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Mobile in Motion: Potential Disruptive Business Models

Implications of recent moves by Google and industry leaders

With the multitude of announcements at Mobile World Congress, and spectrum auctions in the U.S. continuing, the press has been buzzing about the emergence of disruptive business models in the mobile-operator sector. But media coverage of such topics and of the moves by Google, Apple, Microsoft, Nokia, Verizon Wireless, and other firms has not yet presented a clear picture of what these developments imply for players in this industry and for the future of mobile communications. Few observers have offered helpful suggestions for how mobile-operator executives can begin addressing three key questions:

- How should we interpret the changes buffeting mobile?
- What management decisions do we need to make?
- How can we bring together facts, judgments, and clear decision criteria to make those decisions?

This white paper sheds light on these questions by examining recent news of the mobile industry through the lens of business model evolution and by suggesting implications for how mobile operators should proceed. As a proxy for the many moves being made in the software/Internet and spectrum arenas, we focus on the impact of two major moves by Google: development of the Android platform and participation in the U.S. 700MHz spectrum auction.

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Competing for Mobile's Future

Despite the lack of clarity around how mobile operators can best pursue future success, one thing seems certain: The old industry order will give way to something entirely new. Over the past 15 years or so, even through significant technological advances and increased penetration, players in the mobile space have competed through a relatively fixed set of business models:

- Original equipment manufacturers (OEMs) sought to make money from handset margins. (Apple's recent move to tap service revenues with the iPhone has been a major, though isolated, change in this regard.)

- Mobile operators subsidized phones and built company-owned retail channels to lock in subscribers and control devices and services connecting to their networks. (More recently, operators have started to levy a sort of tax from content and Web-services companies targeting 3G subscribers.)

- Content companies and Web-services providers chose between going to market via operator partners (and paying that tax) or risking obscurity by being off deck.

This set of business models has created an ecosystem that is closed (characterized by constrained consumer choice) and modular (lacking integrated players with end-to-end solutions). By contrast:

- The PC / Internet ecosystem is open and modular. It's open in that consumers choose from a wide variety of computing devices that work on any ISP's network and access Web-based services from any site accessible through their Web browser. It's modular in that end users consume products and services from several independent companies. Device companies have not become large services players, and ISPs have not integrated significantly into devices or Web services.

- Satellite radio is closed and integrated. Consumers buy satellite radio as one integrated offer in which the device, connectivity, and programmed content all come from the same integrating source.

Operating in a closed-but-modular ecosystem, the worldwide mobile industry has become a $350 billion behemoth whose major players now boast $1.1 trillion in market value. But disruptive new business models are threatening their dominance. Some of these models are driving mobile devices, access, and services toward a more open system, while others are bringing more end-to-end offers to market that are integrated across devices, services, and content.

However, it's not clear whether the forces of openness and integration can succeed equally. Advocates of openness are banking on diversity of ecosystem participation to spur innovation and ensure winning con-

sumer offers. Think of the Wintel PC standard and standard Internet browsers/website protocols igniting the PC economy, which allowed multiple Web e-commerce and ad models to reach large audiences, stimulating competition to introduce the most appealing and efficient offerings into the marketplace.

Meanwhile, those betting on integration reckon that the complexity and speed of change in the mobile industry will mean that multi-company ecosystems will never be good enough. These observers believe that offers from integrated operations will come to market faster and will prove more appealing and easier for consumers to use. Such offers will therefore give the companies that develop them an early-mover advantage. Apple's combination of iPod device, iTunes software/Web store, and groundbreaking record-label deals driving digital music, is one obvious example.

In the next few years, then, we expect to see a three-way battle among the established ecosystem and the disruptive forces of openness and end-to-end integration. Mobile operators, as well as content/Web-services players, must start making bets now on how each model will play out in the marketplace.

Enter Android: Who Would Benefit from an Open, Modular Mobile Ecosystem?

To consider where this three-way battle is headed and to offer insights for how operators might respond, let's examine Android, Google's new open-source mobile-phone platform. Google is counting on Android to win wide acceptance among handset OEMs, software applications developers, and Web-services companies. This kind of open platform could:

- Help handset OEMs sell new and higher-end devices through which consumers could access a variety of next-generation software and Web-enabled applications

- Guarantee software and Web-services companies a sufficiently large and consistently addressable end-user market to justify investment in new product and service development

- Help operators drive adoption of mobile Internet, entertainment, and other ARPU-increasing services, and perhaps ultimately reduce handset subsidies as consumers see greater value in successive generations of devices

Does this vision of symbiotic and virtuous-cycle prosperity sound familiar? It should, because if we substituted "PC" and "ISP" for "device" and "mobile operator," this story would read much like the PC/Internet story. And within the mobile industry, this is the same vision that Microsoft, Symbian, and (more narrowly) Qualcomm's BREW have set out to realize. So beyond "What is it?" the key question about Android is really "How is it different?"

What's Different About Android? Key Questions for Operators

Observers have made much of the fact that Android is free. But given the relatively low cost of all mobile software platforms (less than $10 per handset, for subscribers worth thousands of dollars), the real story is not about cost economics. Rather, meaningful differences will arise only if Android achieves a breakthrough in either of the following areas:

- Driving a substantially greater volume of users (more handsets designed for Android, merchandised by more mobile operators and other distributors, and bought by more consumers)

- Creating substantially greater ability to foster ARPU-growing Internet use and content/services consumption

With respect to the first point, Android's success will be driven directly by the choices of a relatively short list of major device OEMs. These choices, in turn, will depend largely on demand and order flow from the big operators. Additional factors include OEMs' beliefs about whether a consumer-electronics-style retail market will emerge for mobile handsets. In such a market, OEMs would directly follow consumer demand rather than selling via operators. (We discuss this issue of OEM allegiance later in this document.)

Since operators will play a major role in driving user volume, they should base their investment decisions on their judgment of Android's ability to achieve the second breakthrough discussed above: ARPU at a higher level than could be achieved through alternative platforms. Operators should consider this critical question about Android's ARPU potential from several angles:

- Do operators believe that Internet/entertainment usage volume for Android users will be higher than for other similarly targeted mobile devices? (The early success of Apple's iPhone in stimulating mobile Web usage may call into question any kind of secret sauce that Android alone could provide here.)

- Do operators believe that Google could monetize that usage better than they could on their own or with different partners? That is, do they think Google's monetization advantage in PC-based advertising would translate to mobile?

- If either or both of the above are true, should operators make it easy for Android users to access Google-based Web services, even if that implies economics sharing and reduced control over customers?

- Alternatively, do operators believe they can put Android phones in users' hands but steer them to non-Google Web services and entertainment options?

From Google's Perspective: Goals for Android and a Dilemma for Operators

Let's clarify how Google could benefit from driving volume adoption of Android. We see two potential scenarios:

1. *Google simply claims its fair share of mobile search volume and other ad-funded mobile services.* Having more mobile devices on the market with better-functioning, browser-friendly interfaces should increase mobile Internet usage. The main benefit to Google would be that it prevents mobile Internet usage from becoming a closed model where it could not achieve a share-of-mobile-Internet equivalent to its share-of-PC-Internet.

2. *Android software and Android-compatible Web services work better together with Google's own Web services.* The Android platform would become something of a phone deck itself. Operators and OEMs could use Android's open nature to modify software look and feel and to make other customizations. However, if Google's Web services enjoy built-in advantages in appealing to Android end users, operators may find it difficult to steer end users toward using Android phones but not Google services.

In either scenario, operators would cede to Google some portion of value creation that they could achieve through alternative means, such as go-it-alone or partnership strategies. If they believe Scenario 2 is more likely, they are choosing to open their business models to a powerful third party. And the potential of alternative strategies will be heavily influenced by whether operators' competitors in a given market begin fully supporting Android. (Full support is more than merely announcing consortium participation.)

This brings us back to the first "What's different about Android?" possibility noted above: the potential for greater volume adoption than other platforms have achieved or could achieve. While allowing Android to gain critical-mass volume can constitute a choice for operators, a more accurate description might be "prisoner's dilemma": What happens to a given operator if it invests in a non-Android strategy and then a critical mass of competitors goes the other way?

Pressure from Another Direction: Implications of New Spectrum and 'Open' Networks

In addition to the challenges laid down by Android, Google's participation in the ongoing 700MHz auctions in the United States raises a second set of issues for operators using established business models. Taken at face value, Google's intent to buy spectrum might look like a direct attack on mobile operators' core revenue streams. But we need to consider specific strategic paths Google might follow, to tease out the real threats from the possible opportunities for today's mobile operators.

Google's participation in the auction could be no more than a well-orchestrated bluff: Google's real intent may be to signal to operators that the company is ready to do whatever it takes to get a foothold in the wireless market (although auctions are still taking place, insiders believe Google has most likely not been the high bidder). Perhaps more importantly, Google has effectively ensured that the U.S. Federal Communications Commission and other regulators reshape terms and conditions for spectrum licensees in a way that benefits Android: by driving true network openness.

In the U.S. auctions, the licensee for each major spectrum block will be obliged to open its network to any device and any third party supplying applications. Other network operators may, in turn, feel pressured to open their networks so as to compete with the diverse offerings that will likely become available for use on that spectrum. Under these circumstances, even if Google never does control spectrum, Android could still benefit. Device OEMs may feel emboldened to make and market handsets directly to end users and this will entail a reduced marketing and distribution impact of operators.

Regarding openness and modularity, we can assume that any Google move that fosters an unbundled ecosystem of 700MHz wireless services would make wireless look more like the PC / Internet ecosystem. In that ecosystem, the majority of value creation has flowed to advertising- and Internet-based business models and not to PC manufacturers or ISPs (which are analogous to OEMs and mobile operators, respectively, in the wireless world).

Let's assume, however, that Google's participation in the auction is more than posturing; that it is serious about acquiring spectrum rights, at least at the right price. Thinking about what Google might do with spectrum will also help operators prepare for a variety of challenges and opportunities that will flow from broader ownership of spectrum rights, whether Google or others.

The company has a number of different options for extracting value from any spectrum investment it might make. To help operator executives think through the strategic challenges that this development raises, we'll consider three scenarios in which Google could leverage a spectrum investment:

1. Google runs a forced overlay network that operates in parallel to the services offered by current operators, with consumers directly buying handsets that access Google's network as well as those of operators.

2. Google competes head-to-head with the operators by running an end-to-end mobile operation.

3. Google competes indirectly with the operators by running a wholesale mobile operation.

For each scenario, we'll explore these questions:

- What would Google actually do? What would its actions mean for its business model?

- What needs to happen for the scenario to play out successfully? How much consumer appeal will be required? How will other players in the space react? How would the economics have to work (for Google as well as the industry as a whole)? How much would the acquisition mesh with Android?

- What would the scenario mean for established operators?

1. Google runs its 700MHz network as a forced overlay to voice and data services offered by current operators.

Imagine a range of handsets that contain cellular/PCS connectivity and also 700MHz. These devices might resemble today's MediaFLO or DVB-h handsets in that they are multi-frequency and multi-mode, designed to make seamless use of networks operated by different entities. Google's new handsets would include technologies optimized for different usage situations (hence economics) other than basic wireless voice/SMS. These handsets could be pitched to customers as "Keep your current wireless provider and service, but get better (free?) mobile Internet, too, on a specialized network."

Would operators want to distribute these handsets? Maybe. But it's also possible to imagine these handsets being heavily marketed through consumer-electronics retail channels, directly to the end users of open-network operators, if some component of the mobile Internet offer is better or less expensive than what the operators themselves are offering.

In this scenario, Google would encourage use of its spectrum/network as an overlay to that of established operators. The company would not try to take operators' subscribers entirely, but rather would seek to claim some portion of subscribers' mobile usage. For Google, this forced overlay scenario could present two possibilities for enhancing economic value:

- Google could charge customers for service access on the 700MHz spectrum and a bundle of applications, on either a pre-pay or subscription basis. Essentially, Google would be targeting a high proportion of the installed customer base across several operators, but with a lower expected ARPU than full voice-and-data business models. (It would also require a lower CPGA.)

- Google could enjoy a more indirect financial benefit if some tier of the Internet access offered with these new handsets were free. This could help diffuse Android widely, affording vast audiences free access to Google's services and applications. The company could monetize its offerings through its core advertising model. This would be an attractive approach for Google, as it complements the Android

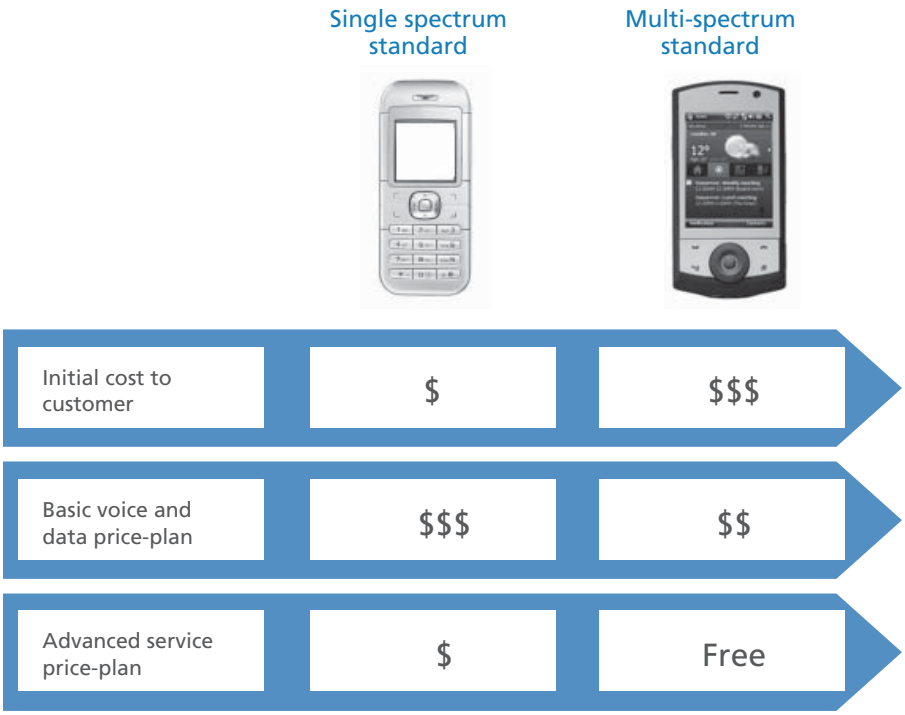
and consolidates its basic audience-driven, advertising-based model. In a "buy this phone and get free mobile Internet" vision, Google could achieve premium device pricing that earns a positive gross margin instead of requiring a subsidy, which would help make the per-user economics work (along with ad-based Internet usage).

Success on one or both of these fronts could expand Google's current annual Internet-based revenue per user ($60-100 today for heavier Internet users) by eating into some portion of mobile operators' current or future end-user ARPU.

As mentioned above, mobile operators could see themselves as having little incentive to distribute the type of network-agile devices required for this scenario to play out. After all, while they would hang onto their customers, they would inevitably suffer a decline in ARPU as customers took at least some of their Internet usage to the 700MHz network. So for operators to distribute these types of hybrid devices, they would need to be convinced that some other aspect of their economics would improve; for example, through reduced device subsidies or lower churn.

For example, if operators could save themselves, say, $150 in device subsidization costs every 18 months or so, they should be willing to tolerate a monthly ARPU erosion of up to $8 and maintain equivalent levels of profitability.

Exhibit 1 **Two Device Paradigms**



Still, operators' ceding control of their subscribers' mobile Internet usage to Google could constitute a huge opportunity cost. On balance, it would not likely appeal to operators, unless Google shared a substantial portion of mobile Internet-driven revenues.

2. Google launches a nationwide wireless service and competes head-to-head with established operators.

While many observes believe that Google would not make a facilities-based investment in owning a network, this move would not be out of keeping with previous infrastructure-based moves the company has already made in Wi-Fi and fiber. Certainly, Google's becoming a spectrum licensee and operating a network would represent the clearest and most direct attack on the mobile market. In customers' eyes, Google would be positioning itself as an alternative to the established operators, though leveraging its Android platform as a distinct competitive advantage.

But the basic play here is a simple one: attempting to steal market share from the traditional operators across their entire service offering. In other words, compared to Scenario 1, Google would be targeting a small proportion of the installed customer base (only those the company could win over entirely as mobile subscribers). But it would have a higher ARPU target for each subscriber it did get.

Nevertheless, as Google has no significant experience managing large-scale subscription businesses, this would clearly be a departure for the company. Its expertise lies in managing and extracting value from large audiences, which it knows how to target effectively and efficiently with advertising. Furthermore, to look attractive, Google would have to achieve scale rapidly in order to build out a nationwide network. Naturally, one option would be for Google to establish a joint venture with an experienced operator.

In the short term, this "Google as operator" scenario seems to conflict with a broad Android roll-out, because other operators would see Google as direct competition and presumably be less interested in helping to drive adoption of Android-based handsets. For Android to be available through both sources, operators would have to accept Google's acting as both competitor and platform provider. This seems highly unlikely, unless operators lose a significant degree of control over their distribution of handsets (through open networks and unlocked phones), in which case they would lose ability to dictate handset choice for a material portion of their end users.

In the long term, Google might be able to pull off this feat of competing with operators while also driving Android usage across other operators' networks. But this move would probably limit Android's short-term potential. In the near term, operators would see Google as a competitor and would still have the ability to dampen Android's successful market entry. Thus, this move by Google could provide momentum to other established mobile-platform companies with substantial installed bases of handsets already in-market (Microsoft and Nokia). Such companies are by no means sitting still during all of this. They could benefit if Google goes a step too far with spectrum moves while simultaneously trying to launch Android.

Scenario 3: Google uses spectrum to wholesale for major partners.

This scenario (which we see as the most likely of the three) would enable other companies to offer services on Google's spectrum, in much the same way that today's mobile virtual network operators (MVNOs) take advantage of license holders' spare network capacity.

This could afford Google a reasonable compromise position, where it gains a valuable point of control in the wireless access market and secures a place at the table in determining future market development, without competing directly for subscribers. Using spectrum to wholesale for major partners would expose Google to new, subscription-based business models while at the same time de-risking a full move into the space by a company that lacks sufficient experience. And it would guarantee minimum early scale for Android without direct alienation of established operators, whose allegiance is likely needed to achieve meaningful share in the long-run.

The scale of the threat this scenario poses to mobile operators hinges largely on who the virtual operators might be. For example, suppose Google enables a large-scale head-to-head offensive by cable operators. In this case, mobile operator executives will likely see Google as competing against their companies as much as if the company had launched its own consumer offering. However, if Google enables smaller local start-ups or highly targeted brand-based MVNOs, incumbent operators may view the degree of competition as more palatable (see Exhibit 2).

Exhibit 2 **Strategic options for a Google spectrum investment: key metrics**

	Network overlay	Mobile operator	Spectrum wholesaler
Market share	>50%	5%-10%	5%-10%
ARPU	$5-$10	$5-$80	$25-$40
CPGA	$0 (If operators are fully subsidizing devices) $50 (If Google has to partially subsidize devices)	$200	$0
Margin	80%	50%	70%
Likelihood	Medium	Low	High
MO threat level	High	Medium	Low-medium

While the three scenarios described above represent what we see as the key paths Google might take, the company would need to make crucial decisions before embarking on any of them. For example:

- Should Google operate alone or form a joint venture to exploit a partner's experience in running day-to-day mobile operations and a large-scale subscription business?
- Should the company focus exclusively on mobile broadband, or compete directly on voice too?
- What mix of emphasis should Google place on smart phones versus non-voice Mobile Internet Devices (MIDs), Internet-enabled notebooks, and other connected digital devices?
- Should Google focus on realizing one scenario or several? (We could imagine the company pursuing Scenarios 1 and 3 with the same spectrum assets and network. Specifically, Google could try to force an overlay onto current operators and simultaneously enable a separate group of customer-facing service providers by offering full voice/data services on a 700MHz network.)

Our discussion thus far has focused on the U.S., where the spectrum auction is already underway. It goes without saying that the decisions that Google makes in North America could well be replicated across European markets, although different markets will present different opportunities and challenges.

Putting the Pieces Together: Strategic Options for Mobile Operators

What does this discussion suggest for mobile operators? In formulating their strategies for moving forward, each operator will need to:

- Make a judgment about Google's strategic intent and the company's probable success in pursuing it
- Analyze the specific competitive situation in different markets
- Understand its own strategic context (for example, market share and business portfolio)

To that end, we see three relevant, high-level strategic paths that operators might consider.

1. Resist Android and Take Countermeasures

Operators that take this path will stand their ground and fight Google's maneuvers. They can seek to protect their value by simply shutting the door and refusing to distribute Android devices. They can also remain closed to prevent other channels from distributing

Android handsets to run on operators' networks. Operators on this path may choose to partner more closely with an effective and sizeable competitor to Google on the platform and Web-services side (for instance, Nokia with Ovi, or Microsoft with future generations of Windows Mobile and the company's array of Web services including those recently acquired with Danger, Inc.). They might also develop their own competitive services.

2. Embrace Android and a New Calculus for Making Money

On this path, operators could strategically cede some control (of mobile Internet usage and maybe even of how subscribers connect wirelessly) by accepting Google's entry into the fray and partnering closely with the company. This partnering would inevitably come with costs and risks. However, managed correctly, more openness could enable operators to unlock significant value from customers who do not have access to the services they want today. So, operators would be giving up a slice of pie—but it could be a slice from a much bigger pie than would exist otherwise.

3. Double-Bet to Maintain Options

Of course, the potential Google moves and industry outcomes envisioned here cover a wide range of possibilities. It's possible that Google itself is not fixed on one specific strategy. So there is no reason why the major operators cannot gently encourage Google in one direction or the other, finding a balance between protecting their core revenue lines and growing, thanks to Google's open strategy. Furthermore, operators can choose to spread their bets across multiple platforms. Telefonica, for example, is simultaneously working with Google and Nokia as well as developing its own platform.

Getting Specific: Market and Company Considerations

For a mid-sized, growth-oriented operator in a more fragmented market (say with 10-15% market share), partnering will look like an attractive option. Partnering presents opportunities to gain customer appeal and scale. These gains may, in turn, help mid-sized companies challenge incumbents and other larger players that historically used their scale to protect market share. Such players may be less interested in partnering, because it requires giving up some of the revenue they have been getting for little effort. Certainly, the more fragmented the market, the more the potential points of entry for Google, and players of all sizes should be aware of this. The trade-off may be between sacrificing a point or two of revenue share to Google and sacrificing many more points as well as long-term strategic control to a smaller competitor that has partnered with Google instead.

Markets with greater levels of consolidation may be able to take a more aggressive stance against Google's entry. In markets shared by three or four players in roughly equal proportions, there is no reason that companies need to give up much revenue share. So unless one player gets

fazed by the threat or becomes seduced by Google's long-term charm, these markets may prove more difficult for Google to enter profitably. However, certain recent experience in more-consolidated markets—iPhone in the U.S. or U.K., for example—suggests there may always be irresistible pressures for one operator within a competitive oligarchy to attempt a game-changing move vs. its competitors, by partnering with a powerful non-operator entity such as Google or Apple.

Next Steps: Key Issues for Mobile Operators Today

Google's aggressive moves formalize the company's recognition that mobile is a huge future market in its own right, and that it represents a likely control lever for competition on the Internet in general. Through some combination of the moves discussed here, Google is likely to emerge as a strong player and a force to be reckoned with in mobile, whether as a competitor or a high-stakes partner. But the implications for mobile operators go beyond Google; even if some other company, such as Microsoft, Apple, or Nokia, catalyzes the end of the long-time paradigm of closed and modular, the issues and strategic choices raised here will remain high priorities for operator executives.

At a practical level, we have identified four issues that mobile operators should be addressing now:

1. Identifying Level of Urgency for Decisions and Actions

Operators need to set clear timeframes for developing strategic plans relative to Google's moves and for implementing them in time to produce the required impacts. This comes down to an understanding of when Google will be in a position to act. Specifically:

- When do we believe an interesting portfolio of Android devices will come to market?
- What will the pipeline for Android applications look like?
- If Google succeeds in a spectrum auction in the U.S. or elsewhere, which strategic option will it choose? How quickly might it be able to build out an effective network? What kinds of services would it roll out?

As part of these timing-related deliberations, operators should also consider how actions they could take quickly might force Google's hand in one direction or the other. For instance, if operators show good intention in terms of pushing Android devices, could they negotiate an advantaged cut of ad revenues? In other words, by offering Google some kind of volume guarantee, could operators justify taking a sufficient cut from the ad-generated revenues to make full and exclusive adoption of Android economically and strategically advisable?

2. Developing a Clear View of Device Demand and Distribution Dynamics

Operators need to carefully estimate future consumer demand for Android and Android-like devices and services. They must also gauge the impact of changes to distribution models on their control over how devices are marketed and subsidized. The iPhone has shown that a single, attractive device can create significant pull to an operator with exclusive rights. It can even stimulate a paradigm shift in business model (with the device manufacturer now driving a substantial share of retail distribution and taking a share of future customer revenues). The iPhone is not simply a story about platform. Cutting-edge design as well as the Apple brand and marketing machine have played a big part in this product's success. However, the iPhone story demonstrates the potential impact of a breakthrough device on the market. So operators must ask themselves:

- Will Android devices really steal significant share from an operator that chooses not to embrace them?
- Can Android devices be distributed effectively by OEMs if operator channels are closed to them? (Or can Google sell devices directly, given that it has direct, targeted access to a global audience?)
- Would low-cost or free mobile Internet be enough inducement for consumers to pay higher prices for a device? If so, this could weaken operators' traditional ability to play the subsidize-for-services-contract model against would-be, direct-to-consumer device plays.

3. Considering Strategic Alternatives to Google

Even with all the developments coming out of Mobile World Congress, Google has been dominating mobile-focused headlines in recent weeks. But it is not alone in shaking up the mobile space. Operators need to judge how well alternative future platforms from Nokia and Microsoft could compete with Android. Could Nokia's expertise in device development give it an edge in terms of integration of hardware and software? Will Microsoft's overall software development heritage, its mobile assets (Windows Mobile, a growing range of mobile web services, and now Danger), and its positions in gaming, home video, and portable music help operator partners achieve success better than alternatives? And once those questions have been considered, what kind of partnering arrangements will put operators in the best position? Should they sign an exclusive arrangement? Spread their bets?

4. Quantifying the Economics of Possible Google Moves

Operators need to explicitly model out the economic impact of Google's possible moves. There are two sets of distinct considerations here:

- How would the economics look from Google's perspective? With or without a Google-controlled network, could Android drive sufficient

ad-based revenue to enable Google to at least partially subsidize Android devices? How much of that ad revenue might it be prepared to share to encourage an operator to co-subsidize devices?

- How much of operators' customer revenue might be eroded by Android applications? Could voice over Internet protocol (VoIP) services make the situation even more challenging for a voice operator? If so, what, if anything, could an operator do to prevent this?

While most operators have made a long-time science out of understanding their own profitability economics and subscriber value, many lack a detailed viewpoint, shared across the management team, on the economics of adjacent or competing business models. In light of the developments laid out in this white paper, operators need to understand and quantify the economics at work for other types of players emerging in the expanding mobile space.

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While we have ventured several theories and scenarios, the long-term direction of the mobile industry remains uncertain. But we do know that maneuvering by Google, Apple, Microsoft, Nokia, and many others is permanently transforming the industry. As more players enter the fray, and as technology standards become more open, the competition will intensify. Operators need to make clear decisions, and soon, about what they are going to embrace and reject, where they will partner, where they will fight, where they need to double-bet, and where they can afford to play their own hand.❖

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