Industry Overview

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Finding value in smartphones

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Smartphones introduce both risks and opportunities

BAML global tech research team has taken a deep look at various aspects of how value is created around smartphones, from devices to mobile payments, carriers, semiconductors and applications. We discuss the changes we have already started to notice and the ones that will almost surely come. The term itself may soon disappear, as smartphone revenue will likely overtake regular phones in 2010, with Nokia expecting smartphones to account for 60-65% of industry revenue in 2011. Our note discusses the following topics:

- How value is created and the way it is distributed among the various groups of players. We discuss the genius of Apple and Google, Microsoft's challenges, RIM's defiance, and Nokia's poor execution.
- Risks embedded in Android's efforts to decouple software from hardware; emerging similarities to the PC ecosystem and how this could impact value distribution.
- Is there a market for a stand alone operating system? The value of Microsoft in a market that thrives for applications and services.
- Semiconductors: apps processor wars: TI's OMAP vs. Qualcomm and integrated vs. discrete solutions; Intel's targeted entry to the high end segment.
- Understanding the uniqueness of smartphone-based mCommerce and discussing Google's strategy to address the new opportunities. Sizing the market and the potential contribution to Google's earnings.
- The carriers' perspective. Compare the cost of subsidizing smartphones to their benefits; quantifying the contribution to ARPU and subscriber additions.
- Lastly, we look at the market for mobile payments, and look at the differences between the potential in mature vs. emerging markets.

Conclusion: 2010 will be a defining year

We believe that many of the above trends will take their almost final shape, or at least will turn much clearer in 2010. We believe Apple, Google, Sybase, Qualcomm, Mediatek and Broadcom will create most of the value from the proliferation of smartphones. We think it is not a surprise, that like in the PC value chain, the list is mostly composed of software/app and semiconductor vendors. On the other side of the market, we note likely challenges for the traditional handset vendors LG, Samsung, Motorola, Sony Ericsson and HTC to create and sustain value over time.

We have doubts, but we are not losing hope, on the ability of Nokia, RIM and Palm to grow/sustain current positions in the consumer smartphone market. On one hand, they failed so far to put together the necessary ingredients for an attractive offering. However, the stocks are cheap and they all have notable advantages and could recover if manage to improve the solution set/scale, respectively.

Table 1: Contributing Analysts

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Conclusions from the smartphone proliferation

The rise of smartphones has injected a new level of risks and opportunities to the mobile handset marketplace. This is not only a new challenge for the handset makers, but additionally a new challenge (or opportunity) for semiconductor vendors, software and applications companies, telecom carriers and mobile payment processors. In this report, we explore the fascinating dynamics we find in each of these areas.

Our first chapter is a summary of the likely winners and losers of these emerging trends, as outlined throughout our report.

Handset vendors and others: Three groups of players

Apple and Qualcomm to benefit the most

We classify our handset universe into three groups of companies. In the first group, vendors that we think will create the highest value from the smartphone market, namely Apple and Qualcomm. Apple understands the value creation process and is likely to continue and benefit from the expansion of its global footprint. Qualcomm is benefiting from the Android proliferation, being one of the leading semiconductor providers. In addition, smartphones are synonymous with 3G and Qualcomm should therefore benefit from the strong growth we are modeling.

Motorola, LG, Samsung, SEMC and HTC at risk of creating less value

Companies that only focus on manufacturing will likely suffer from the decoupling process of hardware and software, we highlight throughout our report. In the long run, this could translate into higher margin volatility, based on timing of hit products, and could also translate to lower margin level overall.

Motorola is making an effort to break this barrier by introducing a new service to the market, around social networking, MotoBlur; Samsung recently launched Bada, a simple open mobile platform which allows developers to build a variety of mobile applications for Samsung handsets; and LG launched its own “LG Application Store” which is available now in some parts of Asia with roughly 1,500 applications. Time will tell whether they could be successful in creating a strong community around the new services. But at the minimum, we think that Samsung and LG have better growth potential in smartphones vs. HTC, given their economies of scale, brand equity, and telco relationships.

RIM, Nokia and Palm need strategy overhaul

These vendors have clear strengths but they also have notable weaknesses. They will need to fine tune their position in 2010 in order to join the "good club" of value creators. On the positive side, they have a somewhat better position than the hardware-only players. RIM developed a strong ecosystem and brand recognition centered on messaging, Nokia benefits from a very strong distribution channel and is pushing its own Symbian and Maemo ecosystems and Palm has a solid product portfolio (both hardware and software). However, these vendors also have clear weaknesses. RIM’s focus has been one-dimensional, mainly centered around messaging, but delivered a sub-par product to consumers, from unattractive hardware to poor browsing capabilities and a challenged multimedia experience. Nokia has thus far failed to execute on both hardware and software deliveries and would need to show major improvement on multiple fronts to capture subscribers’ mind share outside of the emerging markets. Palm on the other hand has introduced a solid product offering, both hardware and software, but has yet to create the necessary scale.

Connecting long term views to the 2010 reality

Stocks however do not always behave on the basis of their long term potential, and we therefore note that **on a shorter term basis**, we see opportunities in stocks of Motorola, RIM, Palm and Nokia, mostly driven by our expectations for some kind of restructuring, supported by attractive valuation. In our view, 2010 will be very a defining year for these stocks. Motorola will need to prove it can continue to differentiate even while using industry standard (Android) software and ecosystem. Palm would have to improve its scale, and RIM and Nokia would have to improve their execution and bring to market better products. Absence of these developments could keep these stocks as value traps for investors.

Messaging still an important market

While our analysis focuses on the role of browsing, software and applications, we recognize that messaging (email, instant messaging) and social networking are also key drivers for smartphone adoption, especially in international and (lower-end) prepaid markets. Messaging related applications consume very little bandwidth while enabling carriers to expand smartphone adoption. RIM has a strong lead in messaging due to its proprietary Network Operations Center (NOC). However, over the longer-term we see other vendors potentially catching-up and offering messaging services to carriers for free. Nokia claims market leadership in QWERTY phone shipments outside North America and has lately seen an acceleration of its push email service. Readers of the Wall Street Journal and the Economist, amongst others, will have seen their aggressive adverts to attack the Blackberry market. As we discuss later, RIM would need to supplement its messaging services platform with a better multimedia, browsing and apps framework to sustain its competitive position in the market.

Google to benefit from mCommerce and search

Our Internet team expects the mCommerce market to grow from $1bn currently to $12bn by 2013, and for search related revenues from mCommerce, subscription and local services and applications to create $1.65 EPS opportunity for Google in 2012, or about 4% upside to street estimates. We do not see the smartphone market trend as having a big impact on Google's earnings for now (Google remains a play on an economic recovery); however, we believe it could help the stock multiple as anticipation builds for the mobile earnings contribution in a few years.

Sybase: a play on carriers' data backbone

Sybase has built a stack of mobile and embedded database products, mobile middleware, mobile device management, and specific mobility applications. The company is the #1 player in both the mobile middleware and mobile device management, and maintains a top spot in the inter-operator mobile messaging market. Sybase's combined mobile and messaging segments account for about 30% of total revenue and about 22% of operating profit, and we expect these segments to grow at an average rate of 10% for CY10.

Broadcom poised to emerge as a baseband winner

With one of the most compelling product portfolios within wireless (ranging from basebands, apps-processors, connectivity solutions to analog), we believe Broadcom is poised to emerge as one of the primary beneficiaries within our semiconductor coverage from the ongoing consolidation within the wireless baseband market, which should allow it to gain significant mindshare at Samsung and Nokia through 2011. In addition, we believe that Broadcom has built a significant market leadership in the combo chip market (combines a few

technologies: Bluetooth, WiFi, GPS, M, etc) – one that we believe will prove difficult to break by other semiconductor companies – which we believe positions the company to capture significant dollar content (outside of basebands and apps-processors).

Qualcomm: to benefit from smartphone and 3G transition

We expect Qualcomm to be a leading beneficiary of the transition to 3G/4G mobile broadband devices such as smartphones, data-cards, e-book readers and others. The company benefits in two ways - first by collecting royalties that are proportional to price of these devices, hence it benefits as devices become more complex and ASP increases. Second, Qualcomm is a leading vendor of semiconductors to mobile broadband devices, especially to smartphones based on Google's Android devices.

In addition to smartphones, some of Qualcomm's higher-end chipsets, including the Snapdragon, are being designed into netbooks. Here we highlight the upcoming Lenovo smart book that will be unveiled at upcoming CES show. Currently Qualcomm’s snapdragon can only support Linux operating system, but the company could see greater potential for this side of its business once Microsoft decides to port its Windows operating system to ARM based processors. This could potentially materialize in 2010.

Mediatek: a play on China’s smartphone market

We anticipate 2010 to be a strong year for Mediatek as handset companies prepare to battle back for market share. Mediatek will offer cost-effective feature phones that will be marketed widely in China and emerging markets as feature phones. The company will again focus on mainstream smart-phone features that are popular and quickly launch chipsets and reference solutions that will be widely adopted by non-major brands and whitebox phone makers.

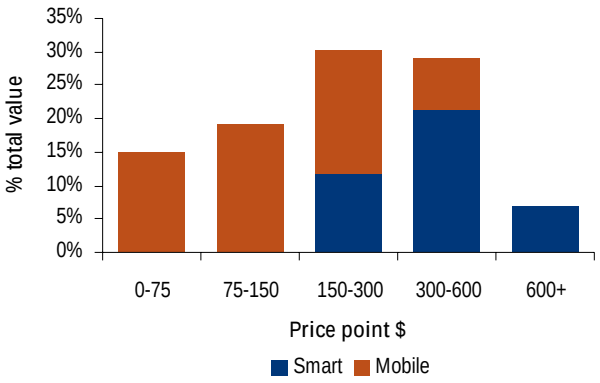
We see MTK as a major beneficiary of the 3G and smartphone roll out taking place in China. Mediatek's dominant market share in China should continue to hold and potentially increase since it will have products for all primary competing standards in China including WCDMA, TDSCMA, CDMA and legacy 2G (EDGE).

1. Nokia's view of smartphone value share

We start our report with some interesting data recently presented by Nokia that we have extrapolated into the charts below. The company validated our views, calling for a decline in smartphone pricing over the next two years; featured phones will be replaced by smartphones; growing demand at all price points, but the $150-300 ASP bracket could turn almost entirely into a smartphone space. Finally, Nokia also sees demand for low end smartphones, in the price range of $75-150. In fact if you overlay Nokia's data with our 9% per annum market value growth out to 2011, they are much more bullish on smartphone growth than we or the market, but also more aggressive on price declines.

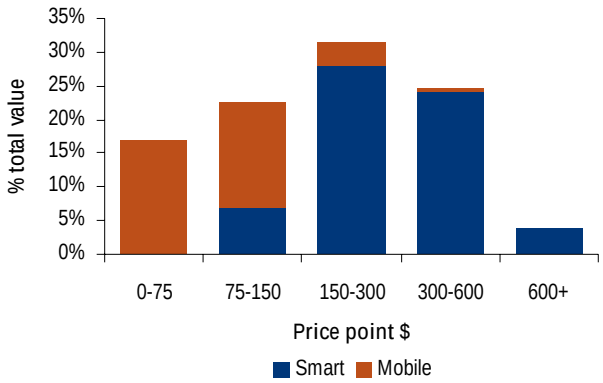
This means that smartphones are becoming more mainstream and in a few years, the term itself may disappear, just because these devices will simply dominate the developed cellular markets. Nokia sees over 60% of handset revenue being smartphone driven by 2011.

Chart 1: 2009E market revenue mix by price-band



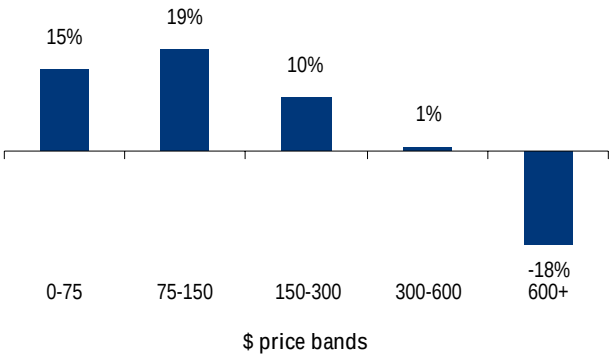
Source: Nokia, BofA Merrill Lynch Global Research converting € price bands to $ at $1.50 per €.

Chart 2: 2011E market revenue mix by price band



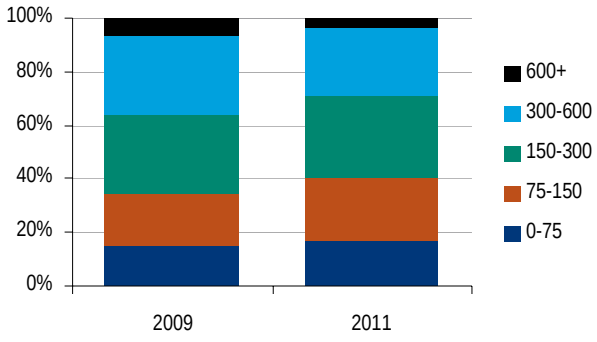
Source: Nokia, BofA Merrill Lynch Global Research converting € price bands to $ at $1.50 per €.

Chart 3: 2009E and 2011E revenue by price band



Source: Nokia, BofA Merrill Lynch Global Research assuming our $ growth estimates for the market of 12% in 2010, 5% 2011.

Chart 4: 2009 and 2011 value market share by price band



Source: Nokia.

2. How will value be created?

Section contributed by Global Handset Team: Tal Liani, Andrew Griffin, Vivek Arya, Laura Chen, Cynthia Meng and Simon Woo

Smartphones seem to change the process for value creation. On the positive side, they create new opportunities for carriers, software and application vendors and e-commerce players, but on the other hand, they also disrupt the market. The value creation process is changing, bringing new players to the market, like Apple and RIM. The semiconductor landscape is also changing with new entrants seen in both the very high end and the very low end of the market.

This report deals with these changing dynamics. This chapter discusses the process of value creation for handset companies, the impact of Android and the change Apple introduced to the market. The following chapters deal with the software and application layers, Google, semiconductors, carriers' vantage point and the mobile billing aspect.

BAML regional smartphone model

Table 2: BAML handset and smartphone market forecasts

MM units	2006	2007	2008	2009E	2010E	2011E	2012E
Total Handsets	1,020	1,176	1,228	1,153	1,300	1,400	1493
Traditional phones, Feature phones	938	1,052	1,077	972	1,068	1,116	1141
Smartphones	82	124	152	181	232	284	352
Smartphones YoY	45%	52%	22%	19%	28%	23%	24%
Smartphone Mix	6.6%	8.6%	10.0%	12.6%	14.5%	16.2%	24%
Smartphone Regional Mix	**2006**	**2007**	**2008**	**2009E**	**2010E**	**2011E**	**2012E**
Total Units	82	124	152	181	232	284	352
North America	9	21	37	54	65	84	97
W Europe	15	23	32	38	52	66	74
Asia Pacific (ex Japan)	22	31	29	37	52	63	97
CEMA	14	20	23	23	28	34	36
Latin America	1	4	10	9	12	14	22
Japan	22	24	21	20	22	24	26
Regional Mix YoY							
Total Units		52%	22%	19%	28%	23%	24%
North America		133%	71%	47%	22%	29%	15%
W Europe		58%	38%	20%	37%	25%	12%
Asia Pacific (ex Japan)		41%	-4%	26%	40%	20%	55%
CEMA		48%	12%	-1%	23%	22%	5%
Latin America		437%	136%	-5%	34%	17%	56%
Japan		12%	-14%	-5%	8%	9%	9%

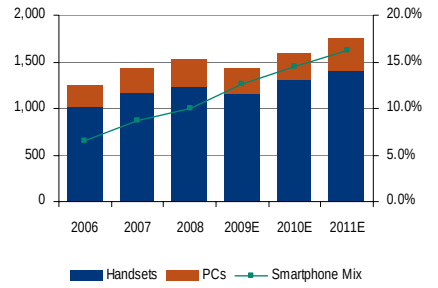
Source: IDC, company reports, BofA Merrill Lynch Global Research Global Research Estimates.

Defining the Landscape

Mobile handset shipments, shipped in 2009, are more than four times the number of PCs (desktop + notebooks) shipped. It's the largest market of any type of device out there, selling 1.15bn units a year and generating ~$150bn in sales.

Smartphones represent the most exciting secular growth opportunity within this market, the smartphone market grew 19% YoY in 2009, despite macro headwinds, and we expect unit shipments to grow 57% the next two years. Looking at total computing market (handsets+PCs), we expect smartphones to account for 16.2% of total market in 2011, compared to 12.6% in 2009 and only 6.6% in 2006.

Chart 5: Smartphones could account for 16% of PC+Handset device market shipments by 2011



Source: BofA Merrill Lynch Global Research Global Research; IDC.

Table 3: Smartphone and PC shipment trends.

MM units	2006	2007	2008	2009E	2010E	2011E
Total Handsets	1,020	1,176	1,228	1,153	1,300	1,400
Traditional phones, Featurephones	938	1,052	1,077	972	1,068	1,116
Smartphones	82	124	152	181	232	284
Total PC	227	261	287	278	301	353
Desktop	146	153	145	123	117	123
Notebooks/Netbooks	81	108	143	155	184	229
Total PC + Handset Market	1,246	1,437	1,516	1,430	1,601	1,753
Smartphone Mix	6.6%	8.6%	10.0%	12.6%	14.5%	16.2%
YoY						
Total Handsets	22%	15%	4%	-6%	13%	8%
Traditional phones, Featurephones	21%	12%	2%	-10%	10%	5%
Smartphones	45%	52%	22%	19%	28%	23%
Total PC	11%	15%	10%	-3%	9%	17%
Desktop	3%	5%	-6%	-15%	-5%	6%
Notebooks/Netbooks	28%	34%	32%	9%	19%	24%
Total PC + Handset Market	20%	15%	5%	-6%	12%	9%

Source: BofA Merrill Lynch Global Research Global Research; IDC.

Smartphones create most of the value

Value creation in smartphones comes through effective integration between hardware, software and applications that enables the handset vendor and carrier partner to differentiate the user experience. Not only are smartphones growifast in unit terms, they also create greater value compared to conventional phones, with Apple generating $300 operating profit per iPhone vs. Nokia's only $10. Consider that as recently as 2006, the top three handset vendors Nokia, Samsung, and Motorola controlled nearly 65% of the revenues and nearly 75% of total operating profits of the handset industry. However, in 2009, Apple (40%) and RIM (14%) generated over 50% of operating profits while contributing only 17% of total sales, a testament to the value of their respective ecosystems. We also highlight here that roughly 17% of the market's operating profit is captured by Qualcomm through its handset royalty business (QTL).

Table 4: Operating profitability trends for major handset vendors.

Op. Inc ($bn)	2006	2007	2008	2009E
Nokia	$6.6	$10.5	$9.4	$4.2
Motorola	$2.7	($0.7)	($1.5)	($1.0)
Samsung	$2.0	$2.7	$2.7	$2.4
LG	$0.1	$1.0	$1.5	$1.2
Sony-Ericsson	$1.6	$2.2	$0.1	($1.5)
RIM	$0.0	$1.1	$2.1	$2.6
Apple	$0.0	$0.0	$3.2	$6.5
HTC	$0.0	$0.0	$1.0	$0.7
Palm	$0.0	$0.0	($0.1)	($0.2)
Qualcomm	$2.3	$2.4	$3.5	$3.0
Total	$15.3	$19.1	$21.8	$17.8
% of Total				
Nokia	43%	55%	43%	24%
Motorola	18%	-4%	-7%	-6%
Samsung	13%	14%	12%	13%
LG	1%	5%	7%	7%
Sony-Ericsson	10%	11%	0%	-9%
RIM	0%	6%	10%	14%
Apple	0%	0%	15%	37%
HTC	0%	0%	4%	4%
Palm	0%	0%	-1%	-1%
Qualcomm	15%	12%	16%	17%
Total	100%	100%	100%	100%

Source: BofA Merrill Lynch Global Research Global Research; Company reports.

Apple iPhone shakes the market

The main thesis of our report is that the path to value creation changes fundamentally, as the market migrates from cell phones to smartphones. Apple was one of the first companies to execute well on this new opportunity, launching an innovative hardware (iPhone) and building an entire ecosystem that creates value to almost all market participants: the subscribers, the carriers, the application developers and to Apple itself.

Apple's value creation could be attributed to the whole package of its value proposition, on all its sides and subtleties: innovative device, seamless integration with iTunes apps/multimedia, the creation of a market for multimedia, games and web consumption; the carrier subsidies that bring the price of the device to attractive levels, the army of developers that stand behind the ecosystem and constantly feed it with new applications and Apple’s traditional marketing prowess.

Google’s Android making inroads; Microsoft focuses on OS

Apple introduced new threats to the traditional handset vendors, as it redefined the standards of delivering a service to the subscribers, and brought it up to levels that the traditional vendors are unable to replicate via their internal resources. This dynamics has created an opportunity for Google to enter the market via bridging the gap and helping the traditional handset vendors to complete the missing parts around their hardware.

It is interesting to analyze the differences between Google and Microsoft's approaches to this new opportunity. At a high level, both companies have aimed to bring to market new operating systems. However, this is also where the similarities end. While Microsoft has focused thus far on the narrow opportunity of selling an operating system, Google understood the bigger picture and focused on developing the market "pro bono", positioning itself in key junctions of the value creation process. From there, Google went on to develop a process for creating revenues and profits around this position.

More specifically, while Microsoft aimed to replicate its PC-industry like practices, and sell copies of its Windows Mobile OS for ~$15-$25 per handset, Google provided the OS for free, created a whole ecosystem around it and focused on ad revenues and the monetization of user usage information.

In our view, Google stands to better extract value from an emerging opportunity, while Microsoft failed to understand the bigger picture of how value is created. The genius of Google was that it first focused on creating a whole market around its own OS, leveraging the dynamics of carrier competition and traditional vendor's shortcomings. Google's Android created a network of developers that has already brought over 12,000 applications to market. It has also defined the software environment, defined the user interface and teamed up with semiconductor players. With most of the environment pre-defined, the handset vendors were only left to deal with handset design and integration issues.

Microsoft catching up, but strategy lags

In our view, Microsoft has fallen short in two key areas thus far: (1) developing a successful value chain, including handset manufacturers and network providers around WinMo (which may require the adoption of a different business model); and (2) utilizing its developer community to create an application ecosystem to support WinMo.

Microsoft's recently released Windows Mobile 6.5, incorporates a few upgrades to the previous version 6.1, such as Windows Marketplace, a revised Internet Explorer browser, and new 'Today', 'Start' screens. However, it seems like MSFT has saved the majority of the key changes for the upcoming version 7.

Though little official detail is available, we anticipate changes in WinMo 7 to focus on consumer segment, with an improved interface coupled with a revised Mobile Office 2010. While these features can help narrow the user experience gaps and may attract more developers, we believe that further changes to MSFT's mobile strategy may be required to boost adoption by handset manufacturers. In our view, there could always be a market for a stand alone OS, but that's not where the majority of the value is. Microsoft's Mobile OS has lost market share over the last three years and this trend could continue, unless the company changes strategy and help handset vendors deliver greater value to consumers. Should Microsoft put the right focus on the new opportunities, we believe it has an opportunity to capitalize on its existing relationships with handset makers and potentially increase its share.

Android could turn disruptive to carriers over time

Google's near term objectives are to increase mobile Internet usage and seed its operating system with as many devices as possible. We see a scenario where Android finds itself into $200-250 ASP devices (versus $350-400 currently) by late 2010/early 2011. Once widely deployed, Android will be able to collect personal/usage information on subscribers, which will enable it to better monetize search and display advertising. Recall that Google recently purchased a mobile-based advertising company (AdMob for $750mn), which may open up many new revenue opportunities for the company, on the back of Android proliferation.

The biggest question is mostly about Google's next step. For example, could the company look to foster broader use of Android devices and disrupt the market by providing direct handset subsidies? Taking this argument to the extreme - will the subscriber be more loyal to the user experience (i.e. Android ecosystem), or to

the carrier, and could Android's popularity extract so much power that it drives subscriber to churn networks, like Apple's iPhone today? In our view, the answers are already embedded within the questions. We view Android as a highly disruptive evolution to the market dynamics, and this it could have vast impact on carriers over time.

Beyond benefits, Android injects risks to handset vendors

We argue that Android has turned the smartphone market into a PC-like environment. It has transferred the value from hardware manufacturing to software and applications of the ecosystem. The standardization it brought to market, the symbiotic relationships it created with semiconductor companies, its focus on applications- all these steps could eventually push the traditional vendors to a corner, where they mostly compete with one another on handset design and the pace of which they can launch new phones. For example, while Apple generates most of the market value via a single handset design that has been around for two and a half years now, Motorola aims to launch about 20 new models next year in order to generate some value and enhance margins.

Another example of how the value is left with Google rather than with the handset manufacturer is the recent launch of Motorola's DROID by Verizon. While Motorola put significant effort into the development of the device, it seems to have a very small part in its brand equity. The DROID brand name belongs to Verizon and the commercials only mention Google and Verizon. This turns Motorola into the "soup de jour" – or the company with the flavor of the day handset. These examples clearly demonstrate how the value is transferred away from the traditional handset vendors, in our view.

PC model infiltrates the smartphone market

Recently, we had the opportunity to compared BofAML research team's DROID that is connected to Verizon, to the Taiwanese team HTC's Magic device, also running Android and connected to one of the local networks in Taiwan. While carriers claim that they can still differentiate within the Android platform, our experience was different. The two devices we tested had an identical look and feel, exact same menu and even the menu items had the same names, despite being from two different manufacturers, different geographies and different carriers. The value in both of these units was centered on the identical experience of Android, not the carrier, nor the manufacturer.

We argue that Android has turned the smartphone market into a PC-like environment, suggesting that it may potentially leave little value on the table for the traditional hardware players: LG, Motorola, Samsung, Sony Ericsson or HTC.

One would argue that this dynamic only impacts the high-end side of the market, where we find handsets with strong processors, memory, big batteries and large screen. We disagree. We believe that the decoupling process is an inevitable and natural process of the market.

First, we also see these trends in the very low end markets. In China, for example, the local handset manufacturers focus almost exclusively on hardware and design, while the semiconductor, software, OS and applications are provided mostly by Mediatek. This has lead to the proliferation of hundreds of local manufacturers that try to bring uniquely designed handsets to the market. The quality of the some of the products is indeed poor, but it does not contradict the fact the market there developed in a very similar way to the PC market. Over time, only the stronger companies, with better distribution and better brand recognition will likely survive, again - similar to trends seen in the PC market.

Second, currently only devices with strong hardware (processing power, memory and battery) could run Android, but this will change as component pricing comes down and cheaper smartphones hit the market. For example, Motorola is expecting to launch $250 Android devices by year-end 2010 and $200 devices in 2011, and Nokia, highlighted at the beginning of the report, sees smartphones capturing most of the $150-300 price bracket within three years, and even some part of the $75-150 group.

Will applications be the X-factor?

Our note discussed so far the likely impact of the new ecosystems on the future profitability of the traditional handset vendors. Some companies already tried to make the transition and deal with the changing environment. Nokia for example aimed to build its own ecosystem with its own application store (Ovi) and operating system (Symbian and Maemo). Palm and RIM are other examples.

In the following three sections we will discuss three other questions of the value creations process:

1. With so many competing applications stores, will breath of applications create a differentiation?

2. Are open systems, like Android Symbian and Maemo, inherently better than closed systems, like that of Apple, RIM or Palm?

3. What could cause the iPhone to lose its current momentum?

Starting with the question of applications depth.

Apple's second major impact on the smartphone ecosystem has been the creation of fertile market of over 200,000 downloadable applications that constantly provide smartphone users new ways to explore with their devices. Competing smartphone vendors have rushed to emulate this model with varying degrees of success. For instance RIM has its App World; Nokia has Ovi store; and Palm has its app store. Android seems to attract thus far most of the attention, offering over 12,000 applications (vs. only 500 on Palm's store).

When it comes to mass-market applications we do not believe there will be any major differences in the depth of applications offered by the surviving application stores. A recent study highlighted by Palm indicated users will only use a handful of apps and that about 1,500 should cover most needs. However, in the nascent growth phase of the smartphone market, we believe the breadth of applications can become a differentiating factor, and the perception of (Apple's) 100,000 apps is hard to counter. Secondly, Apple's single user interface (on both iPhone and iPod Touch), high-end hardware capabilities, ease of apps discovery with streamlined iTunes e-commerce, and fulfillment portal makes it enticing for developers to create new apps exclusively or first for the iPhone.

Also, in specialty verticals and niche markets there will likely always be room to differentiate via a unique set of services and applications, in our opinion. RIM's push email and native SAP support for the enterprise vertical, and Nokia's inclusion of weather and agricultural commodity market price apps on mid range phones in rural areas of India are good examples (Nokia is targeting farmers that value updated weather forecast throughout the day, or prices at markets that may be half a day's journey away).

Two changes in the way apps are developed may make the availability of apps a moot point. More and more apps are written to run in browsers, rather than "native" to the phone. This makes them browser, not operating system dependent. Almost all phone vendors, including Apple, are using webkit based browsers that lend themselves to so-called "web runtime" applications. The original aim of Java, to allow platform independent software development, is being played out in the webruntime app environment.

But webruntime is not appropriate for higher performance applications, such as games, which have to be written "native" to the OS. Here the use of toolkits such as Qt or GTK that allow platform independent software development for the PC industry is taking shape in the mobile world. Nokia acquired the Qt toolkit through its mid 2008 acquisition of Trolltech, and has just finished porting Symbian and Maemo to it, alongside the existing Windows, Mac OS X and Linux. Windows Mobile is coming soon. See the Nokia section later in this report for more details.

Closed systems also create value

The second issue we highlighted was the question of closed vs. open ecosystem.

What is more valuable Apple's closed ecosystem, or Google's open ecosystem? We argue that both can create value.

Android supporters highlight the value in its “openness”. But most successful ecosystems to date are closed systems: Apple's iPhone and RIM's enterprise systems. In our view, it is not about how closed or how open the system is but rather how much value it brings to the users. This is an important distinction. It means that companies that offer a thin device, with a good user interface, sensitive touch screen, easy to use application store and good selection of applications, combined with distribution channels and good carrier relationships will likely attract subscriber’s interest and create value. In other words, it means that RIM, Palm and Nokia could create value and succeed if they manage to put together and deliver all the required ingredients of the ecosystem, even if their systems are closed-ended.

Nokia is promoting its high end Maemo platform as an open mobile computer alternative to iPhone. It will still be a tightly integrated software/hardware solution, like iPhone, but operators will be able to customize the user interface and developers are completely free to develop and distribute apps as they see fit. There is no Nokia approval process unless the app is posted to Ovi Store. An app sold from, say, a gaming website, will not attract the 30% tax of being sold through an app store. This is much more like the traditional PC software environment. Symbian has the same open attributes, but without the tight coupling of hardware and software. In this respect it is more like Android.

Could the iPhone lose its crown?

Contributed by ML Hardware analyst Scott Craig

Throughout this report, we mostly highlight Apple's positives, yet we thought it would be interesting (and different) to look at some long term risks ahead.

On the negative side, we highlight three factors. First, Apple's success has largely been based on AT&T's/carriers' willingness to add a $400+ subsidy (except in certain countries like China) on the iPhone (versus only $200-300 subsidy on other smartphones), but Android devices create a viable alternative at lower pricing. Second, carriers may be wary of Apple controlling too much of the brand strength and control over the customer. Third, carriers may start metering data plans and offer different tiers at different price points, which would be more suitable to cheaper devices (carriers won't be able to justify high subsidy on reduced revenues).

We think all these arguments are valid risk areas for Apple in the long run, although we believe it may take many years to see these materializing. We highlight a few reasons for our comfort level with Apple's near term prospects.

We believe the hardware is still head and shoulders above the competition. All Android, WinMo RIM, and Symbian products are still pale imitations, in our view. In addition, older products that require lower subsidy levels help Apple to compete in the lower-end side of the market, making about 30% of the total iPhone production schedule.

Apple's gross margins are substantially above the industry average, at 60% vs. Motorola's DROID at 35%. We note however this is risk is already captured in our model though. We estimate the current iPhone ASP at ~$600, with 60% gross margin but model an ASP decline into the low $500 range, with gross margins declining to low 50% by the end of F2011. The remaining differences in prices and margins are justified in our view, and could be attributed to brand equity, image and innovation leadership.

Lastly, while it may be too early to draw any conclusions from the following example, we point out that the change from exclusive carrier agreements to open agreements in countries like the UK or Canada, did not impact the subsidy levels thus far, even though common sense would indicate that this would be the perfect time for carriers to look for subsidy reductions.

Caveat: comparing our LT views to our 2010 ratings

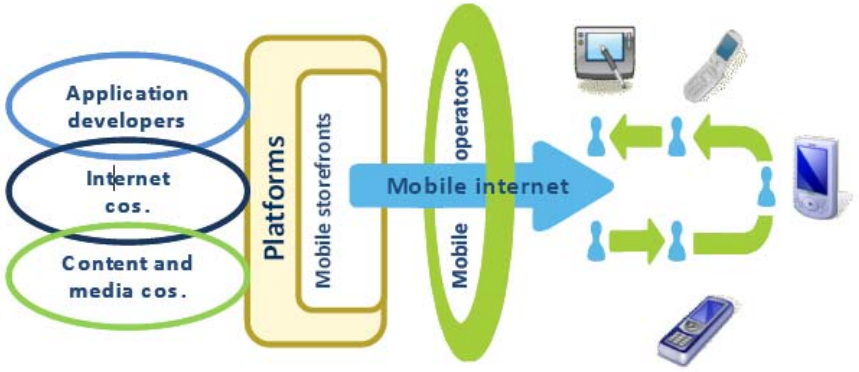
Our report is discussing the likely implications of Apple's and Google's entry to the smartphone market. We highlight our long term view on the likely market evolution. But our analysis has inherent limitations. For example, the trends in emerging markets are different. There, Samsung and Nokia are still expected to generate good profits for many years, via lower-end devices. In emerging market, distribution capabilities are still very important and carrier relationships are less, when compared to trends in developed markets.

Throughout the report, we express concerns over many vendors that we currently rate as Buys, given that our rating mostly related to the opportunities we see in 2010, and their attractive valuation levels. Motorola, RIM, Palm and Nokia, mostly rooted in our expectations for some kind of restructuring in the near future. Nevertheless, in our view, 2010 will be very a defining year for these stocks. Motorola will need to prove it can continue to differentiate even while using industry standard (Android) software and ecosystem. Palm would have to improve its scale, and RIM and Nokia would have to improve their execution and bring to market better products. Absence of these developments could keep these stocks as value traps for investors.

Conclusion: How is value being created

As we mentioned above, companies need to offer total value to consumers. In our view, by bringing all the pieces together, small and closed ecosystems, could deliver as much value as big and open systems, as long as they put together all the ingredients for success.

Chart 6: Mobile Ecosystem



Source: IDC, 2009

We think that a good offering starts with a good hardware, which is still the area where most of the companies fail.

Second, it's the applications environment. Apple's iTunes and Android's market are two examples, while Nokia's Ovi is the challenged one up to now. The purchasing process needs to be easy and "fun".

Third, it's the distribution network, with good distribution leading to better volumes, manufacturing scale and eventually attracts better carriers' subsidies. Palm for example has most of the required ingredients, but may not be able to survive long term without better distribution channels.

Value creation could also be generated via unique services. RIM's email is a good example, while Motorola's MotoBlur is in the right direction. If the traditional handset makers fail to develop this side of their business, they will likely only be able to generate low margin levels, similar to trends seen in the PC market.

Breath of applications is an important factor, but only to a certain limit, especially given that about 1,500 apps provide enough variety to satisfy most users' demands. While this is true for general mass market applications, specialty verticals and niche markets will continue to demand unique offerings of applications and services. In addition to investments in applications, we think the sheer number of available applications will lead over time to a growing emphasis and growing investment to improve the discovery process of applications.

Lastly, we believe that the user interfaces has already improved dramatically over the last few years, even for those that offer poor hardware. We tested Nokia, Palm, RIM, Android and Apple UI's – all offered solid UI experience to us.

Baking it all in, we group the smartphone vendors into three buckets. At the high end, we see Apple and Qualcomm that will likely create value over time. At the bottom of the market, we see the traditional handset vendors that need to find ways to break out from handset manufacturing and be part of the software and application layers. In the middle of the market we put RIM, Nokia and Palm. They are somewhat better than the hardware-only players, but they also have clear weaknesses. We elaborate on our views of the vendors in the next chapter.

3. Detailed discussion of Smartphone vendors

For completeness, we examine the market trends, and the strategies employed by the major smartphone vendors in their efforts to capture value.

Section contributed by Global Handset Team: Tal Liani, Andrew Griffin, Vivek Arya, Laura Chen, Cynthia Meng and Simon Woo

Historical snapshot of market share dynamics

From the perspective of unit shipments, last year (trailing twelve months or TTM) shipments of smartphones were 158.9mn, up 6% YoY, a sharp deceleration from the 22% growth in 2008. However we attribute this to the macro weakness.

Nokia slightly lost share, down from 40% in 2008 to 39% in 2009e and down big from 49% in 2007. RIM was a distant second player, with market share up from 10% to 16% to 20% between 2007, 2008 and 2009.

Apple's shipments surged by 78% YoY, with share of total market growing to 13% from 9% in 2008 and a negligible 3% in 2007, the first year of iPhone launch.

HTC and Samsung were other vendors in the top 5, with low to mid single digit market shares while growing shipments at a healthy 10% - 20% YoY pace.

Table 5: Smartphone market share trends for largest global vendors.

Units (mm)	1Q08	2Q08	3Q08	4Q08	1Q09	2Q09	3Q09	2006	2007	2008	TTM
Nokia	14.6	15.3	15.5	15.1	13.7	16.9	16.4	39.0	60.4	60.5	62.0
RIM	4.3	5.6	6.0	7.6	7.3	8.0	8.5	5.9	12.3	23.6	31.4
Apple	1.7	0.8	6.9	4.4	3.8	5.2	7.4	-	3.7	13.8	20.8
HTC	1.4	1.7	2.1	2.2	1.5	2.1	2.2	0.5	3.0	7.5	8.0
Samsung	1.0	1.4	1.5	1.5	1.4	1.1	1.3	0.6	2.3	5.4	5.2
Others	10.8	11.9	9.5	8.4	7.2	8.7	7.1	35.7	42.0	40.6	31.5
Total	33.9	36.7	41.6	39.2	34.9	41.9	42.9	81.7	123.7	151.4	158.9
Units YoY											
Nokia	24%	10%	-3%	-20%	-7%	10%	6%	37%	55%	0%	-3%
RIM	98%	105%	84%	87%	69%	42%	41%	44%	108%	92%	56%
Apple		182%	517%	90%	123%	583%	8%			271%	78%
HTC	420%	392%	160%	41%	7%	21%	2%		484%	148%	17%
Samsung	160%	147%	193%	87%	33%	-23%	-16%	124%	289%	139%	10%
Others	8%	11%	-9%	-22%	-33%	-27%	-25%	52%	18%	-3%	-27%
Total	38%	29%	29%	2%	3%	14%	3%	45%	51%	22%	6%
Mkt Share											
Nokia	43%	42%	37%	38%	39%	40%	38%	48%	49%	40%	39%
RIM	13%	15%	15%	19%	21%	19%	20%	7%	10%	16%	20%
Apple	5%	2%	17%	11%	11%	12%	17%	0%	3%	9%	13%
HTC	4%	5%	5%	6%	4%	5%	5%	1%	2%	5%	5%
Samsung	3%	4%	4%	4%	4%	3%	3%	1%	2%	4%	3%
Others	32%	32%	23%	22%	21%	21%	17%	44%	34%	27%	20%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: IDC.

We already covered our views of Apple's iPhone extensively and we would refer our readers back to the previous chapter for the details.

Motorola: trying to create differentiation

Our discussions with Motorola suggest management fully understands the risks and opportunities in supporting Android ecosystem. The company is making an effort to create a proprietary service, dubbed MotoBlur, which aims to build customer loyalty via the launch of a social networking service. The service

enables subscribers to utilize smartphones for their social networking activities, with services like Twitter and Facebook being integrated into a single platform. In the future, Motorola plans to replicate this strategy in different directions, offering services to other communities, such as high-end photography and others.

We rate Motorola a Buy, on valuation, its restructuring story and forthcoming cycle driven by product launches which will also help to support margins. We expect the company to launch 20 new smartphones in 2010 and believe that earnings could grow substantially, as the company makes its way back to the market.

Nevertheless, Motorola will still have to prove, in our view, that it can create some value beyond just handset manufacturing, as we articulated in section 1 of our report.

RIM: can it expand beyond messaging?

RIM was likely the first company that created value in the handset landscape via the development of a sticky service revenue, creating a market for messaging-centric devices. On the enterprise side, RIM has mastered the value creation process better than any other company. The company delivered a tightly integrated hardware, software and service and created, in our view, an un-refutable position with the business community.

However, on the consumer side, it struggled to match Apple's offering on a few fronts.

First, it continued to address the market mainly via QWERTY devices and offered what we view as poor touch screen devices (both Storm1 and Storm2). Also, its browser was sub par and offered poor experience for internet access and poor support of video protocols. RIM has also lagged in multimedia synchronization and has had to rely on third party software. This has widened the consumer perception gap compared to the flawless multimedia discovery, download and synch done by Apple/iTunes. While other smartphone and even feature phone vendors put YouTube icon on their main screen, RIM's devices do not effectively support Flash and video content. We do see some changes in the company, such as RIM's recently announced collaboration with Adobe to simplify the delivery of rich content and apps for Blackberry smartphones, and we suspect support for Flash will come.

Some of the shortcoming is related to RIM's focus on enterprise standards. For example, multi tasking would shorten the battery life dramatically, and you could see indeed that Apple disabled this feature in its operating system. But the majority of the issues are more related to RIM's initial lack of understanding of consumer tastes, in our view, which have underscored Apple's success including an effective touch screen, applications market, graphic user interface, simplicity of navigation, large screen for videos, support of multiple internet protocols that enabled support of video services and other components.

RIM's third major risk factor includes its high reliance on Verizon Wireless who has accounted for as much as ~30% of RIM's total shipments in the past. Verizon's recent promotion of the Droid product, upcoming Palm products and possible launch of Apple's iPhone could all impact RIM's market share in 2010 and beyond, in our view.

Maintain Buy on RIM

As we mentioned earlier in our note, we distinguish between companies that only limit themselves to hardware manufacturing, likes of LG, Samsung, Motorola and others, and between companies like RIM that developed their own ecosystem. In our view, 2010 will be a very important year for RIM.

Should RIM manage to bring to market attractive devices, that expand the market opportunity beyond messaging; should it manage to enhance the browsing experience, support Flash and internet-based video and bring a product closer in its offerings to the iPhone or the DROID, we think it will be able to establish itself back in the consumer market.

Secondly, we note that in late August RIM acquired a company called Torch Mobile that makes a web browser for smartphones. We expect this acquisition, and RIM's recent deals with Adobe (for Flash software) to contribute towards an enhanced browsing experience in RIM's 2010 Blackberry models.

Third, we believe there are additional opportunities in the messaging market, especially in the pre-paid market, which is targeted by RIM's new low end devices (8520 Curve), and also older products.

We maintain our Buy on valuation and on our fundamental views that RIM understands the issues at stake and will substantially improve its offering in 2010.

Nokia: at a decision junction

At a high level, Nokia is in a position that it has it all, but has almost nothing at the same time. Nokia's global footprint, manufacturing and procurement capabilities, brand recognition and carrier relationships are not in question. The company has already proved that all of these qualities helped it to reach a 40% market share in the smartphone market, from a unit shipment angle.

The question is about its ability to leverage all of the above to generate value. The difference between the share distribution of Nokia's, Apple and RIM's smartphones unit shipments, and between the distribution of value, is striking. Nokia indeed leverages its size to generate unit volume, but fails to generate enough value.

Nokia getting it, but is it enough?

Our experience with Nokia was different than our experience with RIM. While RIM's defiant management team seems to only be learning from mistakes, Nokia was always able to articulate very well the challenges ahead, including the formation of competing ecosystems and other likely negatives.

The company addressed these issues by acquiring Symbian, in an effort to control the operating system and create an ecosystem around it. It also acquired Navteq in order to build a unique service offering around its location based capabilities, similar to RIM's unique capabilities in emails, and Apple in multimedia applications.

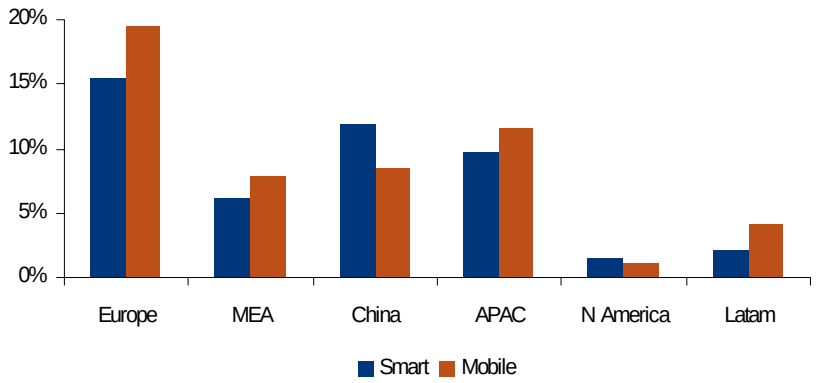
While the intentions were good, the execution was far less impressive. and we have a belated understanding of the problem. Nokia hit a perfect storm of touch taking off more quickly than expected, a big 2008 internal reorganization of product development (that created delays), the buyout and transformation of Symbian into a free open source system (more delays), the two-year development of a hardware-acceleration chip platform to deal with multi-touch

capacitative screens, and on the software development side the porting of mobile operating systems to the successful PC development toolkit, Qt (pronounced "cute").

Over 2008 and 2009 Nokia's high end products were invariably late (because of changes to R&D teams) and disappointing (because the hardware platform wasn't powerful enough. Even the N900, its latest $600-700 Maemo product, is too thick in our view, though to be fair the company is promoting this as a software showcase for operators and developers, rather than a volume runner. On the apps side, users in some countries found the Ovi Store unreliable, developers found it much easier to write apps for Apple and Android, and developers found the whole back-end/payment system unwieldy. Although Nokia has clung to high 30's unit market share, its value share has fallen from 35% to 25% over this time period.

So by Q3, Nokia was in the embarrassing position of selling fewer smartphones (by value) than regular phones in its home European markets, and having no material presence in the main smartphone market, the US. However its emerging market smartphone presence is very strong - the company creates more smartphone revenue in China than it does regular phones, and in other emerging markets, bar Latam, its smartphone revenue is close to its regular phone revenue.

Chart 7: Nokia Q3 2009 devices & services revenue mix



Source: Nokia, BofA Merrill Lynch Global Research

They have a plan

The idea that 2010 is a key year for the industry is doubly true for Nokia which must recover from its worst margin year since 1994 (as far back as our model goes). They see smartphone ASP dropping sharply - too fast for Android and Apple to be able to harvest the $150-300 ASP market, or even the beginning of the smart $75-150 ASP market.

The chart below shows how their platforms attack the market. Maemo is a full Linux PC implementation, on a mobile-sized hardware platform. We will see the volume runner product released in H2 2010, and there is an outside chance we'll see it previewed at Mobile World Congress Barcelona in February.

What we will definitely see at Barcelona is Symbian^3, the third iteration of the open source version of Symbian. Nokia promises a much better user interface, with capacitative screen and multi touch support. A further UI evolution comes with Symbian^4 in H2 2010.

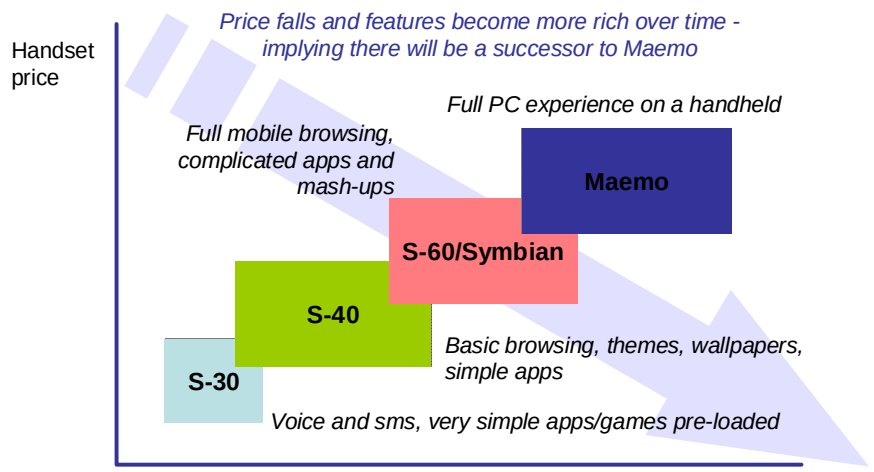
The Symbian Foundation board comprises

Operators:
AT&T
DoCoMo
Vodafone

Handset vendors:
Fujitsu
Nokia
Samsung
Sony Ericsson

Semiconductor vendors:
Qualcomm
ST Ericsson
Texas Instruments

Chart 8: Nokia's OS landscape



Source: BofA Merrill Lynch Global Research

Series 40 is Nokia's in-house low-end OS. Nokia has promised touch and qwerty support for S-40 in 2010 which means we will see some very low priced smartphone functionality devices appearing from the company. S-30 will be a smaller and smaller part of the pie for old style phones and we see it disappearing altogether.

Tying this all together is an improved developer experience, either through webruntime app support, or from the use of its multi-platform software development toolkit, Qt, which deserves half a page of detail.

Nokia gets "cute"

Back in 2008 Nokia's $153m Trolltech acquisition was largely ignored by the market (including us). Yet is probably more significant than Nokia's $8bn acquisition of Navteq. As Engadget wrote at the time, Trolltech is the "biggest little company you've never heard of".

If you want to develop a PC application that will run on Windows, Mac and Linux platforms, then it makes sense to write the application in a development environment that will allow the application to run on different platforms. Trolltech developed a toolkit called Qt (pronounced "cute") that does just this. Skype and Google Earth are two of the better known apps that were developed on Qt.

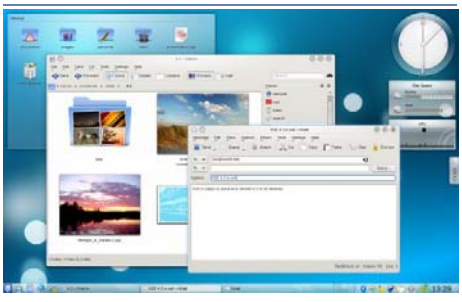
Nokia's interest in Qt is to bridge the PC and mobile applications world, making it easier to develop applications for both. Qt applications will run on Windows CE, Symbian and Maemo (Nokia's latest Linux based OS) are all now ported to Qt with support for the latest version of Windows Mobile on the way.

Normally we would expect a giant company like Nokia to stifle an independent small firm like Trolltech. But in fact the reverse seems to be true. Since the acquisition Nokia has invested significantly in the technology, and actually opened up the licensing of Qt (which is free open source) to make it easier for developers to monetize applications developed on Qt.

Qt is a trojan horse for Nokia because it brings with it the patronage of the K Desktop Environment, or KDE. KDE is a very popular user interface used in the Unix and Linux world. KDE is not just a desktop interface, it is also a development

"Support for Qt would vastly simplify the process of developing third-party applications for those platforms, encouraging the growth of a richer software ecosystem" *ars technica January 2008*

Exhibit 1: KDE – it is a windows style PC user interface for Linux machines



Source: KDE

platform for applications and there is a large free software library of games, multimedia, office, mapping, and other applications. KDE continues to be developed on Qt and a new release was issued recently.

Services complete the picture

We are not convinced that Nokia's services push can really stand alone as a profit generator, but there is momentum there now. Nokia's free email service, Ovi mail, designed for non PC owners, has 4m subscribers. Its push email service added a quarter of a million subscribers in the last week of November (the week before Nokia's annual capital markets day). Over 60 operators have signed messaging deals, with Nokia pushing its lower ARPU-take than RIM as a selling point.

Ovi app downloads are growing 70% *per month*, and the user growth 50%. Average downloads per user is 8, and Nokia claims its mix of free and paid applications was similar to iPhone's App Store – i.e. predominantly free. Most of the paid apps are games. Ovi Store is however not the only channel to download apps – developers can choose to post them anywhere on the web. Ovi Store runs in 16 languages and has operator billing in 13 countries. Store downtime, which was a problem early on (Ovi Store only launched in June 2009) is now running at a much lower rate (99.99% uptime). Having used Ovi on Nokia's 5800 phone without the stress we have seen on some blogs, we were surprised Nokia didn't showcase a few of the apps that are now available just to put the record straight.

In China, Nokia has set up a JV internet services company (foreign ownership of internet companies is not permitted). Nokia works closely with local content suppliers where Symbian, along with the Mediatek platform, is the only software development platform of note. Nokia is using a different try-before-you-buy strategy to China where "free" is always the starting point for apps.

Nokia's music store now boasts 9m tracks. It is the number one on-line music provider in India (though one questions if this includes illegal download sites). It operates in 22 countries and is relaunching DRM free versions.

Nokia's location/maps services operate in 180+ countries and 50 languages, with Drive+Walk navigation in 70+. Total Ovi users (mail or store or messaging etc) are now 75m. Nokia claimed a 100k per week new user run-rate, though even this is not high enough to get them to their 300m target by 2012. Google Android's decision to release free navigation on full Android devices may put Nokia's navigation investment in question, but unless Google releases navigation to other platforms it at least has a map at its disposal, unlike Apple and RIM and the Windows Mobile vendors.

As Nokia's CEO stressed at its December 2009 capital markets day, 2010 will depend on three things, "execution, execution, and execution".

PALM: good offering; execution is key

While the street is generally skeptical of Palm's likely success, we maintain a more positive view. On the product front, Palm has one of the better solutions in the market, in our view. The hardware is solid, both the slider (Pre) and candybar (Pixi) form factors. The screen is sensitive, the keyboard is likely the best in the market today (despite its small size), the products are extremely light, especially the Pixi, and the user face is probably the most attractive one on the market today. Palm's products come with a social networking service called Synergy that aggregates the users' multiple email and social networking information.

Palm is also working very hard on developing a developer community. Since the operating system is web based, it is relatively easy to find application developers, but the company's efforts go well beyond this level. First, the company is working to facilitate non-traditional ways to market its applications. It is offering application developers to deposit their applications with Palm and get in return a URL address that points to a download link for the applications. This will enable the application developers to post this URL address in chats, blogs, tweets and other communities, and may enable to create a word-to-mouth advertisement for the applications. Palm has also recruited two managers from Mozilla to help build web-based development processes and communities, in the same way that Mozilla developed its products.

Palm currently offers only ~500 applications via its application store, but is adding 50-100 applications per week. In addition, in a few weeks, the company will be opening its store to enable outside developers to post their applications in Palm store, similar to processes implemented by Android.

Scale is Palm's main challenge

Palm's main challenge will be to carve a profitable niche for itself between the large vendors (Nokia, Apple, RIM) on one-side and the army of Android-based vendors (Motorola, HTC, Samsung) on the other side. While Palm's new Pre and Pixi products are only sold through 5 carriers currently (Sprint is largest), we expect substantial channel expansion in 2010 when we expect Verizon, AT&T and others to also promote Palm's smartphones. By that time Palm could also have a substantially larger applications catalog.

The second risk factor is pricing given increasing competition between smartphone vendors. For instance, Palm's Pre was launched at $199 (after rebates) in June, but is now available at $79 in some locations. Palm's Pixi meanwhile was launched at $99 but already available for $29 (including retailer and carrier discounts) in some channels. While Palm aspires to 30% gross margin, Motorola is talking about a current gross margin of 35% for its DROID product.

Samsung: can smartphone be a new catalyst?

Samsung Electronics' (SEC) smartphone business is still in the infancy stage with the introduction of its own platform, called "bada" (which means "sea" in Korean), as recently as 10 November 2009. The bada is based on Samsung's own software and user interface which are already in use for its high-end phones, such as the full touch screen phones (Omnia series). Year to date, Samsung has shipped about 7mn smartphones that are mostly based on Microsoft's OS Window Mobile (WinMob) and partially on Google's Android. This compares with total handset shipment of about 220mn units. In short, smartphones should have only minimal contribution to SEC's 2009 results (ratio of smartphones to total handset shipments is about 3%). Instead of smartphones, Samsung's focus has been full touch screen phones which accounted for about 18% of total 2009 handset shipments (approximately 40mn units).

In 2010, Samsung expects unit growth of smartphones to double (about 15mn units) on the back of two major OS, WinMob and Android. The number of new smartphone models should also increase in 2010 – about 30 models vs. 20 in 2009. Samsung usually introduces about 100 new models pa and these would include not only smartphones but also high-end feature phones. Thus, we estimate that new smartphone models should account for about 30% of total new

handset models in 2010 vs. 20% in 2009. Sales of Bada-based phones should be less than 10% of total smartphone shipment in 2010 due to start-up and learning curve periods, in our view. We therefore believe Samsung's mainstream OS will still be WinMob and Android in 2010.

2010 outlook

Overall, our model for Samsung's handset business shows about US$2.4bn OP generation in 2009 (US$26.6bn sales, 9% OPM), which is close to the previous high (2007 OP: US$2.75bn). In 2010, we expect Samsung to sustain 2009 level of OP (our current estimates for 2010: 249mn units, US$28.69bn sales, US$2.46bn OP, 9% OPM) despite intense price competition.

Although Samsung's global leadership in smartphone will remain weak vs. Apple or even compared to Nokia, we acknowledge its gradual progress in this field (introduction of own platform, about 15mn unit shipments in 2010). We believe that its well-managed product mix and cost-competitive regular phones will help it sustain about 9% margins in 2010; its 2009 results already indicate well that it can sustain the previous peak level of profits despite the global recession and lack of smartphone-driven growth.

Table 6: Samsung: consolidated handset results

US$mn	2008	2009E	2010E	2011E
Units (mn)	197	221	249	282
Sales	26,405	26,586	28,693	31,377
OP	2,716	2,463	2,494	2,858
OPM	10.3%	9.3%	8.7%	9.1%
Blended ASP (US$)	134	121	115	111
Blended OP per unit (US$)	14	11	10	10
Smartphone units	3	7	15	25
% of smartphone to total	2%	3%	6%	9%

Source: Company reports, BofA Merrill Lynch Global Research Global Research estimates.

HTC: Android, opportunity or threat?

Based on our estimates, HTC's WinMo smartphone shipment were down over 30% YoY. As WinMo 7 which support capacitive touch screen, more intuitive input and UI enhancement will not be ready by 2H10, we don't expect HTC's WinMo shipment to recover next year. On Android product, the initial feedback is good and mobile internet user experience is impressive, HTC also has proven its capability in user interface design on the "Hero" product.

However, with Google's Android OS aiming to lower the entry barrier with a simpler design process, HTC's value-add on software design/UI is being squeezed and becoming easier to replicate. In addition to HTC's inferior brand position and relatively small scale, we see a risk of the company getting sandwiched between top-tier handset brands and low-cost new entrants.

Management sees similar gross margin for both WinMo and Android products, and expects limited impact as the company expands into mid-tier price markets. However, we do expect ASPs to decline, given the intensified competition.

To enhance its brand awareness, HTC introduced its marketing campaign "Quietly Brilliant" which aims to deliver its value — "honest, humble, simple, dynamic and innovative" — to customers. The new HTC YOU advertisement is being rolled out across 20 countries. Its tagline "You don't need to get a phone.

You need a phone that gets you," would aim to create an emotional appeal about its phones, in our view.

While we acknowledge HTC's efforts to invigorate its brand, we are still concerned about HTC's OP margin outlook. Management expects 2010 full-year opex to be higher YoY, but how much of this marketing spend will translate into actual benefits in terms of market share or revenue growth is still uncertain.

LG: Smartphone lagged; upside from low base

LG is a laggard in smartphones with only 1% global share (vs. its handset global market share 11%). The company targets to ship about 5mn smartphone units next year (vs. ~1mn this year) with 10-15 new models based on Windows Mobile, Android and Linux platform. The company expects its smartphone will start ramping in 2Q10, which could lead to some margin and ASP upsides. With LGE's strong brand equity, telco relationships, technology innovation, as well as economies of scale, we think the company should be able to become a major force in smartphones when they go mainstream in 2-3 years. We think 2Q10 will be better checking point to see LGE's smartphone product delivery.

Aside from smartphone, we still see LGE's momentum on feature phone, touch screen phone intact. The company aims to achieve 15-20% YoY unit growth in 2010 with more upside in emerging countries, Asia and Europe.

LGE currently has about 20% market share in the US. To see further growth, we must see LGE penetrate into other regions such as Europe and Asia where LGE only has 5-7% market share vs. its global market share of 11%. Starting from 4Q09, LGE is aggressively ramping up its investments in channel marketing/distribution to expand into emerging markets. We expect the company's handset shipment to bottom out in 1Q10, followed by more diversified product portfolio offerings including smartphones in 2Q10.

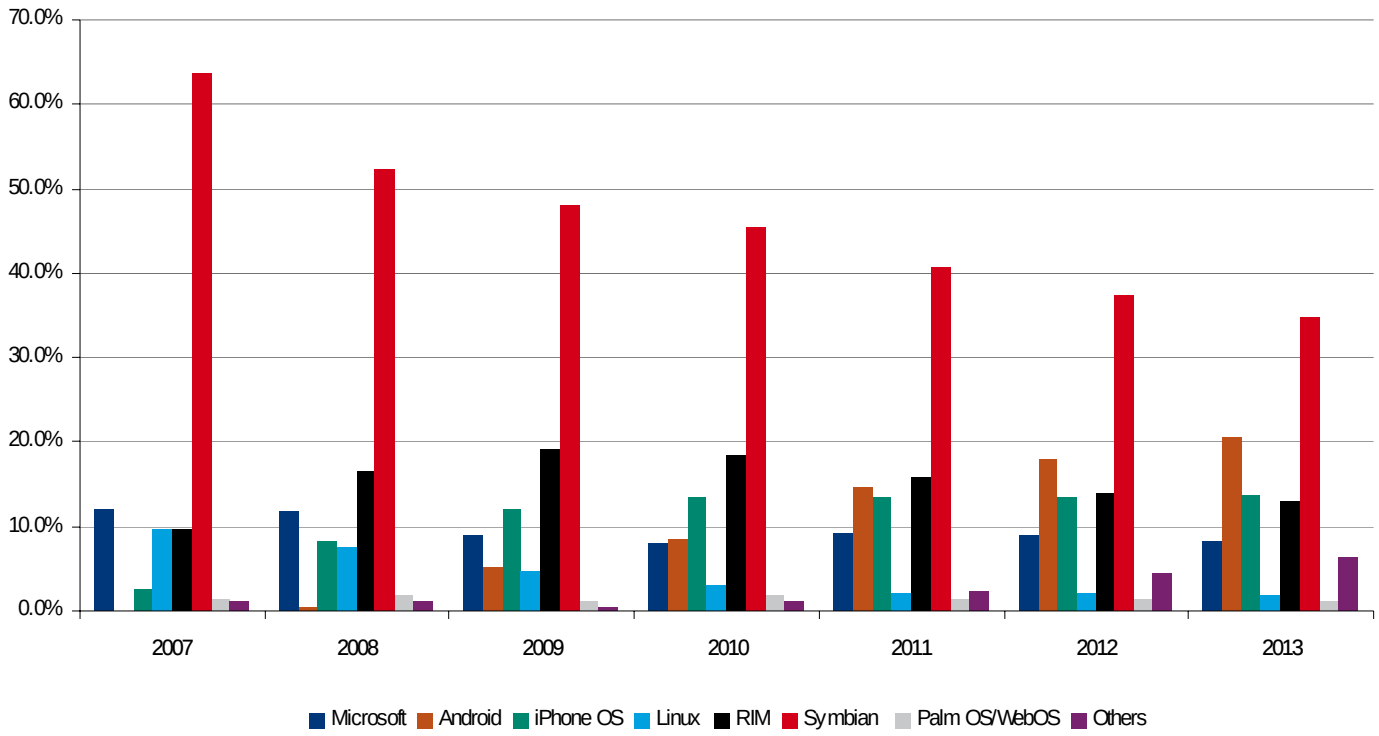
4. Microsoft catching up, but strategy lags

Microsoft's recently released Windows Mobile 6.5, incorporates a few upgrades to the previous version 6.1, such as Windows Marketplace, a revised Internet Explorer browser, and new 'Today', 'Start' screens. However Microsoft said it is keeping the majority of the key changes for the upcoming version 7.

Contributed by US Software analyst Kash Rangan

Gartner estimates that Microsoft is likely to maintain its share in the mobile OS market going forward while gains by Android will come mostly at the expense of Symbian. We remain skeptical, and note that Microsoft has been losing share over the last few years.

Chart 9: Gartner expects Android to gain up to 20% mobile OS market share by 2013, and sees Symbian as the main share loser. MSFT is expected to be able to maintain its share at high single digits after some erosion.



Source: Gartner (Sep 2009)

Trying to monetize the operating system introduces limitations

At the high level, we see stark differences between the strategies of Microsoft and Google. While Google provides the OS for free, aiming to move all services to the Cloud and trying to monetize via ad revenues and user information, Microsoft has tried to replicate its PC model and charge $15 - $20 license fee for a copy of its operating system.

However, in an environment of shrinking profits, Windows Mobile puts a drag on the already low operating margins of smartphones vendors. For illustration, assuming a positive scenario, where a vendor sells a device for $300, making 10% margin, Microsoft's charge would eat up 50% to 65% of this profit.

With the advent of Google's Android mobile operating system, handset developers now have a viable free and feature rich alternative for consumer smartphones. In addition, Android has proved it could quickly release to market software upgrades that pack more features requested by handset manufacturers.

MSFT's effort to overlay a desktop style OS on mobile phones has also led to bulky software which requires high end CPUs/GPUs for optimized performance, and in turn lead to a drain on battery life.

Could Microsoft improve position?

Though little official detail is available regarding the feature set in WinMo 7, we anticipate improvements to focus on the consumer with enhancements to the user interface (motion sensitive which supports gestures and multi-touch), Zune features, better integration with Windows Marketplace and Silverlight support.

Additionally, with the upcoming Mobile Office 2010, MSFT will likely leverage its Windows Live Cloud service to facilitate synchronization with email, contacts, and calendar data which is stored in the Cloud.

However, while these features can help narrow the user experience gap between Windows Mobile and smartphones like the iPhone and may attract more developers, we believe that further changes to MSFT's mobile strategy may be required to boost adoption by handset manufacturers. In our view, MSFT has thus far fallen short in two key areas – (i) in developing a successful value chain including handset manufacturers and network providers around WinMo (this however may require the adoption of a different business model), and (2) in utilizing its developer community to create an application ecosystem to support WinMo.

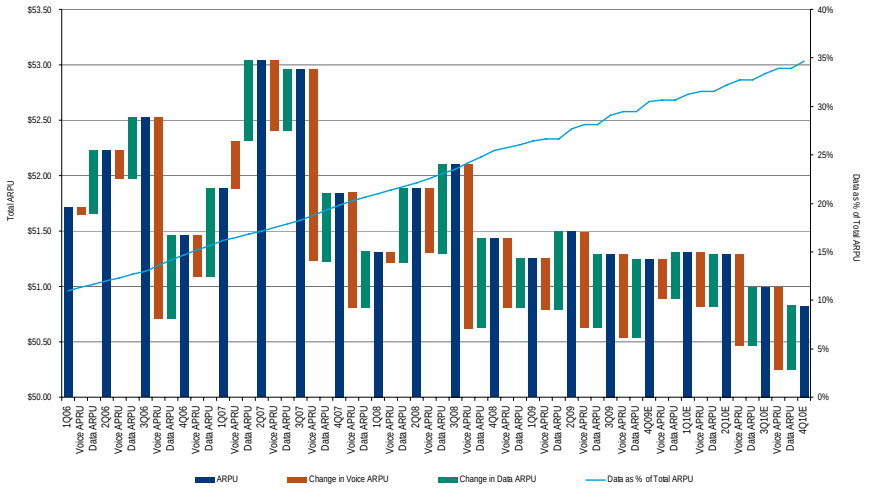
On the positive side, should the company change its mobile business model, it has an opportunity to capitalize on its existing relationships with handset makers and potentially reverse recent share losses.

5. The carriers' perspective

Investors and carriers have broadly accepted the smartphone trade-off: higher subsidy costs, explosive data traffic growth and much less control over data applications -- in return for higher data revenues and higher-quality customers. It is more than just an opportunity, however, it is becoming a necessity as saturating subscriber penetration slows subscriber growth and competitive and economic pressures erode voice pricing. In fact, in the US, despite a rapid rise in the prominence of data revenue, overall industry ARPU has not grown substantially in years.

Contributed by BAML Telecom analysts
Glen Campbell and David Barden

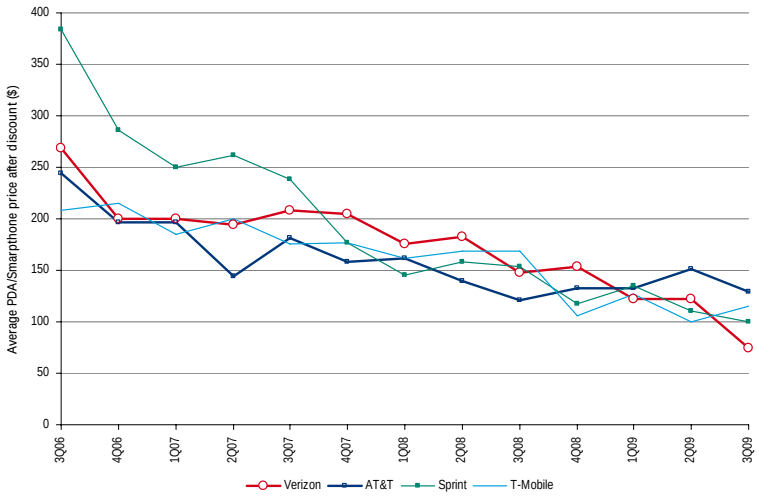
Chart 10: Top 4 providers ARPU decomposition



Source: BofA-Merrill Lynch Global Research estimates, company reports

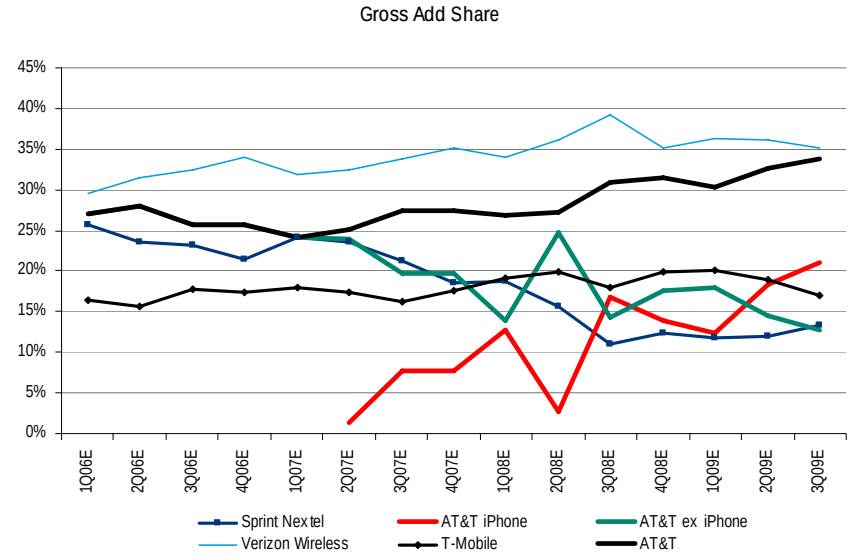
In our view, 2009 was the "year of proof" for smartphones, and for the iPhone in particular, when returns on incremental subsidy investment went positive. US market results show this well, with a widening gap on pricing and performance between carriers at the high and low ends of the market. Verizon's wireless results were solid, and AT&T's even better, in a market hard-hit by recession and price competition.

Chart 11: Average PDA/Smartphone price after discount



Source: BofA-Merrill Lynch Global Research estimates, company reports

Chart 12: The iPhone has driven AT&T's gross add share resurgence



Source: BofA-Merrill Lynch Global Research estimates, company reports

What to expect in 2010

We see 2010 as a year of broader smartphone vendor competition -- a positive development for carriers. Android is the new kid on the block, with a PC-like multi-vendor business model -- enhanced (from the carrier perspective) by a free OS. ASP's on Android smartphones are already substantially below iPhone ASPs, with the potential to drop much further. By late 2010 or early 2011, we expect Android ASPs to be less than half that of the iPhone. As a result, we expect that average smartphone subsidies will drop.

Data revenue growth should remain robust, driven by penetration gains not just for smartphones and data cards -- but also by the mix shift within these segments: more smartphones with 3G radios, screens and useful browsers; more data cards with true 3G and 3.5G capabilities. North American data revenue growth also continues to benefit from rising usage of SMS, and we expect that this trend will continue for the next 1-2 years.

But investors need to watch the math carefully. Lower average smartphone subsidies does not imply lower subsidies in total. We expect that smartphones will comprise a growing proportion of total device sales, and it is quite possible that upgrade and replacement cycles will shorten further.

Service pricing will evolve

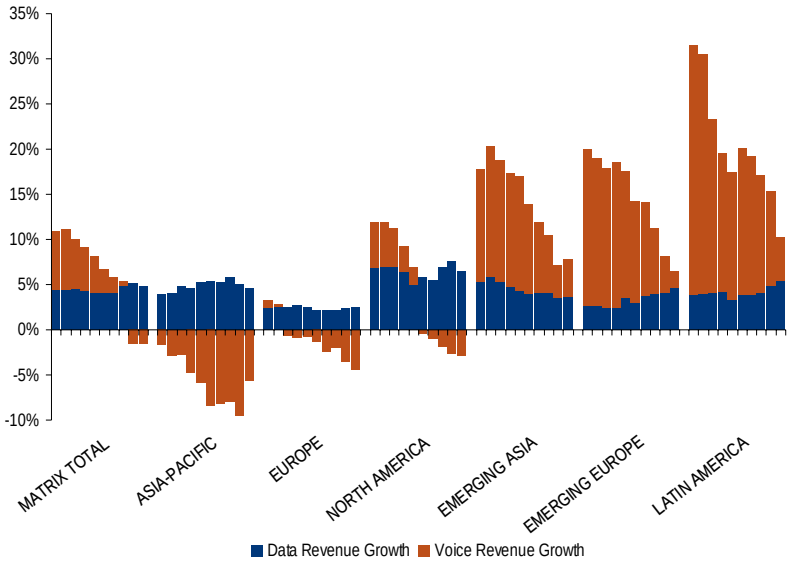
We believe that carrier service pricing will evolve so that the benefits of lower subsidies are shared with customers. If they don't, what incentive will there be for smartphone customers to diversify away from high-end iPhones and BlackBerrys that carry low retail price points? Likely changes include lower eligibility levels for hardware purchases and upgrades and tiered data plans tied to usage.

We expect more unbundling of hardware and service. This trend is well established in emerging markets, in Europe (via SIM-only offerings) and in the "value" segment of the US market. The result: lower ARPU, higher margins, and a slower handset replacement cycle.

We expect to see a drift toward tiered, usage-based data pricing, not only to define eligibility for subsidies, but also to manage mobile data traffic levels and properly segment a growing market for mobile broadband. Extrapolating static service pricing across a growing base of more deeply penetrated smartphones may prove optimistic as carriers may need to tier pricing to coax incremental data spending from the newest customers. Potentially offsetting this may be further upselling the hungriest users to ever-larger, more expensive consumption tiers.

Mobile data traffic is surging under the combined pressures of penetration growth and usage growth, in both the smartphone and data card segments. AT&T, for example, has seen an 18-fold increase in its mobile data traffic load in the two and a half years since the iPhone was introduced. Many carriers around the world are seeing 100%-plus mobile data traffic growth. In leading mobile broadband markets around the world, we estimate that per capita usage is now passing 100MB/month – and still rising rapidly. In our view, only usage-based pricing (or similar economic incentives) can contain this growth so as to maintain good network performance and carrier economics. The politics of such a move may impact, and be impacted by, ongoing net neutrality regulatory consideration in the US.

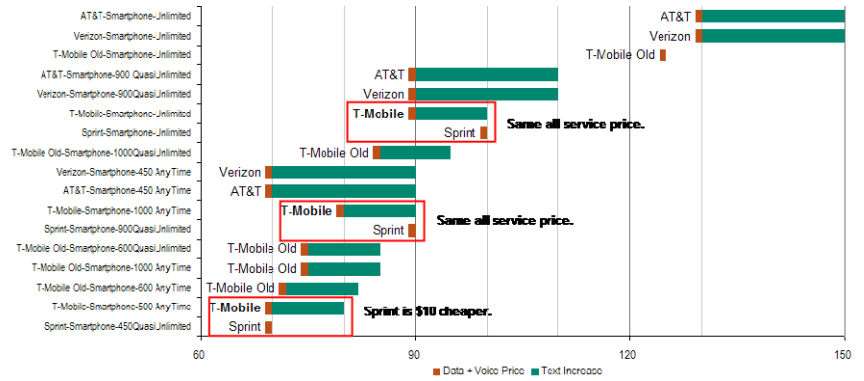
Chart 13: Data revenue growth (1Q07 – 2Q09)



Source: BofA-Merrill Lynch Global Research estimates, company reports

Disparate usage levels also argue for tiered price points on mobile data services. A typical business BlackBerry user consumes 10MB/month; consumer iPhone users typically use more than 20X this amount. Likewise we are seeing usage differences of 5X to 10X between data sticks and cards that are used for travel and those that are fixed broadband substitutes.

Chart 14: AT&T and VZ maintain premium pricing, presumably to gate consumption while laggards Sprint and T-Mobile are 'priming the pump' with sharply lower service pricing



Source: Engadget.com, BoyGeniusReport.com, Tmonews.com, Company marketing materials.

Will carriers reduce cost structure?

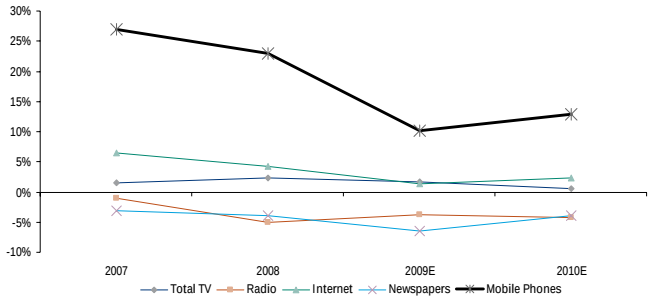
We expect that developed country carrier business models will shift to more closely resemble those of emerging market carriers, which have been more finely honed in response to affordability constraints. In a recession year, cost cutting has already been an important carrier focus; in 2010, we expect to see more business re-engineering aimed at long-term cost reduction: rate plan simplification, shortening handset line-ups, rationalizing distribution and so on. We expect that more carriers will abandon their aspirations to be app stores and mobile content providers.

6. mCommerce growing to $12bn by 2013

Contributed by US Internet analyst, Justin Post

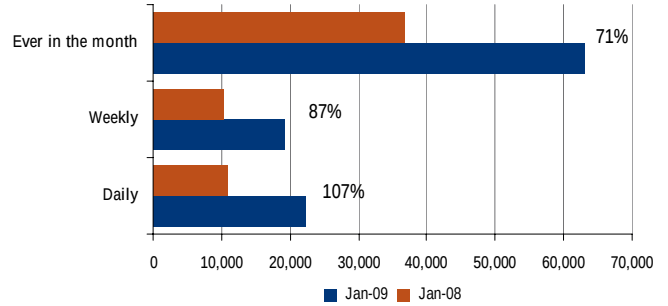
Empirical data shows that the time spent with mobile devices is growing at 4x the rate as with other forms of media including Internet, Radio, and TV. Data also shows that mobile internet usage is increasing and that accessing the internet via a mobile device is becoming a more frequent activity. comScore estimates the number of mobile subscribers that accessed the internet from a mobile device in January 2009 was up 71% y/y to 63mn, representing roughly 22% of the 300mn US installed base of mobile devices. In addition, comScore estimates the number of mobile subscribers that accessed the internet from a mobile device at least daily more than doubled y/y in January 2009 to 23mn.

Chart 15: Y/Y Change in Average Hourly Consumption



Source: BofA Merrill Lynch Global Research Global Researchs, VSS, comScore,

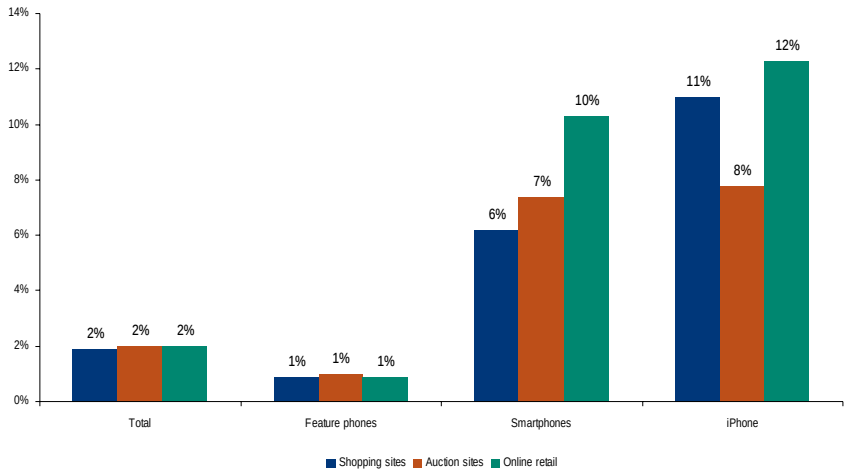
Chart 16: Frequency of Mobile Internet Access in the US (Users in 000s)



Source: comScore M:Metrics, Three-month Average Ending January 2008 and January 2009

With capable Web browsers, online mobile activities are not just texting and ringtones, and there appears to be a much higher monetization potential for eCommerce, and by extension, advertising. ComScore data shows that iPhone and Smartphones have approximately 10x and 6x more reach, respectively for eCommerce and auction sites among mobile phone users than non-smartphones.

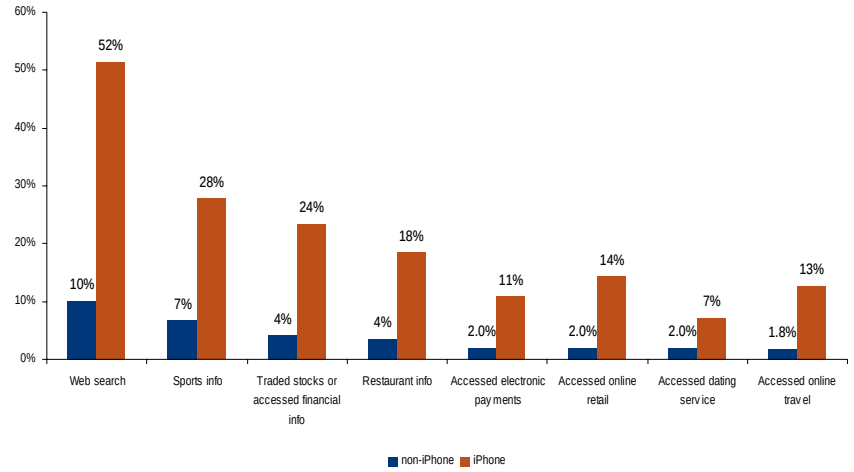
Chart 17: Smartphones, particularly the iPhone, have much higher eCommerce reach



Source: comScore MobiLens, US, 3-month average ending August '09

We are seeing evidence that increasing mobile browsing activity will spur the entire Internet ecosystem. The following table highlights increased activity for search, eCommerce, payments, travel services, online financial services, subscription services and even restaurant information, which should all spur greater advertiser demand for branding reach on mobile devices.

Chart 18: iPhone reach across online services is more than 5x non-iPhone reach



Source: comScore

The Mobile monetization opportunity is big

Mobile Internet monetization, like Internet monetization, will likely come from two sources: advertising and commerce. Like the Internet, these two methods of monetization are linked, but not completely. Commerce-related advertising is the easiest to justify and like search on the Internet, will likely be a major driver of mobile advertising. Brand advertising, however, is driven by large sophisticated advertisers and may come on much faster than search as large advertisers allocate small portions of their budget to new forms of media. Although these experimental budgets are small compared to TV or other large media, a small portion of Nike's or Coca-Cola's ad spend would be substantial compared to the estimated $416mn (eMarketer estimate from September 2009) in mobile advertising spend in 2009.

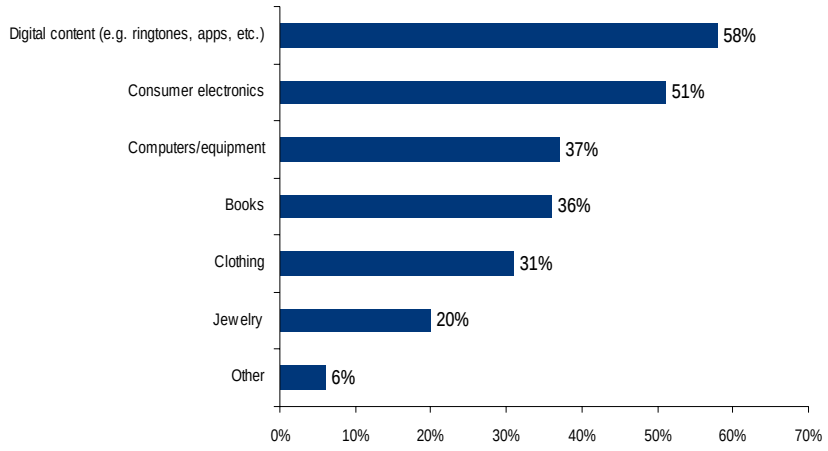
Estimating the mobile commerce (or mCommerce) opportunity is challenging, and estimates are quickly changing. For example: ABI Research predicted last year that there would $544mn in mobile commerce in US in 2009, but in the first nine months of 2009, eBay has generated $380mn in gross merchandise value from its iPhone application alone and should easily top $500mn by year end. More recent estimates (eMarketer), point to around $1bn in mobile commerce this year, and even this higher estimate is likely missing many of the uniquely mCommerce applications (e.g. restaurant reservations, movie tickets, etc.) and focusing on digital content (e.g. ringtones) and traditional eCommerce purchases (consumer electronics).

A possible method to estimate the mCommerce opportunity would be to look to Japan where mobile device usage, primarily feature phones, is more advanced than the US. Japan's largest eCommerce company Rakuten generated roughly 16% of its 2008 revenue from mobile devices, growing at approximately 40% y/y, twice the rate of the company as a whole. Using Rakuten's mobile usage in Japan as a baseline, the US mCommerce opportunity in 2012 would be $33bn, an unlikely number given 2009 estimates of only $1bn. This argument, however, is likely specious because to date, Japan has seen limited eCommerce penetration relative to the US (example: Rakuten's eCommerce revenue in 2008 was approximately 1/11th of Amazon's US revenue) allowing for digital content to

be a bigger slice of the pie. Also, Japan's mCommerce arose without the iPhone and other highly Internet-enabled smartphones, therefore, comparisons are probably unwarranted.

The iPhone and other full Internet access smartphones have changed the game for online commerce over a mobile device. It is not surprising to think that users would buy digital content over their phones, and carriers have done well selling ringtones to feature phone users for years. It is, however, somewhat surprising to learn that according to a PriceGrabber study, nearly as many users of Web-enabled smartphones purchased consumer electronics through their mobile devices as have purchased digital content. Despite the small screen size, consumers are already transacting through their iPhones, and we expect this trend to continue as device ease of use and mobile Web access speeds increase, much in the same way that improving online purchasing experience and increased broadband adoption spurred the growth of computer-based eCommerce.

Chart 19: Web-enabled smartphone users who have purchased in the last 12 months



Source: PriceGrabber.com survey

According to this PriceGrabber study, mCommerce is likely cannibalizing eCommerce right now, with smartphone users purchasing everything from clothing to electronics from their iPhones. Longer term, however, we believe mCommerce and eCommerce will largely bifurcate, addressing different purchasing behaviors, with mobile devices being used primarily for local, time-sensitive, and digital content (e.g. reservations) while users return to PCs for larger more information intensive, considered purchases (e.g. big screen TVs). Given relative small size of the mCommerce market (see estimates below) any cannibalization of PC-based eCommerce will be minimal for the foreseeable future.

Estimating $12bn in mCommerce by 2013

Based on available data and various industry estimates, we are estimating $1.3bn in US and European mCommerce in 2009 compared to $325bn in eCommerce (ex. travel). This estimate does not reflect all eCommerce related applications (like restaurant reservations, contribution to dating subscription sites), but does include auction and eCommerce sales. We think our estimates will prove to be conservative given that there will be roughly $655 in eCommerce sales per PC in 2009 vs. only $30 estimate for mobile. By 2013 the mobile platform should have applications that make mobile buying experience as easy as the PC.

Table 7: US/Europe Mobile Commerce (mCommerce) Revenue (Smart-phones only)

	2008	2009E	2010E	2011E	2012E	2013E
US Smartphone Subscribers	43.8	60.7	81.5	99.1	141.1	171.0
W. Europe Smartphone Subscribers	73.0	98.6	130.6	151.7	208.3	245.0
Installed Base (millions)	116.8	159.3	212.1	250.8	349.4	416.0
mCommerce Per Phone	$4	$8	$12	$20	$23	$30
% of PC	0.6%	1.2%	1.5%	2.5%	2.8%	3.5%
Total Revenues (millions)	$493	$1,346	$2,439	$5,016	$8,035	$12,272
% y/y Growth		173%	81%	106%	60%	53%
% of eCommerce	0.2%	0.4%	0.7%	1.2%	1.7%	2.5%

Source: Banc of America - Merrill Lynch, IDC

Google: EPS opportunity starting to add up

We see mobile search as a significant opportunity that will grow with retail eCommerce, subscription services, local product/services look up, applications downloads and travel spending on mobile devices. Search will be driven by the smartphone installed base; increased usage of search to aid in smartphone Web browsing and increased advertiser demand for search placement given mobile eCommerce growth. Based on our estimates of the smart-phone installed base, mobile search activity and revenue per search, we estimate the mobile search market for the US and Europe could reach $3bn by 2012.

The Smartphone is the enabler of search activity

By 2012, we estimate the number of smart-phone devices shipped worldwide will reach 352mn, up from 152mn in 2008. We view the Smart-phone installed base as the only real addressable market for mobile search, as legacy mobile devices provide limited search usage relative to smartphones.

Table 8: Smartphone shipment forecasts. Expect market to be 352mn units by 2012.

MM units	2006	2007	2008	2009E	2010E	2011E	2012E
Total Handsets	1,020	1,176	1,228	1,153	1,300	1,400	1493
Traditional phones, Feature phones	938	1,052	1,077	972	1,068	1,116	1141
Smartphones	82	124	152	181	232	284	352
Smartphones YoY	45%	52%	22%	19%	28%	23%	24%
Smartphone Mix	6.6%	8.6%	10.0%	12.6%	14.5%	16.2%	24%

Source: IDC' BofA-ML Estimates.

Search activity on mobile could trend toward PC usage

We looked at the PC Web search market in the US for an indication of what mobile search activity could look like in a more mature state. Using data from various sources, we estimate that the PC search industry generated roughly $48 per PC in 2009, on an installed base of 237mn units. We estimate there were 681 searches conducted per PC and that each search generated about $0.07 in revenue to the industry. We anticipate that search revenues per PC will increase to $63 by 2012, with Google capturing $42 based on current search market share trends.

Table 9: US PC Search Revenue

	2008	2009E	2010E	2011E	2012E
US PC Installed Base (mn)	234	237	239	245	250
US Paid Search Revenue (mn)	$10,546	$11,296	$13,007	$14,698	$15,727
US Searches (mn)	136,838	161,469	179,230	193,569	205,183
Rev/PC	$45	$48	$54	$60	$63
Searches/PC	585	681	749	790	821
Rev/Search	$0.08	$0.07	$0.07	$0.08	$0.08

Source: IDC, comScore, IAB and BofA Merrill Lynch Global Research Global Researchs

Table 10: Google's Share of US PC Search Revenue

	2008	2009E	2010E	2011E	2012E
Google Net US Search Revenue (mn)	$7,419	$7,849	$9,552	$9,553	$10,400
Google US Searches (mn)	84,592	101,725	114,707	125,820	135,421
Rev/PC	$32	$33	$40	$39	$42
Searches/PC	362	429	479	513	542
Rev/Search	$0.09	$0.08	$0.08	$0.08	$0.08
Share of Searches	62%	63%	64%	65%	66%

Source: IDC, comScore, IAB and BofA Merrill Lynch Global Research Global Researchs

We then took the smartphone installed base and assumed a 70% discount in searches per device relative to the PC by 2012, and a 45% discount in revenue per search versus the PC, to account for the more early stage of the mobile advertising market (even in 2012). Using these assumptions, we estimate the mobile search market at $3.0bn in 2012. Google has said that mobile clicks could return a higher value than PC clicks, and our estimates may be conservative.

For conservatism, we only used the smartphone installed base in the US and Europe for our mobile search market projections, as the search advertiser base in these markets is more established. Longer term, the search market in Asia may be as large as Europe, but Google's market share outlook there is less certain.

Table 11: US/Europe Mobile Search Revenue (smartphones only)

	2008	2009E	2010E	2011E	2012E
US Smartphone Subscribers	44	61	81	99	141
W. Europe Smartphone Subscribers	73	99	131	152	208
Installed Base US/Europe(millions)	117	159	212	251	349
Searches Per Phone	60	100	150	200	250
% of PC	10%	15%	20%	25%	30%
Revenue Per Search	$0.01	$0.01	$0.02	$0.03	$0.03
% of PC	13%	19%	32%	43%	45%
Total Revenues (millions)	$70	$207	$732	$1,655	$2,987

Source: BofA Merrill Lynch Global Research Global Researchs, IDC

To sanity check our mobile search revenue ramp expectations, we compared our estimates versus the trajectory for PC search revenues in the US from 2000-2004. In the early years our estimated ramp is comparable, although our out year ramp is slightly higher which reflects our view that the established PC search advertising market will help pave the way for the mobile market.

Table 12: PC vs. Mobile search ramp

	Year 1	Year 2	Year 3	Year 4	Year 5
Mobile Search (2008-2012)	$70	$207	$732	$1,655	$2,987
US PC Search (2000-2004)	$113	$300	$901	$2,543	$3,850

Source: BofA Merrill Lynch Global Research Global Researchs, IDC, IAB

$1.65 EPS opportunity for Google in 2012

Google has a leading advertiser base, the most established brand in search, and is a pioneer in mobile technology with Android and, therefore, we expect it to have leading share in mobile markets. Assuming that Google can capture 60% search market share on mobile devices and can keep an 80% revenue share of advertising from Google mobile searches, we estimate that Google could

generate $1.4bn in search revenues in 2012. We assume that since users will naturally want to use Google, this would limit the need to sign expensive distribution agreements for pre-loaded search links. Applying a 50% incremental operating margin to mobile search revenues and a 25% tax rate, we estimate a $1.65 EPS opportunity by 2012, about 4% upside to current street estimates.

Table 13: Google's Mobile Search Market Opportunity

	2008	2009E	2010E	2011E	2012E
Total US/Eur Mobile Revenue	$70	$207	$732	$1,655	$2,987
Google Share of Searches	57%	59%	60%	60%	60%
Google Revenue Share % (share of search x rev share)	80%	80%	80%	80%	80%
Google Revenues	$32	$98	$351	$793	$1,431
Incremental Margins	50%	50%	50%	50%	50%
Tax Rate	25%	25%	25%	25%	25%
Net EPS	$0.04	$0.11	$0.40	$0.92	$1.65

Source: BofA Merrill Lynch Global Research Global Researchs

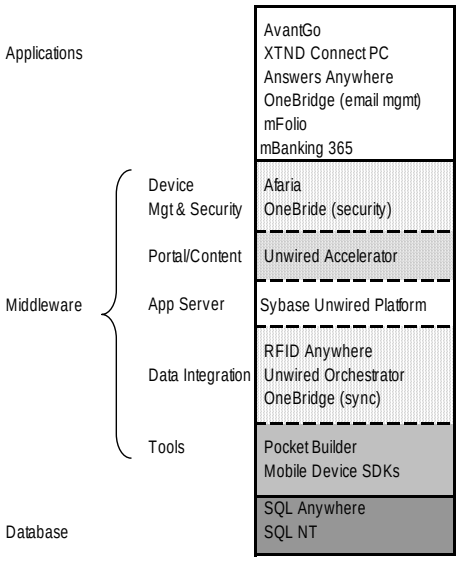
Sybase: a play on enterprise mobility

Contributed by BAML analyst Mitesh Dhruv

We are intrigued by Sybase foray in the mobility market. The company was early in spotting the trend toward mobile applications and commerce as the next secular trend following e-commerce and diverted investments in that direction. Sybase's combined mobile and messaging segments account for about 30% of total revenue and about 22% of operating profit. We expect these segments to grow at an average rate of 10% for CY10.

Through significant internal investments coupled with half a dozen strategic acquisitions, Sybase has built a stack of mobile and embedded database products, mobile middleware, mobile device management, and specific mobility applications. The mobile middleware and device management market is projected to reach $2bn in 2013, up from $1.1bn in 2008 (12% CAGR). Sybase is the #1 player in both these markets, except for the corporate email segment, where RIM is still the dominant player.

Chart 20: Sybase has built a comprehensive stack of mobile software products



Source: BofA Merrill Lynch Global Research Global Research; Sybase

Use cases reflect today's truly mobile environment

With its embedded database, Sybase is helping customers create a free flow of information, particularly for employees on the road. This lets people access information on any device from any location. Customers use Sybase's middleware platform to deliver email and to mobilize other applications like sales force automation, inventory management, ERP etc. Finally, Sybase's mobile device management software serves various functions like user authentication and password protection, device tracking, and installation of security software and upgrade patches.

The acceleration in the types of apps to be mobilized, the variety of mobile devices, and the lack of a dominant mobile operating system play into Sybase's hands. Sybase's key differentiation is its support for heterogeneous mobile environments such as RIM, Android, Windows, Apple, and Symbian and its device independence. The company also made good progress adding partners like Accenture, Samsung, SAP, RIM, and more recently Verizon (targeting the SMB space).

Leveraged to fast growing mobile messaging market

Sybase's key differentiation is its support for heterogeneous mobile environments such as RIM, Android, Windows, Apple, and Symbian.

In addition to the above markets, Sybase has also entered the inter-carrier messaging market in 2006, via its Mobile 365 acquisition. Sybase has a #1 position with approximately 40-50% share (per management estimates) of the inter-carrier messaging market and serves as a hub or a platform for inter-network messaging to about 800 carriers worldwide. For example, if a T-Mobile cell phone user sends a message to a Verizon user, the message is routed through the Sybase hub. Sybase is currently processing messages at a run rate of 365bn messages/year, up from 200bn in 2008 (+82% y/y growth). Sybase 365 is also used for enterprise content delivery solutions. For example, Citibank uses it to send banking alerts or alerts for new products.

We note however that the growth in messages does not translate into revenue at the same rate. The inter-network segment faces pricing pressure as a lot of the carriers, especially in the US, demand a flat-fee messaging pricing. Moreover, majority of the 800 carriers are outside the US, a lot of them being regional carriers. This creates pricing pressure as regional carriers don't appreciate the breadth of coverage supported by Sybase since they are mainly concerned with messages only within their network.

On the other hand, Enterprise Content delivery seems to be growing in certain verticals, such as mobile banking (account balance, alerts) and airline (flight status). We could see similar trends also in other verticals, as corporates adopt mobile messaging to reach out to their consumers.

7. The semiconductor battles

Baseband market to further consolidate, new entrants primary beneficiaries

Contributed by US Semiconductor analyst Sumit Dhanda

Much of the shake-up that has occurred in the past few months in the baseband market can be attributed to Nokia's decision in 2007 to use a multi-source strategy for its baseband and abandon its internal custom ASIC baseband development. This has since led to the selection of Broadcom, STMicroelectronics, Infineon and Qualcomm as additional baseband suppliers over TI (Nokia's long-time ASIC supplier). We think this as the beginning of a profound change of competitive landscape in the baseband market, which culminated with TI's announcement in 2009 of its intention to exit the baseband business by 2011/12 following a similar decision by its closest competitor Freescale in 2008.

Brief discussion of market share dynamics

The exit of Freescale and TI has left the baseband market concentrated around six vendors: Qualcomm, Mediatek, Infineon, Marvell, ST-Ericsson and Broadcom. While we expect Qualcomm to further consolidate its high market share (through an increased presence at Motorola, share gains at Nokia), we believe that emerging vendors, namely Broadcom and Mediatek will likely be the primary beneficiaries over the next two years given their relatively faster growth prospects vs. more established baseband vendors.

Specifically, we expect Broadcom to emerge as the fastest growing supplier in the baseband market over the next 2 years as a result of the ramp of its design wins at Samsung (for EDGE and 3G platforms, both currently underway), as well as the ramp at Nokia for EDGE (underway now) and 3G platforms (likely to occur in 2011/2012). While it is hard to speculate on the potential success of these design wins, our belief is that these design wins at Samsung and Nokia are for high volume sockets. This, we believe, will help Broadcom significantly expand its baseband revenue from its current annual run-rate of $350-400m to a potential run-rate close to $700-800m exiting 2011.

We believe that Mediatek's strategy of focusing on turn-key solutions for the Chinese market (including both branded and grey markets) will continue to help the company capture much of the fast growth of the Chinese market (especially now that Mediatek has struck a licensing agreement with Qualcomm that includes W-CDMA and CDMA patents) and in turn, maintain its stronghold of the local Chinese handset market (we estimate that Mediatek controls ~30% of the Chinese cell phone market). As some OEMs, like Motorola, increase their use of Taiwanese ODMs for complete solutions (mostly low-end), Mediatek is likely to grow share via existing relationships. That said we are unclear about Mediatek's prospects in penetrating the top five handset OEMs via direct sales.

We expect ST-Ericsson (JV between STMicroelectronics and Ericsson and the combination of NXP, Ericsson Mobile Platform and Silicon Labs) to play an important role going forward given its sheer size ($2.8b in annualized wireless sales as of 3Q09) and its strong presence at Samsung, LG and Sony-Ericsson in basebands, along with its status as a second source supplier at Nokia in future 3G platforms (which is likely start to ramp in 2011), as well as its current status as a second source apps-processor supplier to Nokia (with the Nomadik platform). However, we see limited room for Infineon to gain significant scale in high-end handsets outside of Apple (100% share), LG and Samsung (an account that it shares with Qualcomm, BRCM and ST-Ericsson) given its more modest product

lineup in basebands along with the lack of a significant presence in connectivity and application processors. The company has made good progress in low-end solutions at Nokia, selling GSM/GPRS products today and ramping EDGE solutions in 2010. We expect Infineon to remain a viable third supplier in basebands at least as long as it maintains its revenue stream at Samsung, LG and Apple.

Table 14: Worldwide Discrete Baseband Vendor Revenue and Market Share

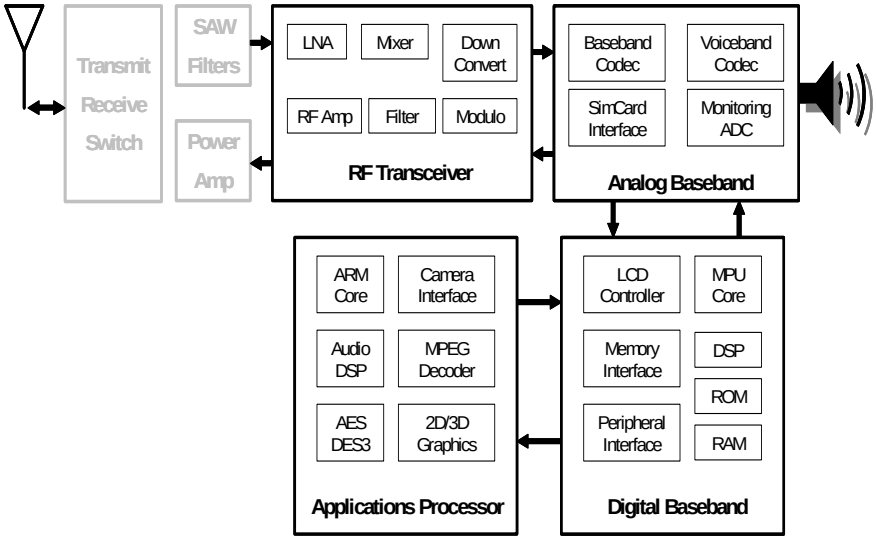
	2007		2008	
	Revenue ($M)	Share (%)	Revenue ($M)	Share (%)
Qualcomm	$2,775	30%	$2,956	34%
Texas Instruments	$2,719	29%	$2,226	25%
Mediatek	$974	10%	$1,016	12%
Infineon	$600	6%	$712	8%
Freescale	$680	7%	$602	7%
NXP	$448	5%	$356	4%
ST Micro	$8	0%	$176	2%
Others	$1,139	12%	$728	8%

Source: IDC

Wireless handset ICs: Components demystified

The following section is somewhat technical and we would therefore like to first describe the basic semiconductor content of a typical handset. The radio receives the wireless analog signal from the antenna and passes it to the baseband for processing according to the interface standard (WCDMA, CDMA, GSM, etc). The digital signal is then converted into an audio signal by the analog baseband and sent to the speaker (on the receive side; on the transmit side the reverse sequence takes place). In addition there is often an application processor which offloads specialized programs, such as productivity and multimedia functions (display, audio, etc.) from the digital baseband.

Figure 1: Wireless Handset Block Diagram



Source: BofA Merrill Lynch Global Research

Radio (RF) Front End

The Radio Block, also called the front-end, is responsible for processing the analog radio waves captured by the antenna into digital signals to be processed by the baseband processor. It consists of two stages: (1) **Power amplifier (PA),** which sits next to the antenna and boosts the analog radio signal's strength. (2) **The RF/ IF transceiver** receives (or generates) the high-frequency analog radio waves and translates them into low-frequency signals which are then converted into a digital stream.

Digital Baseband Processor

The digital baseband, includes a general purpose microprocessor (usually an ARM licensed design) and one or more digital signal processors (DSP). The baseband processes the digital signal from the RF transceiver by applying the multiplexing technique, which is either based on time division multiplexing (in GSM) or spread spectrum (in CDMA). Basically a digital baseband extracts the digital voice signals from the transmission protocol. We note that 3/3.5G basebands require more powerful DSPs compared to 2/2.5G due to the more complex multiplexing techniques.

Analog Baseband Processor

The analog baseband converts the digital voice signal into an analog signal, generating the audio signals going into the speaker. Analog processors tend to be integrated with the digital baseband in most handsets.

Application Processors (Multimedia Processors)

Application processors are embedded microprocessors capable of running all major mobile operating systems and programming languages. They are used to improve the overall system performance, such as accelerate MPEG decoding, image sensor processing, GPS calculations, etc.

Value shifting to application processors

While a rapid consolidation of the baseband market would lend credence to the view that basebands are increasingly being perceived as commoditized products by handset OEMs, we believe this view grossly underestimates the importance that the basebands hold in terms of driving the performance and power consumption of cell phones.

Furthermore, we believe this view also neglects the fact that basebands (being the primary logic engine of a cell phone) have a long and complex development process, including the design-in process (whether its a custom ASIC or merchant ASSP), and the qualification process (at carriers and handset OEMs, often across multiple O/S and standards) that is increasingly evolving alongside cellular standards (3G, 4G). If anything, we believe the emergence of newer wireless standards (such as 4G), coupled with the continued emphasis on reducing the power consumption and the form factor of cell phones (a trend that should favor highly integrated baseband products that feature graphics processors, peripherals, and connectivity capabilities) should add to the complexity of future baseband products, and thus reduce the risk of commoditization.

Discrete vs. integrated: which is better?

Handset vendors have the choice between integrated solutions, that incorporate both the baseband and apps-processor into a single die, or a discrete solution, where they buy a stand alone baseband and a stand alone application processor.

While we expect basebands to remain a significant part of the wireless semiconductor market, we believe that application processors are likely to become a more important area of innovation/R&D focus. In particular, the success of innovative products such as the Apple iPhone, coupled with the ever expanding demand for richer multimedia user experience in cell phones, has all but assured that more handset OEMs will likely focus much of the hardware innovation around apps processors (alongside connectivity, user interface and form factor) to provide competitive smartphone solutions.

The success of the iPhone has bolstered the case for adopting discrete apps processors, such as TI's OMAP and Marvell's PXA, in favor of integrated System-on-a-Chip SoC solutions with a dedicated on-board multimedia graphics processors integrated with the baseband modem, such as Qualcomm's.

In the intermediate term, we believe that discrete processors will continue to be the favored solution for smartphones vs. the integrated baseband-apps processor approach, given their ability to support richer multimedia user experience without compromising the overall performance and the power consumption of the platform. We explain that integrated basebands have to delicately balance the power constraints of the modem and apps-processor block, and could therefore introduce some performance limitations. In addition, the design/innovation cycle for discrete apps processors tends to be shorter and more frequent than that of basebands. Consequently, customizing apps processors to provide differentiated features with short time-to-market can dramatically impact the success of any given cell phone platforms. We note that recent high-end products that came to market, such as Motorola's DROID and Palm Pre use a discrete solutions, while lower end solutions, like Motorola's CLIQ and Palm's Pixi use Qualcomm's integrated solution.

Naturally, integrated baseband and apps processors tend to offer a lower overall cost with strong enough performance and multimedia experience, which we think will continue to favor these solutions in the mid-tier segment of the cell phone market. That said, integrated baseband/apps-processors vendors such as Qualcomm have dramatically improved the performance of their apps processors while leveraging Moore's Law. This in turn is likely to make them a compelling choice in upcoming generations of smartphones in the future years.

In the meantime, we expect the discrete apps processor market (an estimated $3b in 2008) to remain largely controlled by TI (20% share), Marvell (19% share), Renesas (9%) and Samsung (7%) over the next two years, although we expect the dynamics in this market to potentially undergo significant change with the entry of Intel with Medfield in 2011.

We believe that TI will be a net share gainer in apps processors in the near term given a compelling roadmap that is likely to facilitate TI's efforts to diversify away from its largest apps-processor customer Nokia. TI has won share at Palm, Samsung and Motorola Android based phones and has also struck a supplier agreement to provide apps-processors for Sony-Ericsson in coming years.

We believe that Marvell, which also has a compelling roadmap will score some share gains at the top five handset OEMs but will increasingly focus its efforts on Tier-II vendors. An example could be the Ophone in China where Marvell is partnering directly with local carrier China Unicom to enable smartphone-type of features in low cost platforms.

We believe that Broadcom (5% share) and ST-Ericsson (5%) will continue to gain share thanks to their increasing presence at Nokia. On the other hand, we see limited opportunities for Renesas to translate its success in the Japanese market into significant share gains in the mass market.

We are unclear about Samsung's potential success outside of its main customer Apple, which currently sources 100% of its apps processors from Samsung.

Nvidia: a strong newcomer

While not viewed as a credible supplier in the wireless handset market thus far, we believe that Nvidia's Tegra solution holds some promise in addressing the smartphone and Mobile Internet Devices (MID) segments. Tegra, which was introduced in 2008 and was the culmination of Nvidia's multi-year expertise in the discrete GPU segment of the PC market and its acquisition of PortalPlayer in 2007, is a SoC which integrates the CPU (ARM-11 core), an Nvidia based GPU, northbridge, southbridge, and memory controller into a single chip.

Tegra's strength is (not surprisingly) its GPUs, which offers 720p video encode/decode and HD 1080p video playback, and has a higher level of functionality vs. competing apps-processors. The power characteristics (an estimated 300 mW) against a frequency of 600-800 Mhz are in line with competing mainstream apps processor offerings. However the lack of O/S support outside of Windows Mobile/CE and Android could limit Nvidia's initial penetration in this market.

Nevertheless, one key advantage that Nvidia holds vs. competing solutions is that Nvidia leverages its high performance GPU technology into Tegra. Others, like Apple/Samsung, TI and Intel in Moorestown, license graphics accelerator cores from U.K based Imagination Technologies, and integrate them inside their apps processors.

Nvidia has spoken about being involved in nearly 50 projects across smartphones and MIDs that are expected to ramp beginning 1H10.

ARM vs. x86 (or… Intel getting ready to enter the market)

We believe that Intel is making credible progress in its strategy to re-address the cell phone market with x86 platforms as evidenced by the milestones achieved in Moorestown (45nm follow-on to Menlow) which is scheduled for production volumes in 2010).

We note that Intel has been able to reduce Moorestown's idle power by 50x (vs. Menlow which had standby power of 1.6 watts) and its board size by 2x (vs. Menlow's estimated size of 8.5 mm^2). In addition, Intel has made significant changes in the way it has approached the power consumption of its processor and SoCs through the repartitioning of silicon, both at the CPU and the platform level. This includes:

1. The integration of some components such as battery chargers, low drop out regulators, audio codecs and touch screen controllers, into a single piece of silicon.
2. Elimination of components not critical to the performance of smartphones (such as PCIx),
3. and the use of power optimized components such as low power DDR memory and accelerators for video decoding).

Further, Intel is also driving the development of a software ecosystem to support Atom and Moblin, Intel's own Linux based O/S for smartphones/MIDs and is also enabling OEMs/ODMs to bring in their own designs, develop specific applications and "customize" the software stack and hardware specs around Intel architecture - either with Intel or through the use of third party foundries such as TSM.

Importantly, Intel is taking advantage of a well developed set of mature technologies developed by other suppliers as evidenced by its announced partnership with TSM, and its recent relationship with Nokia and EMP on baseband technology. We believe the litmus test for Intel will be the ultimate success of Medfield (the 32nm follow-on to Moorestown, scheduled for production in 2011), as this SoC is likely to expand meaningfully on the progress achieved in Moorestown.

Intel's biggest challenges in our view in cracking the cell phone market is the fact that it is encumbered by its PC legacy and the lack of a standard O/S across cellular platforms. Notably, the issue is not whether Intel can deliver highly integrated SoCs with performance/power metrics competitive with those offered by ARM licensees. Rather, we believe it conceivable that cell phone OEMs will be reluctant to adopt Intel solutions for fear that Intel would dominate the cell phone market a la the PC world. We believe though that most would welcome a strong competitor to Qualcomm.

While the jury is still out with respect to Intel's ultimate success in the cell phone market, we believe that a potential catalyst for Intel could be the ongoing race among handset OEMs to break the stronghold that Apple and RIM have established in the smartphone market.

8. Mobile Payments: A Big (Long-Term) Opportunity/Threat

Contributed by US services analyst James Kissane

Given the nature of money, innovation in the payment system tends to move slowly. Back in the 1970s, pundits were predicting a cashless society. As recently as 2007, cash and checks still accounted for approximately 45% of personal consumer expenditures in the United States, the birthplace of the charge card. In addition, sometimes a normally functioning market does not dictate the course of evolution in the payments space, as entrenched leaders may thwart innovation to protect their position. That said, we envision a day when swiping plastic at the point of sale is as frowned upon as writing a check.

In emerging markets where the banking system developed more slowly, check writing never gained traction and plastic penetration is minimal, mobile payments innovation is starting to flourish. Given the high rates of penetration of mobile phones relative to traditional banking services, mobile commerce may become the standard in certain markets. Longer term, we expect mobile commerce to play an increasingly important role in developed economies as well. Factors contributing to the ramp over time will be the: ubiquitousness of mobile phones globally; investments in mobile technology, security and trust initiatives; growing suite of consumer and merchant mobile applications and the underlying economics.

In the wire transfer space, we have noticed progress, potentially expanding the market opportunity for new and existing vendors. In the credit/debit space, there is a myriad of mobile initiatives being led by traditional and non-traditional players. And progressive banks have been rolling out mobile banking apps.

Below we list some recently announced initiatives around mobile payments:

- Nokia Invests In Obopay
- MasterCard Partners with Obopay to Offer Industry-leading Person-to-Person Mobile Payment Service
- Visa expands m-payment services via Android, Nokia
- Vodafone, Safaricom, Western Union Partner for Mobile Transfers
- Bank of America Goes Mobile With iPhone Specific Website
- Fidelity National Information Services Announces New Triple Play Mobile Banking Offering
- Fiserv Launches All-in-One Mobile Banking
- IBM Making Payments a Reality Via RFID

Mobile Money Transfers

The global remittance market is made up of global transfer companies such as Western Union and MoneyGram, banks and financial institutions and old-fashioned physical cash transfer vehicles (hawalas, etc).

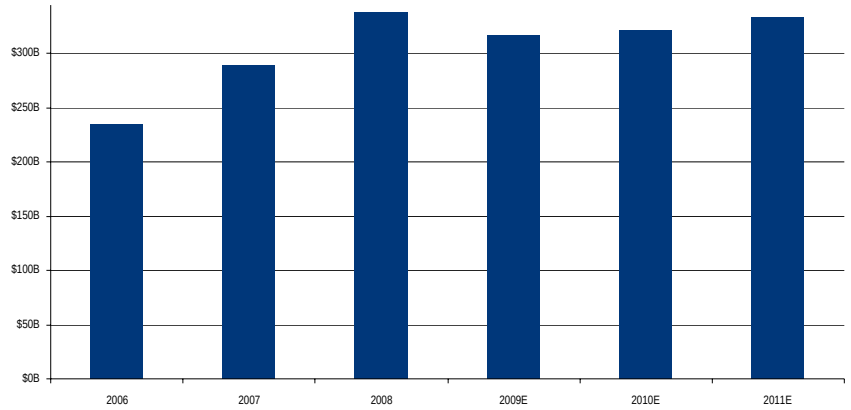
For transfer companies and banks the typical method of money transfer involves a wire transfer with the customer initiating the transaction at a branch/agent location. However, many developing countries lack infrastructure and branch networks, and mobile phones are therefore being viewed as a viable transfer medium.

While still in nascent stages (especially in developed economies such as the US) mobile money transfers may play an important role in the future of money remittance.

Global Remittance Market

According to the World Bank remittances flows to developing countries are expected to reach over $330 billion in 2011 (see Chart1). The market is highly fragmented and difficult to assess. To execute a traditional money transfer, it requires a send location (location where the customer is sending money from), a receive location (where the person being sent the money goes to pick it up), and importantly, a network to tie them together and settle the transaction.

Chart 21: Remittance flow to developing countries, 2006-2011



Source: World Bank

In many emerging markets the cost of developing an adequate branch/agent network is substantial. Furthermore, significant segments of the population are “unbanked” (do not have bank accounts). This makes it difficult to not only transfer money cross-border, but intra-country as well (intra-country is significant for large countries such as India, China, Russia, etc). One solution, at least for intra-country transfers, may be mobile phones.

The Groupe Speciale Mobile Association (GSMA) estimates that mobile networks now cover more than 80 percent of the world's population. Mobile is substantially more ubiquitous than ATM/branch locations and even land lines. The GSMA also forecasts that the ‘formal’ global remittance market could actually approach $1 trillion in five years with the help of mobile communications. The driving factor behind the accelerated growth is developing country expansion and market expansion led by lower transfer costs. While such growth estimates appear aggressive to us, the World Bank estimates that by reducing commission charges by 2-5%, the flow of ‘formal’ remittances would increase by 50-70%.

Mobile Transfers in Action

Phone operators in both Africa and Asia, supported by higher penetration of mobile phones relative to traditional banking services, recognized the opportunity and began to offer this new transfer service to their mobile subscribers.

The biggest success story to date is the M-PESA money transfer service created in 2007 by Safaricom, a Vodafone affiliate, in Kenya. Safaricom offers M-PESA intra-country mobile transfer service to almost half of its total 18 million mobile users.

Safaricom customers are encouraged to sign up for the M-PESA service at one of 11,000+ authorized agent locations (typically a merchant storefront). Agents allow customers to deposit/withdraw money in their M-PESA account and to transact business virtually from their phones. Customer funds are held in a non-interest bearing trust account at the Commercial Bank of Africa. Subscribers can transfer money to other mobile users, pay bills, replenish air time, etc. via the M-PESA application on their phone. Safaricom is compensated on a per transaction/total principal sent basis. Since M-PESA's launch in 2007, over $3B have been transferred via the service.

Carriers in China are working with banks and intermediaries to make mobile payment easier. Currently in selected Chinese markets, small amount transactions such as subway and movie tickets, vending machine payments can be made by China Mobile handset users. However for large amount transactions, there are no reliable solutions yet.

While most of this success has been witnessed through intra-country money transfers, the cross-border market is also developing. Cross-border transfers present additional hurdles, reflecting local banking rules and cross-border remittance regulations (e.g. Patriot Act and global Money Laundering regulations). However, we believe companies with solid compliance infrastructure are positioned to tackle the mobile cross-border money transfer opportunity.

After a successful pilot program launched in December 2008 Western Union, Vodafone, and M-PESA reached an agreement that allows money transfers between the UK and Kenya (cross-border). WU also reached an agreement with phone operator Zain, to expand its mobile transfer services throughout Africa and the Middle East.

Nokia has also announced the launch of its mobile payment service, Nokia Money, slated to debut in Africa and Asia in early 2010.

Mobile Banking and Payments in Developed Markets

While mobile money movement in developed countries such as the US seems to be progressing slowly, mobile payments innovations are starting to come to market at a more rapid rate.

In the US, larger banks are increasingly launching mobile payment applications. Examples include Bank of America and Wells Fargo iPhone applications that are available for free download from Apple. Larger financial institutions are increasingly focusing on mobile banking applications as part of improving the customer experience, and perhaps reducing physical costs associated with branch operations.

The credit card networks, Visa and MasterCard, have also announced initiatives targeting the money transfer market. MasterCard, through its MoneySend service, enables registered card holders (credit, debit and prepaid) to send money via mobile phones. Funds are typically available within 24-48 hours and can be sent directly to another MasterCard branded card. MasterCard generates transaction fees as well as account maintenance fees where applicable. MoneySend is currently available in 17 countries, with a global roll-out planned in 2010. The service is geared to both the banked and unbanked populations around the world.

MasterCard has also launched global pilot programs incorporating its PayPass contact-less technology into mobile phones. With the pilots the company is

evaluating the potential to replace cards with mobile phones that are linked to a customer's account and can be read without contact at the point-of-sale (using Near Field Communication (NFC) technology embedded in the phone). We believe the key to rolling out mobile pay programs such as PayPass has more to do with getting telecom carriers on board (i.e. negotiating economics) than technology.

MasterCard has also launched mobile applications such as MasterCard Nearby that helps customers find nearby ATM and retail locations (including special offers from merchants).

Visa is also experimenting with NFC technology as it prepares for the potential shift from plastic to mobile. Perhaps more immediate, however, are the company's pilot programs surrounding merchant loyalty and rebate programs. In 4Q08, in conjunction with Google and its Android platform, Visa launched a program with Chase through which Chase cardholders could receive targeted merchant rebate and loyalty offers directly to their mobile phones. Additionally, customers could use Google mapping technology to find nearby participating merchants, as well as real time short message service (SMS) updates related to their account activity.

eBay it also getting aggressive in the mobile payments space, and the company reported mobile online payments using PayPal increased 650% on Black Friday (off a small base). Recently the company opened the PayPal platform to third party developers. Developers are using the platform to build applications that enable peer-to-peer payment transfers using PayPal as a platform (you could tweet money to others on an iPhone, or pay for a game download on Facebook). Users will likely need PayPal accounts to inject and retrieve money from their various applications, building the PayPal account base. We see Mobile and PayPal on an interesting collision course.

Ultimately, we believe the "holy grail" is for smart phones to become a "one stop data shop" displacing physical credit cards as well as facilitating more targeted advertising and loyalty programs.

Impediments to Mobile Money Movement

While the growth opportunity in mobile money movement seems evident, there are several key near-term challenges, particularly with respect to cross-border transactions. US regulators, in a post-911 world, have enacted tougher anti-money laundering laws and regulations such as the Patriot Act which apply to money transfer services. Mobile operators looking to enter the money movement business would have to ensure that they can comply with such regulations. Additionally, certain countries have restrictions on the amount of money that can be transferred cross-border or which entities can transfer money intra-country (for example WU and other transfer companies are restricted from acting as an intra-country transfer agent in India and China).

We also believe that at least over the near-intermediate term, the need for a built out physical agent network will remain critical. We think the success of Safaricom attests to this. The unbanked will continue to rely on physical deposit/withdraw location whereby they can replenish and access their accounts. While technology innovation over the past thirty years has been impressive, we have yet to see real cash dispensed from a PC or cell phone.

Mobile money transfer also introduces a new party into the payment ecosystem, the telecom carrier. This may change the economics of the transaction and require new pricing schemes. The traditional parties could either share some of their fees with carriers or attempt to raise the merchant discount rate, which will likely incur the wrath of merchants and perhaps regulators. This could make it less attractive for the current stakeholders, although it can be argued that volume increases could more than offset this risk. Another alternative could be to charge the consumer directly for the mobile payment service. We imagine that the carriers who sport high fixed cost bases would be looking to generate fees on a per transaction basis.

One of the interesting things about mobile payment system initiatives will be the impact on the role of the brand in the future. It may be more difficult for network brands to maintain the value of the brand. When using cards today, we find that merchants no longer look at the card to see the brand, let alone the signature on the back of the card. To the extent more commerce goes mobile, its even less clear what role the "brand" may play. To be clear, the role of the underlying network will be crucial. But to the extent, the value of the brand becomes less relevant, it may open up the branded networks to more competition.

Price objective basis & risk

Apple (AAPL, $196.43)

Our PO of $240 is based on 22x our C2010 NOPAT/share estimate of $9.30 (non-subscription) plus $37 in net cash. Our target multiple is at the low end of the historical range of 20-40x given uncertainty in the PC market and iPod maturity. We believe the valuation range for Apple is likely going through compression, albeit at higher levels than other companies in our coverage universe.

Risks to our price objective are: (1) Apple's significant exposure to the consumer, (2) slower than expected adoption of the iPhone and increased competition in the smartphone market, (3) worse than expected iPod revenue growth, (4) premium multiple for growth potential could compress, (5) managing beat and raise expectations for EPS estimates, (6) gross margins lower than expected, and (7) CEO succession issues.

Broadcom Corp (BRCM, $31.39)

Our price objective of $40 is based on a roughly 20x multiple to our CY10 FCF per share estimate of $2.04, below the median multiple (48x) accorded to the stock over the past decade. We believe that a more positive stance on Broadcom's valuation relative to the group is warranted given our bullish view on the company's fundamentals (driven by the strength of its product cycles) and relative outperformance. Upside risks to our price objective are better than expected end market demand trends, a sooner than anticipated recovery in worldwide economies, more meaningful share gains within key markets, and more muted downside risk to near-term estimates. Conversely, downside risks to our price objective are more significant deceleration in GDP growth and end demand, a delay/cancellation of expected new product launches by key OEM customers, unanticipated declines in gross margins, and less than expected benefit from ongoing expense management initiatives.

HTC Corp. (HTCCF, TWD344.00)

Our PO of NT$332 is based on 13x FY10E EPS, which is at the mid-end of the stock's trading range of 6-16x over the past three years. While HTC has remained the technology leader in WinMo and Android phones, its weakness in economy of scale and brand awareness will constrain its growth, in our view. HTC has suffered stagnant growth even with limited competition in the WinMo and Android space, and we are concerned about its prospects should competition heat up. Given its muted growth outlook, we think it could trade back to trough-cycle value.

Downside risk: Slower-than-expected company recovery. Upside risks: Faster execution of model transitions and less competition from leading handset brands and Research in Motion and Apple.

LG Electronics (LGEAF, W116,000)

Our price objective of W122,000 (8x FY10E EPS) is based on SOTP valuation. The implied target market cap of W19.9tn can be broken down to home entertainment (W8.0tn), mobile communications (W6.5tn), home appliance (W0.3tn), air conditioning (W0.3tn), business solutions (W0.3tn), and its 38pct stake in LGD (W4.5tn). In our view, LGE's share price is attractive considering its cheap valuation and solid margin outlook in 2010.

Risks: (1) Handset competition from Nokia/MOT or even smartphone makers' renewed focus on the US and global market, (2) sudden change in the TFT-LCD and LCD TVmarket equation (3) margin pressure on appliance business from higher input costs, and (4) potential M&A to spur growth.

Mediatek (MDTKF, NT$520.00)

Our PO is based on a two-pronged approach. Our FV model implies NT$650. Also, our PO implies a P/E of 16x based on our 2010 earnings forecast which is not stretching. The re-rating comes from (a) higher growth and (b) diminished earnings volatility. Further re-rating could occur once the market and its 3G platform prospects are clearer, potentially pushing P/E to the upper end of its 7-25x historical range and our stretch high of NT$752.

Risk to growth and profitability would rise significantly if the company hit a technical hurdle on 3G networks. Then, we would we have to re-think our long-term forecast. Other nearer term risks are China demand, credit tightening, higher NOR prices and tight component supply.

Nokia (A) (NOK, US$12.56)

Our EUR11.5/ USD16.9 PO is based on a 2011 PE multiple of 10x ex cash (11x incl cash), backed up by our EVA model.

Our EVA model -lo, -mid, -hi scenarios are EUR8-12-16 (USD12/18/24) based on the following 2012-2019 metrics: Revenue growth 2.5%,4%,5%, handset op margin 10%,14%, 17%, NSN op margin 5%. WACC is 10%,9%,8%.

Risks to our valuation are: Nokia loses further market share and its associated scale advantage, subscriber growth and upgrade cycles are lower than we expect andleading to slower overall handset market growth.

Upside would come from the company seeing its low-end smartphone push resulting in market share gains amplified by it being the highest growth segment of the market, and from high competition leading to it gaining from its strong cost base and channel presence position particularly in emerging markets.

Palm, Inc. (PALM, $12.17)

We rate Palm a Buy with a 12-month price objective of $20 based on 28x CY10 PE. This is at the high end of 20x-30x PE commanded by comparable small-cap growth stocks in early stages of new product launches and sales and earnings acceleration. However we believe Palm offers a unique opportunity to participate in the high growth smartphone space given its breakthrough web operating system and user interface.

We also note that while we forecast $0.72 in CY10 EPS based on 6.2mn shipments at 7.3% operating margins, we see potential for $1/sh+ in EPS power if Palm were to ship 7mn units and attain 10% operating margins. Hence on an EPS power basis, our $20 PO corresponds to a more attractive 20x PE.

Risk factors: 1) Execution risk. 2) Competition against larger and stronger players Apple, RIM and others. 3) Weak consumer spending could depress demand for smartphones. 4) Premium valuation makes stock susceptible to newsflow. and 5) Weak balance sheet could demand additional and potentially dilutive capital raise.

RSCH in Motion (RIMM, $65.80)

We rate RIM a Buy with a $100 PO based on 20x FY11E PE. Our choice of PE is inline with comaparables and implies about 1x PEG ratio.
Risks to our price objective: 1) Slowdown in smartphone market due to macroeconomic weakness, 2) Margin pressure from increasing hardware sales, 3) Competitive risk from Apple, Nokia, Motorola, Samsung and Palm, 4) Risk from potential slowdown of smartphone market due to macro factors, 5) Litigation risk: RIM was sued in the past by NTP and Visto for large settlements. While we cannot predict any future litigation actions, we note that this has been a litigious space in the past.

Samsung Elec (SSNLF, W785,000)

Our price objectives of W970,000 for a local share (SSNLF) and US$385 for GDR (SSNHY) are derived from a 2.3x P/BV based on average estimated book value for 2009-11. Although this is far higher than the Korean stock market average (about 1x based on 2009-11E book value on average), most Tier 1 global IT stocks are trading at 2x or higher. Our long-term valuations such as DCF (11pct WACC, 4pct perpetual growth, 7x EV/EBITDA for terminal value) and the average of mid- and up-cycle fair value also support our PO.

We also use a sum-of-the-parts valuation (SOTP) to cross check our 2.3x P/BV based PO. Net-net, our SOTP fair value appears about 4% higher than our PO (W1,012,000 vs W970,000). In SOTP, our target EV/EBITDA multiples are 6.8x semiconductors, 7.0x LCD, 8.5x handsets, 7.5x digital media and home appliances.

Downside risks: (1) a possible W-shaped macro economy recovery after 1H09 (downside risks to 4Q09 and 2010 recovery), (2) stock outperformance among pure players when macro recovers rapidly vs SEC (relatively low beta stock vs pure memory, LCD and handset plays), and (3) relatively high valuation multiples of SEC vs some peers or local market averages.

Upside risks are a full-fledged macro recovery in 2010 and after, a better competitive landscape at the expense of companies in financial difficulties and new demand from new applications such as smartphones, SSD and Windows 7.

Analyst Certification

We, Tal Liani, Andrew Griffin, Justin Post, Laura Chen, Scott D. Craig, CFA, Simon Dong-je Woo, CFA, Sumit Dhanda and Vivek Arya, hereby certify that the views each of us has expressed in this research report accurately reflect each of our respective personal views about the subject securities and issuers. We also certify that no part of our respective compensation was, is, or will be, directly or indirectly, related to the specific recommendations or view expressed in this research report.

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APR - Semiconductor Coverage Cluster

Investment rating	Company	BofAML ticker	Bloomberg symbol	Analyst
BUY				
	Hynix	HXSCF	000660 KS	Simon Dong-je Woo, CFA
	Mediatek	MDTKF	2454 TT	Daniel Heyler
	Samsung Elec	SSNLF	005930 KS	Simon Dong-je Woo, CFA
	Samsung Elec -G	SSNHY	SMSN LI	Simon Dong-je Woo, CFA
NEUTRAL				
	Chipbond Technology	CPBTF	6147 TT	Daniel Heyler
	Siliconware	SPIL	SPIL US	Daniel Heyler
	Siliconware	SPILF	2325 TT	Daniel Heyler
	Taiwan Semi	TSM	TSM US	Daniel Heyler
	Taiwan Semi	TSMWF	2330 TT	Daniel Heyler
UNDERPERFORM				
	Advanced Semi	ASX	ASX US	Daniel Heyler
	Advanced Semiconductor Engineering	ASXCF	2311 TT	Daniel Heyler
	ASM Pacific	ASMVF	522 HK	Daniel Heyler
	Faraday	FDYTF	3035 TT	Daniel Heyler
	Himax Technology-ADR	HIMX	HIMX US	Daniel Heyler
	Inotera Memories	INMFF	3474 TT	Simon Dong-je Woo, CFA
	Kinsus Interconnect Technology	KNSUF	3189 TT	Daniel Heyler
	Nan Ya PCB Corporation	NANYF	8046 TT	Daniel Heyler
	Nanya Tech Corp.	NNYAF	2408 TT	Simon Dong-je Woo, CFA
	Novatek	NVKMF	3034 TT	Daniel Heyler
	Powerchip	PWSMF	5346 TT	Simon Dong-je Woo, CFA
	ProMOS Tech	PTGSF	5387 TT	Simon Dong-je Woo, CFA
	Realtek	RLTQF	2379 TT	Daniel Heyler
	Richtek Technology	RHTKF	6286 TT	Daniel Heyler

APR - Semiconductor Coverage Cluster

Investment rating	Company	BofAML ticker	Bloomberg symbol	Analyst
	SMIC	SIUIF	981 HK	Daniel Heyler
	SMIC	SMI	SMI US	Daniel Heyler
	Spreadtrum-ADR	SPRD	SPRD US	Daniel Heyler
	UMC	UMC	UMC US	Daniel Heyler
	UMC	UMELF	2303 TT	Daniel Heyler
	VIA Tech	VIATF	2388 TT	Daniel Heyler

APR - Technology Hardware Coverage Cluster

Investment rating	Company	BofAML ticker	Bloomberg symbol	Analyst
BUY				
	Asustek	AKCPF	2357 TT	Tony Tseng, CFA
	AU Optronics	AUO	AUO US	Simon Dong-je Woo, CFA
	AU Optronics	AUOPF	2409 TT	Simon Dong-je Woo, CFA
	Cheil Industries	CLFUF	001300 KS	Simon Dong-je Woo, CFA
	Comba Telecom Systems Holdings Limited	COBJF	2342 HK	Cynthia J.H. Meng
	Compal Electron	XLCPF	2324 TT	Tina Chang, CFA
	Coretronic	CCOCF	5371 TT	Jasmine Wei
	Delta Electronics Inc.	DLTEF	2308 TT	Tina Chang, CFA
	Foxconn Intl Hld	FXCNF	2038 HK	Laura Chen
	Hon Hai Prec.	HNHAF	2317 TT	Tony Tseng, CFA
	Largan Precision	LGANF	3008 TT	Laura Chen
	Lenovo Group	LNVGF	992 HK	Daniel Heyler
	Lenovo Group	LNVGY	LNVGY US	Daniel Heyler
	LG Display Co., Ltd.	LPHLF	034220 KS	Simon Dong-je Woo, CFA
	LG Display Co., Ltd.-A	LPL	LPL US	Simon Dong-je Woo, CFA
	LG Electronics	LGEAF	066570 KS	Laura Chen
	Samsung Techwin	SGTWF	012450 KS	Simon Dong-je Woo, CFA
	Shin Zu Shing	SZUSF	3376 TT	Tina Chang, CFA
	Silitech	SLKCF	3311 TT	Laura Chen
	Simplo Tech	SPLOF	6121 TT	Tina Chang, CFA
	Wistron	WICOF	3231 TT	Tony Tseng, CFA
	ZTE Corporation	ZTCOF	763 HK	Cynthia J.H. Meng
NEUTRAL				
	Acer, Inc	ASIYF	2353 TT	Tony Tseng, CFA
	Alpha Networks I	AHNWF	3380 TT	Laura Chen
	Catcher Tech	CHERF	2474 TT	Tina Chang, CFA
	Chicony Elect	CCNYF	2385 TT	Tina Chang, CFA
	Lite-On Tech	LOTZF	2301 TT	Tina Chang, CFA
	Merry Electron	MMECF	2439 TT	Laura Chen
	Quanta Computer	QUCPF	2382 TT	Tony Tseng, CFA
UNDERPERFORM				
	Chi Mei Optoelectronics Corp.	CMEOF	3009 TT	Simon Dong-je Woo, CFA
	Compal Comm	CPCMF	8078 TT	Laura Chen
	Epistar Corp	EPIPF	2448 TT	Jasmine Wei
	Everlight Electronics Co., Ltd	EVLEF	2393 TT	Jasmine Wei
	Foxconn Tech	FXTCF	2354 TT	Tony Tseng, CFA
	Gemtek Technolog	GTKTF	4906 TT	Laura Chen
	HTC Corp.	HTCCF	2498 TT	Laura Chen
	InnoLux	INXDF	3481 TT	Jasmine Wei
	Inventec	IVCJF	2356 TT	Tina Chang, CFA
	Inventec Applian	IVAPF	3367 TT	Tina Chang, CFA
	Mitac Intl	MTCXF	2315 TT	Tina Chang, CFA
	Radiant	ROPTF	6176 TT	Jasmine Wei
	Samsung Elec M	SSEMF	009150 KS	Masashi Kubota
	Samsung SDI	SSDIF	006400 KS	Simon Dong-je Woo, CFA
	Seoul Semicon	SLSOF	046890 KS	Simon Dong-je Woo, CFA
	Wellypower	XTTWF	3080 TT	Jasmine Wei
RVW				
	TPV	TPVTF	903 HK	Simon Dong-je Woo, CFA

EMEA - Technology Coverage Cluster

Investment rating	Company	BofAML ticker	Bloomberg symbol	Analyst
BUY				
	Alcatel Lucent-A	ALU	ALU US	Andrew Griffin
	Alcatel-Lucent	ALALF	ALU FP	Andrew Griffin
	ASM Intl	ASMI	ASMI US	Jonathan Crossfield
	ASM Intl	XLMSF	ASM NA	Jonathan Crossfield
	Autonomy	AUTNF	AU/ LN	Raimo Lenschow, CFA
	Capgemini	CAPMF	CAP FP	Raimo Lenschow, CFA
	CSR	CSRXF	CSR LN	Jonathan Crossfield
	Ericsson L.M.	ERIC	ERIC US	Andrew Griffin
	Ericsson L.M.	ERIXF	ERICB SS	Andrew Griffin
	Infineon Technologies	IFNNF	IFX GR	Jonathan Crossfield
	Infineon Technologies	IFNNY	IFNNY US	Jonathan Crossfield
	Logica	LGIAF	LOG LN	Raimo Lenschow, CFA
	Logitech	LOGI	LOGI US	Jonathan Tseng, CFA
	Logitech Intl-R	XLGKF	LOGN VX	Jonathan Tseng, CFA
	Micro Focus	MCFUF	MCRO LN	Jonathan Tseng, CFA
	Misys	MUSJF	MSY LN	Raimo Lenschow, CFA
	Nokia (A)	NOK	NOK US	Andrew Griffin
	Nokia (A)	NOKBF	NOK1V FH	Andrew Griffin
	STMicroelectroni	STM	STM US	Jonathan Crossfield
	STMicroelectroni	STMEF	STM FP	Jonathan Crossfield
	Temenos	TMNSF	TEMN SW	Raimo Lenschow, CFA
NEUTRAL				
	ASML	ASML	ASML US	Jonathan Crossfield
	ASML	ASMLF	ASML NA	Jonathan Crossfield
	Atos Origin	AEXAF	ATO FP	Jonathan Tseng, CFA
	Sage Group	SGGEF	SGE LN	Raimo Lenschow, CFA
	SAP A.G.	SAP	SAP US	Raimo Lenschow, CFA
	SAP A.G.	SAPGF	SAP GR	Raimo Lenschow, CFA
	Software AG	SWDAF	SOW GR	Raimo Lenschow, CFA
UNDERPERFORM				
	ARM	ARMH	ARMH US	Jonathan Crossfield
	ARM	ARMHF	ARM LN	Jonathan Crossfield
	Aveva	AVEVF	AVV LN	Jonathan Tseng, CFA
	Indra	ISMAF	IDR SM	Jonathan Tseng, CFA
	Tieto	TCYBF	TIE1V FH	Jonathan Tseng, CFA
	TomTom	TMOAF	TOM2 NA	Jonathan Tseng, CFA
	Wolfson	WLFMF	WLF LN	Jonathan Crossfield

US-Enterprise Hardware, Storage and Supply Chain Coverage Cluster

Investment rating	Company	BofAML ticker	Bloomberg symbol	Analyst
BUY				
	Amphenol	APH	APH US	Wamsi Mohan
	Apple	AAPL	AAPL US	Scott D. Craig, CFA
	Arrow Electronics, Inc.	ARW	ARW US	Scott D. Craig, CFA
	Avnet Inc.	AVT	AVT US	Scott D. Craig, CFA
	Brocade Comm	BRCD	BRCD US	Scott D. Craig, CFA
	Corning Inc.	GLW	GLW US	Wamsi Mohan
	Hewlett-Packard	HPQ	HPQ US	Scott D. Craig, CFA
	IBM	IBM	IBM US	Scott D. Craig, CFA
	Jabil Circuit	JBL	JBL US	Wamsi Mohan
	SYNNEX Corp.	SNX	SNX US	Scott D. Craig, CFA
	Teradata Corporation	TDC	TDC US	Wamsi Mohan
	Tyco Electronics	TEL	TEL US	Wamsi Mohan
NEUTRAL				
	Dell Inc	DELL	DELL US	Scott D. Craig, CFA
	EMC Corp	EMC	EMC US	Wamsi Mohan
	Flextronics International	FLEX	FLEX US	Wamsi Mohan
	Ingram Micro Inc.	IM	IM US	Scott D. Craig, CFA

US-Enterprise Hardware, Storage and Supply Chain Coverage Cluster

Investment rating	Company	BofAML ticker	Bloomberg symbol	Analyst
	Molex	MOLX	MOLX US	Wamsi Mohan
	NetApp	NTAP	NTAP US	Wamsi Mohan
	Tech Data Corp.	TECD	TECD US	Scott D. Craig, CFA
UNDERPERFORM				
	Emulex Corporation	ELX	ELX US	Scott D. Craig, CFA
	Lexmark International, Inc.	LXK	LXK US	Scott D. Craig, CFA
	QLogic Corporation	QLGC	QLGC US	Scott D. Craig, CFA
	Seagate Technology	STX	STX US	Scott D. Craig, CFA
	Western Digital	WDC	WDC US	Scott D. Craig, CFA

US-Semiconductors Coverage Cluster

Investment rating	Company	BofAML ticker	Bloomberg symbol	Analyst
BUY				
	Altera Corp	ALTR	ALTR US	Sumit Dhanda
	Analog Devices	ADI	ADI US	Sumit Dhanda
	Broadcom Corp	BRCM	BRCM US	Sumit Dhanda
	Linear Technology	LLTC	LLTC US	Sumit Dhanda
	SanDisk Corp Inc	SNDK	SNDK US	Simon Dong-je Woo, CFA
	Xilinx	XLNX	XLNX US	Sumit Dhanda
NEUTRAL				
	Atheros Communications	ATHR	ATHR US	Eric A. Ghernati
	Intel	INTC	INTC US	Sumit Dhanda
	LSI Logic	LSI	LSI US	Sumit Dhanda
	Marvell Tech	MRVL	MRVL US	Sumit Dhanda
	PMC-Sierra	PMCS	PMCS US	Eric A. Ghernati
	Semtech Corp	SMTC	SMTC US	Sumit Dhanda
	Texas Instrument	TXN	TXN US	Sumit Dhanda
UNDERPERFORM				
	Fairchild Semiconductor	FCS	FCS US	Eric A. Ghernati
	Intersil Corporation	ISIL	ISIL US	Sumit Dhanda
	Maxim Integrated	MXIM	MXIM US	Sumit Dhanda
	Micrel Inc	MCRL	MCRL US	Sumit Dhanda
	Microchip Tech.	MCHP	MCHP US	Sumit Dhanda
	National Semiconductor	NSM	NSM US	Sumit Dhanda
	Power Integrations Inc	POWI	POWI US	Sumit Dhanda

US-Telecom and Data Networking Equipment Coverage Cluster

Investment rating	Company	BofAML ticker	Bloomberg symbol	Analyst
BUY				
	AudioCodes	AUDC	AUDC US	Vivek Arya
	BigBand Networks	BBND	BBND US	Tal Liani
	Blue Coat Systems, Inc	BCSI	BCSI US	Tal Liani
	Cisco Systems	CSCO	CSCO US	Tal Liani
	Garmin	GRMN	GRMN US	Vivek Arya
	Motorola	MOT	MOT US	Tal Liani
	NETGEAR	NTGR	NTGR US	Woo Jin Ho
	Palm, Inc.	PALM	PALM US	Vivek Arya
	Polycom	PLCM	PLCM US	Woo Jin Ho
	QUALCOMM	QCOM	QCOM US	Tal Liani
	Riverbed Technology	RVBD	RVBD US	Tal Liani
	RSCH in Motion	RIMM	RIMM US	Vivek Arya
	Voltaire Ltd	VOLT	VOLT US	Tal Liani
NEUTRAL				
	ADC Telecomm	ADCT	ADCT US	Tal Liani
	Amdocs	DOX	DOX US	Tal Liani
	F5 Networks	FFIV	FFIV US	Tal Liani

US-Telecom and Data Networking Equipment Coverage Cluster

Investment rating	Company	BofAML ticker	Bloomberg symbol	Analyst
	Harmonic Inc	HLIT	HLIT US	Vivek Arya
	Juniper Networks	JNPR	JNPR US	Tal Liani
UNDERPERFORM				
	Adtran	ADTN	ADTN US	Vivek Arya
	CIENA	CIEN	CIEN US	Tal Liani
	Tellabs	TLAB	TLAB US	Tal Liani
RVW				
	Tekelec	TKLC	TKLC US	Vivek Arya

Important Disclosures

Investment Rating Distribution: Electrical Equipment Group (as of 12 Nov 2009)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	17	50.00%	Buy	10	66.67%
Neutral	6	17.65%	Neutral	3	60.00%
Sell	11	32.35%	Sell	4	36.36%

Investment Rating Distribution: Electronics Group (as of 12 Nov 2009)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	33	42.86%	Buy	14	51.85%
Neutral	16	20.78%	Neutral	5	33.33%
Sell	28	36.36%	Sell	7	29.17%

Investment Rating Distribution: Technology Group (as of 12 Nov 2009)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	109	50.00%	Buy	65	65.66%
Neutral	51	23.39%	Neutral	34	77.27%
Sell	58	26.61%	Sell	25	45.45%

Investment Rating Distribution: Telecommunications Group (as of 12 Nov 2009)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	86	48.59%	Buy	46	64.79%
Neutral	53	29.94%	Neutral	28	68.29%
Sell	38	21.47%	Sell	19	59.38%

Investment Rating Distribution: Global Group (as of 12 Nov 2009)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	1629	50.37%	Buy	842	57.51%
Neutral	821	25.39%	Neutral	455	62.33%
Sell	784	24.24%	Sell	357	49.31%

* Companies in respect of which MLPF&S or an affiliate has received compensation for investment banking services within the past 12 months. For purposes of this distribution, a stock rated Underperform is included as a Sell.

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Investment rating	Total return expectation (within 12-month period of date of initial rating)	Ratings dispersion guidelines for coverage cluster*
Buy	≥ 10%	≤ 70%
Neutral	≥ 0%	≤ 30%
Underperform	N/A	≥ 20%

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