entirely new dimensions for the customer interface and for integration with apps. This could be a very good thing for the consumer and the OEM that strikes out to lead the market in that regard.

However, it's very likely that should Samsung be sent back to the drawing board, the consumer backlash in the short term will route buying behavior in Apple's direction. Just as we saw smartphones become mass-market devices for the first time, new user interface evolution will require yet another wave of consumer education.

In the long run, though, Samsung has an opportunity to eschew the open-source mentality of innovating on the back of basic frameworks in order to create something that would completely set it apart. The Korean giant is likely to delve deep into the other research-and-development bucket that it is so well-known for, lifting advances in its video and television portfolio. In terms of screen resolution, the company has 3D capability, HD, and ultra-definition (UD) support at its disposal (a portable use case for ultra-def in particular could quite literally create the market for UD content, which thus far is quite lacking). Samsung can also leverage top-end, high-megapixel cameras to tailor devices for better video consumption and output than what the market has seen at an affordable price point, and it could pioneer a personalized UI that dovetails with the impressive work the company has done on the connected-television side with smart content search, discovery, and curation.



Apple, for its part, will hold down the fort on its intellectual property, further refining the iconic iPhone as it goes along. The iPhone 5, which hits markets September 21, is faster, lighter, and thinner than its predecessors — and, most notably, it comes with LTE support. But, overall, Apple isn't breaking much new ground with the release. The new version of the iconic device mainly offers incremental improvements, particularly in the speed categories: Aside from the 4G mobile broadband support, it allows users to load music apps 2.1 times faster and images from photo apps 1.7 times faster. The cameras have gotten an upgrade, too, with faster photo capture. The gadget is 18 percent thinner and 20 percent lighter than the iPhone 4GS, and it sports a larger screen — almost 5 inches, up from 3.5.

Apple's real market leadership going forward will have to come from integrated apps and the ability to leverage the Apple ecosystem, especially the iCloud and AirPlay digital media storage and management apps, both of which could bring Apple into the mix as a connected-home pioneer in light of the other Apple devices consumers may own — like the iPad.

Microsoft and Nokia

Nokia, once the No. 1 phone maker in the world, has seen its fortunes wane post-iPhone. Its global smartphone market share has been halved, from 15 percent to 7 percent, over the past year alone in the wake of halting development of the Symbian OS.

To the rescue is Microsoft, which is providing the OS for the Lumia portfolio. Amid dismal earnings numbers otherwise, Nokia's Lumia smartphone sales in the second quarter beat estimates, with the Finnish incumbent moving 4 million of them during the period — including 600,000 in the all-important North American market.

Nokia launched both the Lumia 920 and the Lumia 820 based on the Windows Phone 8 OS. Both have bells and whistles like near field communication (NFC) integration



and wireless charging, but the company is wisely focusing on integrated apps to gain a first differentiation.

The Nokia City Lens app for instance adds an augmented-reality layer to the Nokia Maps function. The phones have Skype integration, a new home screen layout, and turn-by-turn navigation.

The company has made a big gamble on Microsoft's Windows Phone OS, which it chose to replace Symbian last year. The Windows Phone 8 launch is now looming, and Nokia calls it "an important catalyst." But Windows has never been able to gain significant traction in the mobile space, so in many ways these two companies are resting on weak pillars across the board. It will be interesting to see how Nokia positions new Windows Phones against the strength of Android and Apple iOS.

Google

On the OS front, Google's Android continues to lead among smartphone platforms, accounting for 52.2 percent of smartphone subscribers in the second quarter against Apple's 33.4 percent, according to comScore. Google's success in partnering with OEMs is clear, but it failed with its own branded smartphone, the Nexus One. The internet giant's Nexus tablet, however, is a different story, and Google could parlay its experience with the next generation of the device — the Nexus 7, due in November — into a broader OEM strategy.

For instance, Google will be test-driving the Android 4.1 Jelly Bean OS on the Nexus 7, which, true to its name, sports a 7-inch screen, like the Kindle Fire, the rumored iPad mini, and a host of affordable Android tablets. The hardware differentiator lies in the fact that the Nexus 7 will be one of the only tablets of that size to offer a quad-core processor with a 1.3 GHz Nvidia Tegra 3 chip that will supercharge the video functionality of the device. This is an important function when it comes to gaining consumers' interest in next-generation hardware.



Meanwhile Jelly Bean offers functionalities that Google will use to set itself apart from the market: a smarter keyboard, fast voice typing, Android Beam for wirelessly sharing information among devices, and Google Now, which uses search history, location history, app usage, and calendar information to present concierge-like information tailored to the user's context.

This has ramifications for the smartphone side. The Jelly Bean upgrade has already rolled out to the Nexus S 4G and Galaxy Nexus smartphones from Sprint in an over-the-air update in mid-September. The smartphone features further set Android handsets apart from the iPhone as Google fights for continued market dominance.

Research In Motion

The BlackBerry maker has seen a breathtakingly steep fall from grace, akin to the one Motorola saw with the dawn of the iPhone, when the Motorola Razzr went from must-have gadget to relic within weeks. RIM has dwindled in market share, reaching just 9.5 percent of the U.S. smartphone market. The company's woes stem from the same well as the original Razzr's: irrelevance. The once-termed "CrackBerry" has lost its addictive power, thanks to outdated user interfaces, poor app development, and frustratingly bad hardware design ill-suited for nonbusiness use. For instance, the Storm and Torch touchscreen models were glitchy when they were launched, two years after the iPhone had set the new standard.

However, don't count RIM out just yet. The Canadian company has vowed to make things right with the upcoming BlackBerry 10, which launches in the first quarter of 2013. With HD displays and two lines — one touchscreen, one not — RIM hopes to get the form factor right for a change, and hopefully its business model, too.

RIM is also clearly trying to populate the BlackBerry 10 app catalog ahead of launch to stack the deck in its favor. It has created — not without a whiff of desperation, it must



be said — the 10K Developer Commitment. Developers submitting BlackBerry 10 apps this fall that go on to generate more than \$1,000 in revenue, including in-app purchases, will get a \$10,000 bonus from RIM. The catch: Developers will have to put resources into the apps ahead of the actual hardware launch, so they will have no idea whether the gamble is a good risk to take.

Hewlett-Packard

When Hewlett-Packard bought Palm for \$1.2 billion in 2010, it had high hopes for taking webOS — an entirely new OS — and making it into a new, more intuitive platform for consumers. But OS fragmentation in the market has meant not only consumer confusion but also shrinking pieces of the revenue pie for software. WebOS-based hardware died a slow, well-publicized death last year.

Next year, however, expect a Lazarus effect for the platform. HP has two beta versions of an open-source version of webOS: one for developers that runs on the Ubuntu Linux desktop and one for the OpenEmbedded development environment, intended to help developers embed webOS in new devices. The goals are widespread community adoption, cross-compiling support for embedded platforms, and support for multiple hardware architectures. And that, of course, means that webOS could see new life with third-party OEMs next year, perhaps targeted to the low-cost emerging market. A bonus lies in embracing the Linux platform, which provides built-in legions of loyal developers equipped to write apps for the platform. As we well know, apps are the Achilles' heel for any smartphone or tablet, no matter how good the hardware is.

What's next

There are big launches ahead, but it's clear already that the market is coalescing in a measurable way. Android and iOS dominate the OS platform landscape, but Windows Phone 8 and the BlackBerry 10 OS are attempting to wrest market relevance from the





two with new hardware approaches that are tailored to dovetail with the embedded OS to supercharge specific content and applications categories.

Meanwhile the top Android OEMs — Samsung, HTC, LG, and ZTE — are beginning to make the pivot away from leading with specs and are starting to rely on the confidence that developers will find the hardware compelling enough to write to. They, too, are eyeing consumer and enterprise trends, looking for ways to become enablers and positioning their brands accordingly.

This is a big shift in the market and one with the potential to change the business model for all stakeholders. While operators fear becoming a dumb pipe in the wake of 4G, 3G, and Wi-Fi offload, OEMs fear becoming the maker of dumb gadgets — offerings that have lots of horsepower but no stake in what they're actually used for. The personalization mantra — access to anything, anywhere, anytime — has meant giving developers and consumers complete control over the use cases and having to stand idly by, hoping that one's form factors are up to the task and can attract interest.

Going forward, OEMs, operators, and content owners and developers have the opportunity to work together to create high-value, usage-tailored packages that still offer a strong baseline of functionality to preserve flexibility for the consumer. If done well, that means they will be able to forge a better role in the value chain, expand revenue opportunities, and bolster consumer loyalty beyond the table stakes.



Finding a niche in the app marketplace – by Derek Kerton

The market for mobile apps is largely dominated by two companies: Apple and Google. Those two giants continue steadily growing, sucking up much of the industry's oxygen and starving any pretenders of air. Despite this, there is a battle for third place, where smaller players could leverage a niche to survive and thrive.

Two dominant marketplaces

According to the most recent data from Flurry, the iTunes App Store and Google Play each offer more than 600,000 apps. For all appearances, these two app marketplaces are on an unstoppable tear and are now enjoying the benefits of a virtuous circle. In other words, the strength of these app stores attracts new smartphone users, who in turn attract more developers.

Flurry calculates that Apple has paid out more than \$5.5 billion to developers since the App Store launched in 2008 and that Apple and Android combined acquired \$5.4 billion in revenues in 2011 across apps, in-app purchases, and advertising revenues. Advertising was 18 percent of the total revenue, and it continues to grow.

Two trailing marketplaces

Microsoft and RIM offer app marketplaces, too, and both have specific advantages. Microsoft's is the most modern platform, and its marketplace is growing quickly, approaching 90,000 apps. BlackBerry App World is somewhat moribund, but it still boasts the highest average revenue per app, due to a bias toward enterprise applications.



Carrier app marketplaces

The mobile phone carriers used to be the kings of app marketplaces, but their walled gardens have truly stifled any appeal. While they have benefitted enormously from the open-app economies provided by their vendors, they are also drafting plans to recapture the role of a storefront for content.

For the most part, their hopes lie in HTML5, a part of the market where no app store has yet gained a lead. In fact, carriers have a specific advantage in that they already have a financial relationship with the subscriber and can provide billing, both prepaid and contract postpaid, for an app store. Whether they can act quickly enough to beat the innovators will be interesting to watch. History isn't on their side.

Current market

A hit-driven market (for now)

The app marketplace is historically a very hit-driven market, where the top apps earn the lion's share of the total revenues. But more and more, the long tail is getting its due. Flurry's data shows that in 2010, 28 percent of app revenues went to the top 25 apps. But Flurry predicts that in 2012 the revenue share of the top 25 apps will drop to 15 percent.

This represents the growth of the small developer and, we believe, a shift to niche apps on phones. Basically, people have all installed Facebook, but now they are also looking for apps specific to their career, hobby, or town.

How many apps are enough?

Windows Marketplace now has more than 80,000 apps, but observers say that's too few to compete with the two leaders' 600,000 each. Usually the words "only has" appear before 80,000. But here's a quick quiz:



When Apple launched its extremely successful “There’s an app for that” campaign, how many apps were in the App Store?

The answer, in retrospect, may surprise. The ad campaign kicked off in January 2009, and the following February the App Store **made headlines by passing the 20,000 app milestone**. That puts criticism of Windows Marketplace’s breadth to rest.

Basically, we can use Apple’s argument for its competitors. With fewer than 20,000 apps, Apple said there was an app for whatever you wanted to do. The same would apply fourfold to the likes of Windows Marketplace. At this point, any app-store count is like the megapixel count in compact camera sales: important numbers for bragging rights but somewhat irrelevant for mainstream consumers.

That said, there is a market for mega-megapixel cameras, and there will also be consumers who seek the app stores with 600,000 apps, with reason: If you crave the latest apps, they tend to appear on the two leading platforms first, and there are occasionally better versions on leading platforms.

App-approval process

The app-approval process is often an annoyance for developers. Most notorious is Apple, with its capricious approval process that often leaves developers confused about why their app was rejected. Furthermore, apps that were once admitted to the app store can be rejected later on, simply because they become in violation of Apple’s noncompete clause. Examples include Google Voice and other voice-recognition apps that would compete with Siri.

A recent app from a developer called Drone+ that maps out the non-secret locations of U.S. military drone strikes was pulled this September, but it does not violate any of Apple’s stated rules. This kind of confusion and uncertainty damages the



attractiveness of any so-called open marketplace and may drive some developers to seek alternatives in more-transparent app stores or to start using HTML5.

Trends to watch

The fight for third place

Industry experts disagree as to how many successful mobile operating systems and marketplaces can exist. Some think two is all the market will support, but many believe three (if not more) can easily coexist. Because of this, the trailing OS companies and marketplaces are fighting viciously to grab the No. 3 spot to start on the virtuous circle the leading two are now enjoying.

Unsurprisingly, the carriers, whose power was disrupted by the rise of the OS-based marketplaces, are enthusiastic about the existence of a successful third player, since that would force additional competition and reduce the power that Apple and Google now have. For this reason, we expect the carriers to be supportive of RIM and Microsoft devices and marketplaces.

HTML5

HTML5 captures much of the functionality of native applications but combines it with the multiplatform attraction of web apps. HTML5 can play video and store content for offline use. It also offers APIs into phone hardware like camera, GPS, or LED light. In many ways, an HTML5 app will be indistinguishable from a native app. The advantage of native boils down to optimization. Native apps will remain the best performing for any given platform and can interoperate with the entire breadth of the device's hardware and APIs. Native apps also tend to run faster, have fewer design compromises, and usually work better offline.





Given the incredible multiplatform appeal of an HTML5 app, a developer can spend much less time porting an app to many platforms and can reach a wider audience with just one app. HTML5 raises the lowest common denominator. It's also much easier to hire developers to code a web app than a device-specific language like iOS' Objective-C, so overall development costs are lower. The big problem so far is that there is no established HTML5 application store, no ecosystem, and no billing solution. Of course, that's also an opportunity for those seeking to fill this gap.

In fact, HTML5 will be the next hot battleground among mobile internet powerhouses (after the tablet wars, of course, which are really the app-marketplace wars in disguise). Apple and Google don't want to cede control of the app marketplaces to new entrants with HTML5 stores, but lots of players shut out from the top three slots see this as a chance to win in the next round.

Mozilla is a strong player in HTML5. At MWC in Barcelona this year it launched a suite of developer tools and a Mozilla Marketplace for HTML5 apps. The online market is still in closed beta, but the Firefox maker is positioned to take a stab at the chinks in the iOS and Android armors.

Amazon will surely want to extend the value of its mobile app store with HTML5 apps, adding that platform to its highly disruptive Android strategy. Carriers have suffered anemic interest in their app stores thus far, but they perhaps could use HTML5 to add more content to the store and regain some ground lost to the OS providers. Either way, HTML5 is just the current reason why no king should rest on his laurels too comfortably. When technology changes rapidly, empires are overthrown in surprisingly short order.



Companies to watch

Amazon

Amazon famously persuaded Android to use its own version of the Kindle Fire tablet. While not a hardware or OS company, Amazon does nonetheless excel at commerce. All of Amazon's loyal customers have a credit card on file, and they are familiar with one-click purchases and trust the vendor. For this reason, Amazon is a true threat to Google as an app marketplace. At \$200, the Kindle Fire was a shot across Google's bow and the beginning of what will be a gripping battle for content, app, and media sales.

This bodes well for the consumer. Google responded with the \$200 Nexus 7 tablet, and Amazon countered in September with the Fire HD — each powerful devices, sold cheaply in an effort to own the consumer within each company's marketplace.

GetJar

GetJar isn't very well-known in the U.S., but our European readers are probably familiar with the app store with a unique business model. Founded in Lithuania in 2004, GetJar took full advantage of the advent of Java in phones and the lack of a clear Java ecosystem. GetJar offers a marketplace for Java apps, ringtones, and wallpapers, connecting developers to customers' phones.

No slouch in terms of numbers, GetJar hosts 350,000 mobile content SKUs (apps or other) for J2ME, Symbian, BlackBerry, Windows Mobile, and Android. Its app marketplace had distributed more than 2.3 billion downloads as of January 2012. Here's GetJar's upside-down model: Downloads are always free for the consumer, and uploads are free for developers. Developers pay GetJar for promotion, downloads, and preferred placement of their apps, which is the reverse of the normal model of how developers get paid. Preferred placement is auctioned, like with Google AdWords, with fees up to \$1 per download.



As a result, the apps at GetJar must monetize in some other manner, usually through advertising. Facebook is the leading download at GetJar, motivated to pay per download in return for reach: GetJar can help Facebook get onto many devices that lack a built-in app store. Consider that Apple's App Store can only get an app into fewer than 5 percent of phones made by Apple and the attractiveness of GetJar becomes clear. GetJar also partners with carriers such as Sprint, Reliance, Virgin, and Vodafone as well as BlackBerry and Symbian stores to run portions of their app stores. Any app developers that make revenue not from app sales but rather from in-app sales, in-app advertising, commissions, and so on are, thus, motivated to post their app at GetJar. In so doing, they may reach new users and drive increased revenues.

Qualcomm

Qualcomm was once dominant in app-store mind share and business. Its closed, well-managed Brew model offered developers SDK, target devices (with Qualcomm chips, of course), marketplace, billing, carrier distribution, and an app store and catalog. When this emerged at the turn of the century, it was a visionary leap forward for mobility. Basically, Qualcomm had managed to capture and package everything that was important, which is to say the company realized early on that success was all about the ecosystem, not just the features.

Brew was a strong wake-up call for CDMA carriers and displaced disjointed Java efforts that did not offer an ecosystem to go with its solid technology. Soon after, developers started getting their first checks in the mail for mobile app sales. Money talks, and new developers listened.

Brew was not without its problems. The most notable was that the developer only received 50 percent of the app's selling price, with 25 percent each going to Qualcomm and the carrier. While this split was much less than the 90 percent DoCoMo was



offering on i-mode in Japan, it was still much better than the zero percent developers were earning on WAP and J2ME.

The second big problem with Brew was (and remains) that it was a very restricted app marketplace. Apps had to work on more than 25 devices to go live and had to pass strict (and very expensive) QA testing. App distribution over Brew still requires a carrier approval to enter the Brew catalog and so be visible to its subscribers. Compare this with the quick and easy process and instant global reach of developing for the iTunes App Store or Google Play today.

But modern Brew has reacted to the competition from Apple and Google. Qualcomm has reinvented Brew as a platform for feature phones and developing markets, lowering the costs of doing business and easing the process of testing.

In October 2011 [comScore reported](#) that “five of the top 10 devices in the US installed base are Brew devices, with the other five being made up of smartphones.” The high penetration of Brew in non-smartphones in CDMA markets makes it an attractive market for developers. Brew has been installed in more than 1,200 handset models from 64 OEMs in 25 countries, and it has more than 250 million users. In early 2011 Qualcomm announced that more than \$3 billion worth of charges had passed through the Brew system, shared among 18,000 apps that the platform has hosted since 2002. Do the math and that works out to roughly \$166,000 per app. With Qualcomm still backing Brew in new markets like China and India, the platform continues to quietly attract development.

Samsung

Samsung efforts are mostly Android-based but also include its bada platform. Bada was launched in June 2010 on the Samsung Wave smartphone. Two years later, seven Samsung devices carry on the bada banner. Bada started out fairly strong, taking just three months to hit 10 million downloads and 10 months to hit 100 million. Nine





months after launch, bada was hosting 13,000 SKUs. The platform had its greatest success in Europe, selling as a feature phone that had the look and feel of a smartphone for a lower cost. Forty percent of Bada downloads are in France, Germany, and Spain (Orange was a leading carrier partner), but Asia and developing markets are targets, too.

It is possible that Samsung will shift efforts away from Android and toward bada, after the reprieve from a San Jose, Calif. court regarding Samsung's supposed use of Apple's intellectual property in the TouchWiz UI on Android phones. However, the message from Samsung is clear: It is committed to Android. And why not? Android has made Samsung the world's biggest phone maker. That said, Samsung clearly has a plan B, in case Android has further setbacks. Bada could even be a viable contender for the third ecosystem slot discussed above.

This summer Gartner reported that bada holds a 2.7 percent share of global mobile devices (equal to Windows Phone). But there is evidence that bada is just a medium priority at Samsung. The OEM said it would also work on the Tizen HTML5 platform in partnership with Intel. The blasé attitude toward bada may be because the fast and steady drop in prices of entry-level Android phones is decimating the market for high-end feature phones — especially in developed nations, where most consumers are less price sensitive. Android is Samsung's better path to device-market domination, if not app-marketplace domination.

Samsung has nothing to lose with bada. It's a great plan B. It's a negotiating cudgel against Android. It develops patents that could be used defensively. It addresses low-cost markets that Android currently can't reach. And, more importantly, it wins customers and buys Samsung time to plan out a migration path for these bada users to stay with Samsung devices (and maybe Samsung's content store) when they eventually upgrade to smartphones.



Alibaba

Last summer the massive Chinese ecommerce site Alibaba launched its mobile platform, called Aliyun. This is a good example of the kind of regional differences that prevent dominance in North America or Europe from translating into dominance around the world.

Alibaba wants to get into mobile for the same reasons as Amazon in the U.S. But Amazon CEO Jeff Bezos has to edge out Apple and Google in a fair fight; in contrast, Alibaba leverages help from a restrictive Chinese government. As a domestic play, it is simply better suited to offer relevant and compliant content and services to the Chinese market.

As a modern platform, Aliyun is designed to be compatible with Android apps, cloud services, and HTML5. And Alibaba has developed a phone with partner KTouch to carry the platform. The jujitsu-like strategy of embracing and extending Android is strikingly similar between Alibaba and Amazon.

Future considerations

1. For now we expect developers to continue to develop under a policy of considering Apple first and Android second. That may eventually shift to the opposite, but since revenue per app remains higher on iOS, that's where developers continue to start. Going forward, many developers will then look at HTML5 as their third target, in order to get the very broad distribution that will offer. Microsoft, RIM, and others will continue to have to incentivize developers to build to their platforms.
2. Carriers will regain some of the ground they lost to the app stores with their own stores and HTML5 apps. They will either cooperate in an effort like WAC or, more likely, partner with white-label vendors like GetJar.





3. New entrants will appear that offer HTML5 web marketplaces, attracted by the dynamism of the mobile industry. These may be familiar names like Amazon, Baidu, Free, or Yahoo, and they may offer their stores as white-label solutions for device makers or carriers.
4. Fragmentation, choice, and complexity are not going away. While there may continue to be two clear leaders, the amount of activity just below the surface will only grow.



The new service provider: mobile in a post-cellular world — by Colin Gibbs

Mobile carriers: a market ripe for disruption

Many segments of the mobile world move fast and are unpredictable, but the market for wireless service providers is far less dynamic. The hierarchy of the major U.S. carriers has remained unchanged for many years — aside from some occasional M&A activity — and no new player has emerged as a challenger in more than a decade. And the business models those carriers typically employ have changed little as well: Customers buy subsidized handsets (many of which are “free”) in exchange for signing two-year contracts and choosing billing plans based on voice and data usage.

The market is likely to see substantial disruption in the coming years, though, as unsubsidized handsets slowly gain ground, the penetration of non-cellular technologies increases, and carriers experiment with ways to manage — and monetize — data traffic.

This report will examine the strategies and technologies poised to upset the carrier market in the near- to mid-term as new business models are developed to compete with more-traditional models. This document will also profile some of the companies that may drive those changes, not only in the U.S. but also around the world.

The emergence of new business models

Perhaps the biggest change in the traditional model of U.S. wireless service providers has been the emergence of prepaid phones. While the prepaid model (also called “pay as you go”) has long been an option for U.S. consumers, it has grown its audience substantially over the past three years as the economy has faltered. Analyst Chetan





Sharma reported that U.S. carriers saw a net decline in postpaid subscribers during the first quarter of 2012, while prepaid users grew by 15 percent over the previous year.

That growth is due primarily to the affordability of the prepaid model, of course, but it isn't just the price point that is attracting consumers. MetroPCS, which operates the largest prepaid-only network in the U.S., is building out its LTE network in an effort to keep pace with the larger (and admittedly faster) networks of its postpaid rivals. And prepaid handsets have recently expanded beyond feature phones and clunky smartphones to include some of the most attractive handsets on the market, as evidenced by Leap Wireless' recent move to offer Apple's iPhone. Indeed, recent data from NPD Group indicates prepaid smartphone sales nearly doubled in the second quarter of 2012 over the previous year, with a 91 percent growth.

While the prepaid model is built on unsubsidized handsets, full-price phones are slowly finding their way into some postpaid services. Google made the first big move here in early 2010 with the introduction of the Nexus One, which challenged the carrier-dominated model of handset sales. Nexus One sales flagged due to Google's inexperience in handset distribution and customer support and also due to a lack of carrier support. Other efforts have met more success. T-Mobile, for example, became the first tier-one operator to truly embrace the nonsubsidized model in July when it announced cheaper, noncontract price plans for users who pay full price for phones or who activate their own handsets on the network.

Unsubsidized smartphones don't pose a massive, immediate threat to the traditional postpaid model, because consumers in the U.S. and some other markets have long grown accustomed to paying little (or even nothing) for a handset at the time of purchase, then paying off the phone over the course of the contract. Changing that mindset will take time. But savvy consumers are beginning to see the value of not being locked into an expensive long-term contract, and we believe that greater awareness will gradually catch on over the next few years. Legacy carriers will have to strike a delicate balance, then, of courting those shrewd consumers as they maintain their lucrative postpaid businesses.



Trends to watch

A new wave of MVNOs is emerging

The list of established prepaid providers includes MVNOs such as TracFone Wireless and Boost Mobile, which offer services via network-operator partners. But while the early MVNOs simply resold connectivity on other networks and tried to differentiate themselves with content — a business proposition that proved **exceedingly difficult** for most players — a few emerging MVNOs are differentiating themselves by combining new technologies and services with bargain pricing.

Republic Wireless, for instance, buys wholesale minutes and bytes from Sprint but offloads traffic to Wi-Fi whenever possible. That strategy allows the company to sell unlimited data for a mere \$20 per month to users who either buy a handset at full price or activate the service on their own Sprint phone. The model enables Sprint to generate revenues as it leverages Wi-Fi without sacrificing the postpaid services on which its business is built. Verizon Wireless is also part of the trend: Analyst Craig Moffett of Sanford C. Bernstein & Co. Inc. **noted** that Verizon Wireless' recent spectrum deal includes a potentially major provision approved by the Department of Justice: Verizon's cable TV partners are allowed to resell the carrier's services under their own brands almost immediately. That **could open the door** for a few more hybrid MVNOs in the next few months.

Several new MVNOs have surfaced in recent months that employ a variety of strategies and business models:

Unlocked smartphone retailer GSM Nation hopes to expand on its expertise in handset distribution by **packaging its vast handset** lineup with T-Mobile USA's HSPA+ service under its own brand. Voyager Mobile **launched in May** with two basic plans — one with data, one without — on Sprint's 3G and WiMAX networks. Ting **launched earlier this year** with compelling shared-data plans on Sprint's networks, and it will expand its





offerings later this year by enabling users to **activate its service** on their own handsets. Karma, which recently snared **a \$1 million seed round**, is preparing to sell 4G hotspots on Clearwire's network. The prepaid data offering will also include a social-bandwidth component that enables — and even encourages — users to share their data connections with others. And a handful of offerings like H2O Wireless, Red Pocket, and TracFone's Straight Talk provide MVNO services based on SIM cards rather than actual handsets, which render some carrier restrictions moot for consumers who use their own phones.

Carriers are laying the groundwork for the MVNO resurgence by making it easier and less expensive to deploy services over their networks, as my colleague **Kevin Fitchard recently reported**. That's especially true of Sprint and T-Mobile USA, which have long sought new ways to compete with their dominant rivals AT&T and Verizon Wireless.

Hybrid network operators: a marriage of the old and the new

Wi-Fi is finally — if slowly — being embraced by most carriers as a viable way to keep customers happy and ease traffic on congested mobile networks. But because Wi-Fi doesn't fit with their traditional business models, most U.S.-based carriers continue to view it as **a secondary option** to 3G and 4G networks. A few disruptive newcomers are making Wi-Fi a top priority, though, and are routing traffic through cell networks only when absolutely necessary.

Dependence on Wi-Fi has been a winning strategy for France-based upstart Free Mobile, a service provider **launched by ISP Iliad** earlier this year. Free views mobile as an extension of its larger broadband service, and it combines Wi-Fi and femtocells with traditional cellular connectivity to offer wireless service at a substantially cheaper price than traditional carriers do. (Free operates its own mobile network, but Iliad's CFO concedes that roughly 90 percent of Free's cellular traffic is handled by Orange, a traditional operator Free has partnered with.) Free **claimed 5.4 percent** of France's mobile market after just six months in business, and its cheap service has forced



traditional carriers to drastically **reduce their prices** in an ultracompetitive market. What's more, Free filed a lawsuit against Vivendi's SFR, claiming the handset subsidies the incumbent carrier charges are essentially usurious loans that customers pay back through hidden fees on their contracts. Whether Free has real staying power is still uncertain — it is **running in the red** and reportedly has suffered **network glitches** — but it is unquestionably disrupting the mobile market in France already.

The rise of non-cellular mobile gadgets

Carriers will continue to build out their 4G networks over the next few years, but **Wi-Fi will be crucial for** handling our ever-increasing appetite for mobile data, especially in heavily populated areas where cellular coverage is difficult to provide. The prospects for Wi-Fi-centric service providers (both network operators and MVNOs) will increase as Wi-Fi penetration grows and more non-cellular devices — particularly tablets — come to market.

The tablet segment is already a booming one, of course, and **NPD recently predicted** tablet shipments will increase at a 28 percent compound annual growth rate (CAGR) over the next five years, reaching 416 million in 2017. But stand-alone data plans for tablets remain pricey, and most consumers refuse to pay a premium for cellular access. That is why users **overwhelmingly prefer** to use Wi-Fi with their tablets and why CCS Insight predicts the share of cellular-enabled tablets **will wane** over the next four years.

Incumbent service providers largely seem oblivious to those trends, though, and have opted not to subsidize cellular-enabled tablets in any substantial way or offer pay-as-you-go data plans for tablets. (Some have launched shared-data plans in an effort to address tablet usage, although those plans typically require extra charges for tablets.) Tablet users who need constant connectivity and consume large amounts of data will play a key role in carrier revenues in the next several years, as Strategy Analytics **recently projected**.





Cellular access will remain a luxury for the vast majority of tablet users. Some of those consumers will gradually turn to speakerphones and Bluetooth headsets to use their non-cellular tablets in place of their smartphones, as my colleague [Kevin C. Tofel](#) recently discussed. While those scenarios lessen the advantages of a truly mobile device — seamless use of a device for uninterrupted service while on the go — they do eliminate the costs of both monthly data plans and dual devices.

Tablets are the most obvious example of these new gadgets, but we'll see a variety of connected devices hit the consumer market in the next several years. Users could be talking to one another over Wi-Fi with headsets like [Google Glass](#) or through portable gaming devices, cameras, and video recorders. That new line of connected devices will increase the opportunities for Wi-Fi-based service providers.

Companies to watch

Dish Network. Non-cellular technologies may be the future of mobile, but in today's U.S. wireless market, spectrum is the coin of the realm. That's why Dish Network is a player to keep an eye on. The satellite-TV provider has the spectrum to launch an LTE service of its own if it chooses — something it has said it plans to do — but it also may be toying with the FCC to [boost the value of its airwaves](#) ahead of an effort to sell them off to the highest bidder. And it prompted more speculation about its plans when an SEC filing disclosed that the company made a \$396 million investment of debt in a single issuer that seems to be 4G network operator Clearwire. The marriage would make a lot of sense if Dish truly wants to join the mobile fray, and the tie-up would have the potential to make big waves in a staid U.S. market. But Verizon and AT&T own the lion's share of LTE-friendly spectrum in the U.S., and lesser carriers are starving for the stuff. So Dish could change the game for a smaller player — Sprint, say, or T-Mobile — just by selling its airwaves.

Open Garden. Few startups in mobile have goals as idealistic as Open Garden's: The San Francisco-based company aims to help users create their own personal mesh





networks for PCs, Macs, and Android devices by crowdsourcing connectivity between 3G, 4G, femtocells, and Wi-Fi. Its application — which is currently available only to Android users — is designed to find the strongest available connection and share it with other Open Garden users nearby. The service has seen 250,000 downloads since its June launch, and the company recently secured \$2 million in funding from an impressive list of angel investors. Open Garden is pitching its offering to carriers as a way to improve service even as those operators offload traffic, which is a difficult proposition considering how short-sighted most network operators are. But savvy carriers will keep an eye on Open Garden and consider its software as data usage continues to ramp up.

Republic Wireless. A division of Bandwidth.com, Republic Wireless launched late last year as a hybrid provider of mobile data services. Republic uses Wi-Fi as a default technology for calls, texts, and data, switching to Sprint's cellular network only when Wi-Fi is unavailable. The company offers a single handset, currently the Motorola Defy XT, for \$249, which runs Android and is programmed to “sniff” for Wi-Fi before opting for cellular access. The company also charges an additional \$29 startup fee. That initial price of \$278 includes a free first month of unlimited voice, texts, and data. Users then pay \$19 per month for unlimited service with no contract. Like France's Free Mobile, Republic has experienced some growing pains: It launched with a set of byzantine rules designed to limit customers' cellular usage — since usage could increase its costs dramatically — but was forced to drop those restrictions after substantial user pushback. The company is still in beta, so it's sure to experience more growing pains, and whether its business model is viable is still questionable, because its low monthly fee may not be enough to offset its overhead for network access and other costs. But Republic is quietly drawing attention from consumers as an affordable — if limited — alternative to expensive cellular services.



Conclusions

As data consumption ramps up and networks grow increasingly crowded, the traditional model will slowly give way to innovative new technologies and services. The market will see increased use of femtocells and Wi-Fi, which are becoming increasingly common in homes, businesses, and public areas and which offer quality connectivity at a fraction of the price of cellular.

These affordable — or even free — services will slowly erode the subsidized-handset model as many users begin to eschew long-term contracts in favor of offerings that are better-suited to their needs. Non-cellular technologies will become better integrated with 3G and 4G networks, making them both easier to use and cheaper for end users. And those factors will pave the way for increased usage of mobile data, which is already ramping up dramatically.

Meanwhile a new wave of MVNOs will gain ground both in the U.S. and around the world. These service providers will use non-cellular technologies hand in hand with incumbent networks to provide cut-rate services to budget-conscious users, giving carriers a way to generate low-margin services without sacrificing high-margin postpaid plans. But MVNOs will also differentiate their offerings based on market niches: We will see the continued emergence of ethnic-branded services, for instance, as carriers extend their reach across borders to target users of specific cultures and nationalities. (China Telecom is currently pursuing that strategy [in the U.K.](#) and hopes to expand its offerings [to the U.S.](#))

The coming era of disruption provides immense opportunities for manufacturers, developers, and service providers that can make mobile both cheaper and easier to use for consumers. But while this disruption is certain to loosen the grip of carriers that still dominate the market, network operators will continue to play a crucial role. Operators that find ways to embrace this new era and integrate traditional cellular services with next-generation offerings will thrive. Those that ignore the coming





disruption, though, will find that the mobile industry does move very quickly — even when it comes to service providers.



The evolving mobile network: from slide-deck presentations to deployment – by Monica Paolini

Data users are neither evenly spread out on the network, nor on a cell. Less than 65% percent of cells handle more than 90% percent of traffic. Between 10% percent and 20% percent of users generate 90% percent of traffic. So flexibility in resource usage has a strong potential.

– Pascal Chambreuil,
Orange Labs, Networks and Carriers

We have all seen [the Cisco VNI graph](#), which shows mobile data growing 18 times over the next five years, in a presentation deck. It makes a strong case for the need of mobile networks to evolve – in fact, to fundamentally change – to reflect the transition from voice- to data-centric usage models. Mobile networks have become data networks, but most of them still have been planned and deployed as voice networks.

Yet to make these changes in operating networks, it is crucial to move beyond compelling graphics and understand what requirements new usage models impose on the network infrastructure and how they can be most effectively met with the solutions commercially available.

Beyond LTE and HSPA

The centerpiece of the transition to mobile data is a combination of long-term evolution (LTE) as the new wireless interface and high-speed packet access (HSPA) updates to leverage as much as possible of the existing infrastructure. While some mobile operators are more aggressively pursuing LTE and others HSPA (often depending not on their preferences but on their spectrum allocations), there is virtually universal agreement that these are the two technologies that will coexist to



provide the foundation for future mobile broadband. The GSM-versus-CDMA war is over, with LTE comfortably positioned as the only 4G technology for mobile access.

However, there are arguably more profound changes under way, ones that will lead to a long-term shift in how mobile networks are planned and operated. The answers to these questions will directly affect mobile operators but also will be crucial in guiding the product development among vendors and setting the stage for the type of experience we will have as subscribers.

Unlike the ubiquitous support for LTE and HSPA adoption, there are still many open questions about the best way forward and the many options available to operators.

Yet — and this is the big news — there has been an interesting shift over the past few months from glossy slide-deck presentations about data growth and what to do about it to much more concrete, closer-to-the-ground discussions on how to transform mobile networks in practice in real deployments. For instance, now that operators have decided that small cells are the way to go, they want to know what is going to be more effective to manage interference, which type of backhaul works best, or how many small cells they will need for each macrocell in dense areas. This is a sign that operators are ready to move, even though financial pressure limits investment and with that the pace of change.

Emerging consensus

The PowerPoint presentations have been useful in creating consensus in the industry in the direction that has to be taken.

Crucially, there is now agreement that, to successfully address the increase in data traffic, operators need to act on multiple fronts because no single solution will be sufficient in isolation.



Add a small-cell layer to increase capacity in the radio access network (RAN), which may include outdoor and indoor small cells as well as femtocells. For most operators, outdoor small cells are initially the main tool. While the earliest interest was in LTE small cells, operators have started to see the small-cell approach as a topology change that combines multiple access technologies — 3G, Wi-Fi, and LTE, for example — within the same deployment. The cost of adding Wi-Fi and 3G to a small cell accounts for a modest percentage of the total cost of ownership (TCO). Similarly, operators that do not have LTE today may deploy 3G and Wi-Fi small cells and swap them with 3G, Wi-Fi, and LTE cells at a minimal cost. This allows them to offload traffic from the 3G macro network today and, thus, manage the existing congestion, which affects 3G networks, not the new LTE ones.

Wi-Fi offload is becoming an integral part of the move toward a higher density of cells located closer to subscribers. On one end, operators have started (or plan) to integrate Wi-Fi more closely to their mobile networks. On the other end, Wi-Fi access points and small cells will often be colocated for cost efficiency.

Traffic must be managed more effectively (e.g., with video optimization) to reduce the load on the RAN and effectively deliver the same amount of content with fewer network resources.

In countries where TDD spectrum is available, operators have become more comfortable using it, granting TD-LTE a solid role within the LTE ecosystem. This expands the reach of LTE as a technology, but it also allows operators to use spectrum resources that for a long time have been underused. This will increase their overall capacity.

Adopt policy-based plans to contain unprofitable traffic growth (e.g., subscribers downloading HD movies to their phone just because they have an unlimited data plan) and to encourage revenue-generating traffic (e.g., messaging and social networking that provide higher per-bit revenues because they are less bandwidth intensive but provide high levels of perceived value to the subscriber on a per-bit basis).



The adoption of Voice over LTE (VoLTE) — along with IP multimedia subsystem (IMS) and rich communication services (RCS) — has become the accepted norm among operators. Some are more aggressive in their adoption plans than others, but most of them now recognize that circuit-switched fallback is a good short-term solution but cannot replace a transition to IP-based voice services. Acme Packet, Genband, Mavenir, Metaswitch, and BroadSoft are companies to watch in this area, in addition to tier-1 infrastructure vendors.

Spectrum refarming is anticipated to be a valuable strategy to increase spectrum utilization by upgrading legacy 2G and 3G infrastructure to LTE. The higher spectral efficiency of LTE makes it possible to increase network capacity in bands already used by the operator.

Implementing change: deploying small cells

The move toward a multilayer mobile network, with Wi-Fi and femtocells inside homes and offices, small cells in the streets and indoor public locations, and the use of wide-coverage macrocells, is the change that will have the biggest impact in the long term. It's also the one that is more difficult for mobile operators to manage, because it takes those operators out of their comfort zone.

Mobile operators have spent decades perfecting deployment models for macrocells. But they need to develop a new approach for small cells that will have to be installed at street level in an environment that is difficult to control and secure and that dynamically changes through time. In most cases, small cells use the same spectrum channels used by the macro network, and, hence, traffic has to be coordinated to mitigate the impact of interference. As a result, small cells represent a cultural challenge to operators that is forcing them to change the way they operate. This challenge is even greater than the need for technological innovation. From our conversations with mobile operators, these are the topics that are most talked about:





Installation and network planning. Operators' initial vision was to simply mount small cells wherever needed — most likely on lampposts — as they would do with an indoor Wi-Fi access point. It is becoming clear that this is not the way small cells will be deployed. It is crucial to position small cells close to where subscribers are to optimize spectrum utilization, so operators need to first understand where — within their macro footprint — their subscribers are. [Keima](#), for example, has done very interesting work to precisely locate subscribers using location-aware social media traffic.

Once target locations have been identified, permitting and leasing these locations can be a lengthy process and often one that is still unclear both to the operator and the owner of the target asset (e.g., cities, utilities, or real estate owners). RF planning is also required both to mitigate the impact of interference with the macro layer and among small cells and to ensure that, if wireless backhaul is used, the location is well suited for it. The entire planning and deployment model is still being worked out and different approaches being tested, but there are no established best-practice guidelines.

Interference management. LTE-Advanced supports multiple interference solutions, and some like eICIC and CoMP are specifically aimed at dealing with multilayer networks. They are needed to manage interference, but their effectiveness in commercial deployments still has to be proved, because this technology is still being developed (with companies like Alcatel-Lucent, Huawei, Nokia, and Qualcomm leading the way).

Backhaul. Backhaul is one of the biggest challenges in small-cell deployments. This is not for lack of solutions but because there is no single solution that works for all small-cell environments. Operators, then, will have to work with multiple solutions ranging from fiber and wireline to sub-6 GHz NLOS wireless links to millimeter wave (60 GHz and eBand) LOS wireless links. In addition to [the companies I mentioned in last year's article](#) (BLiNQ, Bluwan, Cambridge Broadband, DesignArt, Siklu, and Taqua), [Tarana](#) and [Fastback](#) have promised disruptive NLOS solutions in the sub-6 GHz band.



Interestingly, Qualcomm has recently acquired DesignArt, an SOC chipset vendor with a focus on backhaul and small cells that fits well with its work on small-cell and HetNet architecture. Huawei is taking another interesting alternative tack by trying to integrate backhaul and access with the use of TD-LTE on a band that is initially used exclusively for backhaul but that can be eventually reused for access as well. Ruckus Wireless is another company to watch: It provides an NLOS solution that uses unlicensed spectrum — a clear advantage for operators that do not have sub-6 GHz spectrum available.

Interoperability. LTE defines open interfaces that are meant to support multivendor deployments that would allow an operator to select vendors other than its macro network's vendor for its small cells. It is not yet clear whether interoperability across vendors will be feasible in early deployments. [Mobile operators in the U.S. that have announced trials](#), such as AT&T and Sprint, are expected to work primarily with their macro vendors, but in other countries operators have shown more willingness to work with other vendors (e.g., Telefonica in the U.K. is working with both Ruckus Wireless and Alcatel-Lucent). Still, tier-1 vendors — specifically Alcatel-Lucent, Huawei, and Nokia are the most successful to date — are the best placed in the small-cell market, but smaller vendors such as Airspan and PureWave are trying to get into this market by leveraging their stronger focus on small cells. Mobile operators have made it clear that they need a truly interoperable environment, but in practice, it may take time before interoperability becomes established.

Infrastructure sharing. Interoperability is particularly relevant in small-cell deployments because of the interest that mobile operators such as Everything Everywhere in the U.K. have in infrastructure sharing. It is a very sensible approach that, in addition to reducing installation and operations costs, will also facilitate deployments in dense urban areas. Bob Azzi, Sprint's senior VP of Network, recently noted, "We're going to all be after that street corner," and city councils may not like to have their downtown areas crowded with unsightly telecom equipment. Operators may share radios if they are comfortable losing some control over the RAN, or they may share only the small-cell enclosure and backhaul by installing their small-cell module



within an enclosure shared with other operators (PureWave is promoting this type of approach, which allows operators to retain control of the RAN). Alternatively, a neutral host operator may deploy and manage the small-cell infrastructure using a model that is frequently used in DAS deployments.

Implementing change: more open questions and innovation

There are more than small cells in the evolving mobile infrastructure. The transition from closed 2G and 3G mobile networks to an open IP framework is well understood in the fixed environment, but it is still somewhat of a novelty in the mobile telecommunication universe. IP mobile networks are much more flexible and powerful, but they also carry many challenges and choices for both vendors and operators. Video traffic management, signaling traffic, and security are rapidly evolving areas in which the transition to IP requires much learning and a fresh approach.

Video traffic. If it were not for video, the increase in mobile traffic would be eminently manageable. But we are truly facing an invasion of video streaming in mobile networks that generates high traffic loads that are very sensitive to latency, jitter, and packet loss — traffic that is more demanding of network resources, even though on its own it does bring in as much revenue as other types of traffic. Subscribers are enthusiastically streaming video on their devices, but most of them would not pay any additional fee for the privilege of doing so. This raises a crucial question among operators: What is the best way to manage video?

From a technology point of view, they can prevent subscribers from watching video on their phones, charge for it, restrict access to a subset of subscription tiers, and compress or otherwise optimize video transmission. But what about the strategy that minimizes the traffic stress that video is putting on network resources without compromising revenues? Or is there a way to increase revenues by offering premium





services with just a moderate investment in the infrastructure? The jury is still out, but operators are carefully evaluating their options — and vendors are listening. It is clear that the management of video traffic is going to be a key differentiator and revenue-generating (or revenue-protecting) tool for operators. Citrix's acquisition of Bytemobile, as well as the Ortiva and Oversi acquisition from Allot, shows a widening interest among vendors: Video has acquired (and deserves) a central role in mobile traffic management.

Signaling overload. One feature that has distinguished mobile from fixed-IP networks is the amount of signaling. Mobile networks need to manage subscribers who roam from one cell to the next or those who may show up in any country and want to check their email. They have to deal with a vast number of devices that are on most of the time and have a high number of applications that constantly generate signaling traffic that is largely outside the control of the operator. At the same time, signaling enables operators to offer advanced services and billing models, roaming, tiered and quality-based services, and dynamic pricing. As a result, effective management of the signaling traffic is an essential task in operating a mobile network. After the pioneering work by Airvana in trying to understand the impact of roaming on network performance, companies such as Acme Packet, F5, and Tekelec that focus on Diameter — the signaling protocol used by LTE — are working with operators to help them manage the surge in signaling traffic.

Mobile security. Mobile networks have a solid security track record, but this is due to the use of closed interfaces that are difficult to penetrate and the more limited size of the mobile network compared to fixed ones (mobile traffic accounted for only 2 percent of global IP traffic, according to Cisco's VNI). This is changing rapidly with the increase in mobile traffic, the ability to introduce malware into mobile handsets through applications, and the transition to IP-based networks with LTE. IP networks are more open, have more entry points for malicious attacks, and have security vulnerabilities that are more widely known and exploited than those in 2G and 3G mobile networks. Malicious software can use mobile networks to target mobile devices or external networks or can be used to deliver attacks to the mobile network itself.





Security threats are on the rise, with the incidence of malware in mobile devices growing very fast over the past couple of years, as documented by companies like AVG, McAfee, Trend Micro, and Symantec. These companies have been very active on the device front, while companies like Acme Packet, Arbor, F5, Juniper, and Radisys have been working with operators to secure their network infrastructure.

Unlike on the revenue side, where mobile operators are still struggling to find their way out of declining ARPUs and new service models, the network divisions appear to be on more solid ground. There are still many decisions to be made (and insufficient funding to enact many of them in the current environment), but it is clear in which direction the network will have to evolve to face the growth in traffic load and subscriber expectations.



How to win the location-based shopping war — by Laurie Lamberth

August 2010 marked the beginning of the location-based services (LBS) mobile shopping war, when the likes of shopkick, ShopAlerts, AisleBuyer, and Facebook Places launched. Then, from late 2011 and into early 2012, the conflict took its first significant turn. That's when big retailers Wal-Mart, Home Depot, and Costco joined the fray, rolling out branded smartphone and tablet shopping apps that offered a broad array of features and integrated seamlessly with their websites and in-store experiences. In April 2012 Intuit bought AisleBuyer, which continued the trend of larger entities entering the arena and will eventually provide its small-business customer base with a quick and easy way to move into location-based marketing.

Welcome to the age of “omnichannel marketing,” an environment in which customers rely less on traditional sales channels than on brand interactions across multiple touchpoints that include the web, mobile, social, retail, and call centers. By providing a rich, multiplatform shopping experience that gives customers the information they need whenever it's most useful — before or at the point of purchase — brick-and-mortar retailers can fight back against showrooming, where shoppers use their smartphones to locate outlets that offer lower prices.

Indeed, more than half of mobile phone owners use their phones to gather product information while in a physical store, according to a [Pew Research report on the 2011 holiday shopping season](#). Thirty-eight percent phoned a friend, 24 percent searched for product information, and 25 percent sought out price comparisons or bought the item from an online retailer. This last statistic reinforces the idea that information is more important than price when it comes to mobile product research.

The location-based shopping market has a predicted growth rate of more than 90 percent through 2016. Big trends driving this growth include escalating consumer



adoption, increasingly capable and integrated shopping applications, and the rise of sustainable revenue models for location-based marketers.

Current market

Early location-based shopping apps look spindly compared to today's apps. As profiled in my September 2010 GigaOM Pro research note "[Shopping matters when it comes to location-based apps](#)," early location-based shopping apps relied on user-initiated or automatic check-in at a retail location or the customer's presence within a GPS-based geofence to push local offers to the customer's mobile phone. Most of these apps failed to produce enough customer value to survive, as detailed in the following annotated diagram from the note.



Figure 1. What happened? Social and location apps mashup from September 2010, as of September 2012



Legend:

	Shut down		Exited deals in U.S. or everywhere		Bought out		Does not offer deals
	AisleBuyer		Geodetic Sherpa		LevelUp		ShopAlerts
	Bakodo		Google Latitude		Loopt		shopkick
	Business Apps		Google Shopper		My Town		stickybits
	Brightkite		Gowalla		Offeretti		Twitter
	Facebook		Groupon		Plancast		
	Foursquare		InCrowd		SCVNGR		

Source: Lamberth & Assoc.

Today's mobile shopping apps like Intuit's AisleBuyer and Shopkick include a significantly larger set of value points for their users than deals and discounts alone. Location-based shopping apps profiled in Table 2 also provide product information, reviews, recommendations, availability, price comparisons, prescription refills, photo



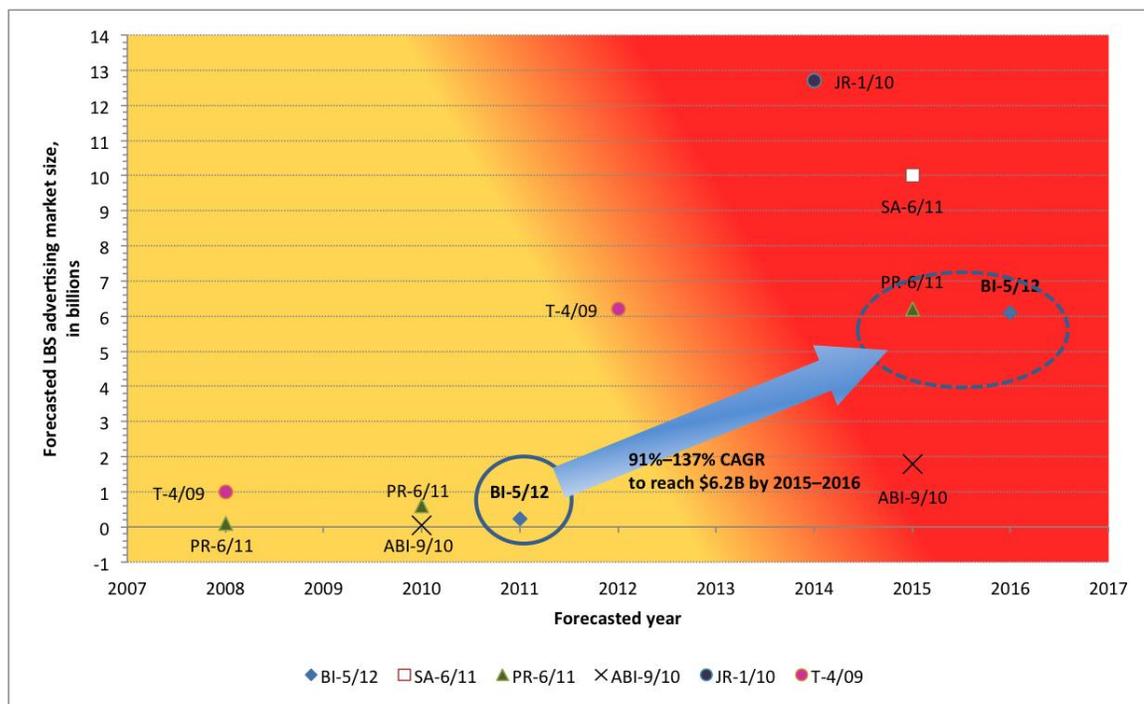
uploads for printing, shopping lists, in-store and mall routing and navigation, running tabs, loyalty and reward points, contests, social shopping, and/or self-checkout or checkout that racks up rewards based on current or cumulative sales volume. Innovation is constantly expanding this universe of capabilities.

Market size

Location-based shopping apps fall within the location-based advertising market, which also includes location-based mobile advertising. Analyst forecasts summarized in the chart and table below place the current location-based advertising market between \$500 million and \$1.5 billion (setting aside the 2009 TechNavio forecast, which seems to be four years early). The forecasts vary widely in the outer years, ranging from ABI's extremely conservative \$1.8 billion forecast for 2015 to Juniper Research's profoundly aggressive \$12.4 billion prediction for 2014, less than two years from today.



Figure 2. Location-based advertising market forecasts



Source: Lamberth & Assoc.

		Forecasted location-based advertising market forecasts									
Source	Chart legend	2008	2009	2010	2011	2012	2013	2014	2015	2016	Comment
Berg Insights	BI-5/12				\$0.24	\$0.46	\$0.88	\$1.67	\$3.19	\$6.10	Most recent 91% CAGR 2012-2016
Strategy Analytics	SA-6/11								\$10.00		Aggressive
Pyramid Research	PR-6/11	\$0.09	\$0.14	\$0.59	\$0.94	\$1.51	\$2.41	\$3.86	\$6.20		Near Berg 5/12
ABI	ABI-9/10			\$0.04	\$0.74	\$0.92	\$1.15	\$1.44	\$1.80		Low outlier
Juniper Research	JR-1/10							\$12.70			High outlier
TechNavio	T-4/09	\$1.00	\$1.58	\$2.49	\$3.93	\$6.20					Four years too early

Interpolated values using constant CAGR

Sources: Berg Insights, "Location Based Advertising and Marketing," May 2012; Strategy Analytics, "The \$10 B Rule: Location, Location, Location," June 2011; Pyramid Research, "Location-Based Services: Market Forecast, 2011-2015," June 2011; ABI, "Location-Based Marketing: Keys to Building a Smart Strategy for Geo-Targeted Campaigns," September 2010; Juniper Research, "Mobile Location Based Services: Applications, Forecasts & Opportunities 2010-2014," January 2010; TechNavio, "Global Location Based Services (LBS) Market 2008-2012," April 2009



Berg Insights’ May 2012 forecast takes a reasonable middle ground, yet even this forecast predicts a meteoric 91 percent compound annual growth rate (CAGR) for location-based advertising between 2012 and 2016.

Is that achievable? We believe so, for four reasons:

First, according to another Pew Research study, summarized in Table 1, consumer adoption of LBS mobile apps has leaped forward, with 18 percent of U.S. smartphone owners — 10 percent of the adult population — using check-in-based location apps. That’s up from only 4 percent in 2011 and should continue to rise as shoppers become more comfortable with trading their location data for monetary rewards and steep discounts.

Table 1. In-store mobile phone use during the holiday shopping season

	All adults		All cell phone owners		All smartphone owners	
	2011	2012	2011	2012	2011	2012
Get location-based directions or information	23%	41%	28%	46%	55%	74%
Use a geosocial or check-in service	4%	10%	5%	11%	12%	18%

Source: Pew Research

Second, location-based shopping companies are building real revenue models. Foursquare and LevelUp, the mobile shopping app launched by social game publisher SCVNGR, have launched paid-advertising services that leverage their huge base of historical check-ins and otherwise nonrevenue-generating members. In an interview with GigaOM Pro, Foursquare’s director of Sales and Revenue Operations, Eric Friedman, said the company “has over 2.5 billion check-ins to mine and leverage.”

Shopkick, the mobile app that offers users rewards just for physically walking into stores, has found its feet and is building a solid revenue stream, with the backing of top-tier national retailers including Target, Macy’s, Toys R Us, and Crate & Barrel.



Shopkick's business value relies on attracting shoppers into stores. For example, shopkick is launching offers at Exxon Mobil stations designed to entice drivers to visit the station's convenience store for a soda or candy bar instead of just paying for gas at the pump.

It's too early to tell which revenue models will be the most successful, and there are bound to be more options to come. Shopkick's early lead, though, gives it pole position in the location-based shopping revenue race.

The entry of big brands into location-based shopping is the third reason for optimism. While this market has been led by venture-backed startups, big retailers and brands have been watching from the sidelines to see which approaches capture customer attention and drive them into stores to spend money. Big retailers such as Wal-Mart, Home Depot, and Costco are integrating those learnings into their own shopper-engagement strategies, which will help fuel the straight-up growth predicted for the segment.

Finally, there's Intuit's acquisition of AisleBuyer. It makes sense that Intuit, the No. 1 provider of small-business-management software, would gobble up AisleBuyer, a location-based shopping app that has differentiated itself with a self-checkout feature integrated with the store's point-of-sale (POS) system. While few think of Intuit as a credit card processor, Intuit's Merchant Services and GoPayment mobile payment service (a competitor to Square) have cornered a significant share of the small-business transaction-processing market. Adding AisleBuyer's self-checkout capability to QuickBooks POS makes perfect sense.

But there's more: Besides streamlining checkout and breaking the sales staff loose from the registers to work with customers on the showroom floor, AisleBuyer encourages engagement through shopping lists compiled at home or in the store by scanning product bar codes and offering deals and recommendations based on cart contents, location-based discounts, and loyalty rewards. As Trevor Dryer, Intuit's head of Product Management for Mobile Payments and Point of Sale, put it, "Integrating



AisleBuyer into QuickBooks POS allows us to bring an enterprise-grade, ‘Amazon quality’ experience to small businesses, giving them the same tools big retailers have.” Intuit’s revamped POS and payment apps should open a floodgate of small retailers jumping into the location-based shopping arena.

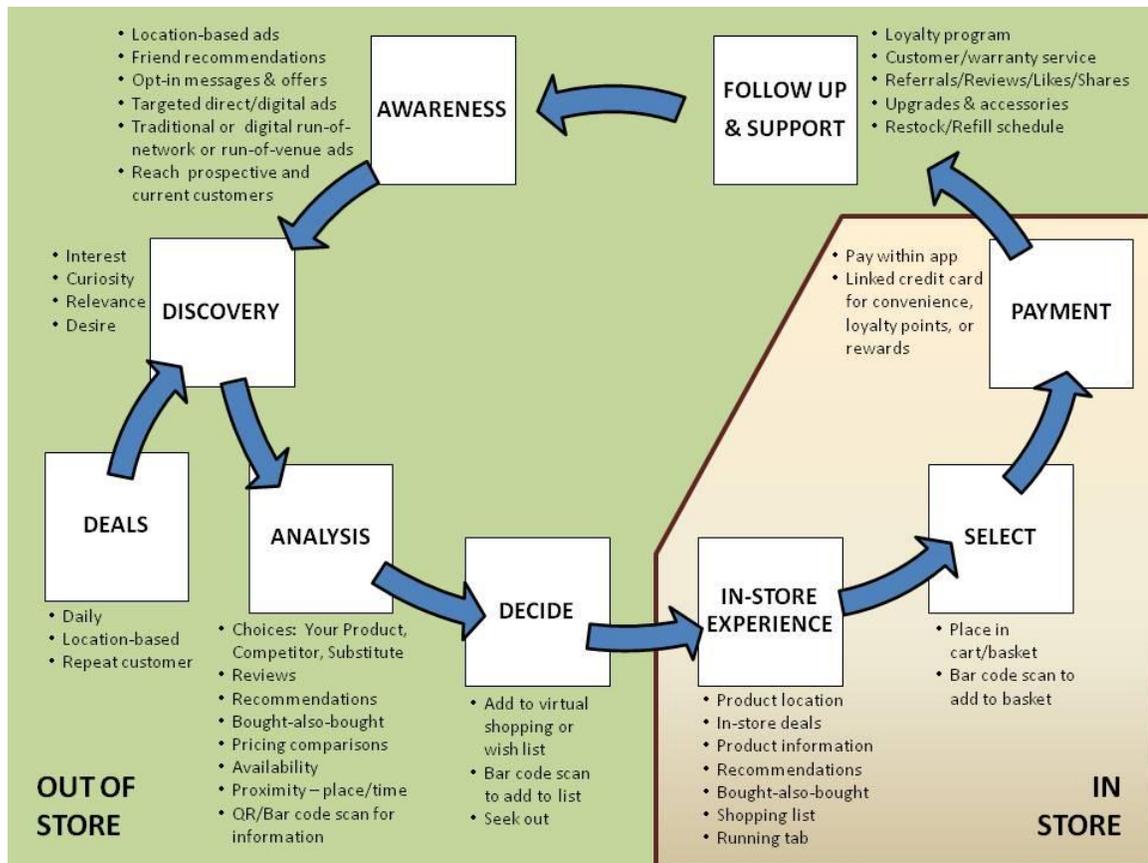
Trends to watch

Omnichannel marketing

Location-based shopping apps are ground zero for omnichannel marketing campaigns. Omnichannel marketing is a process whereby advertisers attempt to capture shopper attention as early in the buying cycle as possible and maintain that interest without losing the shopper to third parties at critical points. For example, an omnichannel retailer will provide product information, reviews, and recommendations within its own site instead of letting the customer turn to Google Shopper or another information source that could divert the customer to another retailer. Omnichannel campaigns also provide direct traceability of offers to sales, the “holy grail” of marketing measurement. Figure 3 describes the omnichannel marketing process.



Figure 3. Omnichannel marketing continuum



Source: Lamberth & Assoc.

Wal-Mart, Home Depot, and Costco stretch toward omnichannel marketing by blending their web, mobile, and in-store customer experiences. For example, Wal-Mart customers can shop at home on walmart.com and choose to have a product delivered, pick it up at the store, or add it to their shopping list. Once at the store, Wal-Mart’s iPhone app provides aisle locations for items on their list, keeps a running tab, and provides a digital version of the store’s weekly circular.

Similarly, Intuit’s acquisition of AisleBuyer complements its strategy to create a customer-surrounding marketing platform. Retailers can easily set up an online presence using Intuit Websites and jump into ecommerce sites with SimpleStore.





AisleBuyer adds location-based advertising and self-checkout, while Intuit's April 2012 acquisition of Demandforce signals coming support for online and social marketing.

Table 2 below shows how a cross section of location-based shopping apps measures up regarding omnichannel marketing. Apps that cover larger portions of this continuum, such as Wal-Mart's and Costco's, have a better opportunity to capture and contain shopper attention and turn that attention into measurable sales.



Table 2. Omnichannel marketing: how today's apps stand up

	AWARENESS					DISCOVERY		DEALS		ANALYSIS					DECIDE		IN-STORE EXPERIENCE		SELECT PAY	PAY	FOLLOW UP AND SUPPORT									
	Location-based ads	Friend recommendations	Opt-in messages and offers	Targeted direct or digital ads	Traditional or digital run-of-network venue ads	Reach current and prospective customers	Interest, curiosity, relevance, desire	Daily, location-based, repeat customer	Choices: your product, competitor, substitute	Reviews	Recommendations and bought-also-bought	Pricing comparisons	Availability	Proximity: place and time	QR or bar code scan for product info	Add to shopping or wish list	Product location	In-store deals	Product information	Shopping list and running tab	Recommendations and bought-also-bought	Scan into cart or basket	Linked credit card for loyalty points or rewards	Pay within app	Loyalty program	Customer or warranty service	Referrals, reviews, Likes, shares	Upgrades and accessories	Restock or refill schedule	
Store apps: Wal-Mart, Home Depot, Costco																														
Intuit and AisleBuyer																														
Aisle411																														
Shopkick																														
Foursquare																														
LevelUp																														
White-label, (e.g., Point Inside, Bizness Apps)										Add-in modules provide varying functionality																				
IViu																														
Google Latitude																														





new: Two years ago most of the applications generating this data did not exist. Both Dryer of Intuit and Seth Priebatsch, LevelUp and SCVNGR's founder and chief ninja, mentioned in interviews with GigaOM Pro that they mine the databases built via their location-based social networks to identify retailers that might benefit from location-based offers.

Eventually large-scale number crunching against mobile location databases will improve audience targeting in all digital media channels by allowing mobile ad networks, digital signage networks, and other digital media channels to target ads based on where people actually are, on average, and to specific individuals or highly evolved demographic surrogates. Mobile phone check-in and purchase data will also become important for other purposes, including store planning, building and mall designs, and even public-safety concerns such as planning evacuation routes.

Companies to watch

If you want to monitor the pulse of the location-based shopping segment, start by tracking the companies listed in the omnichannel marketing table above. In particular, pay attention to:

Intuit and AisleBuyer. Intuit should provide an on-ramp for thousands of small businesses to enter the location-based shopping arena through its AisleBuyer-enhanced point-of-sale (POS) and merchant-services apps. With its recent addition of Demandforce, Intuit is worth watching for more acquisitions as well.

Shopkick and Aisle411. Shopkick and Aisle411 lead the national-brands side of the market, with aggressive plans that could double their customer bases and revenues within the coming year.



Foursquare. Foursquare's recent move into promoted updates provides its first reliable revenue stream and could pave the way for similar paid ads in other location-based shopping apps.

LevelUp. LevelUp's unique approach to payment processing, which saves merchants transaction-processing fees and builds local value for shoppers, should be interesting to follow.

Wal-Mart. Wal-Mart covers the biggest swath of the omnimarketing continuum and is masterful at integrating the customer experience across smartphones, tablets, the web, and in the store. Home Depot and Costco also have similar multichannel digital-marketing programs: Watch for more news about how these programs perform with respect to customer satisfaction and revenue generation.

Looking ahead

Smartphones will increasingly become a hub for retail activity: Mobile is at the eye of the storm of shopper marketing innovation. With smartphone penetration and customers' comfort with disclosing their location to a shopping app both rising, predicted growth in this segment — while seemingly astronomical — may be conservative. Privacy should not be an obstacle, since mobile retail activities are 100 percent opt-in. However, transparency in how information is collected, secured, and used is needed to spur adoption and maintain growth.

Big brands and retailers that need to roll out regionally or nationally consistent programs will enter the location-based advertising market, either directly or with partners such as shopkick or Aisle411. Location-based apps that cater to local retailers will also grow, though location-based app providers that focus on local retailers may have difficulty reaching scale. Intuit's service-provider approach to this market may prove to be a winning play.



About the authors

About Colin Gibbs

Colin Gibbs cut his teeth in tech journalism during a five-year stint at the trade pub RCR Wireless News, where he covered mobile content, applications, marketing, and advertising. During that time he co-founded the Denver chapter of Mobile Media Mondays, a networking group designed to connect members of the wireless community. His work has been cited by the *New York Times*, among other mainstream publications, and he has been quoted in outlets including the *New York Daily News*. Prior to the RCR gig Gibbs spent several years as a general assignment reporter with the *Denver Daily News*, an independent publication, and as a freelance sports reporter with the *Denver Post*.

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Much of Derek Kerton's insight comes from his strategic work with the innovation groups from many of the world's global fixed and wireless carriers. Kerton is the principal analyst and head of the wireless practice for the Kerton Group, a consulting firm focused on advanced telecom, and he is also the chairman of the Telecom Council, an association for global telco executives and their ecosystem counterparts.

Internationally recognized for his telecom industry insight, he consults for companies throughout the telecom value chain (NTT DoCoMo, SKTelecom, Disney, ESPN, Sony) and the financial community on the telecom market issues (Credit Suisse, Merrill Lynch, Dow Jones, Morgan Stanley). Kerton also sits on numerous advisory boards, is frequent chair and moderator in telecom industry conferences globally, and is quoted, published, and interviewed globally on CNN, CNBC, Bloomberg TV, and in the *Wall Street Journal*.



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Laurie Lamberth is an independent VP of Business Development who helps tech companies drive new products and services from concept to market. She is an expert in bringing together people, companies, and technologies to produce extraordinary results by delivering compelling end-user solutions that mash up connected devices, location services, and digital media.

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Monica Paolini is the founder and president of Senza Fili Consulting. She is an expert in wireless technologies and has helped clients worldwide to understand technology and customer requirements, evaluate business-plan opportunities, market their services and products, and estimate the market size and revenue opportunity of new and established wireless technologies. She has frequently been invited to give presentations at conferences and has written several reports on wireless broadband technologies. She holds a Ph.D. in cognitive science from the University of California, San Diego; an MBA from the University of Oxford; and a B.A. and M.A. in philosophy from the University of Bologna.

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Tara Seals has over 13 years of experience as a journalist in the communications space, most recently as the editor in chief of vision2mobile (formerly VON and xchange), guiding the premium content-based industry analysis efforts there. Before that she was the editor of B/OSS, the back-office publication for operators, and headed up the wireless desk for the communications network at VIRGO Publishing. She is also a regular contributor to TMC's Video World Insider, RapidTV News, Global Vision, and Channel Vision. Her areas of expertise include the service provider segment; mobile networks, devices, and applications; and video infrastructure, content, and broadcast





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Further reading

A global mobile handset forecast: 2011–2015

Eighty-five percent of the global population owns mobile phones currently. Meanwhile the growth of new activations and replacement devices in highly populated areas of the Asia-Pacific region will be an important driver for handset growth in the future.

Drivers for handset growth include an increased number of subscribers in developing countries, the rollout of 3G and 4G wireless networks, and shorter upgrade cycles for technology.

Research In Motion: future scenarios and its likely fate

Research In Motion is a different firm today than it was in 2007. It has new management, a full awareness of the gravity of the situation, restless investors, an upcoming OS release, and a number of lingering advantages that can still be leveraged. What might the future hold for RIM? CEO Thorsten Heins has said he plans to surprise critics with RIM's transformation. But in case you don't like surprises, here's a brief look at the most likely scenarios for RIM going forward and their probability of occurring.

App discovery: thinking outside the search box

Discovery. It's the thorn in everyone's side. Fortunately, more than a dozen companies have cropped up to solve the app-discovery situation. Here are a few that are thinking about the issue in exciting ways: outside the search box, outside the app store, and outside traditional mobile devices.

