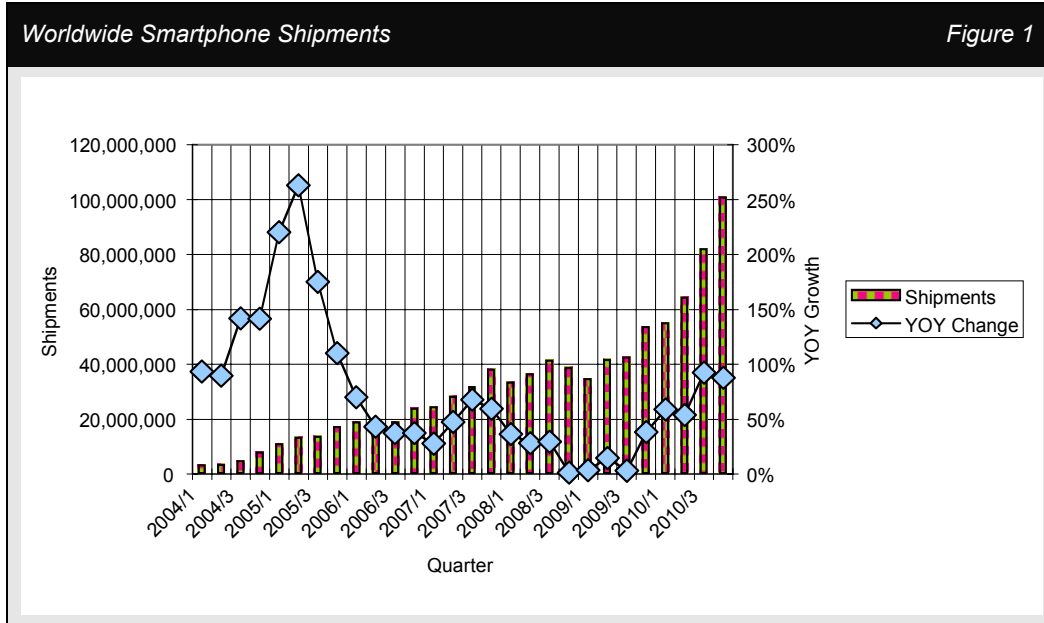


Wolf Bytes 41.28: The Nokia/Microsoft Alliance Promises to Disrupt the Competitive Landscape in the Smartphone Market

- Smartphone shipments grew 87.9% in December, almost as fast as the record rate of 92.4% in September. Smartphones captured 25.2% of the mobile phone market, up from 15.8% a year ago.
- Android continued to surge in December, increasing its share to a market-leading 32.6%, up from just 7.7% a year ago. Nokia, the former leader, saw its share shrink to 27.8%, down from 38.6% a year ago, and BlackBerry's share fell to 14.4% from 19.9%. The iPhone's share held relatively steady at 16.0% vs. 16.2% a year ago. All of the major platforms experienced solid double-digit unit growth because the market itself grew so rapidly.
- The major event since our last report was Nokia's February 11th announcement that it would abandon the Symbian operating system and license Microsoft's (N/R) new Windows Phone 7 operating system. If the alliance is successful, it has the potential to reshape the competitive landscape in the smartphone market.
- The current quarter marked the long-awaited launch of the iPhone on the Verizon (N/R) network. Although the launch did not display the frenetic quality of typical iPhone upgrades, the Verizon iPhone could materially slow Android's share gains in the U.S.

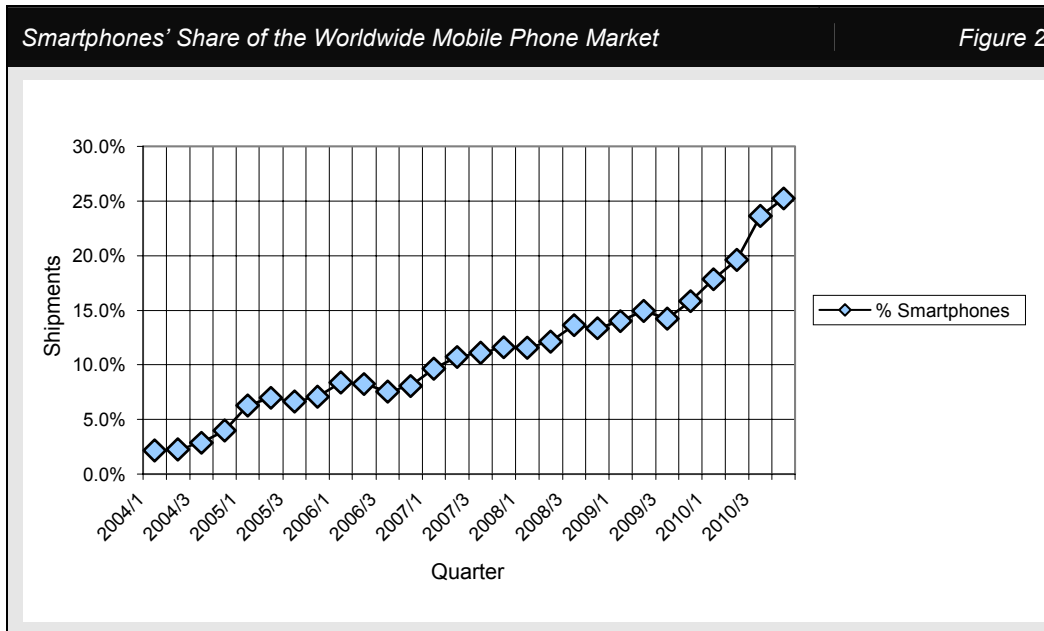
I. Smartphone Shipment Growth in December Almost Matches September's Record Growth

Smartphone shipments grew 87.9% year over year in December, almost matching September's 92.4% record growth.



Source: IDC.

Smartphones' share of the mobile phone market rose to 25.2%, up from 23.6% in September and 15.8% a year ago.

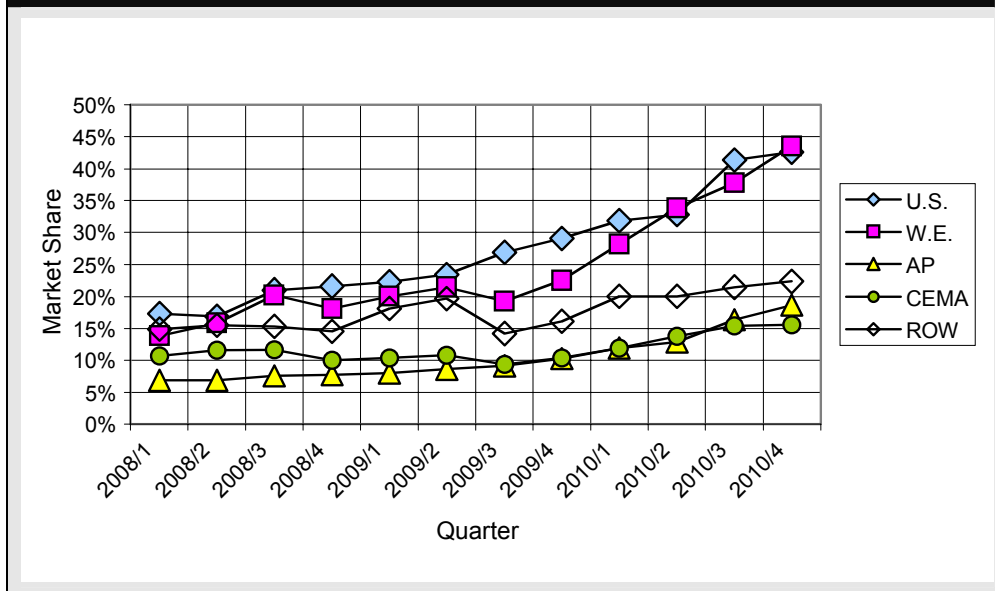


Source: IDC.

While smartphones increased their share of the mobile phone market in all regions, share varied widely across regions. In the U.S., smartphone shipments rose to 42.6% of mobile phone shipments, up from 29.0% a year ago. Smartphones' share of the mobile phone market was even higher in Europe with smartphones capturing 43.6% of the market, up from 22.5% a year ago. In contrast, smartphones held just an 18.7% share in Asia Pacific, 15.6% in the CEMA regions (Central and Eastern Europe, the Middle East and Africa) and 22.4% in the Rest of World regions (Latin America, Canada and Japan).

Smartphones' Share of the Mobile Phone Market by Region

Figure 3



Source: IDC.

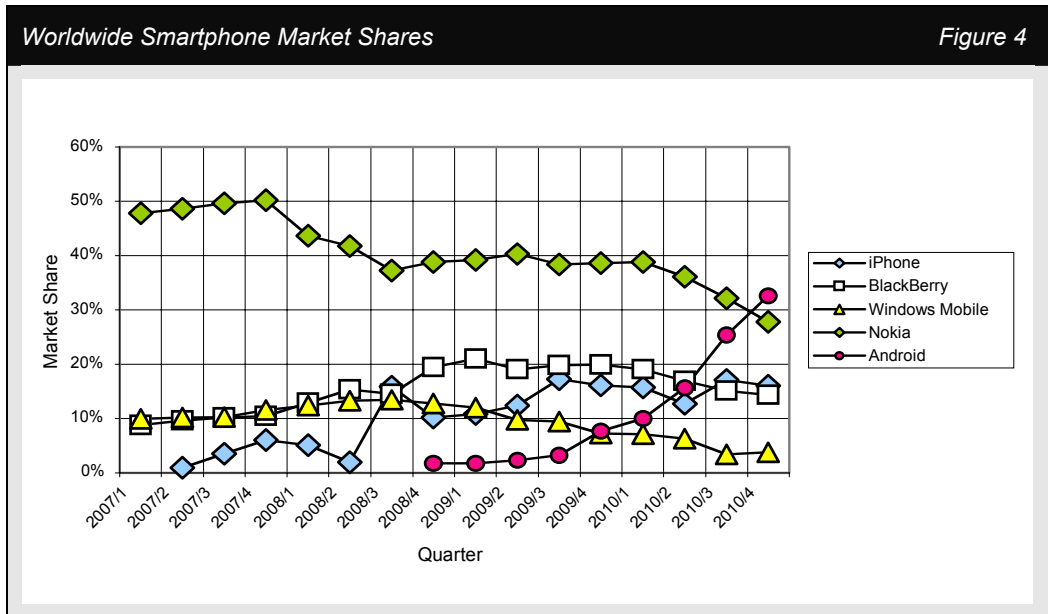
II. Google's Android Operating System Passes Nokia to Become the Leading Smartphone Platform in December

Shipments of Android smartphones rose to 33.0 million units in December, capturing 32.6% of the smartphone market. Android phones captured 64.2% of the 18.9 million sequential increase in worldwide shipments between September and December and 61.0% of the year-over-year increase of 47.3 million units. For the first time, Nokia lost its leadership position in the market; its share declined to 27.8% from 38.6% a year ago. BlackBerry likewise saw its share fall to 14.4% from 19.9% a year ago. The iPhone's share held relatively steady at 16.0% compared to 16.2% a year ago.

In our opinion, Android's stunning rise has stemmed more from Google's distribution strategy than from the magical powers of the Android operating system. Google's objective is to serve ads. The more phones Android runs on, the more ads Google can serve. Google freely licenses Android to any and all smartphone manufacturers, providing a cost-free entry into the market. Handset vendors' desire to substitute higher price, higher margin smartphones for lower priced, lower margin dumb phones in their product portfolios turbocharged the market. In Nokia's December quarter, for example, the average price of a smartphone was \$218 while the average price of a dumb phone was \$60 (assuming a 1.40 euro/dollar exchange rate).

But the secret sauce in Android's success has been the carrier networks, the distribution channel for smartphones. Google has encouraged carriers to add their

own revenue-enhancing software and services to Android devices, creating a powerful incentive to push Android phones.



The market share numbers underscore Android's success in capturing share from other smartphone platforms. But it's unclear how much Android has cannibalized sales of competing platforms or simply grown the smartphone market.

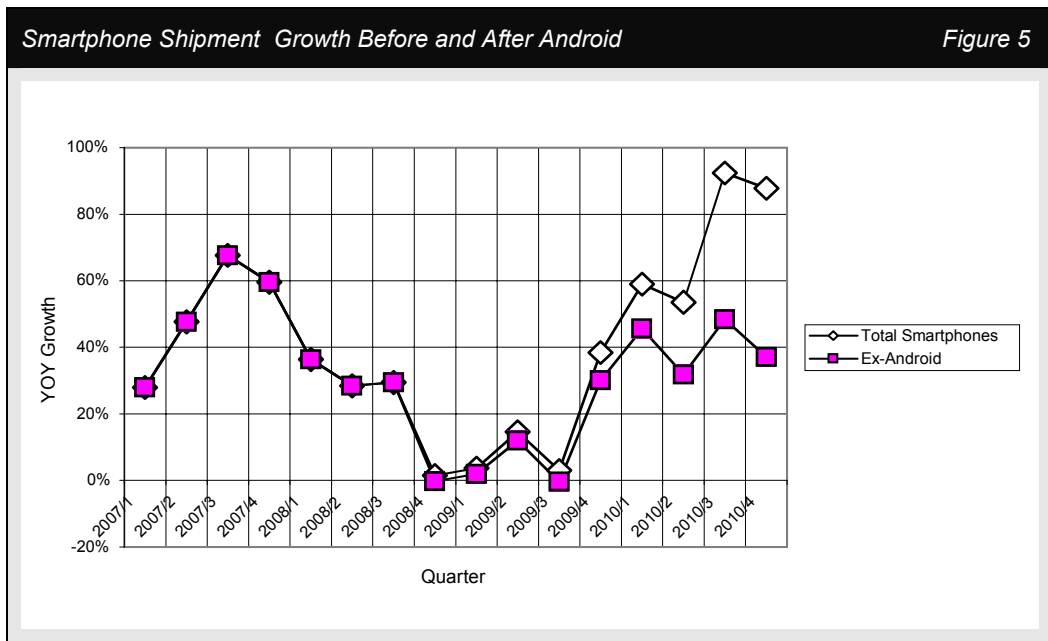


Figure 5 traces the growth of the smartphone market before and after Android's entry in the fourth quarter of 2008. Android clearly propelled the smartphone market to new heights. But even in Android's absence, the smartphone market chalked up respectable growth of 37.1% in December, in line with growth rates in the years before the 2009 recession.

III. The Microsoft/Nokia Alliance Reshapes the Competitive Landscape in the Smartphone Market.

The key event in the smartphone market occurred on February 11, when Nokia announced that it would abandon the Symbian operating system and license Microsoft's new smartphone operating system, Windows Phone 7. In our view, the alliance represented a win-win for both companies. It was a unique situation where two companies desperately needed one another.

Nokia's Predicament

In the past, we've attributed Nokia's problems to the fact that it did hardware really well but software really poorly. With the introduction of the iPhone, the focus of the industry shifted to software and services, an area where Nokia was notably weak. In truth, Nokia's problems went much deeper than our simplistic portrayal because of the company's culture. As a former Nokia employee, Adam Greenfield, described it in his blog:

"Nokia's problem is not, and has never been, that it lacks for creative, thoughtful, talented people, or the resources to turn their ideas into shipping product. It's that the company is fundamentally, and has always been, organized to trade in commodities... Nokia's engineers were and are brilliant at this... there is still no organization on the planet more capable at designing the guts of a phone, the various antennae and radios-on-a-chip that allow a handset to communicate with a network. Nor are there many who can compete with Nokia on the ability to optimize a supply chain and bring in a given bill of materials at a given (and generally astonishingly low) cost."

"These are precisely the skills you need if you're interested in dominating a global market in commodity communication devices, as Nokia did for... fourteen years... But the company utterly failed to anticipate, understand, or organize itself to deal with the critical thing that happened. This was that you could no longer think of mobile phones as communications devices. You had to conceive of them as interface objects through which users would experience content and command functionality that ultimately lived on the network. (That grandeur and disproportionate benefit would accrue to those who did understand this shift was underlined by Apple's launch of its astonishingly successful iPhone in late June of 2007.)"

"Individuals at Nokia, of course, did understand this—many of them. Indeed the entire Insight and Foresight unit produced material throughout the immediate pre-iPhone period that was as visionary with respect to the emerging paradigm as anything I've seen... But... the parties trying to help the company avail itself of this insight were ignored... comprehensively overruled when it came time to set policy or direction. I'm tempted to say that considerations of user experience were bypassed at a structural level."

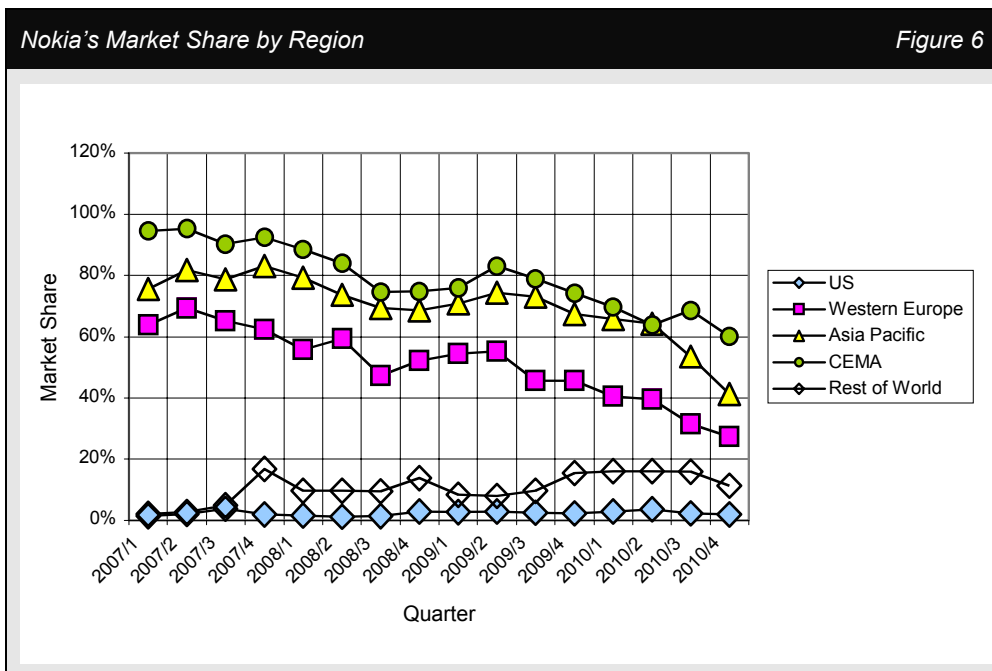
"And this is the crux of it. As it happens, the value-engineering mindset that's so crucial to profitability as a commodity trader is fatal as a purveyor of experiences. Of course, you still want to produce your offering for the lowest achievable cost—but that cost is bound up in intangible, nondeterministic dimensions of design, in ways that are only partially-at-best quantifiable. It's just not particularly wise to allow engineers to make decisions about things like product and service nomenclature, interface typography and the graphic design of icons: they're, I daresay, not even neurocognitively equipped to do so. And yet this is what happened... and... is happening still... at Nokia, engineering has been allowed to displace what is properly the company's design prerogative almost entirely."

“...it’s this inability to even perceive the clear makings of an unacceptably bad user experience, let alone address them as profound obstacles to success in the marketplace, that leads to situations like this.”

“Another blunter way of putting it: there’s nobody with any taste in the decision-making echelons at Nokia. And this is especially unfortunate and ironic, given that elegant, simple Finnish design has tutored generations in what taste means.”¹

Nokia’s predicament is that the Symbian operating system, on which Nokia smartphones run, was not competitive with Android and Apple’s iOS operating system. Symbian was simply too antiquated to be modernized. And even if Symbian could have been modernized, Nokia did not have the culture to accomplish it.

Reflecting this, Nokia’s share of the smartphone market has imploded at an accelerating rate. In Western Europe, one of the company’s traditional strongholds, Nokia’s share fell to 27.2% in December from 45.7% a year ago and 69.4% in the June quarter of 2007. In another stronghold, Asia Pacific, Nokia’s share fell to 41.3% from 67.5% a year ago. In the CEMA regions, Nokia held a 60.1% share in December. But that was down from 92.5% in the fourth quarter of 2007. These share losses made it increasingly clear that there was no obvious way Nokia could reverse them short of abandoning the Symbian operating system.



Source: IDC.

Stephen Elop, Nokia’s new CEO, most likely realized this quite quickly, as he spelled it out in his now famous “Burning Platform” memo to Nokia employees.² With Nokia’s market share imploding in virtually every region, Mr. Elop had little choice but to abandon ship. Nokia could conceivably have pinned its future on its MeeGo operating system. But MeeGo was still in development and months, if not a year away from shipping.

¹ Adam Greenfield, “Nokia: Culture Will Out,” speedbird.wordpress.com, February 19, 2011.
² Chris Ziegler, “Nokia CEO Stephen Elop Rallies Troops in Brutally Honest ‘Burning Platform’ Memo,” engadget.com, February 8, 2011.

Microsoft's Predicament

Microsoft's problems in the smartphone market were arguably as challenging as Nokia's. But first, we have to set the table. Along with Palm and Research in Motion, Microsoft was a pioneer in the smartphone market. Attempting to duplicate its success in the PC market, Microsoft's initial move was to sign up as many licensees as quickly as possible. The irony of this effort is that one of the first companies Microsoft approached was Nokia. However, aware of how Microsoft sucked all of the profits out of the PC market, Nokia instead teamed up with a number of large handset manufacturers, including Fujitsu, Sony Ericsson, Sharp, Motorola and Samsung (all N/R), to form the Symbian consortium for the purpose of developing a competing smartphone operating system. Rebuffed by these companies, Microsoft did an end run, teaming up with HTC and other original design manufacturers in Asia Pacific to design smartphones, which the company, in turn, sold to mobile operators, such as T-Mobile and Orange.

Microsoft's venture into smartphone operating systems centered around a misguided effort to port the Windows PC desktop experience to mobile phones. The company built an industrial strength operating system on this principle, targeted exclusively at the business market. Several of the major handset manufacturers signed up as licensees, most notably Motorola, Samsung and Palm, because they wanted to ride Microsoft's coattails into the enterprise market, where the company held sway on the desktop and in email through Exchange Server. Where Microsoft's effort broke down was in the design of the operating system itself. By attempting to bolt Windows onto a mobile operating system, Microsoft ended up with the most convoluted, difficult-to-use operating system in the smartphone market. Microsoft was initially oblivious to this. Businesses adopted Windows Mobile anyway because of its tight integration with Exchange, forcing their workers to use Windows phones whether they wanted to or not. Indeed, the difficulty in using Windows Mobile smartphones undoubtedly contributed to the success of BlackBerry, which was much easier to use.

In 2006, a number of Windows Mobile licensees woke up to the fact that there was another market out there, which was potentially much larger than the business market—the consumer market. Motorola and Samsung began to build consumer-oriented smartphones featuring slick designs that were aimed at consumers. But this effort failed because the Windows Mobile interface was so difficult to use. Mobile professionals put up with it. But consumers had no reason to. Then came the iPhone in 2007 and with it, the total disruption of the smartphone market. From a communications device, the smartphone quickly morphed into a touch-based miniature computer designed to handle several mobile tasks in addition to phone calls and email. Right after the iPhone was launched, Microsoft went missing in action. From the iPhone's introduction in 2007 until 2010, Microsoft did nothing except to “put lipstick on the pig” of its increasingly antiquated operating system. This period was marked by one failed upgrade after another, encouraging many of its licensees to jump ship and join the Open Handset Alliance formed by Google to promote Android phones. In 2009, Microsoft belatedly went back to the drawing board and started with a clean slate, abandoning the notion of integrating the Windows desktop into a mobile phone. In October 2010, Microsoft finally unveiled its all-new smartphone operating system, Windows Phone 7, to virtually universal acclaim sprinkled with some obvious caveats.

Windows Phone 7

To Microsoft's credit, it did not blindly copy the iPhone's and Android's icon-based navigation metaphor but started from scratch. What sets Windows Phone 7 apart is its user interface. The start screen is composed of user-configurable “tiles” or icons that launch common tasks, such as automatic updates of information relevant to a user. The tiles can be linked to an app, such as Internet Explorer, a contact list, a website or a photo gallery. The tiles also serve as doorways to “hubs,” which are multilayered folders that provide access to content that's stored locally or in the cloud. In addition to the user interface, the two features differentiating Windows Phone 7 from the iPhone and Android are its tight integration with Xbox Live, Office and Outlook. Microsoft has sold over 40 million Xbox's, making Xbox owners a natural target for Windows Phone 7.

One of Microsoft's objectives with Windows Phone 7 was to create a common user experience across all of the smartphones running the operating system—expressed differently, to avoid the fragmentation endemic to the Android platform. This insures that an application written for one WP7 phone will run seamlessly on the others. To accomplish this, Microsoft dictated minimum hardware specs for Windows phones. These include a CPU requirement (Qualcomm's Snapdragon processor—N/R), capacitive multitouch, three navigation buttons, WiFi and GPS, a uniform aspect screen, an accelerometer, and a high-resolution camera. Licensees of Windows Phone 7, then, have only limited flexibility to differentiate the features of their phones. At its launch, Microsoft announced that most of the major wireless carriers had signed on to sell Windows Phone devices, and a number of manufacturers, including HTC, Samsung and LG (all N/R), had licensed Windows Phone 7.

Walt Mossberg of *The Wall Street Journal* wrote:

"My conclusion is that Microsoft has... come up with a user interface that is novel and attractive, that stands out from the Apple and Google approaches, and that works pretty well. Instead of multiple screens filled with small app icons, Windows phones use large, dynamic "tiles" that can give you certain information at a glance. And it has special "hubs" for this like contacts and entertainment that use bold, attractive interfaces and offer personalized, updating information."

Mr. Mossberg was not 100% on board, however. He lamented the absence of certain features found on the iPhone and Android, such as copy/paste, visual voicemail, multitasking and the ability to do video calling. Of course, this is Version One of Windows Phone 7, and we expect Microsoft to add these features quite quickly. A more damning criticism, in our opinion, is that Microsoft "has ceded prominent home-screen real estate to the phone makers and carriers so they can push their own apps, like subscription-based TV and navigation services." This is bound to degrade the user experience.

Cautious on Windows Phone 7's chances, Mr. Mossberg wrote:

"But I couldn't find a killer innovation that would be likely to make iPhone or Android users envious, except possibly for dedicated Xbox users. Even the built-in Office can be replicated with third-party Office-compatible apps on competing platforms, and the iPhone and Android phones can interoperate with Microsoft's corporate Exchange email, calendar and contact systems."³

After ticking off the missing features of Windows Phone 7, David Pogue of *The New York Times* wrote:

"Here's the thing: WP7 is a 1.0 release in a good way, too. It's a complete rethinking of app phone software design. Somehow, Microsoft pulled off the inconceivably difficult task of coming up with a fresh, joyous, beautiful new software design that doesn't look anything like iPhone or Android."

"It's amazing that Microsoft pulled off the hard part: it created a truly fresh approach to managing an app phone's 17 gazillion features that's fun to use, crisp and attractive."

"Obviously, Microsoft still has a lot of work to do... for now, this may not be the phone you'll want to buy. But it's definitely a phone you'll want to watch."⁴

³ Walter Mossberg, "Microsoft's New Windows Phone: Novel But Lacking," *The Wall Street Journal*, October 21, 2010.

⁴ David Pogue, "A Phone of Promise, With Flaws," *The New York Times*, October 27, 2010.

Rich Jaroslovsky of *Bloomberg* questioned whether Windows Phone could stand out from the crowd.

“In technology, being late can be as disastrous as being wrong. And that’s the battle Microsoft is now fighting with the release of Windows Phone 7. The good news is that the software is generally a winner: fun, easy to use and not just another iPhone wannabe. The bad news is that the good news may not matter.”

“Microsoft... deserves a lot of credit for being willing to do a few things that go against the prevailing smartphone norm... The difference is apparent from the moment you power up a Windows Phone. Instead of screen after screen of application icons, as with the iPhone and Android phones, you’re presented with a set of colorful rectangles Microsoft calls “live tiles.” Some of these provide information and summon basic functions, such as the phone tile that tells you how many calls you’ve missed and brings up the dial pad... and some are entry points for what Windows Phone 7 calls ‘hubs.’”

“To the extent that Windows Phone 7 has a Big Idea, hubs is it. These are collections of programs, information and functions organized around a single theme. There are six of them: People, Pictures, Music and Video, Marketplace, Microsoft Office and Games.”

Mr. Jaroslovsky concluded his review with a caveat, voiced by others.

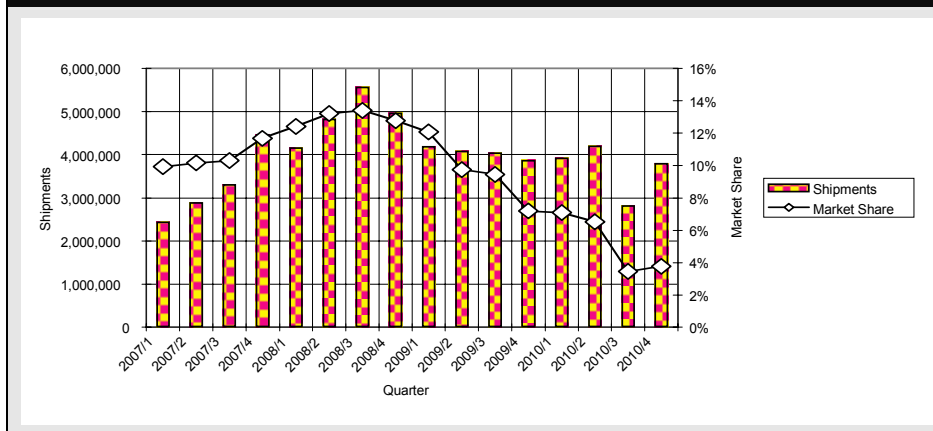
“Facing a field crowded with well-entrenched competitors, Microsoft smartly decided it stood little chance with a me-too entry. Its gamble to do things differently resulted in a product that, all things being equal, provides a plausible alternative. But at this late date, all things aren’t equal, and Windows Phone 7, while much better than previous Microsoft offerings, doesn’t do any one thing so much better that it makes you have to have it.”⁵

Considering that reviewers are obliged to find some faults with any new product, these reviews were nothing short of stunning. But Mr. Jaroslovsky’s premonitions hit the proverbial bull’s eye. Windows Phone 7 might not have been too little. But it was clearly too late in wake of Android’s blitzkrieg of the market. IDC did not separate December quarter Windows Phone 7 sales from legacy Windows Mobile sales. However, as shown in Figure 7, the combined total increased less than one million units sequentially while the platform’s share of the smartphone market rose by just 0.4 percentage points. In short, the launch of Windows Phone 7 was less than auspicious, especially in view of the fact that IDC measures shipments into the carrier channel, and reports surfaced that shipments out of the channel were much weaker than sales in.

⁵ Richard Jaroslovsky, “Microsoft’s Windows Phone 7 Isn’t Good Enough,” *Bloomberg Opinion*, October 21, 2010.

Windows Mobile/Phone Shipments and Market Share

Figure 7



Source: IDC.

Microsoft, then, faced the prospect that despite the dramatic improvements in its smartphone operating system, Windows Phone 7 was unlikely to ever emerge as a viable competitor to the iPhone or Android phones, let alone BlackBerry.

Nokia's Choice

In contemplating a switch to a competing operating system, Nokia had two choices—Google's Android operating system and Windows Phone 7. Most pundits recommended that Nokia should license Android. They acknowledged that manufacturers who licensed Android had limited opportunities to differentiate their phones through software because they all ran on the same operating system. A few vendors added software skins as a way to differentiate them. However, some observers believed these skins actually detracted from the pure Android experience. Rather, those urging Nokia to license Android argued that Nokia would be able to differentiate its phones through hardware features and services, such as the Ovi Store.⁶ What the pundits conveniently ignored is that hardware features were easier to copy than software features.

From Nokia's perspective, the most relevant question was whether its gross margin on the sale of Android phones would be higher or lower than the gross margin on Windows phones. The simplistic view, a heritage of the PC era, is that it was difficult, if not impossible, to preserve a premium gross margin in a market where competitors licensed the same operating system software, eliminating any differentiation. Some PC manufacturers were able to maintain premium gross margins in the early years of the PC era because consumers believed that their hardware was superior and by implication more durable. However, as component manufacturers became more proficient, any perceived hardware advantage eventually evaporated, and PC hardware gross margins began a seemingly endless descent.

The possible flaw in the PC analogy is that smartphones are not personal computers. Not to press the pun, they are much more personal. It's conceivable that consumers are prepared to pay a premium price for a smartphone whose hardware features they perceive as superior. The fact that carriers in post-paid markets subsidize the price of smartphones also serves to sever the connection between price and features. In a sense, the carriers are the consumers in the smartphone market because they control the distribution channel. If smartphone prices come under pressure, it's more likely to emanate from the carriers than consumers, who pay approximately the same price for all smartphones when they sign up for voice and data plans. It's possible, then, that gross margins on

⁶ Nokia might have differentiated its phones through navigation services following its 2008 acquisition of Navteq. However, Google quickly neutralized this advantage by giving away its navigation services for free.

smartphones will always remain higher than those on personal computers because of the unique features of the market. The leading smartphone manufacturers have been able to maintain gross margins of 30-40%. But this levitation could prove to be temporary, reflecting the rapid growth of the market itself, which has pushed pricing to the back burner. The obvious risk Nokia faced in licensing Android is that this price truce could end when the smartphone market became saturated and growth slowed.

On paper, Windows Phone 7 was saddled with the same problem as Android—the inability to differentiate in software. But there was a crucial difference. Virtually all of the leading handset manufacturers had already licensed Android and established considerable brand equity on the platform. Five vendors—Samsung, HTC, Motorola, Sony Ericsson and LG—accounted for over 80% of Android shipments in the fourth quarter of 2010, despite the fact that Android licensees numbered 42. While Nokia's prowess in hardware design and manufacturing undoubtedly provided an edge, it was unlikely to have translated into a gross margin that was higher than those of competitors, especially when these competitors were powerhouse hardware manufacturers in their own right.

The lackluster ramp of Windows Phone 7 meant that Microsoft was in a bind. It raised the possibility that the operating system would never lift off. Perversely, this was in Nokia's interests. A Nokia alliance could theoretically raise Windows Phone 7 from obscurity into one of the four leading platforms in the smartphone space. From Microsoft's perspective, it was important that it did, because the growing success of Android threatened Microsoft's desktop hegemony. In a sense, then, Nokia threw Microsoft a lifeline. Nokia is likely to lose additional market share in 2011 during the transition period to Windows Phone 7. But the Nokia/Microsoft alliance virtually assures that Windows Phone 7 will reach critical mass, a prospect that appeared remote before the alliance. Microsoft is clearly committed to the alliance's success based on reports that the company will spend over \$1 billion on the effort in marketing and software dollars.⁷ If Nokia ends up as Microsoft's only licensee on Windows Phone—more likely now that Microsoft is putting major dollars behind the partnership—the company should be able to maintain its current smartphone gross margin of 30-35%, in line with the gross margins that other integrated smartphone companies earn.

Of course, risks remain. Investors are skeptical that the alliance will ever reach fruition. And they should be, because the landscape is littered with failed alliances. The major risk is one of timing. Despite a superior operating system, Windows Phone 7 has initially been steamrolled by the Android juggernaut. And Nokia's Windows phones are unlikely to be unveiled before the end of the year, an interminable time in the smartphone market. A second risk is that Nokia's market share will continue to deteriorate during the transition. But it would undoubtedly have done so anyway in the absence of this alliance. The third risk, stemming from Nokia's culture, is execution. Nokia's senior management must prioritize on making the partnership successful. In the past Nokia's culture might have sabotaged such an effort. And it may still do so because the Nokia/Microsoft venture represents a major disruption to the culture of the company. However, as Mr. Elop's "Burning Bush" memo underscored, at least the CEO, who is now running the company, understands the problem and presumably can marshal the necessary resources to increase the odds that the alliance will succeed.

We are cautiously optimistic that Nokia and Microsoft will be able to pull this off. For one, Microsoft has already introduced a smartphone operating system that's on a level playing field with the iPhone and Android. Second, Nokia dominates the smartphone market on the hardware side. There's no company that matches its skill and experience in hardware design and manufacturing. And the company also dominates in the scope and depth of its distribution network.

⁷ Dina Bass, "Microsoft Is Said to Pay Nokia More Than \$1 Billion in Deal," Bloomberg.com, March 7, 2011.

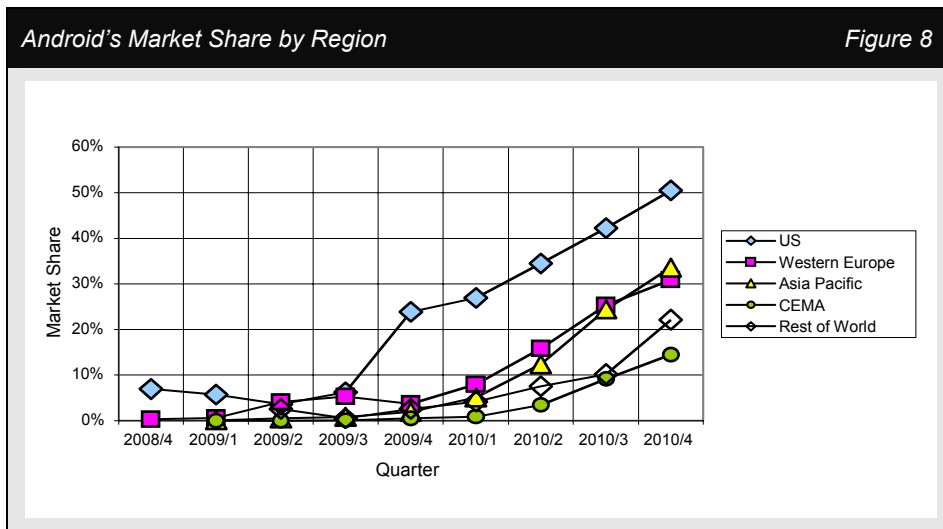
If it does work, the alliance seems certain to disrupt the competitive landscape in the smartphone market. Referring to Windows Phone 7, Andy Rubin, Android's chief architect, said the smartphone market did not need another operating system.⁸ Rubin undoubtedly had dreams of glory for Android what with Nokia's market share imploding and Microsoft nowhere to be found. Assuming the alliance succeeds, Nokia/Microsoft could end up with a 25% share of the smartphone market. The iPhone's share could rise to 25% as Apple increases the iPhone's carrier distribution network through deals like the one the company recently signed with Verizon. BlackBerry is not going away and should be able to hang on to a 15% share. Android could capture the remaining 40% share. What Android lost in the Nokia/ Microsoft alliance was the ability to serve ads on Nokia phones since it's all but certain that Bing will be the default search engine in the deal.

IV. The Competitive Landscape in the December Quarter

Shipments of Android smartphones rose to 33.0 million units in December to capture 32.6% of the smartphone market. More impressively, Android captured 61.0% of the 47.3 million year-over-year increase in worldwide unit shipments. For the first time, Nokia lost its leading position when its share fell to 27.8% from 38.6% a year ago. BlackBerry likewise saw its share fall to 14.4% from 19.9% a year ago while the iPhone's share held relatively steady at 16.0% compared to 16.2%.

Android

Android's share of the smartphone market increased sequentially from September to December in all five geographic regions, rising to 50.5% in the U.S. from 42.2% in September, to 30.9% in Western Europe from 25.3% in September, and to 33.5% in Asia Pacific from 24.4%. Android's share of the CEMA regions rose to 14.5% from 9.2%, and in the Rest of World regions to 22.2% from 10.2%. In short, Android's gains were nothing short of a rout.

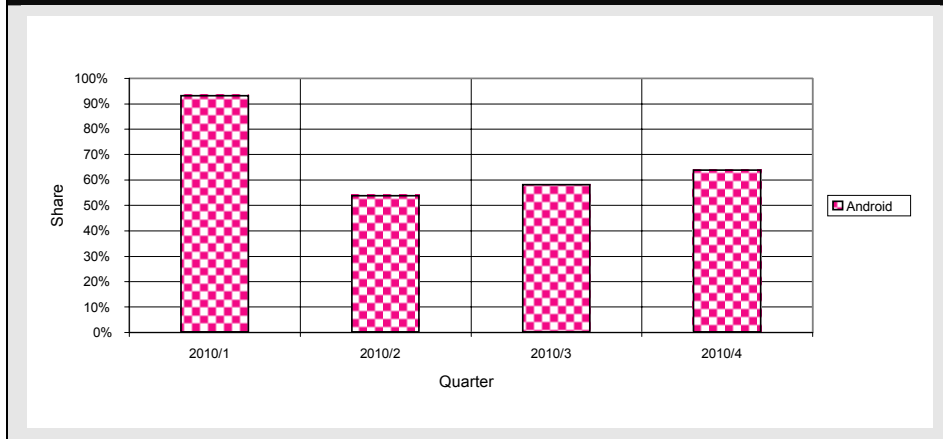


Source: IDC.

Android's share of the quarterly sequential increase in smartphone shipments was even more stunning. As shown in Figure 9, Android captured 93.4% of the sequential increase in the first quarter, 54.0% in the second quarter, 58.4% in the third quarter, and 64.2% in the fourth.

⁸ Sascha Segan, "Exclusive Q&A: Google's Andy Rubin Talks Android," pcmag.com, October 8, 2010.

Android's Share of the Quarterly Sequential Increase in Smartphone Shipments Figure 9



Source: IDC.

In our opinion, Android's rise has stemmed more from Google's distribution strategy than from the magical powers of the Android operating system. Google's objective is to serve ads. The more phones Android runs on, the more ads Google can serve. Google freely licenses Android to any and all smartphone manufacturers providing a cost-free entry into the market. Handset vendors' desire to substitute higher price, higher margin smartphones for lower priced, lower margin dumb phones in their product portfolios turbocharged the market. In Nokia's December quarter, for example, the average price of a smartphone was \$218 while the average price of a dumb phone was \$60 (assuming a 1.40 euro/dollar exchange rate). But the secret sauce in Android's success has been the carrier networks, the almost exclusive distribution channel for smartphones. Google encourages carriers to add their own revenue enhancing software and services to Android devices, creating a powerful incentive for carriers to sell Android phones rather than phones running on other operating systems.

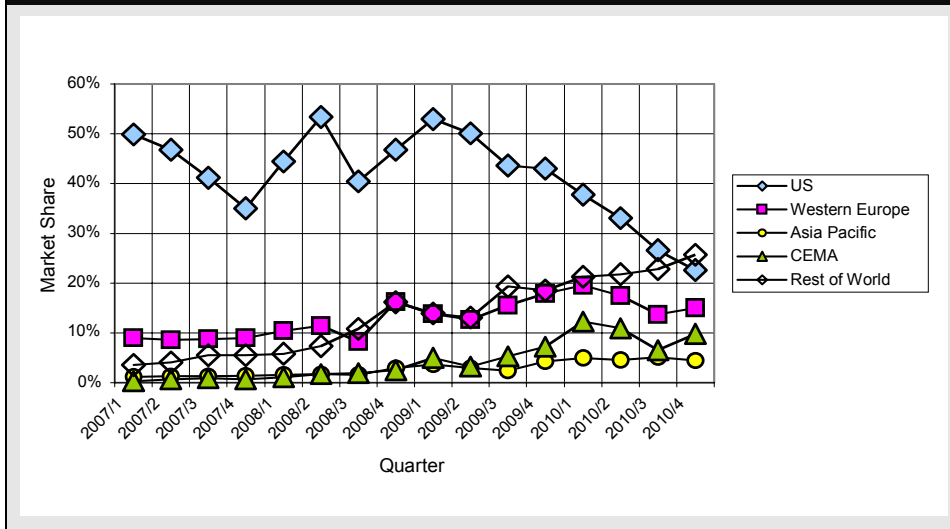
BlackBerry: Still Plugging Away in December

BlackBerry's worldwide market share fell to 14.4% in December from 15.0% in September and 19.9% a year ago. Watching BlackBerry's share in the U.S. smartphone market beginning to crumble, Research in Motion made the strategic decision in 2009 to offset U.S. share losses through growth in international markets. BlackBerry's loss of share in the U.S. chiefly reflected Verizon's decision to switch its "halo" brand status from BlackBerry to Android in the fourth quarter of 2009. Verizon had promoted BlackBerry as an alternative to the iPhone, which was an AT&T exclusive, relying on a continuous barrage of buy-one, get-one-free (BOGO) promotions to bolster BlackBerry sales. But the strategy backfired because there was no mistaking a BlackBerry for an iPhone. In the fourth quarter of 2009, Verizon hitched its wagon to Android, reportedly spending over \$100 million to build the Verizon Droid brand. Verizon continued to offer BlackBerry BOGOs. But no longer in the spotlight, BlackBerry's share at Verizon began to recede.

As shown in Figure 10, RIM's strategy to expand BlackBerry internationally has been reasonably successful, at least until Android stormed into the market. BlackBerry's share of the U.S. market imploded to 22.7% in December, down from 43.0% a year ago and 53.0% in the first quarter of 2009. But BlackBerry has fared far better in international markets. Although BlackBerry's share of the Western European market fell to 15.0% from 18.0% a year ago, the platform managed to increase its share in the other regions. In Asia Pacific, it rose to 4.5% from 4.3% a year ago; in the CEMA regions, it increased to 9.8% from 7.3% while in the Rest of World regions, it jumped to 25.7% from 18.6% a year ago.

BlackBerry's Market Share by Region

Figure 10

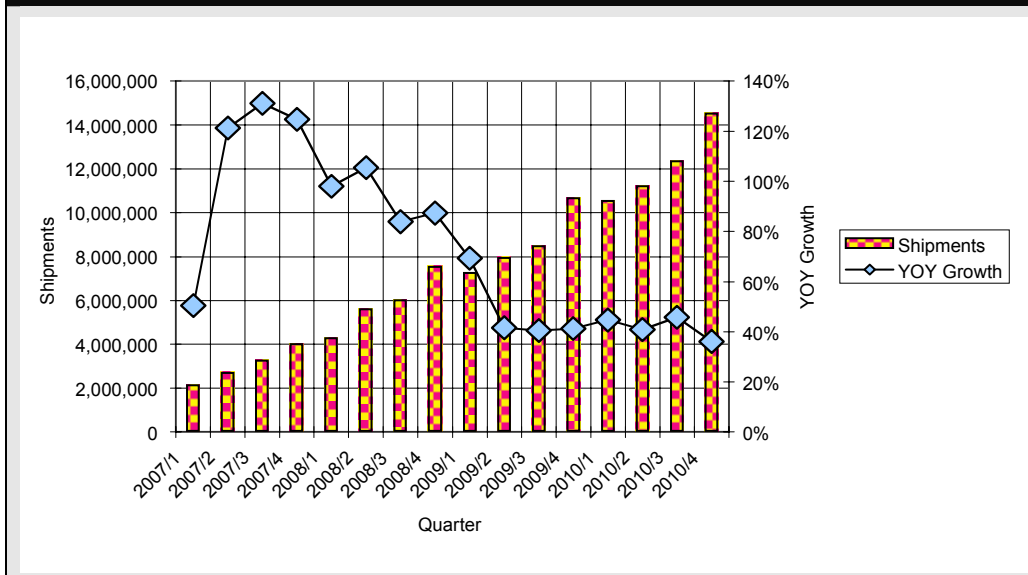


Source: IDC.

The focus on market share obscures an important aspect of BlackBerry's growth—namely that shipments have continued to grow at close to 40% for the past seven quarters.

BlackBerry's Smartphone Shipments

Figure 11



Source: IDC.

What's saved BlackBerry is BlackBerry messenger (BBM), a proprietary instant messaging application running on BlackBerry smartphones. BBM uses a BlackBerry PIN programmed in the device to identify BBM users. Because of the device-specific PIN, BBM has become the framework for a social network constructed around instant messaging. A world-beating feature of BBM is that the sender of a message is notified when it's read. BBM reportedly has 23 million users, almost half of BlackBerry's installed base of 50 million subscribers. Through BBM, RIM has been able to retain a chokehold on a younger demographic that reportedly exchanges up to 100 text messages daily.

A rumor surfaced last week that RIM was considering porting BBM to the iOS and Android operating systems. The details have not been spelled out. However, in our opinion, it would be an extremely foolish move to port the family jewels unless RIM is appropriately compensated for it.

RIM's major challenge is to transition the BlackBerry operating system from one built on the Java programming language, an antiquated operating system, to QNX, a Unix-based operating system, which the company acquired in March 2010. The miracle of QNX is its microkernel, the software that handles most of the tasks of the operating system. The microkernel enables developers to customize the functions of an operating system. QNX's microkernel, called Neutrino, is 1% of the size of conventional operating systems, enabling it to juggle multiple applications while maintaining battery life. RIM plans to launch the Playbook on April 10. Previews of the Playbook have been few and far between. However, video presentations of the Playbook in action indicate that it has strong multitasking capabilities, courtesy of QNX. Reviewers who have seen it also praise the PlayBook for its fit and finish.⁹ However, the PlayBook has also been damned for its virtually impossible-to-use developer tools.¹⁰

RIM believes the Playbook will play well in the enterprise where the BlackBerry continues as the leading brand. RIM hopes to transition the QNX operating system to BlackBerries by the end of the year. By then, RIM may be able to integrate The Amazing Tribe's (a company RIM acquired in 2010) next-generation "Cascades" user interface technology into the BlackBerry OS.

The iPhone Holds Its Own in the December Quarter

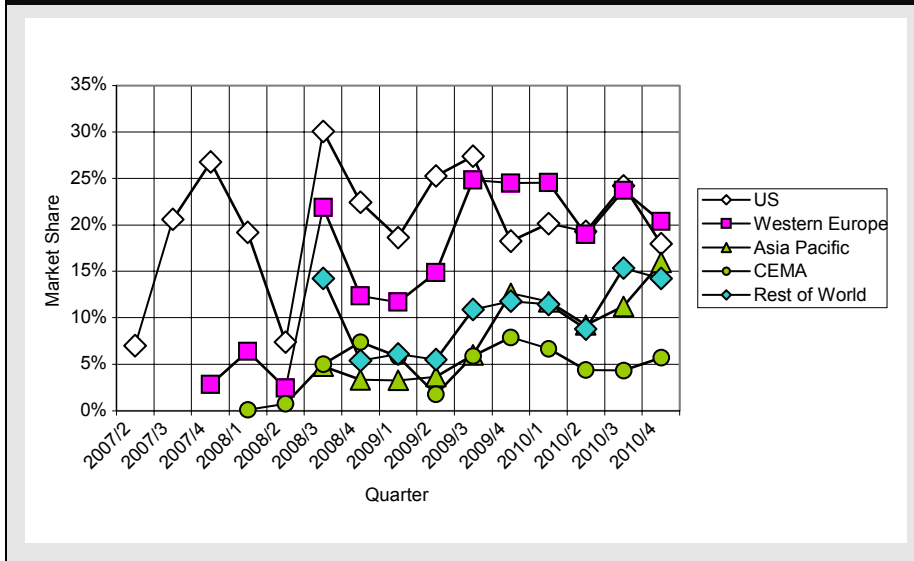
The iPhone managed to hold its own in December growing shipments 86.6% vs. a market growth rate of 87.9%. Fluctuations in the iPhone's market share by region have been erratic, reflecting Apple's now traditional summer upgrade cycle. Fluctuations in share have been exacerbated by IDC's practice of measuring units shipped into the carrier channel instead of sales out of the channel.

⁹ Jay Palmer, "A Serious Challenge to iPad2," Barron's, March 5, 2011.

¹⁰ Jamie Murai wrote, "You win. I concede defeat. I no longer want to attempt developing an app for the Playbook... Considering how terribly designed the entire process is, from the registration right through to loading an app into a simulator, I can only assume that you are trying to drive developers away by inconveniencing them as much as humanly possible... You have succeeded in your quest of driving away a perfectly willing developer... On a more serious note, you need to make your process AT LEAST as good as Apple's or Google's, if not more so. You have failed at both... you win, RIM," jamiemurai.com, February 2011.

iPhone's Market Share by Region

Figure 12

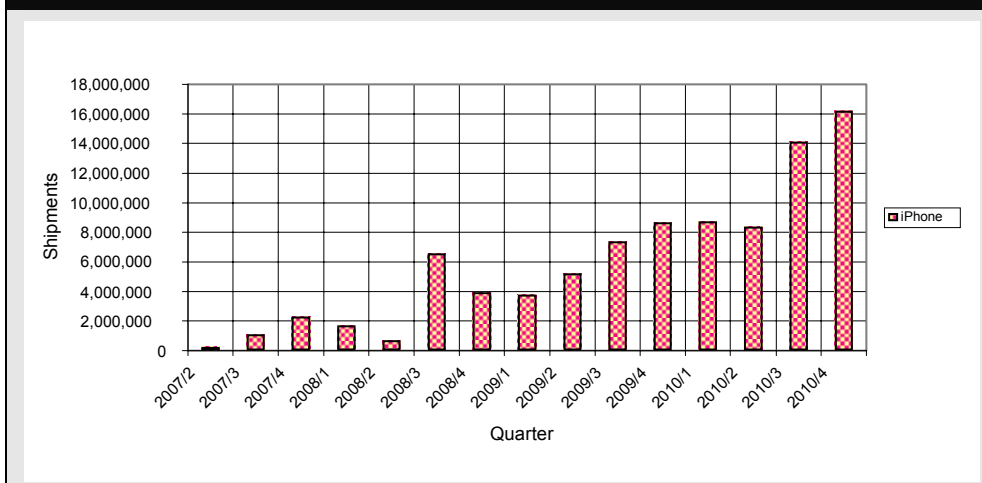


Source: IDC.

On a year-over-year basis, the iPhone's share of the U.S. market fell to 18.0% from 18.2% while its share of the Western European market fell to 20.4% from 24.5%. However, the iPhone's share in the Asia Pacific region rose to 15.9% from 12.6% a year ago on the strength of rising sales in greater China (China, Hong Kong and Taiwan) and South Korea. A portrait of quarterly shipments since the iPhone's introduction in 2007 shows that the growth in shipments has tended to surge in the quarters when new phones were introduced, typically in the third quarter of each year. In contrast with previous years, 2010 iPhone shipments actually increased sequentially in the quarter after Apple introduced a new phone.

Worldwide iPhone Shipments

Figure 13



Source: IDC.

The major event in the March quarter was the iPhone's launch (finally) on the Verizon network in the U.S. While Verizon has not released shipment numbers, the launch was much less frenetic than a typical new iPhone launch. Verizon reported that it was the most successful launch in its history, although most of the phones were purchased online rather than in the Verizon carrier and Apple Stores.

Apple's major challenge will be to expand its carrier network, which stands at 175 today, but could grow to over 500.¹¹

Should Apple Version the iPhone?

Apple initially targeted the iPhone at post-paid markets where carriers subsidize the price of a phone in exchange for a two-year subscription contract. However, the post-paid market represents only about a quarter of the mobile phone market. Since prepaid subscribers buy a phone at retail in exchange for a low-cost subscription plan, they are sensitive to the actual price of a phone. Smartphones in the post-paid market sell for as much as \$600 before carrier subsidies while phones in the prepaid market typically sell for \$200-300 and sometimes for less. Observers have argued that if Apple hopes to target the entire smartphone market, the company necessarily has to sell a cheaper version of the iPhone. Observers point to the iPod as their model. Beginning with one version, the hard drive Classic iPod, Apple subsequently expanded the iPod into three distinct models—the low-end iPod Shuffle at \$49, the multi-touch display iPod Nano starting at \$149, and the high-end iPod touch—an iPhone without the phone but with Face Time video—starting at \$229.

Unfortunately, the iPhone is not the iPad. The portable music player market divided into easily identifiable segments. The smartphone market does not. The iPhone is first and foremost a communications device (phone, email and messaging), and this dictates a minimum set of hardware requirements. Apple could create different versions of the iPhone by disabling certain features, such as the Safari browser. Or, as some have suggested, it could reduce costs by reducing the amount of on-board memory and switching to cloud-based services, by using a lower resolution screen or by tweaking the device in other ways.¹² From Apple's perspective, however, versioning would run the very real risk of degrading the brand equity of the iPhone. Eliminating core features even at lower price points could be self defeating because people who buy the iPhone do so for the entire user experience, not a subset of that experience. At the same time, of course, any version of the iPhone would have access to the iTunes App library of over 350,000 titles.

Apple could design an iPhone that retails, say for \$300 and earn a decent gross margin because the bill of materials before other costs is around \$170 and falling. While not inexpensive for the prepaid market, the iPhone would at least fall into an appropriate price range. However, whether this would be a value-creating strategy is an open question. With a gross margin a fraction of that in the post-paid market, iPhone sales would have to increase dramatically to turn a modestly priced prepaid model into a viable opportunity. And the price elasticity of demand for the iPhone may simply be too low for this to happen.

Moreover, a major risk could stem from versioning. The post- and pre-paid markets are segmented along geographic lines. However, enterprising entrepreneurs could arbitrage the prices in the two markets, buying iPhones at prepaid prices and reselling them in the gray market at higher prices.¹³ Prepaid phones, then, raise the risk of cannibalizing sales of high margin, post-paid iPhones, possibly lowering the total gross profits Apple earns on the iPhone. Of course, the folks at Apple are a lot smarter than we are. So they may have a scheme to build a cheaper phone while retaining the phone's brand equity and margins.

¹¹ It was reported over the weekend, for example, that Apple might build an iPhone that works on China Mobile's next-generation TD-LTE network. China Mobile is the world's largest carrier with over 500 million subscribers.

¹² Darrell Etherington, "How a Cheaper iPhone Would Look," Bloomberg BusinessWeek, March 1, 2011.

¹³ This problem is unique to the iPhone because competing smartphone manufacturers have adopted a strategy of throwing various models with different price points and features at the wall to see which ones stick.

	2009/1	2009/2	2009/3	2009/4	2009	2010/1	2010/2	2010/3	2010/4	2010
Android										
T-Mobile	578,887	423,267	827,660	598,991	2,428,805	393,994	734,105	776,083	1,256,177	3,160,359
HTC	18,238	527,269	543,755	1,079,869	2,169,131	1,435,342	2,800,215	4,663,683	6,788,929	15,688,169
Huawei				69,435	69,435	16,237	126,958	178,960	1,434,252	1,756,407
Lenovo							87,702	154,970	257,966	500,638
LG				33,695	33,695	237,052	677,069	976,675	3,235,421	5,126,217
Motorola				1,968,346	1,968,346	2,304,773	2,694,854	3,782,920	4,921,602	13,704,149
Samsung			4,693	339,630	344,323	729,855	1,582,748	5,857,318	7,744,089	15,914,010
Sharp							40,000	140,000	903,780	1,083,780
SKY							109,200	353,000	525,000	987,200
Sony-Ericsson				4,575		202,050	1,228,788	2,777,534	3,517,068	7,725,440
ZTE								626,856	962,155	1,589,011
Others	0	2,174	3,620	36,402	42,196	70,408	302,622	621,159	1,457,795	2,451,984
Total	597,125	952,710	1,379,728	4,130,943	7,055,931	5,558,461	10,421,302	20,909,158	33,004,234	69,893,155
% share	1.7%	2.3%	3.2%	7.7%	4.1%	10.0%	16.2%	25.4%	32.6%	23.0%
YOY growth				497.5%		830.9%	993.9%	1415.5%	699.0%	890.6%
BlackBerry	7,308,570	7,987,361	8,501,848	10,702,260	34,500,039	10,573,816	11,248,784	12,396,924	14,563,396	48,782,920
% share	21.0%	19.0%	19.9%	19.9%	19.9%	19.1%	17.5%	15.0%	14.4%	16.1%
YOY growth	69.3%	41.7%	40.5%	41.2%	46.3%	44.7%	40.8%	45.8%	36.1%	41.4%
iOS	3,790,153	5,220,642	7,393,905	8,703,819	25,108,519	8,745,459	8,394,224	14,135,848	16,239,802	47,515,333
% share	10.9%	12.4%	17.3%	16.2%	14.5%	15.8%	13.0%	17.2%	16.0%	15.7%
YOY growth	122.4%	586.3%	7.0%	100.0%	82.9%	130.7%	60.8%	91.2%	86.6%	89.2%
Symbian-powered										
Nokia	13,657,584	16,876,371	16,410,253	20,792,252	67,736,460	21,495,730	23,993,590	26,499,954	28,138,216	100,127,490
% share	39.2%	40.2%	38.3%	38.6%	39.0%	38.8%	37.3%	32.2%	27.8%	33.0%
YOY growth	-6.7%	10.3%	5.9%	37.7%	11.9%	57.4%	42.2%	61.5%	35.3%	47.8%
Total	15,907,469	19,839,531	18,611,901	23,569,538	77,928,439	23,572,927	27,292,992	29,278,451	30,681,987	110,826,357
% share	45.7%	47.3%	43.5%	43.7%	44.9%	42.5%	42.4%	35.5%	30.3%	36.5%
YOY growth	-11.1%	1.9%	2.6%	34.9%	6.8%	48.2%	37.6%	57.3%	30.2%	42.2%
Windows Mobile										
Total	4,201,386	4,086,219	4,045,884	3,875,033	16,222,764	3,926,961	4,207,059	2,828,813	3,806,585	14,769,418
% share	12.1%	9.7%	9.4%	7.2%	9.4%	7.1%	6.5%	3.4%	3.8%	4.9%
YOY growth	0.7%	-15.5%	-27.4%	-22.0%	-17.3%	-6.5%	3.0%	-30.1%	-1.8%	-9.0%
Linux										
Total	2,825,501	3,454,036	2,187,137	2,063,221	10,529,895	1,914,027	2,246,389	2,438,979	2,553,244	9,152,639
% share	8.1%	8.2%	5.1%	3.8%	6.1%	3.5%	3.5%	3.0%	2.5%	3.0%
YOY growth										
Total	34,841,680	41,938,848	42,818,329	53,883,838	173,482,695	55,412,762	64,411,711	82,375,792	101,226,815	303,427,080
YOY growth	3.7%	14.5%	2.9%	38.3%	15.1%	59.0%	53.6%	92.4%	87.9%	74.9%
Mobile phones	214,090,743	239,205,897	258,239,594	286,624,786	998,161,020	255,049,151	264,004,081	265,994,765	300,412,049	1,085,460,046
% share	-16.7%	-9.9%	-2.1%	13.2%	-4.0%	19.1%	10.4%	3.0%	4.8%	8.7%
Total phones	248,932,423	281,144,745	301,057,923	340,508,624	1,171,643,715	310,461,913	328,415,792	348,370,557	401,638,864	1,388,887,126
% Smartphones	14.0%	14.9%	14.2%	15.8%	14.8%	17.8%	19.6%	23.6%	25.2%	21.8%

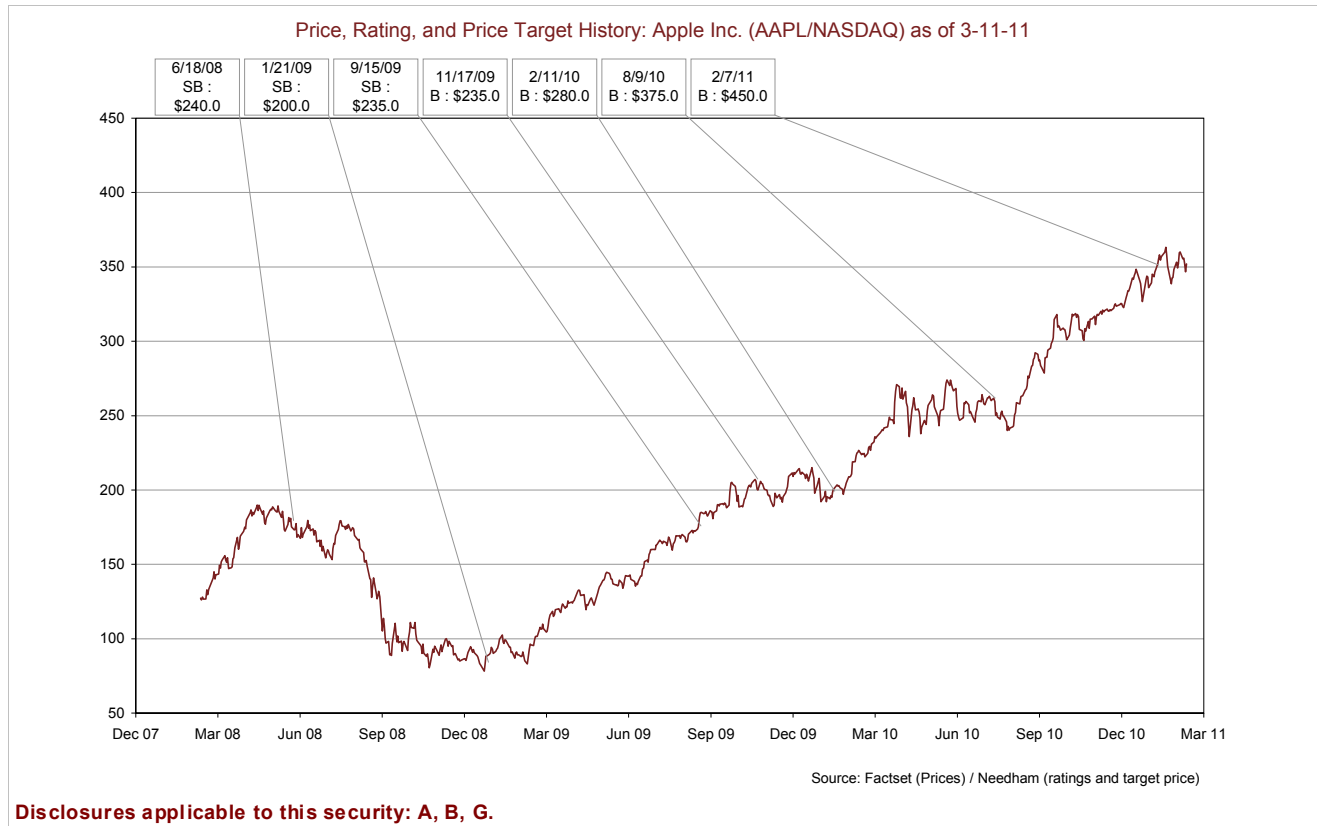
Source: IDC.

Charles Wolf

Mr. Wolf joined Needham & Company, LLC in 2000. He began an 18-year career in the Finance Division of the Columbia Business School in 1966, rising from assistant professor to professor, during which time he published many articles on financial economics and decision theory in major academic journals. He is also co-author of *The Role of Private Placements in Corporate Finance*, published by Harvard University Press. Mr. Wolf joined the equity research department at Credit Suisse First Boston (then The First Boston Company) in 1984. Between 1988 and 1993, he was elected to *Institutional Investor's* "All-America Research Team" in the personal computer industry category. Between 1993 and 1996, he was a consultant to CS First Boston, managing the "New Analysts Program" and writing on the Economic Value Added approach to stock analysis. In May 1996, he rejoined CS First Boston as an analyst covering the PC industry, a position held until October 1998. From November 1998 to November 2000, Mr. Wolf was an analyst covering the PC and enterprise hardware industries at UBS Warburg. Charlie's signature publications, *Wolf Bytes* and *Wolf Bits*, provide in-depth analysis of significant industry issues. He earned his AB, MBA and DBA degrees from Harvard.

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Source: Factset (Prices) / Needham (ratings and target price)

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Buy	62	15
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Restricted	0	0
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