

The Mobile Internet Report Setup*

December 15, 2009

**This presentation is intended to provide you with high-level thoughts covered in Morgan Stanley's Mobile Internet Report, published 12/15/09 (available at www.ms.com/techresearch).*

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What You are Reading – The Mobile Internet Report Setup

Morgan Stanley's global technology and telecom analysts set out to do a deep dive into the rapidly emerging and changing mobile Internet market. We wanted to create a data-rich, theme-based framework for thinking about how the market may develop. We intend to expand and edit the framework as the market evolves. A lot has changed since we published 'The Internet Report' in 1995 on the web (www.ms.com/techresearch). We decided to create most of this report as a PowerPoint presentation and publish it on the web, expecting that bits and pieces of it will be cut / pasted / redistributed and debated / dismissed / lauded. Our goal is to get our thoughts / data into the growing conversation about what may be the biggest technology trend ever, one that may help make us all more informed in ways that are unique to the web circa 2009, and beyond.

We present our thoughts in three ways:

- 1) 'The Mobile Internet Report Setup' – a 92-slide presentation which excerpts highlights of the key themes from the report.
- 2) 'The Mobile Internet Report Key Themes' – a 659-slide presentation which drills down on thoughts covered in 'The Mobile Internet Report.'
- 3) 'The Mobile Internet Report' – a 424-page report which explores 8 major themes in depth and includes the two aforementioned slide presentations + related text.

Each piece is available online at www.ms.com/techresearch

The Mobile Internet Report Setup

- **Wealth Creation / Destruction is Material in New Computing Cycles – Now in Early Innings of Mobile Internet Cycle, the 5th Cycle of Last Half Century.**
- **Mobile Ramping Faster than Desktop Internet Did and Will Be Bigger Than Most Think – 5 Trends Converging (3G + Social Networking + Video + VoIP + Impressive Mobile Devices).**
- **Apple Leading in Mobile Innovation + Impact, for Now – Depth of App Ecosystems + User Experience + Pricing Will Determine Long-Term Winners.**
- **Game-Changing Communications / Commerce Platforms (Social Networking + Mobile) Emerging Very Rapidly.**
- **Massive Data Growth Driving Carrier / Equipment Transitions.**
- **Compelling Opportunities in Emerging Markets.**
- **Growth / Monetization Roadmaps Provided by Japan Mobile + Desktop Internet.**

Wealth Creation / Destruction is Material in New Computing Cycles – Now in Early Innings of Mobile Internet Cycle, the 5th Cycle of Last Half Century.

Tech Cycles Tend to Last Ten Years

Entered Next Major Computing Cycle – Mobile Internet – 2 Years Ago

**Mainframe
Computing
1960s**



**Mini
Computing
1970s**



**Personal
Computing
1980s**



**Desktop Internet
Computing
1990s**

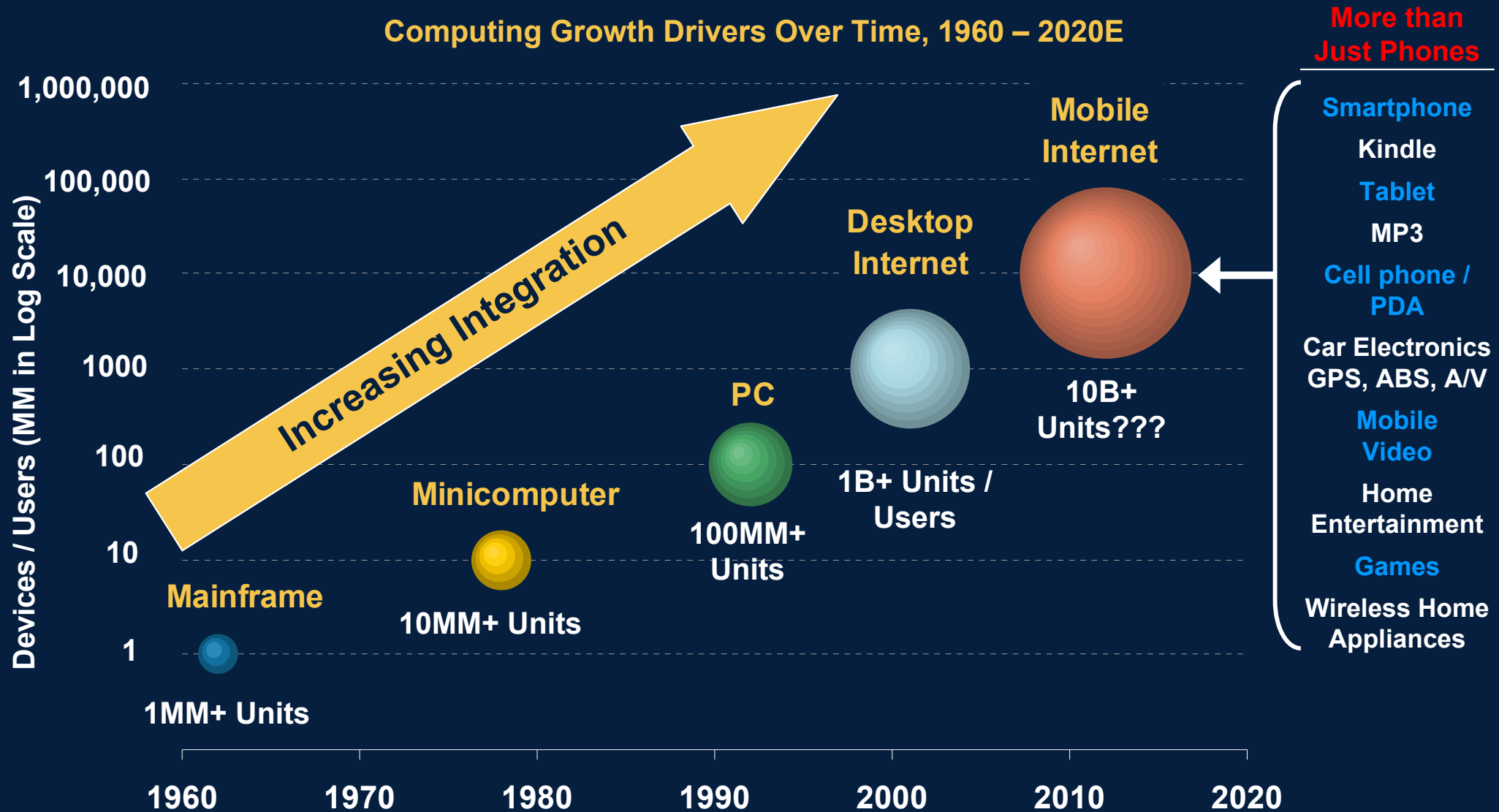


**Mobile Internet
Computing
2000s**



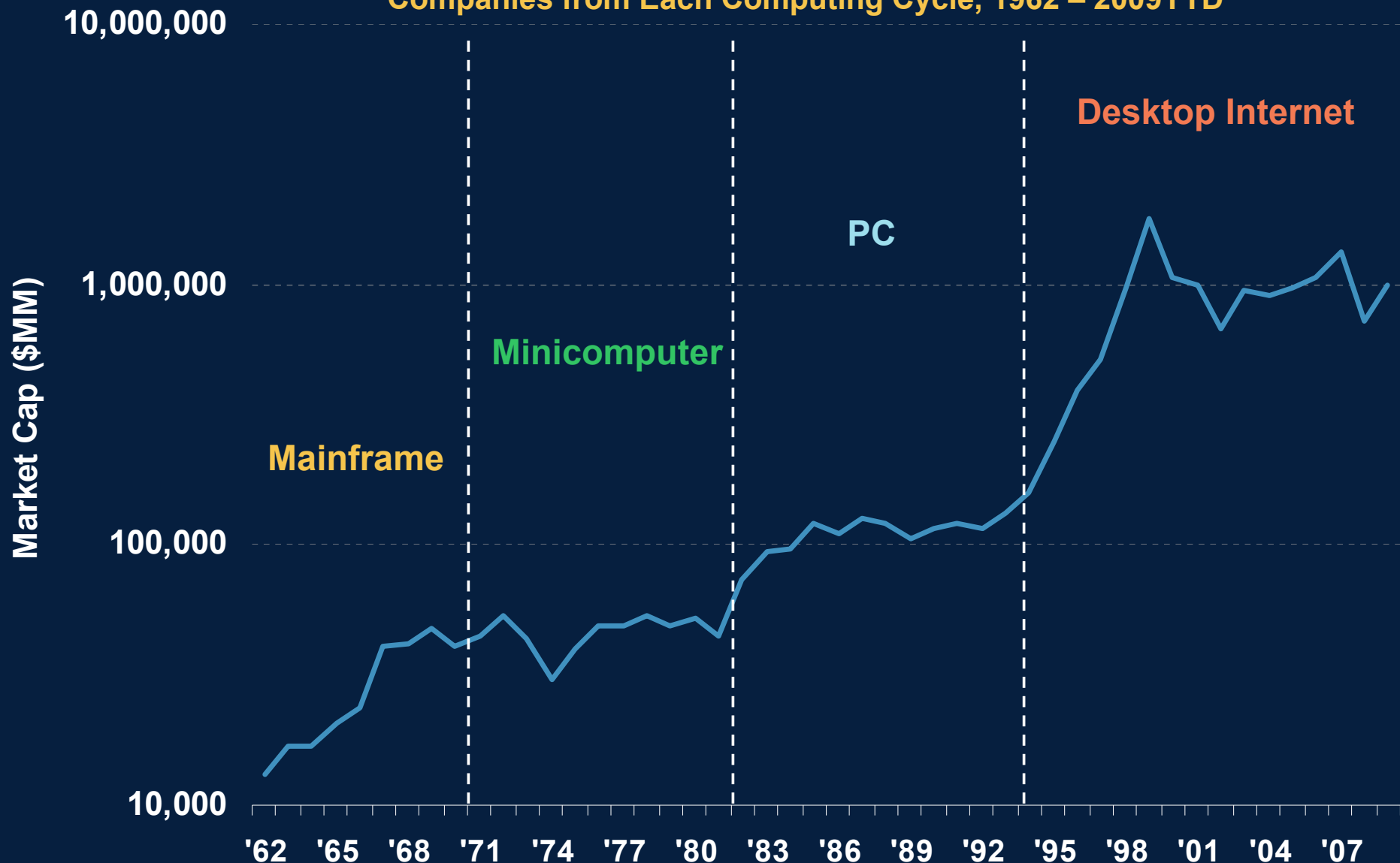
New Computing Cycle Characteristics

Reduce Usage Friction Via Better Processing Power + Improved User Interface +
Smaller Form Factor + Lower Prices + Expanded Services = 10x More Devices



Winners of Each New Cycle Often Create More Market Capitalization than Winners of Prior Cycles

Cumulative Market Capitalization of Top 5 Computing Companies from Each Computing Cycle, 1962 – 2009YTD



Technology Wealth Creation / Destruction Cycles

New Companies Often Win Big in New Cycles While Incumbents Often Falter

Mainframe Computing 1960s

New Winners

IBM
NCR
Control Data
Sperry
Honeywell
Burroughs

Mini Computing 1970s

New Winners

Digital Equipment
Data General
HP
Prime
Computervision
Wang Labs

Personal Computing 1980s

New Winners

Microsoft
Cisco
Intel
Apple
Oracle
EMC
Dell
Compaq

Desktop Internet Computing 1990s

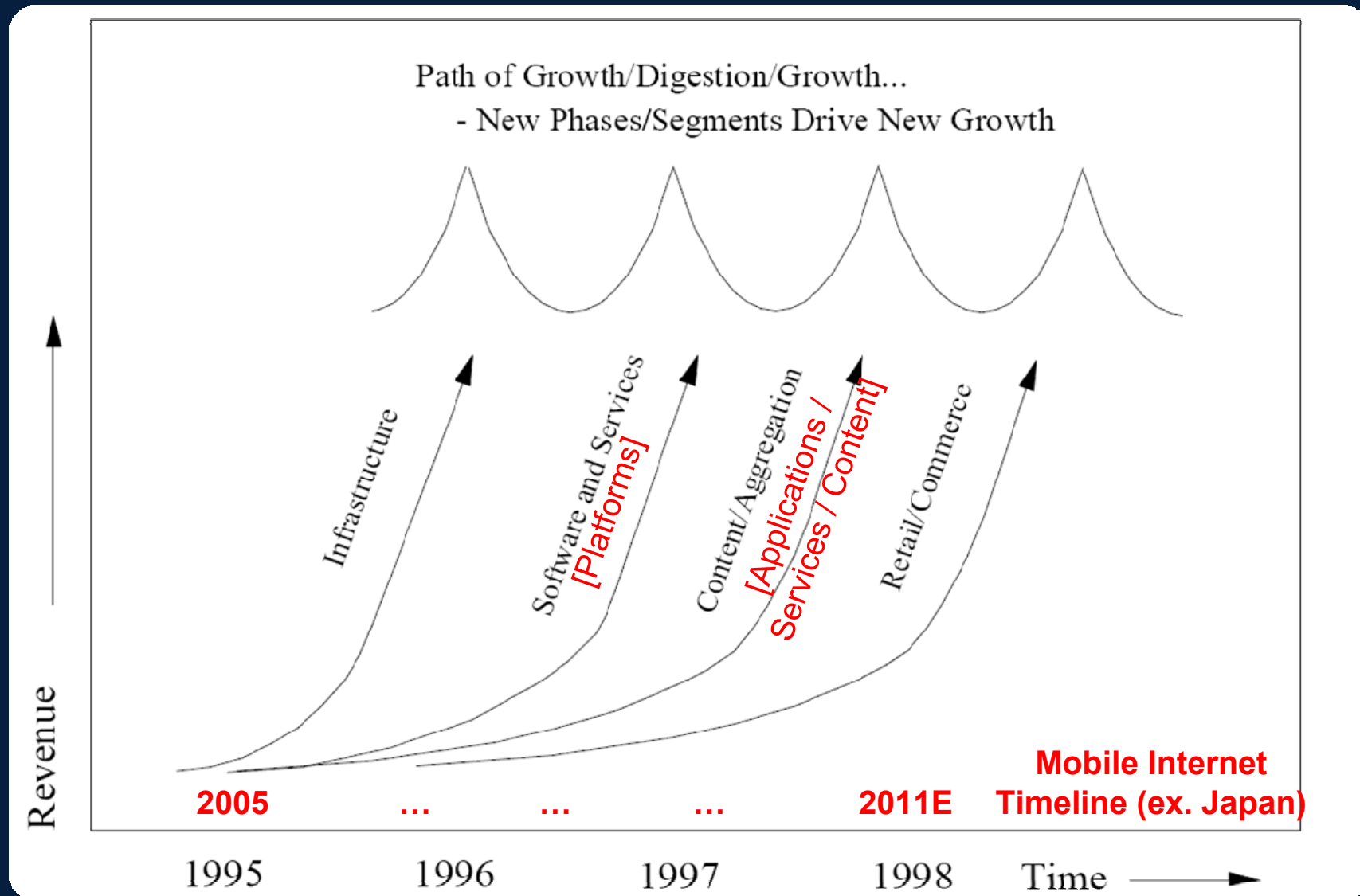
New Winners

Google
AOL
eBay
Yahoo!
Yahoo! Japan
Amazon.com
Tencent
Alibaba
Baidu
Rakuten

Mobile Internet Computing 2000s

Mobile Internet Likely to Follow Timing & Development Patterns of Desktop Internet Market

Timing & Development of Internet Market Segment – From Our 1996 Internet Retailing Report



While many telecom companies did quite well over the past 15 years, at the margin, technology companies created more wealth than telecom & media companies as global desktop Internet + voice / texting mobile markets developed.

The technology sector could garner outsized relative gains (vs. telecom) as the mobile Internet market develops and a large portion of incremental profits go to companies that drive innovation and gain scale.

It's notable that, after years in the backwaters of global mobile development, American companies (led by the likes of Apple, Facebook, Amazon.com and Google) are becoming mobile Internet innovation pacesetters.

Mobile Change Creates Opportunities & Risks

Infrastructure → Platforms → Applications / Services / Content

- **Infrastructure** – Consumer usage of wireless data (including video + images + content + communications) is growing at very rapid rates and this growth trend will likely stay in place for years as consumers demand more from their wireless devices and as companies seize opportunities to serve needs of increasingly empowered mobile users.
- **Platforms** – Three platforms are showing especially strong momentum based on consumer usage + developer interest: 1) Facebook (which is increasingly becoming a desktop + mobile communications hub); 2) mobile (clearly led by Apple's iPhone / iPod touch / iTunes ecosystem) and 3) the web (as online usage of products / services continue to gain share vs. offline counterparts and growing wireless usage expands market opportunities).
- **Applications / Services / Content** – The turn from creating new software (web-based) applications to consumer adoption may be occurring at the fastest pace in history. One need look no further than the ramp in Facebook and iPhone / iPod touch users and the breadth / depth of related services / content ecosystems. Whether it's new games like Zynga's Farmville or Tapulous's Tap Tap Revenge, web services migrated to mobile like Pandora Internet Radio or Amazon.com's store or land-based services that are especially optimized for mobile like OpenTable, many consumers are finding that their online usage rises dramatically when they have 24x7 mobile wireless access to 'cloud-based' stuff.

Mobile Change Creates Opportunities & Risks Infrastructure Companies...

- **Wireless data usage growth impacting infrastructure providers / suppliers / logistics providers** - including carriers / cable / tower companies; communications equipment / handset providers; semiconductor companies and the likes of package deliverers. All must adapt their businesses for consumer-driven share shifts.
- **For wireless carriers, scale + spectrum position + strong balance sheets are the key components for success in the mobile Internet** - scale leads to better distribution, higher operating productivity and easier access to capital, which enable carriers to purchase more spectrum, or “wireless real estate,” + equipment necessary to build robust networks for rapidly growing data traffic loads.
- **Tower companies are well positioned** – as the landlords of wireless coverage and stand to benefit from network expansion and 4G rollout.

Mobile Change Creates Opportunities & Risks

...Infrastructure Companies

- Rising demand for smartphones + surging growth in data usage are driving structural changes for telecom equipment - and will likely have significant implications on device and network vendor positioning and market shares.
- Type of capex is shifting - Equipment vendors that address key architectural shifts in 3G / 4G networks such as mobile backhaul and mobile packet core should be well positioned to capture a larger slice of the mobile capex pie.
 - Mobile packet core and wireless routing take center stage – Quality of Service, deep packet inspection and many new technologies will get developed to allow the onslaught of mobile data to coexist peacefully with real-time voice on the networks.
 - Mobile backhaul networks need massive overhaul – While the radio equipment on wireless networks is overbuilt by a factor of at least 5:1 for the actual voice traffic they carry, the backhaul parts are only 1:1 and quickly get overwhelmed by data.
- While Nokia and Chinese vendors dominate the eroding low-end / high-volume handset market, the handset battleground and profit pool has shifted to smartphones - Both Apple and RIM have demonstrated in recent years that owning the ecosystem (operating system + hardware) is critical for success in this market. We believe Apple is in the pole position for high-end handsets for the next few years but the game is not over as carriers, handset manufacturers, and software providers endeavor to trump Apple's application / ecosystem leadership, especially in non-English speaking markets.

Mobile Change Creates Opportunities & Risks Platform Companies...

- In technology, platform companies that lead technology cycles and garner the most users typically obtain the most power (and related wealth creation) – note IBM in mainframe era, DEC in minicomputer era and Microsoft in PC era. The Internet era has proved to be somewhat different as no single player has dominated ‘the platform’ by playing a crucial role in designing software + hardware. That said, Google’s success in its role as search engine (in effect, uber-aggregator) for the loose and open Internet speaks for itself.
- With the mobile Internet, NTT docomo served as Japan’s platform leader as that market developed from 1999–2005 and Apple is now in the pole position to serve that role as the mobile Internet develops over the next 2-3 years - at least in many English-speaking markets. Apple’s positioning is similar to early platform leaders in that it controls its hardware + software and is aiming to require (or inspire) users to access (and pay for) their Internet-based entertainment / applications through its iTunes distribution system via a wide range of devices - iPhone / iTouch / Macintosh / PC / Apple TV / iPod / upcoming tablet.

Mobile Change Creates Opportunities & Risks ...Platform Companies...

- The high-level riddle is - will the next stage of mobile Internet develop in a fragmented / open way (a la desktop Internet) or will it develop with leading / closed platforms as the mainframe, minicomputer and PC era did? - Apple is extremely focused on not ceding its early high-end mobile platform market leadership as it did in the early days of development of the PC market. Apple's mistake in the early 1980s hinged on two things: 1) not opening up its Macintosh operating system to other hardware manufacturers and 2) protecting its margins by keeping prices too high. This time around, we believe Apple is extremely focused on gaining wireless consumer device market share and will do what it takes to ensure it does so, including driving down hardware prices, pressuring carriers to lower or tier service plan pricing and adding new carrier and distribution partners.
- We believe Apple will extend its lead in the high-end wireless product / service market over the next few years while other players may be able to maintain share in certain areas - like RIM in enterprise and Nokia / Symbian and Samsung in some emerging markets like India and China. We believe a new entrant (like Google Android) has the best chance to serve as a more open counter-balance to Apple as handset + device manufacturers and carriers look for alternative partners in efforts to curb Apple's momentum. We expect Android-based smartphone innovation to continue to impress from many directions - from the likes of Motorola, HTC, INQ, many others, and, of course, Google.

Mobile Change Creates Opportunities & Risks

...Platform Companies

- We believe Facebook has the potential to serve as a communications platform / engine of one-to-one, one-to-some and one-to-many (and visa versa) for the mobile Internet – Facebook has already become a primary way for millions of people to stay connected and Facebook's lead is likely to be extended as more consumers use increasingly powerful mobile devices (with photo / video + high-speed access) and the communications options on Facebook (like voice / video chat and other services) continue to rise.
- Additional platform companies that appear to be well positioned for the rapid changes related to the evolution of the mobile Internet include Tencent and Skype – companies that appear to be at the most risk from rapid changes related to the evolution of the mobile Internet include Microsoft, Nintendo and Sony.

Mobile Change Creates Opportunities & Risks

Application / Service / Content Companies

- In technology, companies that create innovative applications / services / content that capitalize on new computing platforms have opportunities to build large user bases (often with recurring revenue) – note success of companies like Google, Amazon.com, eBay, Yahoo!, Oracle, SAP and Adobe.
- With the mobile Internet, we believe a bevy of ‘traditional’ Internet companies should be able to successfully capitalize on incremental growth as they have been early + aggressive in focusing on mobile opportunities – Google in search + ad serving + video, Amazon.com and Rakuten in commerce, Mixi in mobile social networking and Adobe in mobile content creation / delivery. In addition, a number of private mobile companies are emerging – including the likes of game producers Zynga and Playfish (acquired by Electronic Arts in 11/09) and mobile ad player AdMob (acquired by Google in 11/09).

Mobile Internet – Well Positioned Companies

Companies	Ticker	MS Rating	MS Analyst(s)	12/10/09	52 Week Range		Market Cap (\$B)	C2010E		Y/Y Growth	C2010E	
				Price (US\$)	High	Low		Revenue (\$B)	P/E		Comments	
<u>Infrastructure</u>												
<i>Semiconductors</i>												
Intel	INTC-US	E	Lipacis	\$20	\$21	\$12	\$113.0	\$37.7	9%	13x	CPUs + chipsets for wireless devices	
Samsung Electronics	005930-KR	O	Han	654	700	292	97.3	78.3	6	11	DRAM, NAND with MCP (Multi-Chip Package)	
Qualcomm	QCOM-US	--	--	45	49	32	75.4	--	--	--	3G chips + royalties	
Broadcom	BRCM-US	O	Lipacis	31	32	15	15.2	5.3	20	33	chipsets for wireless devices	
<i>Devices</i>												
Hon Hai	2317-TW	O	J.Lu	4	4	2	36.8	72.7	21	13	mobile device manufacturer	
<i>Wireless Communications Equipment & Services</i>												
Cisco	CSCO-US	--	--	24	25	14	139.0	--	--	--	mobile routing + packet core	
Juniper Networks	JNPR-US	--	--	27	29	12	14.4	--	--	--	mobile routing + backhaul	
Huawei	--	--	--	--	--	--	--	--	--	--	leading wireline/wireless infrastructure provider in EM	
<i>Wireless Towers</i>												
Crown Castle International	CCI-US	O	Flannery	37	39	15	10.7	1.8	8	113	highest urban exposure among tower companies	
<i>Wireless Carriers (Emerging Markets)</i>												
China Unicom	762-HK	O	Chow/Killa	1	2	1	30.7	24.2	8	38	China - 3G technology leadership + mobile data ramp	
Bharti Airtel	532454-IN	O	Jaising	7	10	5	25.5	9.0	17	14	India - best scale + balance sheet + spectrum position	
PT Telekomunikasi	TLKM-ID	O	Killa	1.0	1.0	0.5	20.9	7.8	10	13	Indonesia - strong backhaul + balance sheet position	
Mobily	7020-SA	O	Gardiner	11	12	6	8.0	3.7	8	9	S. Africa - pent-up demand + best network	
Safaricom	SAFARC-KE	O	Gardiner/Vassiouk	0.1	0.1	0.0	2.5	1.1	17	11	Kenya - pent-up demand	
<i>Wireless Carriers (Developed Markets)</i>												
AT&T	T-US	O	Flannery	28	30	21	162.9	123.4	0	12	strong scale + spectrum position + GSM	
Rogers	RCI.B-CA	O	Flannery	31	32	20	19.1	11.5	4	13	wireless data leader, great asset mix	
Iliad	ILD-FR	E	Delfas	118	128	74	6.5	3.1	6	16	Wi-Fi + 3G combo	
<u>Platforms</u>												
Apple	AAPL-US	O	Huberty	193	209	78	174.1	47.9	25	22	high-end mobile device ecosystem	
Tencent	700-HK	O	Ji	19	20	5	35.1	2.5	41	37	China - expanding online community into mobile	
Mixi	2121-JP	O	Nema	9,115	9,825	2,957	1.4	0.2	33	34	social networking + platform play	
Facebook	--	--	--	--	--	--	--	--	--	--	communications platform	
Skype	--	--	--	--	--	--	--	--	--	--	VoIP (Wi-Fi now, 3G later)	
<u>Applications / Services / Content</u>												
Google	GOOG-US	O	Meeker/Devitt	585	595	283	185.6	27.6	17	26	search + video + ad platform + apps + mobile OS	
Amazon.com	AMZN-US	O	Meeker/Devitt	138	146	48	59.6	28.8	22	58	commerce + e-books + cloud computing	
Adobe	ADBE-US	O	Holt	37	37	16	19.1	3.5	19	23	mobile content and app creation tools	
Rakuten	4755-JP	O	Nema	759	825	433	9.8	3.4	8	19	commerce	
<u>Other</u>												
FedEx	FDX-US	E	Greene	88	91	34	27.5	35.3	9	18	commerce shipping	

Mobile Internet – Potentially Challenged Companies

Companies	Ticker	MS Rating	MS Analyst(s)	12/10/09 Price (US\$)	52 Week Range		Market Cap (\$B)	C2010E	Y/Y Growth	C2010E	Comments	
					High	Low		Revenue (\$B)		P/E		
Infrastructure												
Devices												
Nokia	NOK1V-FI	U	Dawson	\$13	\$17	\$8	\$46.8	\$59.8	1%	13x	rising competition at high-end	
RIM	RIM-CA	--	--	59	88	35	33.6	--	--	--	OS not optimized for browsing experience	
Sony-Ericsson	--	--	Dawson /Standaert	--	--	--	--	--	--	--	losing handset share	
Wireless Communications Equipment & Services												
Nokia-Siemens Networks	--	--	Standaert/ Dawson	--	--	--	--	--	--	--	lack competitive products	
Tellabs	TLAB-US	--	--	6	8	4	2.2	--	--	--	shift to ethernet places legacy business at risk	
Wireless Carriers (Developed Markets)												
Sprint	S-US	U	Flannery	4	6	2	10.6	31.4	-3	--	weak spectrum / technology position	
KDDI	9433-JP	E	Tanaka	5,537	7,041	4,271	24.5	38.8	-1	8	brand image needs improvement	
eAccess	9427-JP	E	Tanaka	693	851	498	1.0	0.9	-8	7	facing stiffer competition in mobile data	
Platforms												
Microsoft	MSFT-US	O	Holt	30	30	15	266.2	63.5	10	15	limited success in mobile OS	
Nintendo	7974-JP	O	Ono	232	406	224	32.5	16.6	-11	10	handheld gaming (DS) challenged by iPhone	
Sony	6758-JP	O	Ono	28	31	15	28.2	76.9	0	15	handheld gaming (PSP) challenged by iPhone	

Mobile Internet – Unclearly Positioned Companies

Companies	Ticker	MS Rating	MS Analyst(s)	12/10/09	52 Week Range		Market Cap (\$B)	C2010E		Y/Y Growth	C2010E	
				Price (US\$)	High	Low		Revenue (\$B)	P/E		Comments	
<u>Infrastructure</u>												
<u>Semiconductors</u>												
MediaTek	2454-TW	O	B.Lu / C.Chan	\$16	\$17	\$6	\$17.1	\$4.4	20%	13x	2G advantage in EM offset by 3G / smartphone slow start	
Marvell	MRVL-US	O	Devgan	18	19	6	11.2	3.4	22	16	mobile phone processor provider lacks tier-1 wins	
<u>Devices</u>												
HP	HPQ-US	O	Huberty	50	51	25	118.1	122.3	5	11	server & storage exposure but undefined mobile strategy	
Dell	DELL-US	E	Huberty	13	17	8	26.3	58.2	12	10	mix skewed towards PCs and desktops	
Motorola	MOT-US	--	--	8	9	3	18.9	--	--	--	Android 2.0 early mover, unclear if can differentiate in long-term	
Western Digital	WDC-US	U	Huberty	39	40	11	8.9	9.1	13	9	storage demand increases but SSD implications unclear	
HTC	2498-TW	O	J.Lu	11	16	9	8.7	5.3	18	11	Android early mover, but execution holds key to branding	
Seagate	STX-US	E	Huberty	17	17	3	8.3	11.1	12	7	storage demand increases but SSD implications unclear	
Palm	PALM-US	--	--	12	18	2	1.7	--	--	--	unclear that limited user base can attract developers	
<u>Wireless Communications Equipment & Services</u>												
Ericsson	ERIC.B-SE	U	Standaert	9	11	7	31.0	29.3	-1	19	service upside limited by network equipment downside	
ZTE	763-HK	U	J.Lu	6	6	2	7.1	10.8	20	27	predominates in Asia / Pacific market but lacks tier-1 wins	
Alcatel-Lucent	ALU-FR	E	Standaert	3	5	1	7.8	22.1	-3	29	wireline strength offset by wireless weakness	
<u>Wireless Carriers (Emerging Markets)</u>												
MTN	MTN-ZA	E	Gardiner/Vassiouk	15	18	8	29.0	16.1	7	11	significant market opportunity but strategy unclear	
<u>Wireless Carriers (Developed Markets)</u>												
Telefonica	TEF-ES	O	Prota/Delfas	29	30	17	137.5	84.0	2	2	pricing transition (from overpriced voice to data)	
Vodafone	VOD-GB	O	Delfas	2	2	2	121.8	71.7	16	9	pricing transition (from overpriced voice to data)	
Verizon	VZ-US	E	Flannery	33	35	26	92.9	108.5	1	14	strong scale + spectrum position but LTE timing unclear	
ClearWire	CLWR-US	U	Flannery	6	9	3	4.3	0.5	75	--	fastest network but WiMAX ecosystem unproven	
<u>Cable</u>												
Comcast	CMCSA-US	E	Swinburne	16	18	11	46.0	37.1	4	12	content owner + WiMAX wholesaler	
Cablevision	CVC-US	O	Swinburne	25	26	9	7.5	7.0	-9	16	building Wi-Fi network to cover cable footprint	
<u>Platform</u>												
DeNA	2432-JP	E	Nema	5,480	5,786	2,485	2.6	0.5	11	25	unclear strategy	
Gree	3632-JP	O	Nema	51	64	21	2.2	0.4	17	16	leader of mobile games, but competition is fierce	
<u>Applications / Services / Content</u>												
eBay	EBAY-US	E	Meeker/Devitt	24	26	10	30.6	9.9	13	19	new competition	
Yahoo!	YHOO-US	--	Meeker/Devitt	15	18	11	21.3	--	--	--	new competition	
Yahoo! Japan	4689-JP	O	Nema	303	430	229	17.4	3.4	8	18	slow start in mobile with unclear strategy	

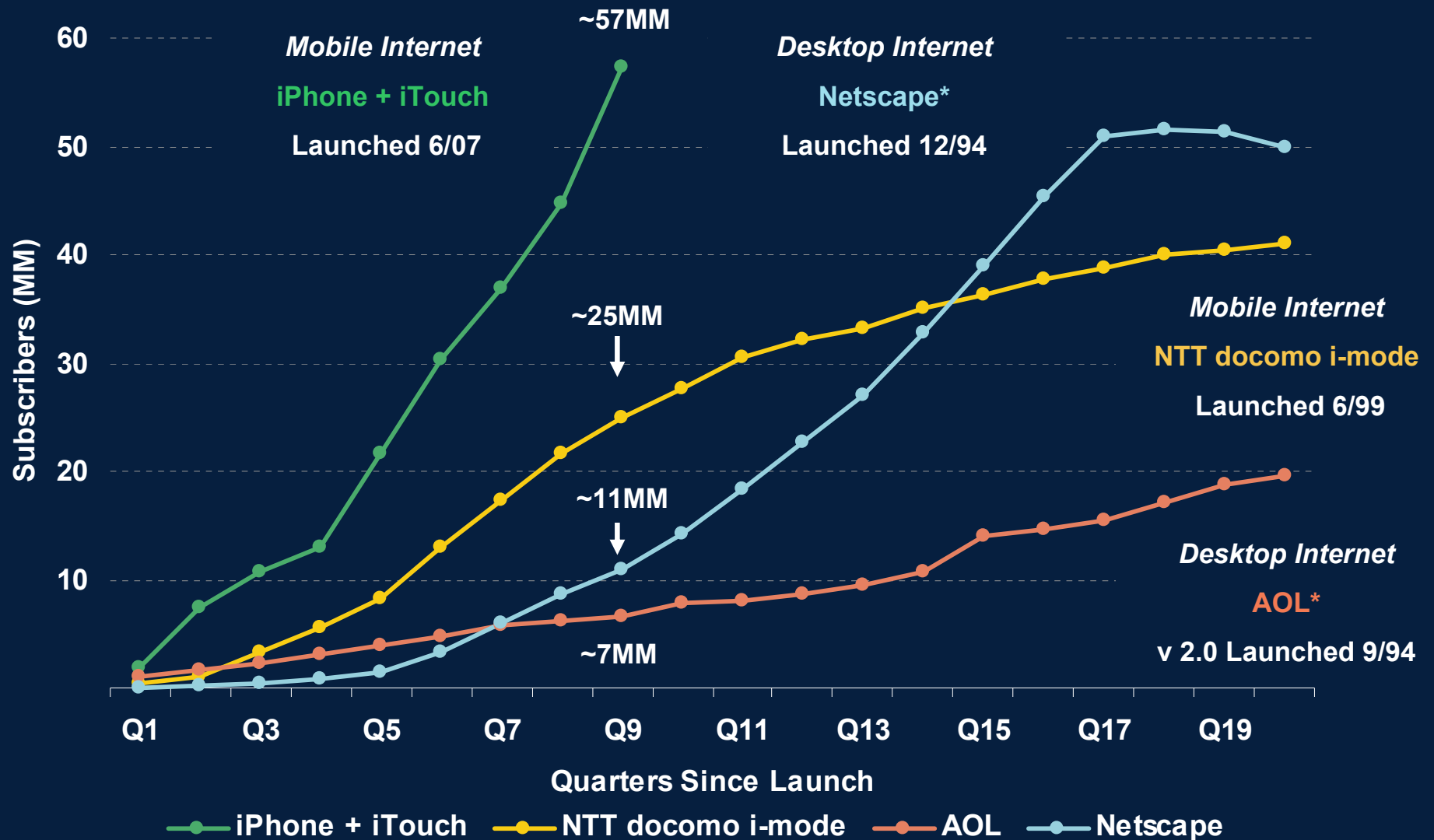
*Mobile Ramping Faster than Desktop Internet Did and Will
Be Bigger Than Most Think –
5 Trends Converging (3G + Social Networking + Video +
VoIP + Impressive Mobile Devices)*

*Regarding pace of change, we believe more users will
likely connect to the Internet via mobile devices than
desktop PCs within 5 years*

Mobile Internet Outpaces Desktop Internet Adoption

iPhone + iTouch Users = 8x AOL Users 9 Quarters After Launch

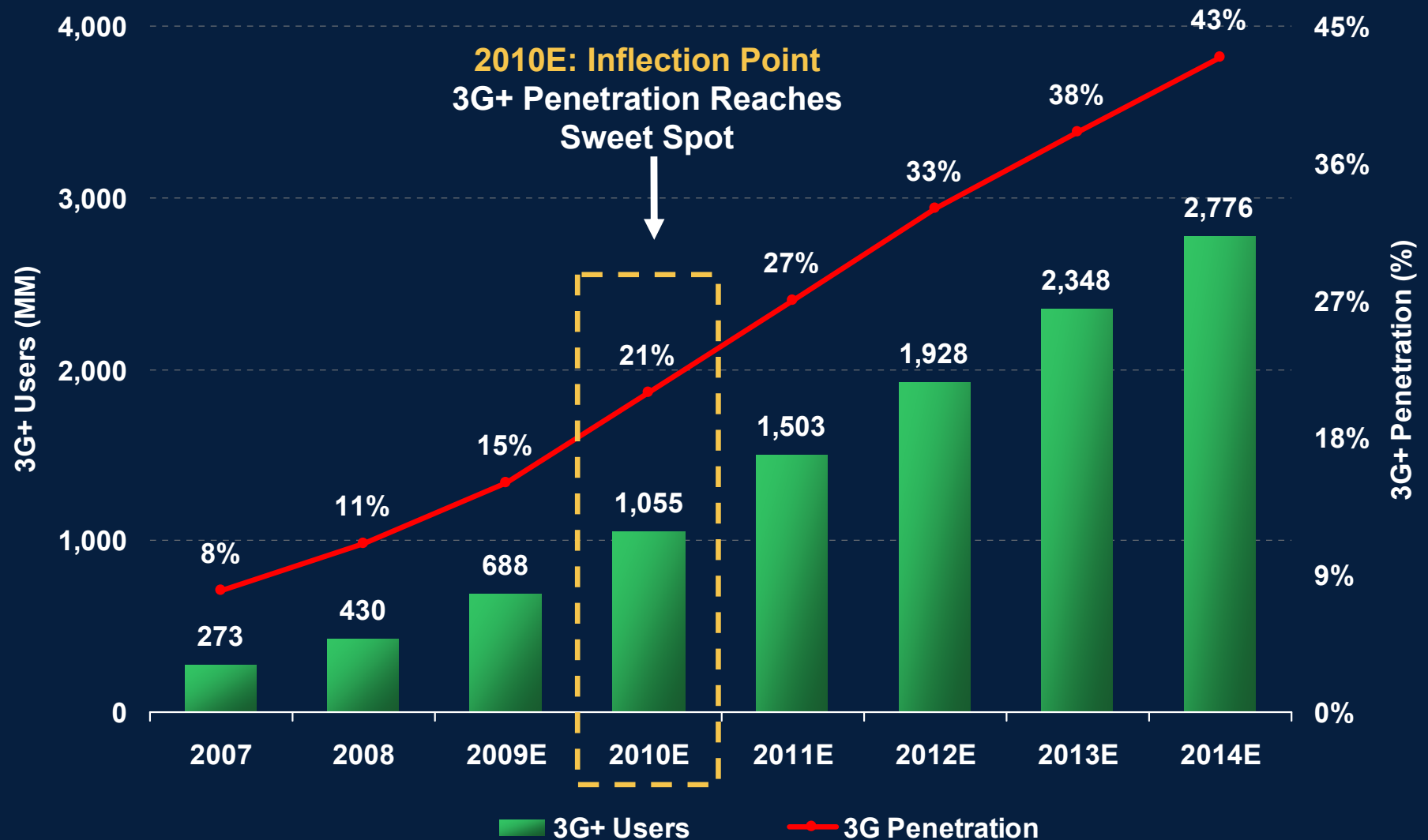
iPhone + iTouch vs. NTT docomo i-mode vs. AOL vs. Netscape Users
First 20 Quarters Since Launch



*3G Adoption =
Hitting Inflection Points*

Global 3G Subscribers = 2010E 'Mainstream' Inflection Point, Penetration >20%

Global 3G+ Subscribers & Penetration, 2007 – 2014E



3G Penetration Inflection Points Vary by Region

W. Europe + N. America = 2007–2008, ROW = 2010E-2014E

3G* Connections & Penetration by Region, 2007 – 2014E

(All connection numbers in 000s)

	2007	2008	2009E	2010E	2011E	2012E	2013E	2014E
Western Europe	79,617	126,724	205,962	299,220	381,422	448,691	499,686	549,615
3G Penetration	17%	25%	39%	54%	67%	77%	85%	92%
Japan	72,690	88,434	101,320	110,823	116,581	120,463	123,217	124,770
3G Penetration	72%	84%	91%	96%	98%	99%	99%	100%
Asia / Pacific (ex. Japan)	50,163	83,514	151,192	295,230	482,981	693,995	918,063	1,135,626
3G Penetration	4%	5%	7%	13%	19%	25%	31%	37%
North America	53,307	83,460	116,575	145,683	177,451	204,835	231,271	260,575
3G Penetration	20%	29%	38%	46%	54%	61%	67%	74%
Eastern Europe	8,785	19,918	40,944	72,321	120,291	139,960	166,288	199,977
3G Penetration	2%	5%	9%	16%	26%	29%	34%	40%
Middle East & Africa	5,781	18,424	50,409	91,085	165,564	239,805	309,251	383,238
3G Penetration	1%	3%	7%	12%	19%	25%	30%	35%
South & Central America	3,126	9,265	21,875	40,448	59,107	80,087	100,027	122,258
3G Penetration	1%	2%	4%	7%	10%	12%	15%	17%
Total	273,469	429,739	688,278	1,054,810	1,503,397	1,927,837	2,347,804	2,776,058
3G Penetration	8%	11%	15%	21%	27%	33%	38%	43%

3G Growth Concentrated in Developed Markets – USA Now Leading in Users + Innovation (Surpassed Japan Users in CQ1)

Rank	Country	CQ2:09 3G Subs (000)	3G Penetration	CQ2 Net Adds	3G Sub Growth		3G Net Adds		% of Global 3G Net Adds	2G +3G Net Adds (000)	Implied 2G Net Adds (Losses) (000)
					Y/Y	Q/Q	Y/Y Growth	%of 3G Subs			
1	USA	103,110	37%	6,599	55%	7%	21%	6%	18%	3,207	-3,392
2	Japan	94,813	87	2,987	16	3	-10	3	8	1,002	-1,985
3	South Korea	33,849	71	1,973	24	6	-26	6	5	839	-1,135
4	Italy	26,773	33	784	21	3	328	3	2	-1,660	-2,444
5	UK	21,711	29	1,844	52	9	29	8	5	269	-1,575
6	Germany	20,408	20	1,603	43	9	-7	8	4	147	-1,456
7	Spain	20,192	38	1,394	47	7	-18	7	4	411	-983
8	France	14,337	25	1,314	75	10	62	9	4	831	-483
9	Australia	12,689	52	923	41	8	-16	7	3	700	-223
10	Indonesia	11,994	9	1,195	71	11	-2	10	3	1,639	444
11	Poland	11,821	27	1,293	93	12	48	11	4	414	-880
12	Taiwan	6,719	27	777	94	13	33	12	2	483	-294
13	Malaysia	6,276	22	805	151	15	24	13	2	351	-454
14	Brazil	5,730	4	1,720	481	43	-853	30	5	6,101	4,381
15	South Africa	5,413	11	568	101	12	73	10	2	1,292	724
16	Russia	5,224	3	1,418	426	37	75	27	4	6,678	5,259
17	Portugal	4,973	33	307	31	7	33	6	1	155	-152
18	Saudi Arabia	4,498	14	514	47	13	150	11	1	2,698	2,184
19	Sweden	4,382	37	248	35	6	-31	6	1	57	-191
20	Canada	4,309	20	649	75	18	228	15	2	307	-342
21	Netherlands	4,133	22	324	38	8	42	8	1	278	-45
22	Austria	3,949	37	356	53	10	41	9	1	123	-233
23	Romania	3,914	14	346	65	10	50	9	1	684	338
24	Israel	3,629	39	358	50	11	30	10	1	110	-248
25	Greece	3,155	17	372	134	13	94	12	1	471	99
26	Egypt	2,904	6	364	103	14	145	13	1	3,809	3,445
27	Hong Kong	2,777	28	163	23	6	-5	6	0	178	15
28	Singapore	2,739	41	136	28	5	-37	5	0	106	-30
29	UAE	2,684	26	106	19	4	0	4	0	76	-31
30	Philippines	2,617	4	199	59	8	-22	8	1	1,772	1,573
Top 30		451,723	25%	31,640	44%	8%	23%	7%	88%	33,527	1,887
Global		484,974	11%	36,130	46%	8%	29%	7%	100%	142,704	106,574

Note: *Informa reports a slightly lower global 3G subscriptions and penetration level vs. Ovum due to the exclusion of 4G and the use of different sources. 3G includes CDMA 1x EV-DO and Rev. A / B, WCDMA, HSPA; Source: Informa WCIS+, Morgan Stanley Research.

3G is Key to Success of Mobile Internet

But Wireless Options – Across-the-Board – are Growing Rapidly



- **GPS** – 421MM+ chipsets sold in 2008E, **+57% Y/Y**; Cell Phones / PDAs = 60% of GPS shipments.



- **3G** – 485MM global users, **+46% Y/Y** in CQ2, >11% mobile user penetration, rising to 44% by 2013E...Japan / W. Europe / USA already >30% penetration.



- **Wi-Fi** – 319MM chipsets sold in 2008E, **+42% Y/Y** with 862MM installed base; estimate 60% of iPhone / iTouch usage may be on Wi-Fi, providing a crucial (and ~10x faster) offload to stressed 3G networks.

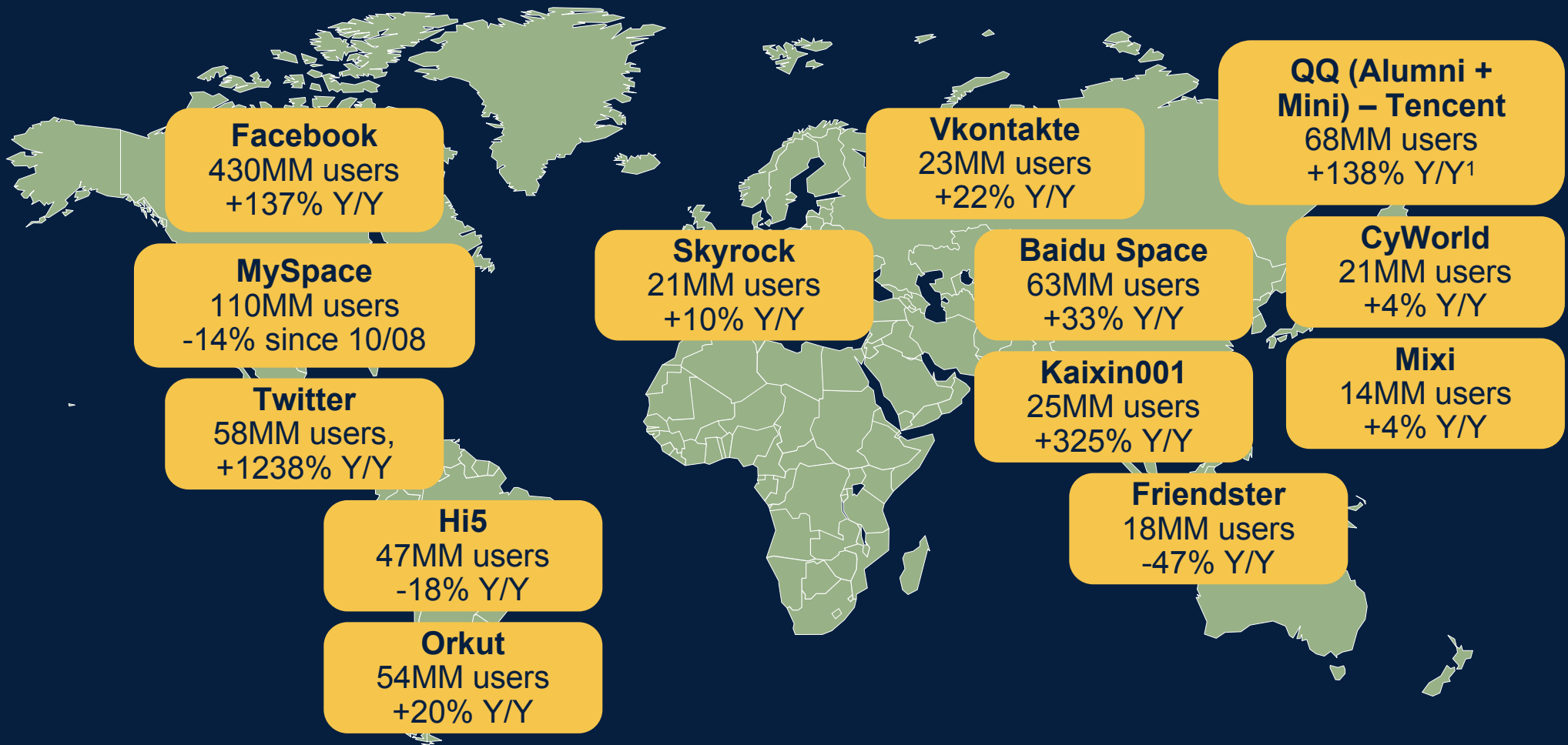


- **Bluetooth** – 1.3B Bluetooth-enabled units shipped in 2008, **+45% Y/Y**; 2B+ Bluetooth devices in use.

*Social Networking =
Consumers Want to Connect via
Wired + Wireless Internet*

Social Networking – Global Phenomenon, Facebook Leading, Though Many Regional Strongholds

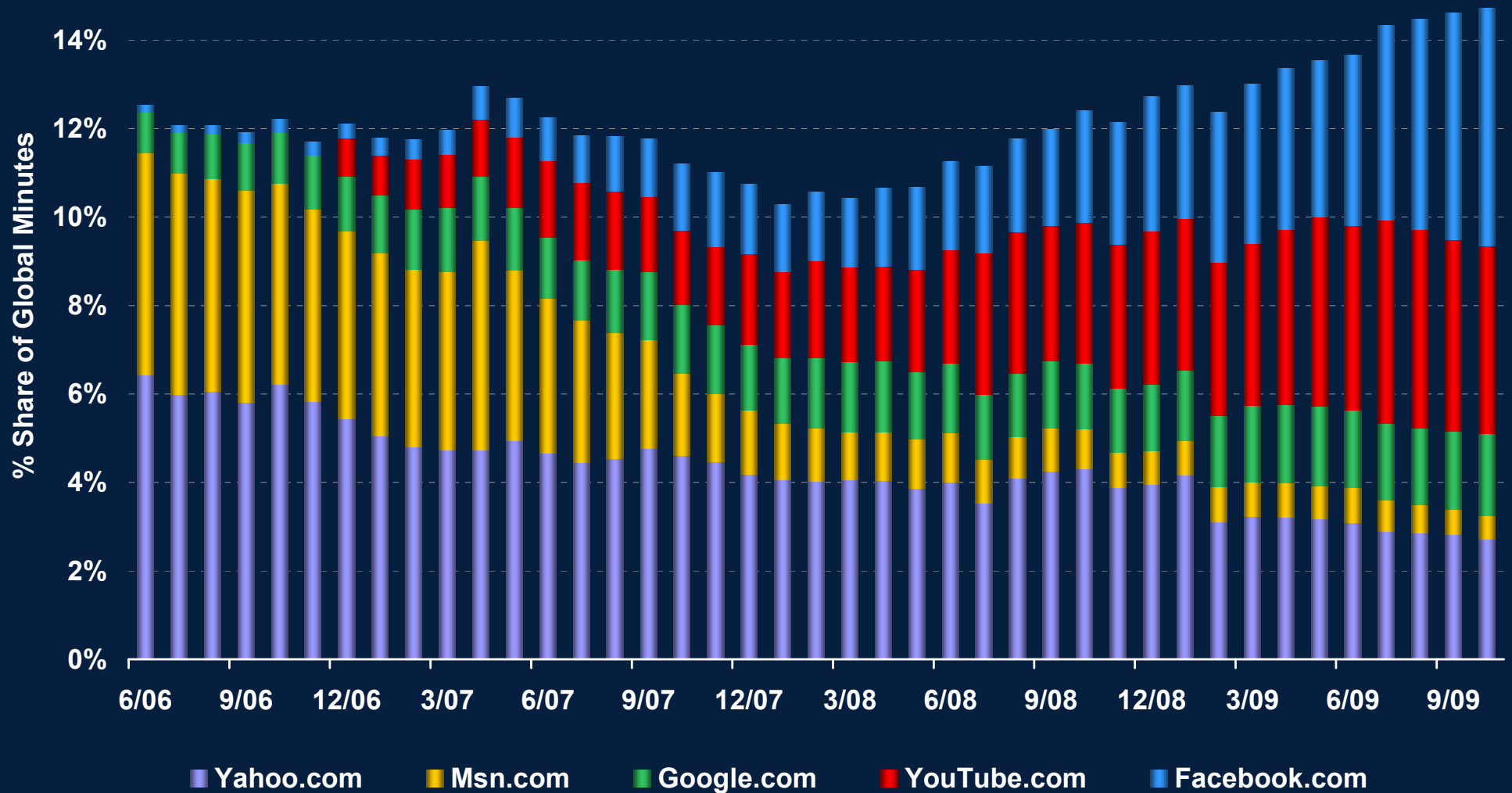
Global Social Networking Web Sites*
830MM Unique Users, +20% Y/Y; 188MM Total Minutes, +25% Y/Y, 10/09



*Note: *Global social networking websites exclude application-based networks such as IM networks. 1) QQ.com social networks (Tencent properties) Y/Y growth since 1/09, data unavailable prior to 1/09 for QQ.com Mini. Usage stats are 'unique visitors', per comScore global 10/09, may differ materially from company-disclosed 'registered accounts' stats. Other notable social networks include Windows Live Profiles, 56.com, Deviantart, Digg, Buzz Media, and Bebo. Source: comScore 10/09, Morgan Stanley Research.*

Facebook (+ YouTube) = Largest Share Gainers of Global Online Usage Over Past 3 Years

Share of Global Online Time Spent, 6/06 – 10/09



Facebook = Garnering Rising Share of Communications

Unified Communications + Multimedia Creation Tool / Repository in Your Pocket



*Video =
Consumers Want to Find + Select + Watch
Video via Wired + Wireless Internet*

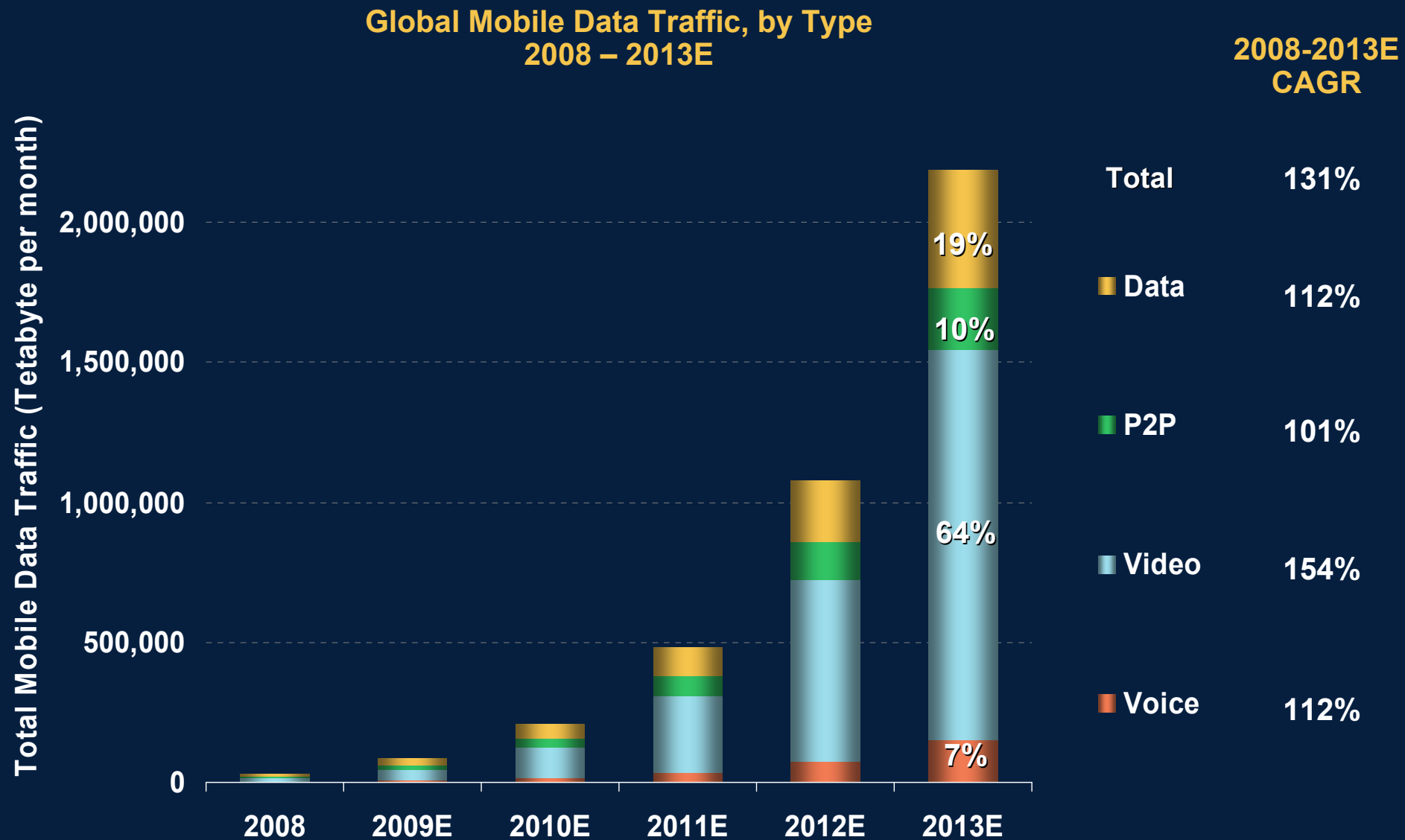
Consumers Have Voted for Video on Desktop

Mobile Usage Likely to Follow

- **466MM** YouTube global users, +35% Y/Y; **73B** minutes of video watched, +70% Y/Y, 10/09
- **42MM** Hulu USA users, +77% Y/Y, 10/09
- **167MM** online video USA users, +14% Y/Y; **109B** minutes of video watched, +169% Y/Y, 10/09
- **54MM** global Internet-enabled set-top boxes (Xbox360, Sony PS3, TiVo, Slingbox, Vudu, Roku...), +59% Y/Y in 2008 – transforming TVs into Internet streaming / on-demand video terminals
- **Mobile video usage could surprise on upside** – **32%** of Americans have used Internet on mobile devices (4/09), up from 24% (12/07).

Video Driving Rapid Growth in Mobile Internet Traffic

Mobile Data Traffic to Rise 66x by 2013E (131% CAGR)



*VoIP =
Consumers Want to Chat
(via Voice + Messaging + Video)
via Wired + Wireless Internet*

If VoIP Leader Skype Were a Carrier, it Would be Largest 'Carrier' in World

521MM Registered Users (+41% Y/Y) & +8% of Cross-Border Calling Minutes

Rank*	Company	Type	Region	Subscribers (MM)	Y/Y Growth	Blended ARPU (US\$)	Y/Y Growth	Market Cap (\$B)
1	China Mobile	Wireless	China	493	19%	\$11	-10%	\$192
2	Vodafone	Wireless	Europe	303	23	37	3	123
3	Telefonica Moviles / O2	Wireless	Europe / LatAm	206	9	41	-9	137
4	China Telecom	Wireline	China	194	-9	11	4	38
5	America Movil	Wireless	LatAm	194	13	13	4	80
6	Telenor	Wireless	Europe / Asia	172	8	20	-3	24
7	T-Mobile	Wireless	Europe / USA	150	6	37	-3	64
8	China Unicom	Wireless	China	145	10	6	-4	32
9	Orange	Wireless	Europe	129	9	50	0	69
10	Bharti Airtel	Wireless	India	111	43	5	-22	25
11	China Unicom ⁽¹⁾	Wireline	China	108	10	9	-18	32
12	MTN Group	Wireless	Africa	108	34	15	-2	28
13	Mobile TeleSystems	Wireless	Europe	101	2	8	-28	20
14	Orascom	Wireless	Africa / Asia	89	12	6	-11	24
15	Verizon Wireless	Wireless	USA	86	6	51	-2	86
16	AT&T Mobility	Wireless	USA	82	9	51	1	155
17	Telkom Indonesia	Wireless	Asia	80	32	3	-13	19
18	Telecom Italia Mobile	Wireless	Europe / LatAm	72	2	37	2	30
19	VimpelCom	Wireless	Russia	61	20	13	7	6
20	NTT docomo	Wireless	Japan	55	2	61	-8	64
21	AT&T ⁽²⁾	Wireline	USA	54	-3	80	-1	155
22	Deutsche Telekom	Wireline	Europe	54	-2	62	0	64
23	BSNL ⁽³⁾	Wireless	India	52	44	3	-35	--
24	Turkcell	Wireless	Europe	49	-4	13	-24	15
25	China Telecom	Wireless	China	47	--	8	--	38
Total				3,195	10%	\$23	2%	\$1,520

Skype ⁽⁵⁾

521MM
Registered
Users

(+41% Y/Y)

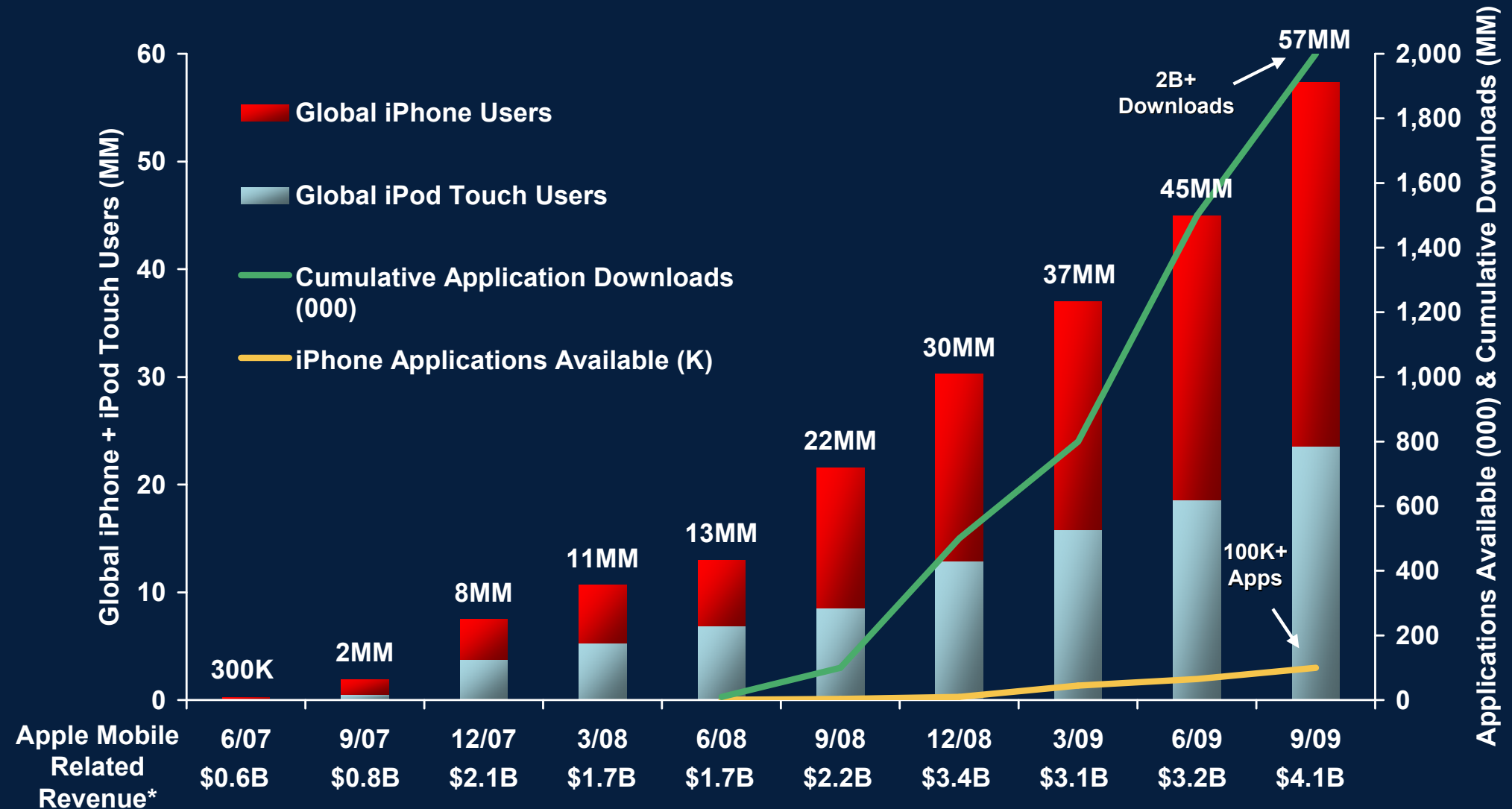
* Ranking is based on subscribers. Subscribers / ARPU data as of latest quarter (CQ3:09 or CH1:09 for some carriers who report on semi-annual basis). Market Cap as of 11/17/09. Total market value excluding duplicates = \$1,231MM; (1) China Netcom merged with China Unicom in 10/08; (2) AT&T / Verizon / DT's wireline ARPU is revenue per RGU (revenue generating unit) and include business lines; (3) BSNL is owned by the Indian government. (5) Subscriber figure for Skype is registered user amount as of CQ3:09, cross-border calling minutes as of C2008, per Telegeography. Source: Company Reports, Telegeography, Morgan Stanley Research.

*Impressive Mobile Devices =
Apple's iPhone + iTouch + App Store Launches Over
Past 2.5 Years Created the Spark for Mobile Internet
Liftoff as Microsoft's Launch of Windows 3.0 did for
the PC in 1990 and the Netscape Browser (and its
IPO) did for the Desktop Internet in 1995*

Apple iPhone / iPod = Fastest New Tech Device / Ecosystem Ramp in History

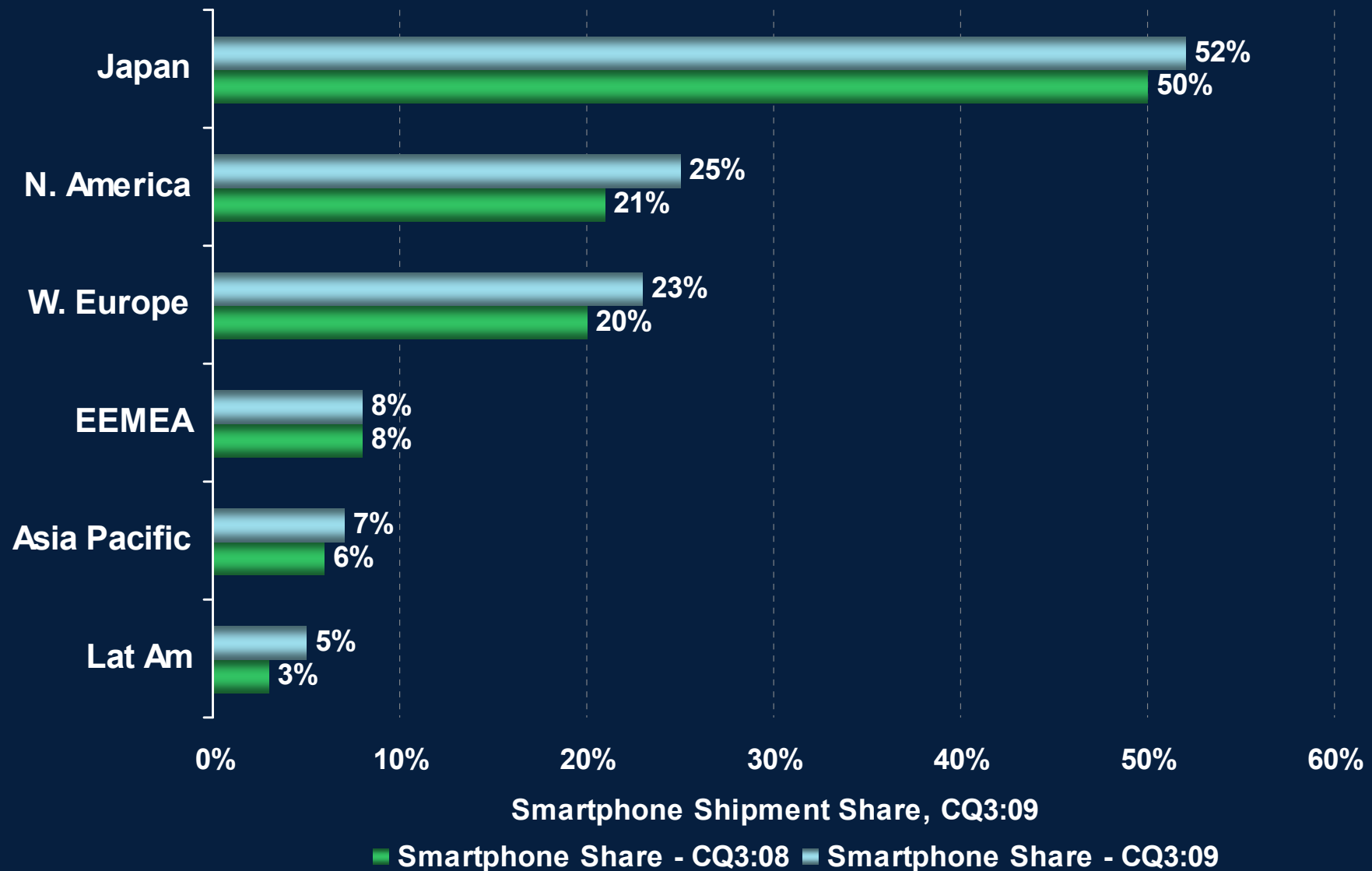
Great UI + Developer Tools + Hardware + Distribution + Powerful Connectivity (Wi-Fi + 3G)

iPhone / iPod Ecosystem – Subscribers, Apps Available & Downloads, 6/07 – 9/09



Impressive / Rapid Growing Smartphone Share Especially in Developed Markets

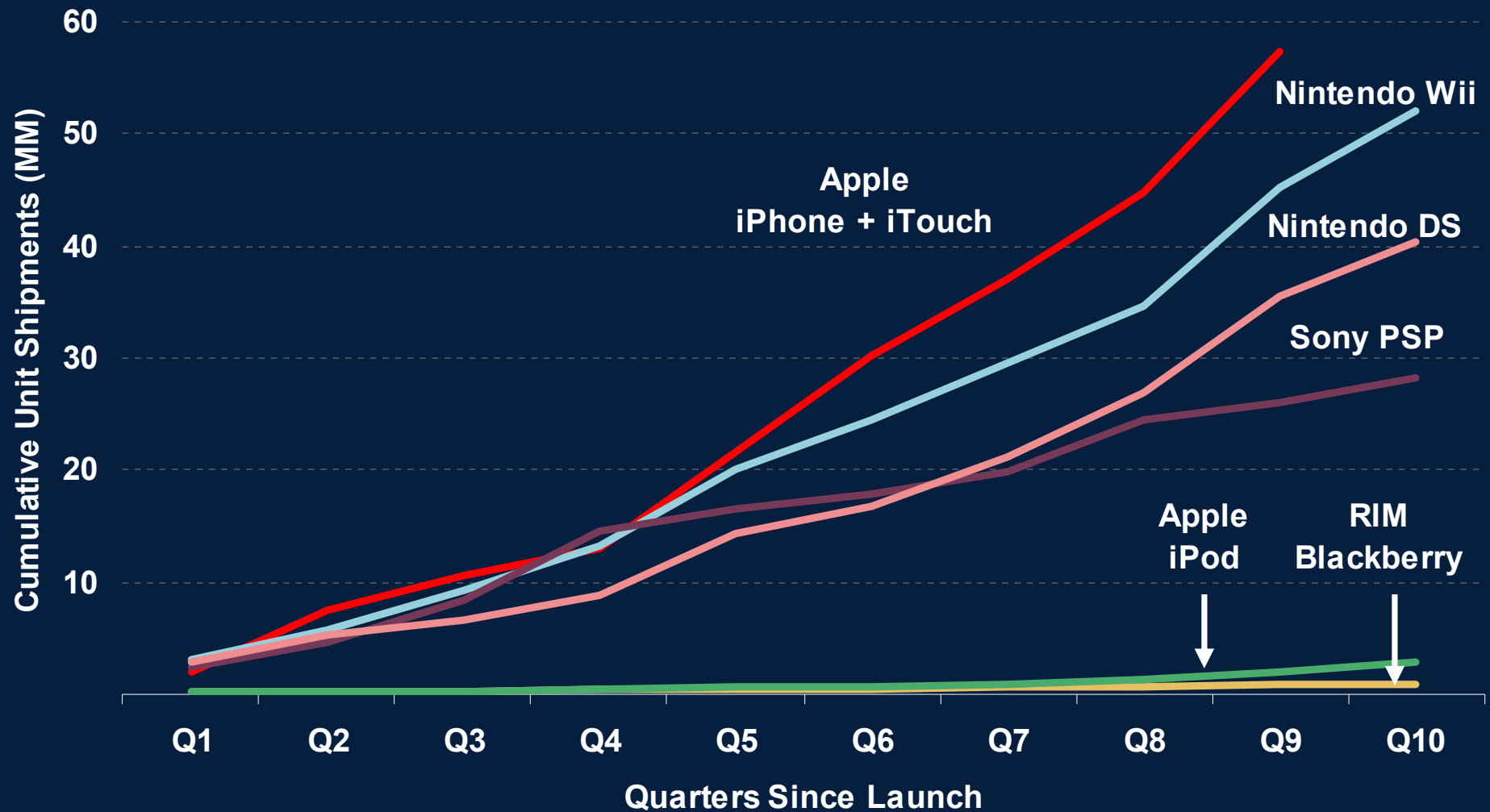
Smartphone Share of Total Handset Shipments, by Region, CQ3:08 + CQ3:09



*Apple Leading in Mobile Innovation + Impact, for Now
– Depth of App Ecosystems + User Experience +
Pricing Will Likely Determine Long-Term Winners.*

Momentum Favors Apple iPhone + iPod Ecosystem – Fastest User Growth in Consumer Technology History

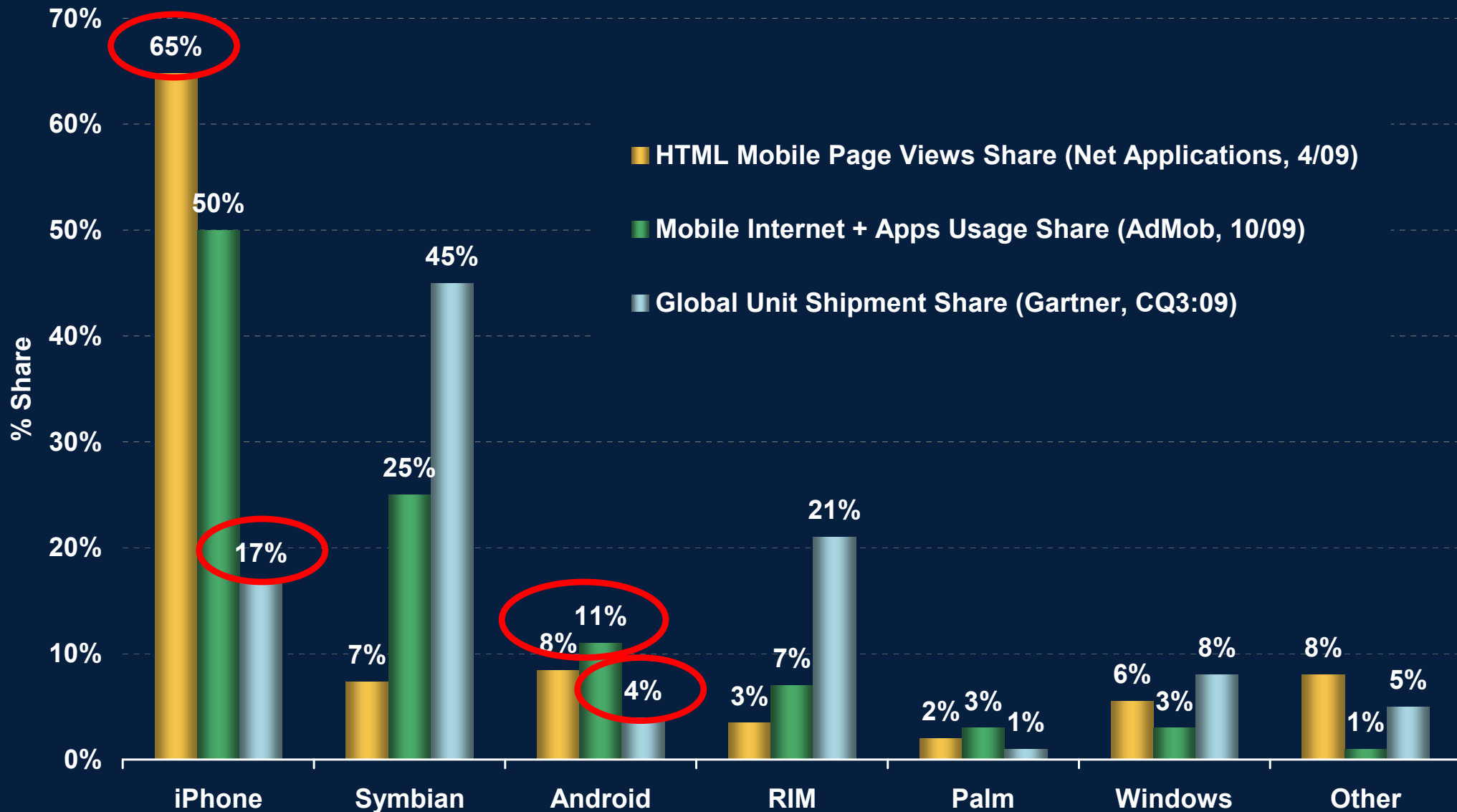
Global Cumulative Unit Shipments in First 10 Quarters
iPhone + iPod vs. Wii / DS / PSP / iPod / BlackBerry



Note: iPhone launched in CQ2:07; iPod launched in CQ4:01; Wii launched in CQ4:06; DS launched in CQ4:04; PSP launched in CQ1:05; BlackBerry smartphone launched in C2002. Source: Apple, Nintendo, Sony, RIM, Katy Huberty, Morgan Stanley Research.

iPhone + Android Mobile Internet Usage Much Higher than Shipment Share = Implies High Probability of On-Going Share Gains Based on Consumer Voting

Global Smartphone Share of HTML Mobile Page View / Mobile Internet + Apps Usage / Unit Shipments



Morgan Stanley

Note: Net Applications collects data from ~160MM monthly visitors on mobile devices that render full HTML pages and JavaScript. Visits to WAP pages are excluded.

Source: AdMob Mobile Metrics Report (10/09), Net Applications (4/09), Gartner (CQ3:09).

In Technology, Products with Most / Best Apps Usually Win – In Mobile, Apple is Clear Leader and Newcomer Android Has Quickly Surpassed the Old Guard

	iPhone App Store	Android App Market	Blackberry App World	Windows Mobile Marketplace	Palm App Catalog	Nokia Ovi Store	Samsung Mobile Applications	LG Application Store	Sony Ericsson Playnow Arena	Verizon Vcast App Store
Launch Date	7/08	10/08	4/09	CH2:09E	6/09	5/09	1/09	7/09	CQ4:09E	CQ4:09E
Number of Apps	100K+	15K	3.5K	--	525	6K	3.7K	1.4K	3.7K	--
Apps Downloaded	2B+	40MM	--	--	1MM	50MM	--	--	--	--
Billing System	iTunes	Google Checkout / Carrier	PayPal	Carrier / Credit Card	Credit Card	Carrier / Credit Card	Credit Card / PayPal	Carrier / Credit Card	Carrier / Credit Card	Carrier / Credit Card
Developer Share	70%	70%	80%	70%	70%	70%	70%	80%	--	70%
Developer Fee	\$99 One Time	\$25 One Time	\$200 One Time	\$99 One Time	\$99 One Time	Free	Free	--	Free	--
Notable Restrictions	Apple / Carrier Demands	Carrier Demands	Carrier Demands	Carrier Demands	Non-native SDK	Carrier Demands	Potential compatability	Potential compatability	Potential compatability	Potential compatability
Client presence	Phone + iTunes	Phone Only	Phone Only	Phone Only	Phone Only	Phone + Web	Web Only	Phone + Web	Phone + Web	Phone + Web

*Game-Changing Communications / Commerce Platforms
(Social Networking + Mobile) Emerging Very Rapidly.*

Facebook + Apple iPhone / iTouch =

Driving Independent / Overlapping Innovation / Usage in Social Networking + Mobile Platforms

Facebook

**Apple iPhone
/ iTouch**

**430MM users
+137% Y/Y**

**350K+ Apps
500MM+ Downloads**

**57MM users
+163% Y/Y**

**100K+ Apps
2B+ Downloads**

**Social
Networking**

Mobile

Facebook = 500MM+ App Downloads

Vibrant Developer / Application Platform Ecosystem = 350K Apps*, +10x Y/Y

Category	# of Applications	% of Total	Top 100 Apps' Monthly Active Users (MM)	# of Apps w/ 1MM+ MAUs
Games	13,537	23%	418	56
Lifestyle	4,778	8	42	8
Utilities	4,604	8	59	8
Education	2,279	4	66	5
Entertainment	2,015	3	76	11
Business	1,981	3	5	1
Sports	1,431	2	5	0
Just For Fun	400	1	44	10
Friends & Family	61	0	37	3
Overall*	59,427		752	102

Note: Category breakdown per Facebook, one application can belong to multiple categories or belong to no category; Overall statistics per AppData, which reports a lower active apps count than Facebook's reported 350,000+ apps "built to date".*

Source: Facebook, AppData as of 11/09, Morgan Stanley Research.

Apple iPhone / iTouch = 2B+ App Downloads (+~14x) – (~35 per User) – Games + Books + Entertainment Lead

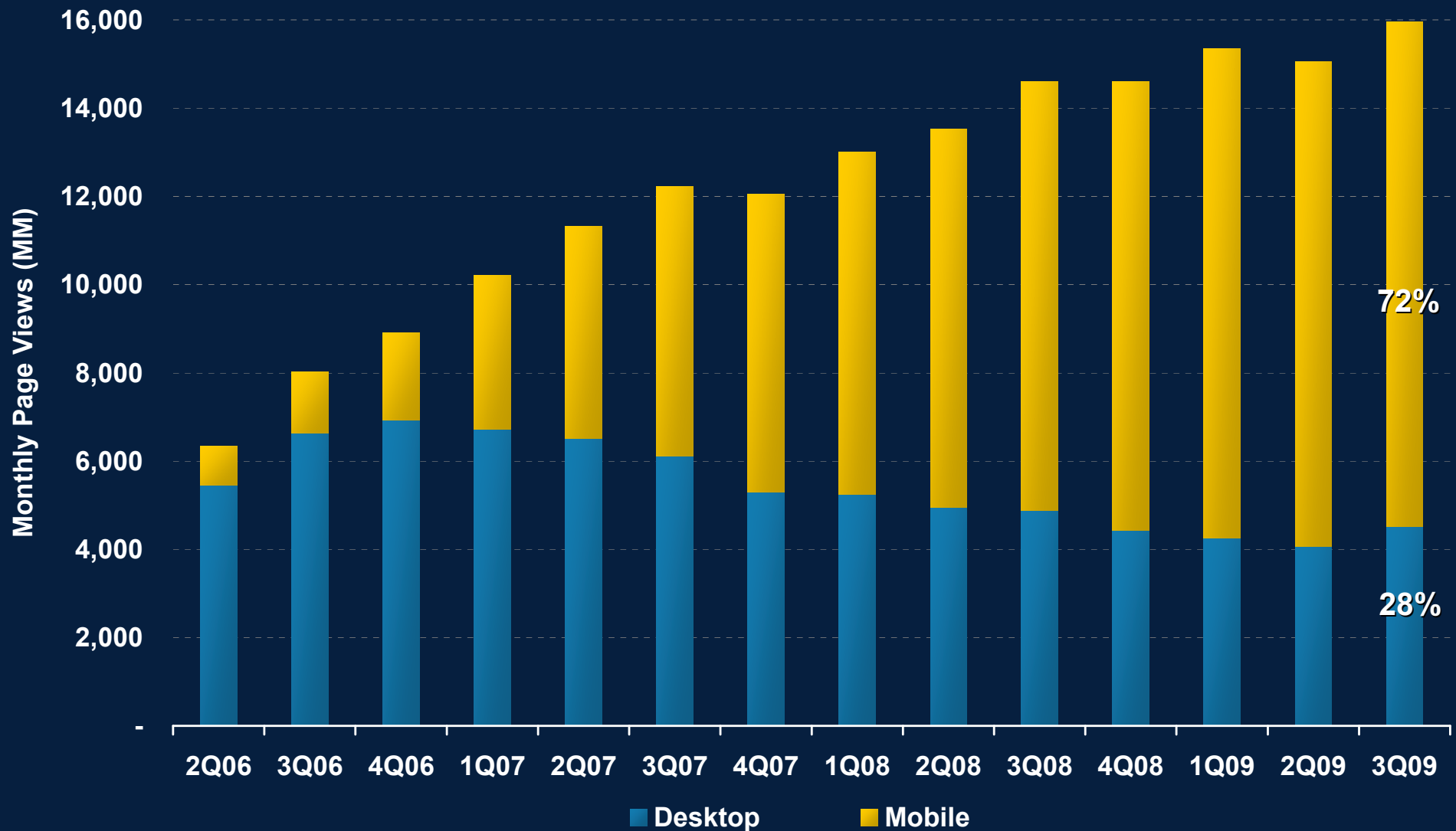
Category	# of Apps (000s)	% of Total	# of Paid Apps (000s)	Paid as % of Category Total
Games	22.6	19.1%	15.7	69%
Entertainment	17.2	14.6	12.5	72
Books	14.8	12.5	13.5	91
Travel	7.9	6.7	7.1	89
Utilities	7.7	6.5	5.5	71
Education	7.7	6.5	6.4	83
Lifestyle	6.7	5.6	4.7	71
Reference	4.7	4.0	3.9	82
Music	4.0	3.4	2.2	56
Sports	3.7	3.1	2.8	76
Navigation	3.0	2.5	2.4	81
Productivity	3.0	2.5	2.2	73
Business	2.7	2.3	1.4	54
News	2.7	2.2	1.7	64
Health & Fitness	2.5	2.1	2.0	79
Social Networking	2.1	1.8	1.1	52
Photography	1.7	1.5	1.4	80
Finance	1.7	1.4	1.1	66
Medical	1.4	1.2	1.1	78
Weather	0.5	0.4	0.4	80
Total	118.4		89.1	75%

Apple iPhone / iTouch – Facebook is Most Downloaded of Top *Free* Apps

	Name	Category	Description
	Facebook	Social Networking	Mobile front-end of the online site, allows users to chat / send messages / share photos + interests
	Google Earth	Travel	Users can view aerial maps of any available city / area, using touch screen to zoom in /out
	Pandora Radio	Music	Creates customized interent radio stations that stream music based on songs / artists users like
	Tap Tap Revenge	Games	Rhythmic music game in which user taps and shakes screen to create certain beats of a song- includes online play
	Shazam	Music	Application identifies artist / song title / album for songs playing on other audio devices
	PAC-MAN Lite	Games	3D remake of the classic game utilizes touch screen controls
	Backgrounds	Entertainment	Large selection of iPhone backgrounds that can be uploaded into your phone background library
	Touch Hockey: FS5	Games	Interactive air hockey game that allows users to play solo or online against friends
	Labyrinth Lite Edition	Games	Users employ sensitive tilt controls to move ball to the end of the puzzle in this remake of the classic wooden puzzle game
	Flashlight.	Utilities	Fills screen with bright white light to use as flash light

Japan Social Networking Trends Show Importance of Mobile – Mixi Mobile Page Views = 72% vs. 17% 3 Years Ago

Mixi's (Japan's Leading Social Network) Monthly Page Views, Mobile vs. PC, CQ2:06 – CQ3:09

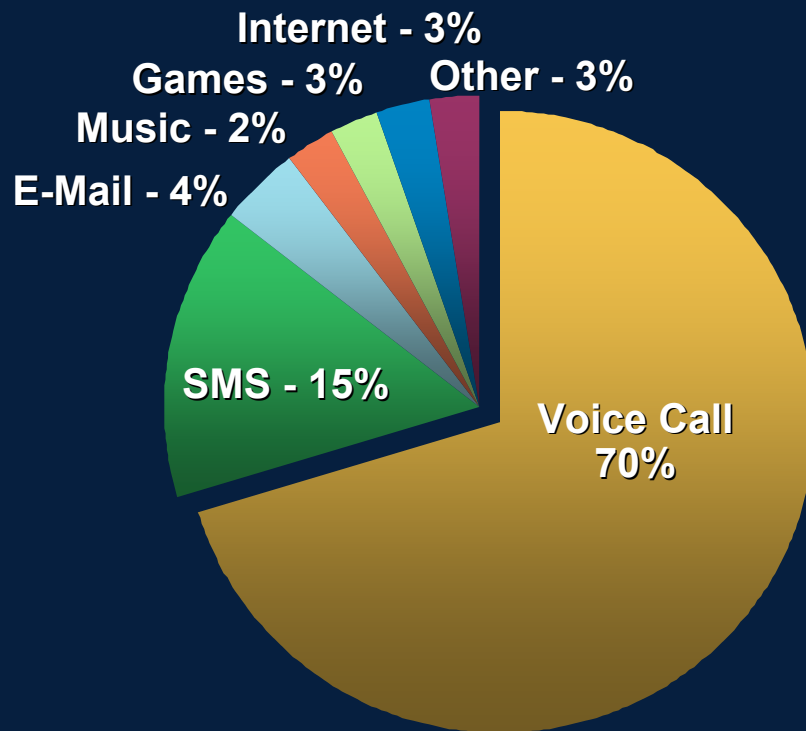


*Massive Data Growth Driving
Carrier / Equipment Transitions.*

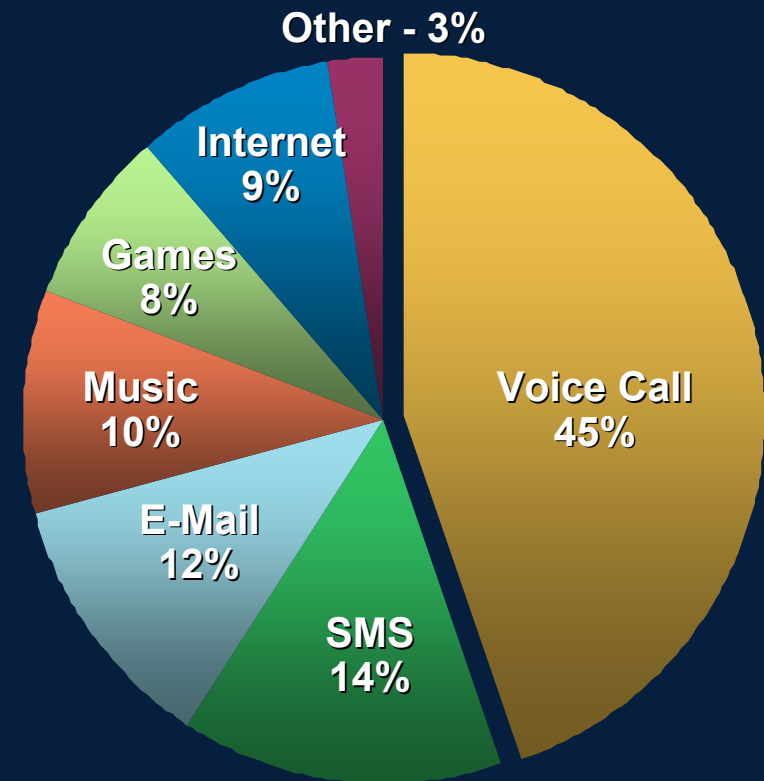
Increasingly, Mobile Phone Usage is About Data, Not Voice = Average Cell Phone = 70% Voice...iPhone = 45% Voice

Daily Usage Breakdown, % of Time Spent on Each Activity

**Average US Cell Phone User
40 Minutes Per Day**



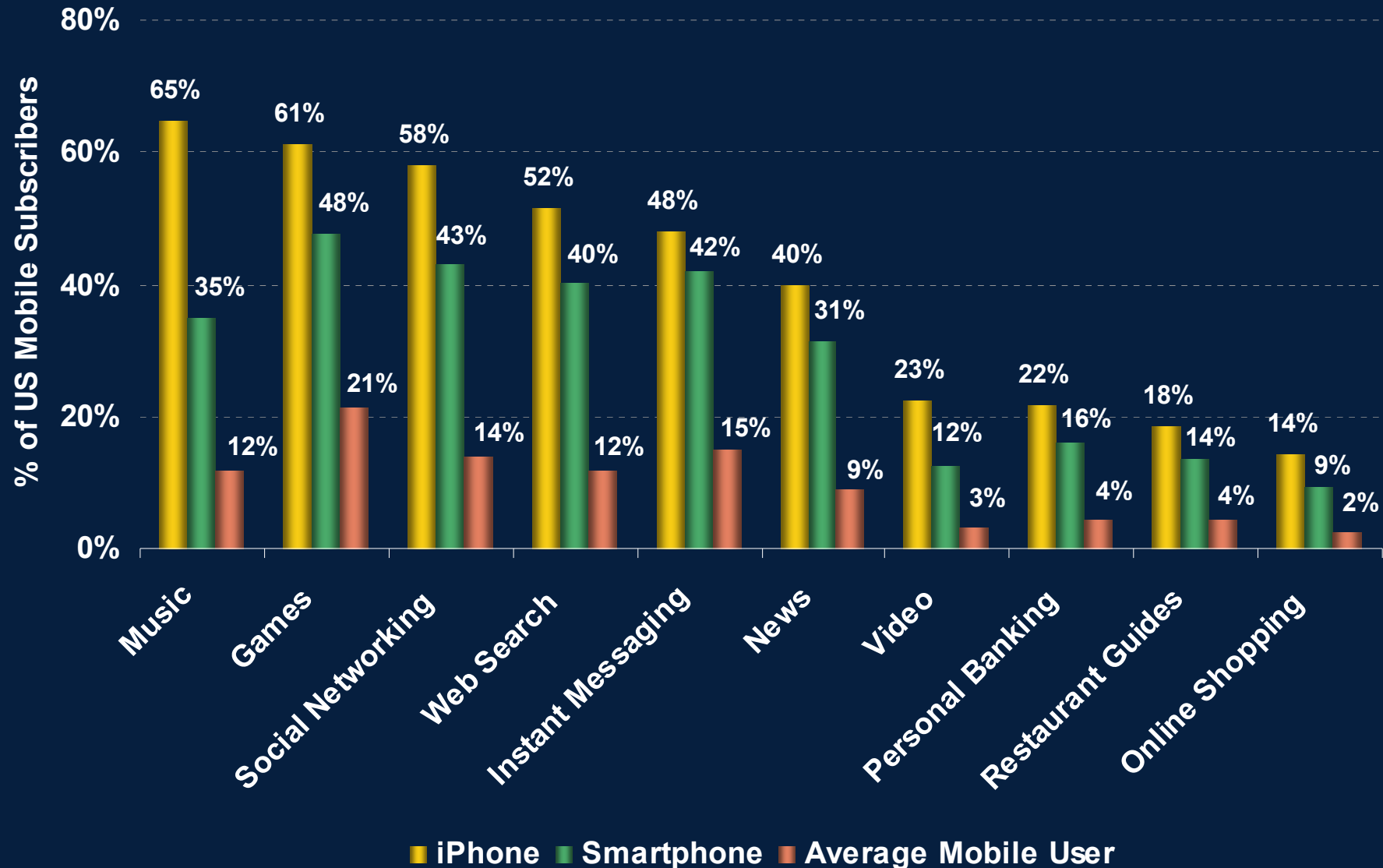
**iPhone User
60 Minutes Per Day**



*Note: CTIA estimates average voice call time per day is 27 minutes, assuming 70% of total time spent is on voice call, per iSuppli, total average time spent on cell phone is approx. 40 minutes per day. iPhone time spent per day is our estimates.
Source: iSuppli ConsumerTrak survey, 10/08, Morgan Stanley Research.*

iPhone Users Use Data / Internet Far More than Average Mobile Users

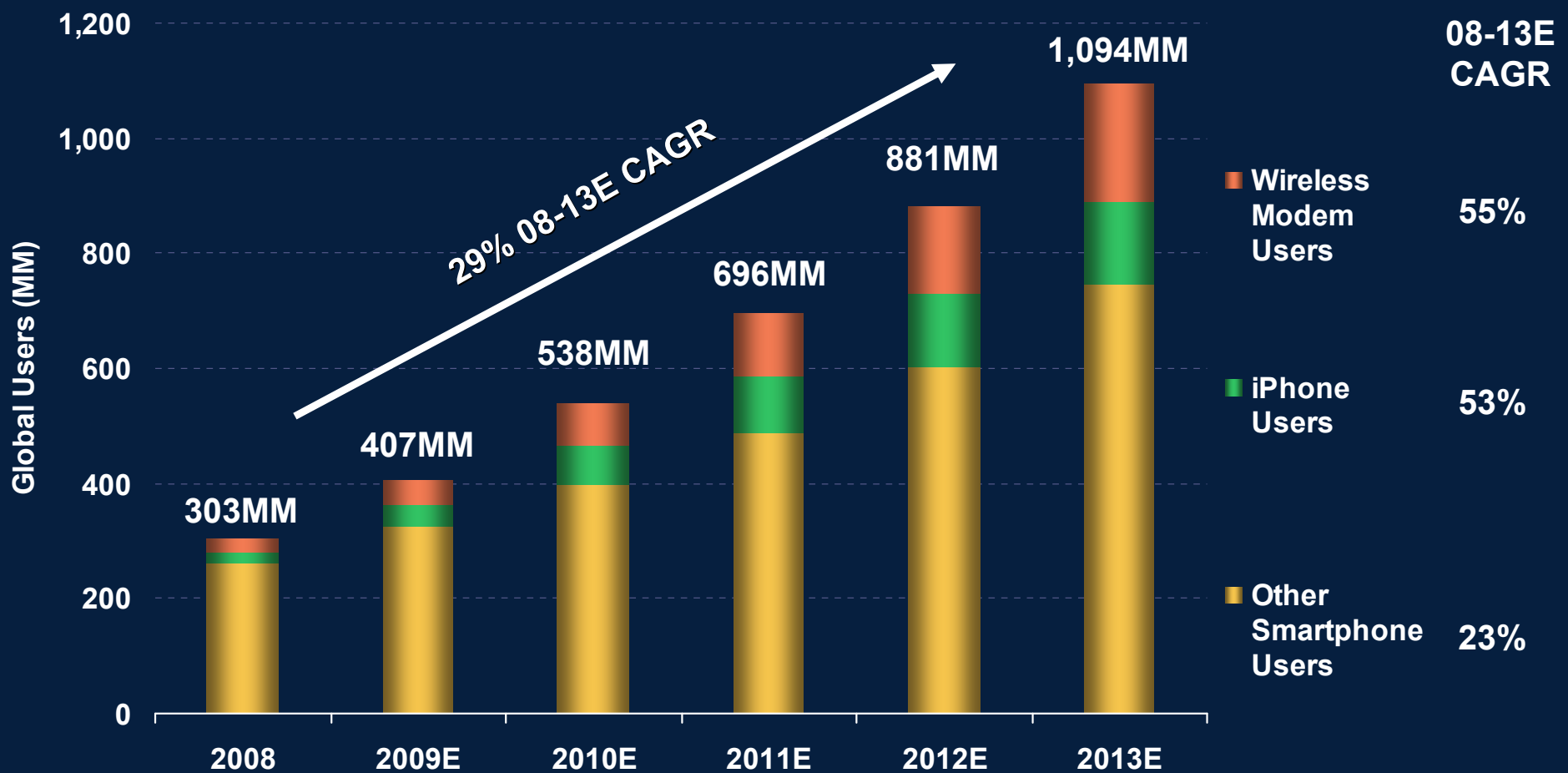
Mobile Content Consumption



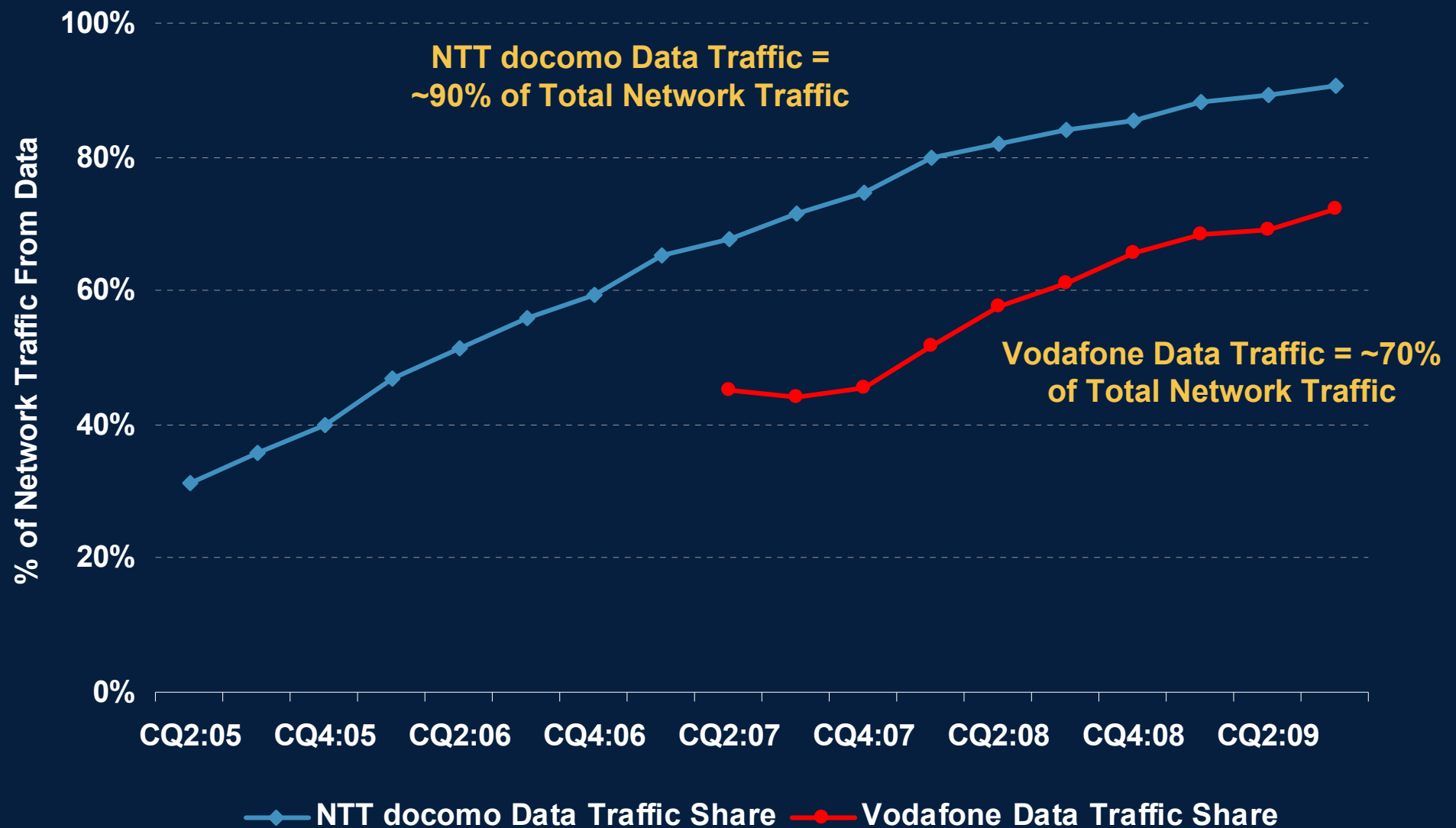
Global Mobile Data Users – 29% CAGR Driven by Wireless Modems + iPhones + Smartphones

- Three tiers of heavy mobile data users: 1) wireless modem (1,000MB 3G mobile data consumption per month); 2) iPhone (200MB) and 3) other smartphones (20MB)

Global Wireless Modem / iPhone / Other Smartphone Users, 2008 – 2013E

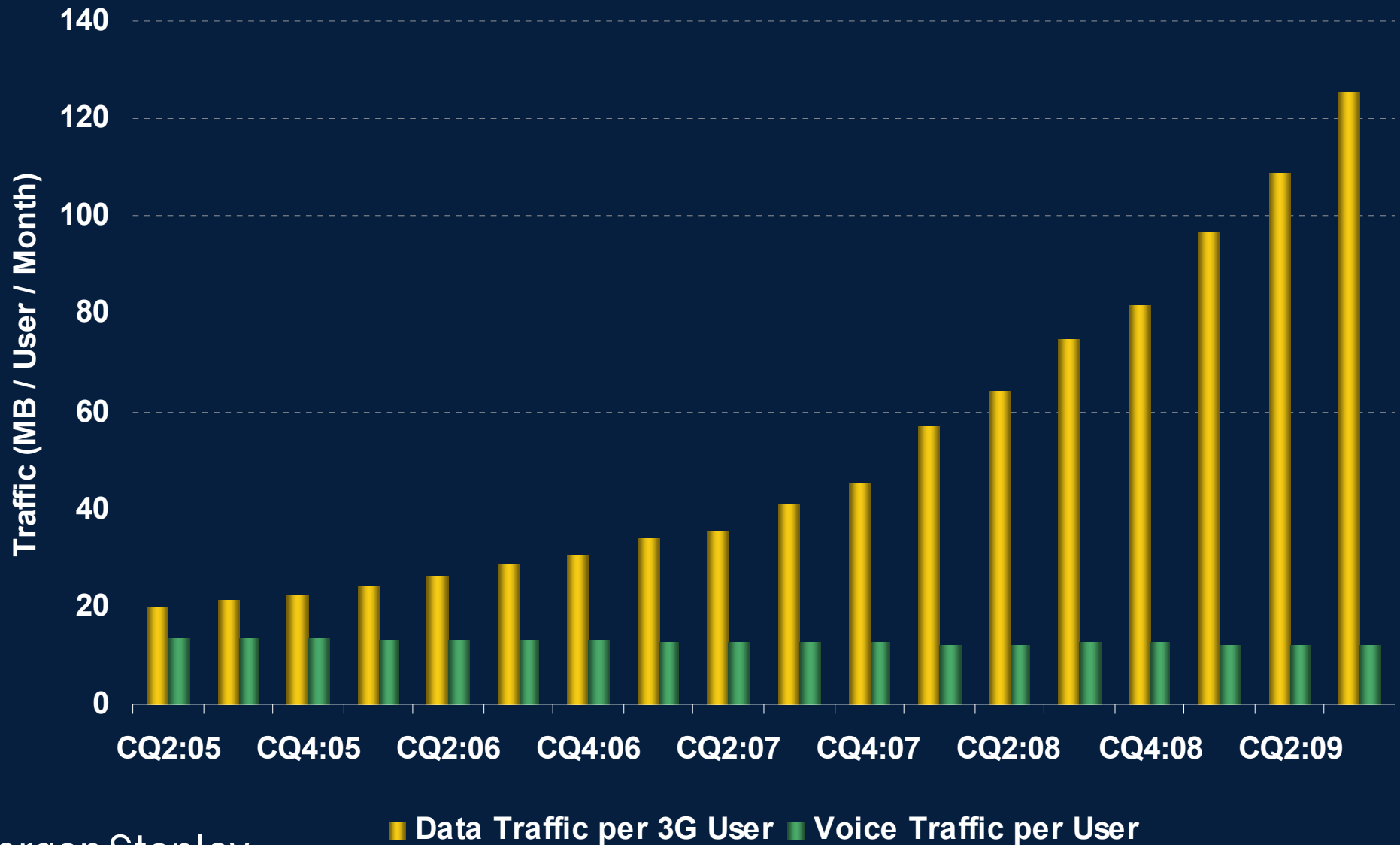


Data = Increasingly Dominating Network Traffic Share for Wireless Carriers in Developed Markets



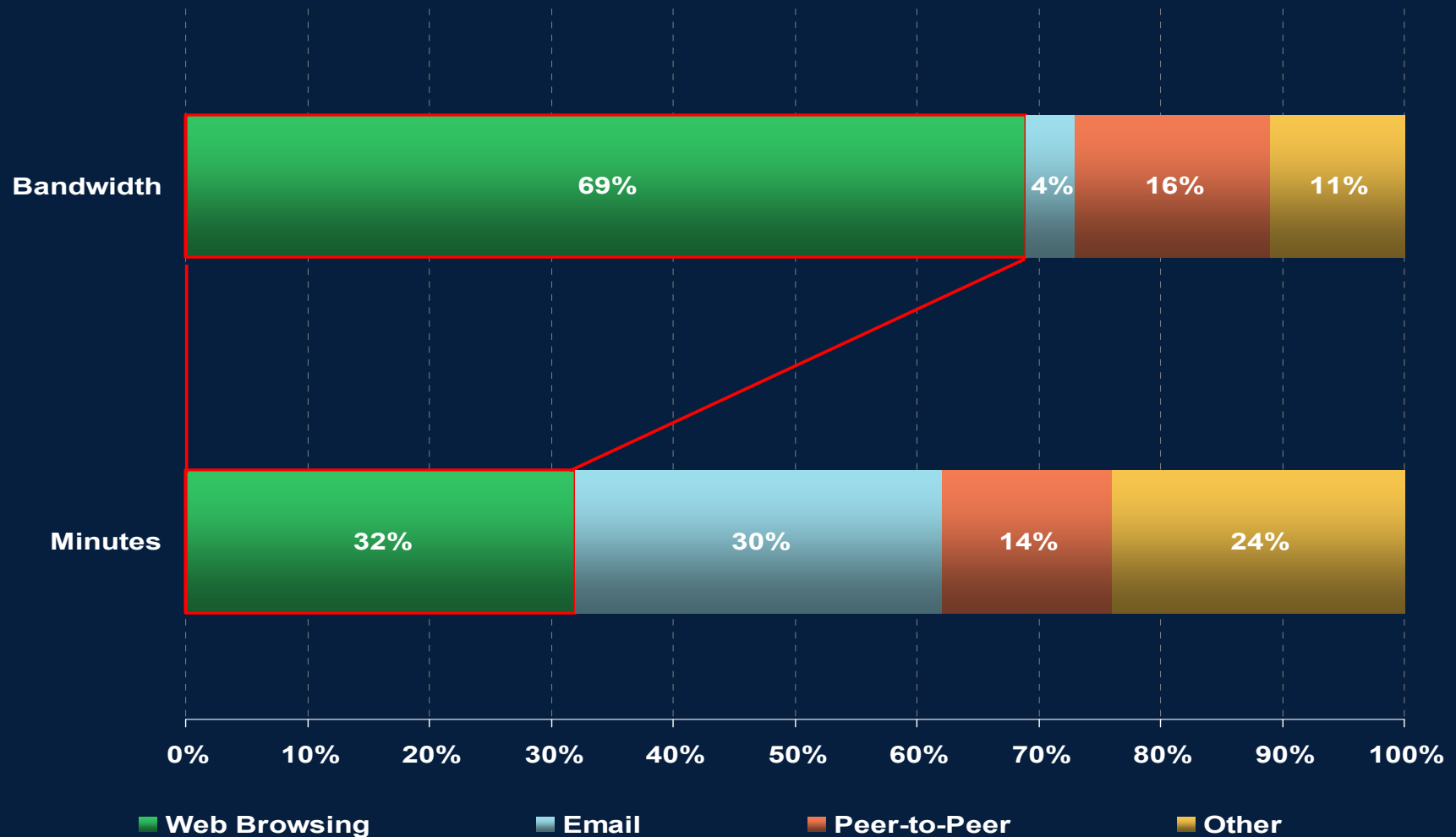
NTT docomo (Japan) Data Traffic Growing at +54% CAGR, Voice Traffic Declining at -2% CAGR

NTT docomo Mobile Data / Voice Traffic per Subscriber,
CQ2:05 – CQ3:09



Mobile Internet Bandwidth Consumption = Web Browsing is Highly Bandwidth Intensive

Mobile Data Bandwidth vs. Airtime Consumption



*Thoughts on How Carriers May Navigate Rapid Data
Growth & Slowing / Declining Core Voice / Messaging
Growth*

Congestion Problems (Voice + Data) Lie at Cell Site Level in Densely Populated Areas

- In our view, the best way to analyze network demand vs. supply is at the cell site level during peak load times rather than throughout the whole day.
- Certain markets like New York and San Francisco have high population density and high smartphone penetration, and, thus, are the most susceptible to network capacity constraints.
- Therefore, wireless carriers will likely target capacity constrained cell sites in these markets first, focusing on technology upgrades (HSPA 3.6 to HSPA 7.2) and backhaul upgrades (T1s to fiber-based Ethernet or microwave).
- By analyzing breaking points at the cell site level using theoretical scenarios based on heavy data sub penetration, heavy data subscriber monthly usage and network technology deployed, we illustrate how carriers should be able to cope with surging demand during peak network load at the cell site level.

Wireless Capacity – Where Does It Lie in the Network?

Capacity can be constrained at two points along a wireless data transmission:

When Traffic is Received / Sent Between Wireless Subscriber and Cell Site

3 Factors Determine Cell Site Capacity

Sectors – How many directions the spectrum signal is divided into at the cell site... usually 3 sectors.

Carriers – # of spectrum channels. More spectrum increases capacity. 3G HSPA, for instance, uses $2 \times 5 \text{ MHz} = 10 \text{ MHz}$.

Technology – 2G, 3G, 4G and various evolutions of each.

When Traffic is Received / Sent Between Cell Site and Wired Network

3 Backhaul Technologies Determine Capacity

T1 – Most common and readily available. 1 line offers 1.5 Mbps. Wireless carriers typically have 12 T1 lines (in high-density markets) at the cell site providing for $12 \times 1.5 \text{ Mbps} = 18 \text{ Mbps}$.

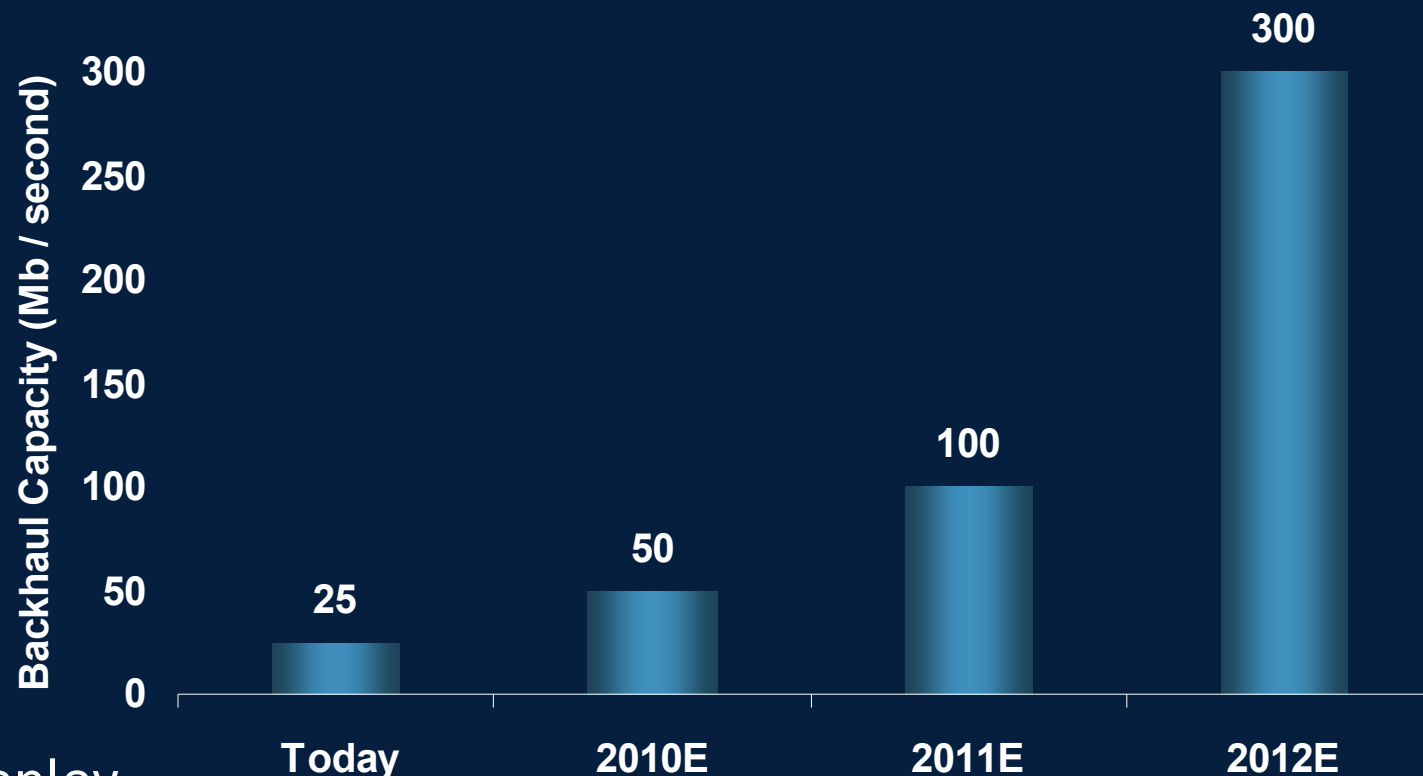
Fiber – Preferred to T1 but limited availability. Offers speed of up to 1Gbps.

Microwave – Equipment resides on the tower and spectrum is needed to deploy. 3rd party service providers like FiberTower and TTM provide access in select markets, currently offering the equivalent of 30 T1s or 45 Mbps which is scalable to 400-600 Mbps.

Wireless Backhaul Capacity Expected to Increase 12x By 2012E – Fiber / Microwave / Ethernet Expected to Cope With Mobile Data Surge

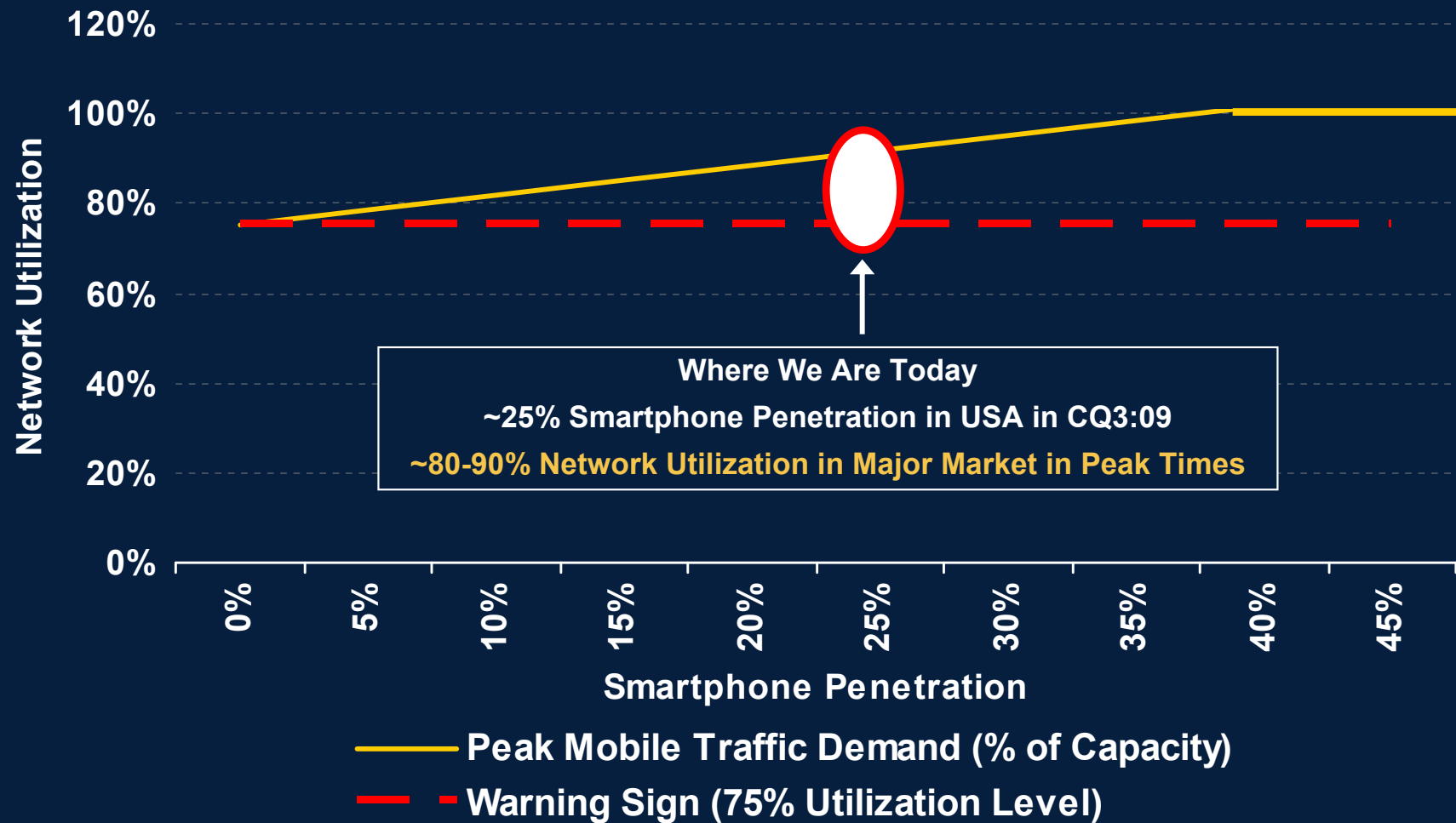
- Today backhaul requires an average capacity of ~25 Mbps in markets with high data traffic – widely held industry view is that it is expected to reach 300 Mbps by 2012, representing 129% CAGR.
- Fiber and microwave deployments will be necessary to meet the rising backhaul demands
- AT&T actively deploying fiber and layering Ethernet connectivity – Currently, 38% of 3G cell sites are fiber fed + the company expects to reach 40% by year-end C2009 and 90% by C2011E.

Backhaul Capacity, 2009 – 2012E



However, As Smartphone Penetration Climbs, Current Networks Can Barely Handle Incremental Data Traffic in Peak Times

Network Utilization (Given Capacity From 3 Sector / 2 Carrier / HSPA 3.6 Mbps Cell Site)
vs. Smartphone Penetration (Given Smartphone Users Consume 150 MB / Month)



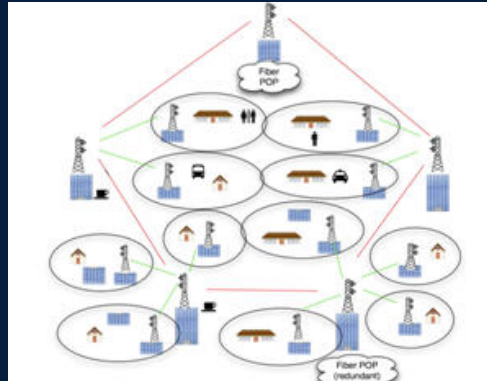
Raw Network Capacity Can Be Added in a Variety of Ways

Short-Term Network Improvements (Next 12-24 Months)

HSPA Upgrade



Transition to Ethernet / Fiber + Microwave Backhaul

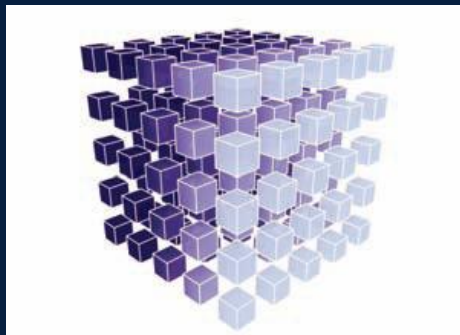


Offloading Traffic via Wi-Fi / Femtocell



Long-Term Network Improvements (Next 2-4 Years)

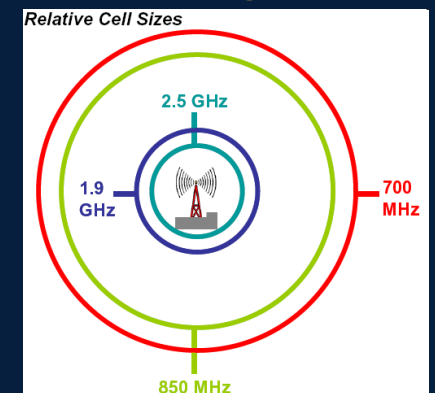
Network Management Technologies



Rollout of LTE

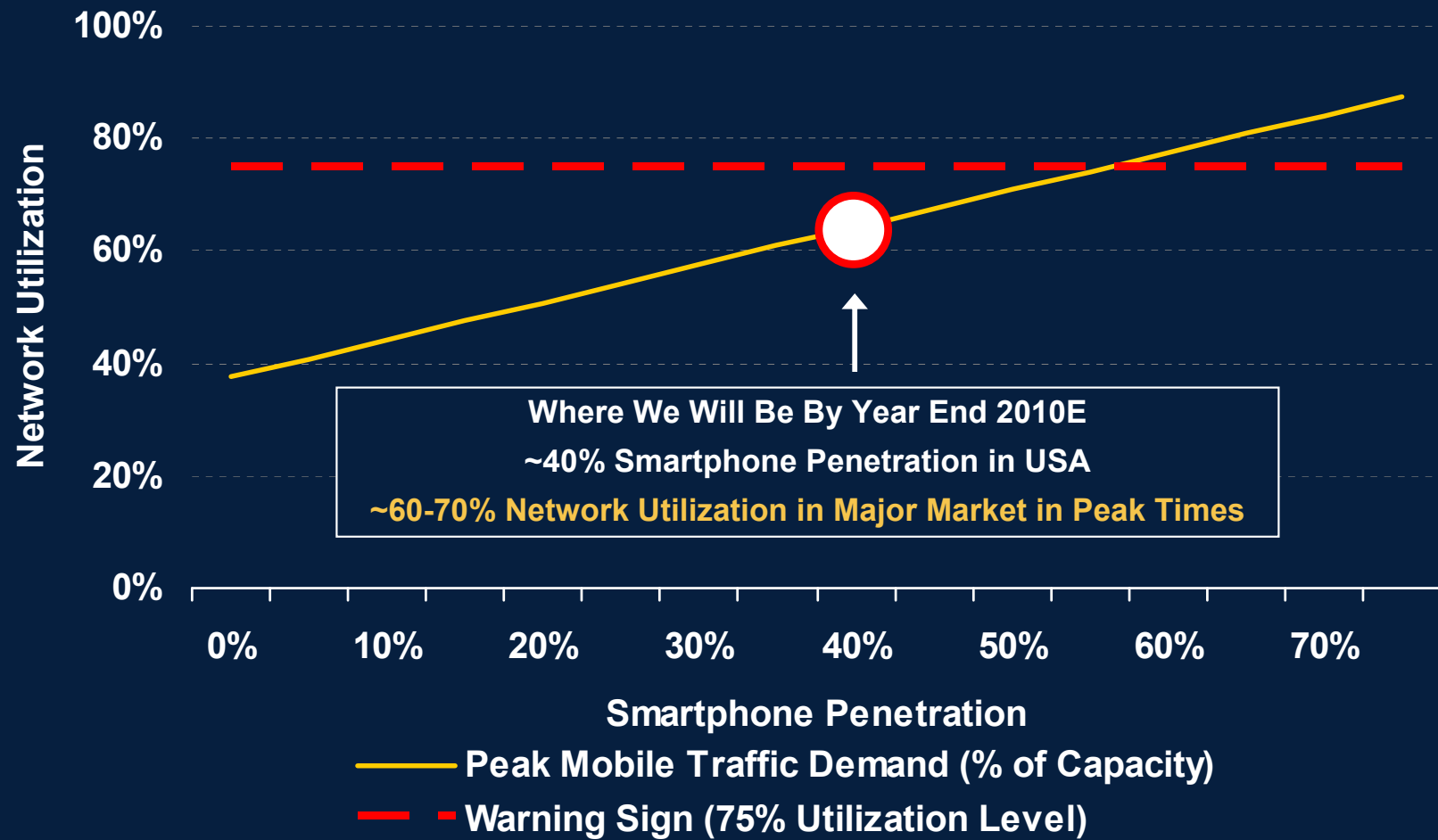


Optimize Spectrum / Propagation



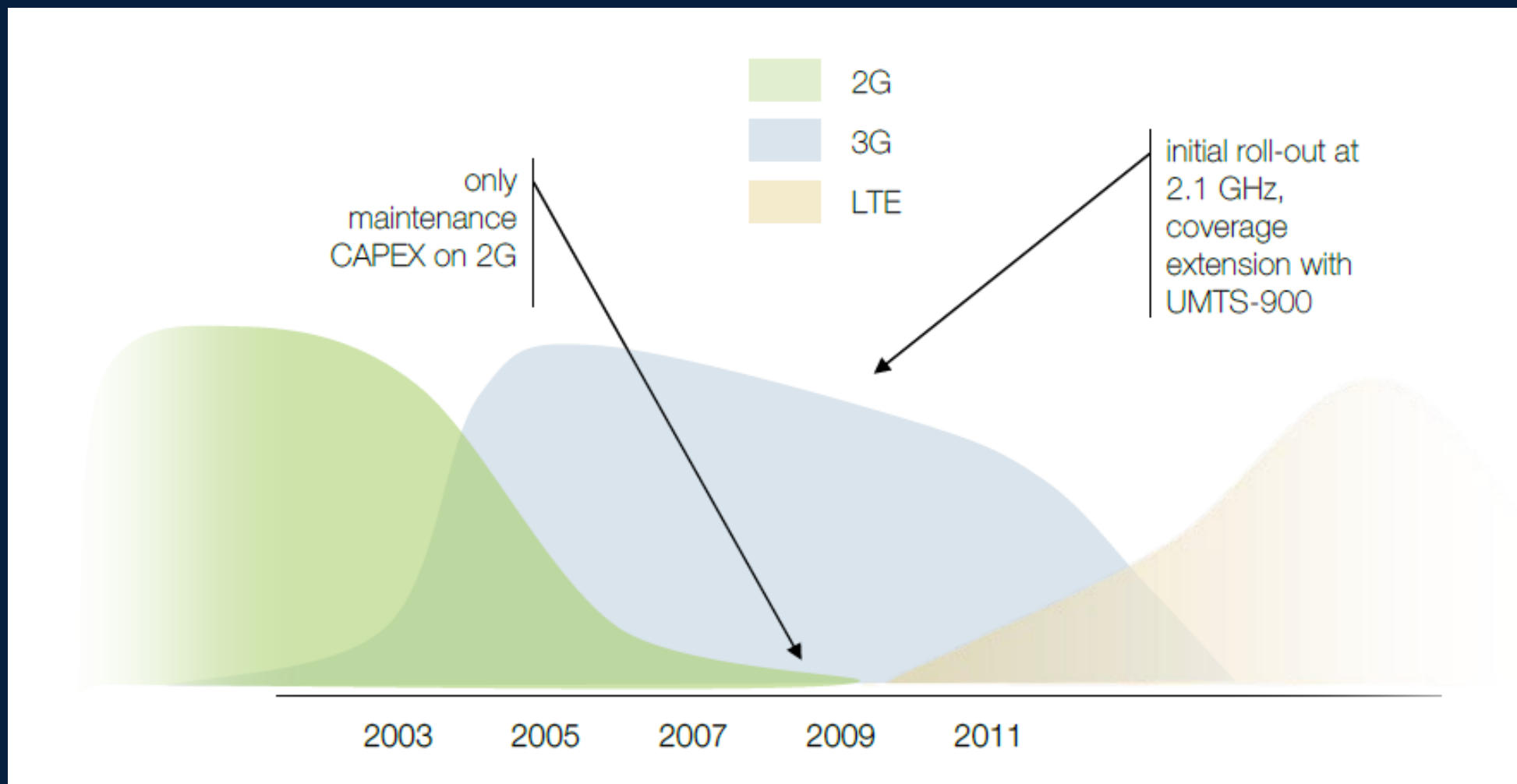
HSPA + Backhaul Upgrades Should Reduce Peak Utilization to ~60-70% by 2010E Despite Rising Smartphone Penetration + Data Usage

Network Utilization (Given Capacity From 3 Sector / 2 Carrier / HSPA 7.2 Mbps Cell Site)
vs. Smartphone Penetration (Given Smartphone Users Consume 300 MB / Month)



Network Capacity Improvement Can Fit Within Existing Capex Budget as Spend on 2.5G + 3G Rolls Off / More Efficient (Lower ASP) Technologies Leveraging Existing Infrastructure Are Deployed

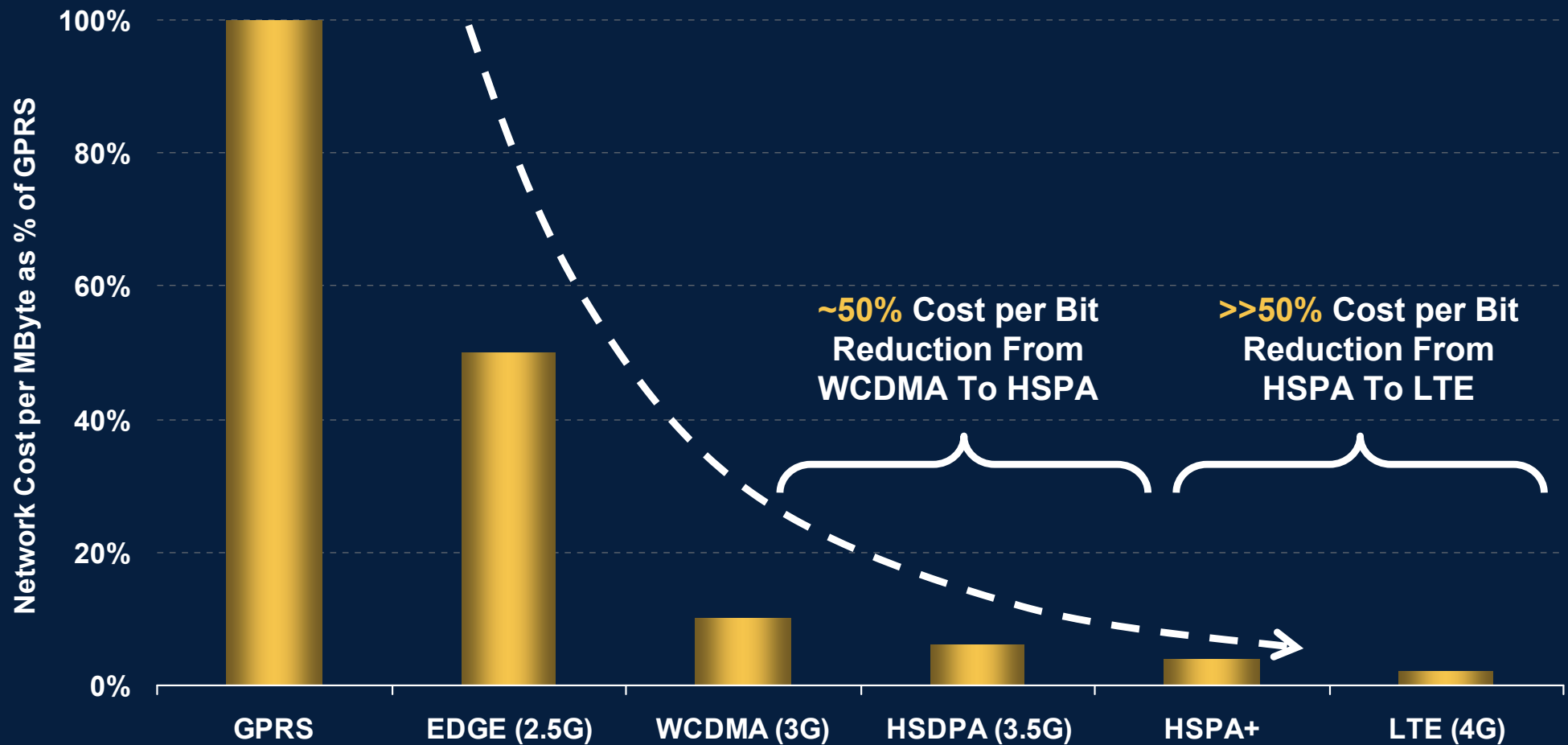
Typical Phasing of Wireless Capex in European Countries, per France Telecom



*Thoughts on How Communications Equipment Companies
May Navigate Rapid Data Growth, Rapid Technology
Innovation + Declining ASPs*

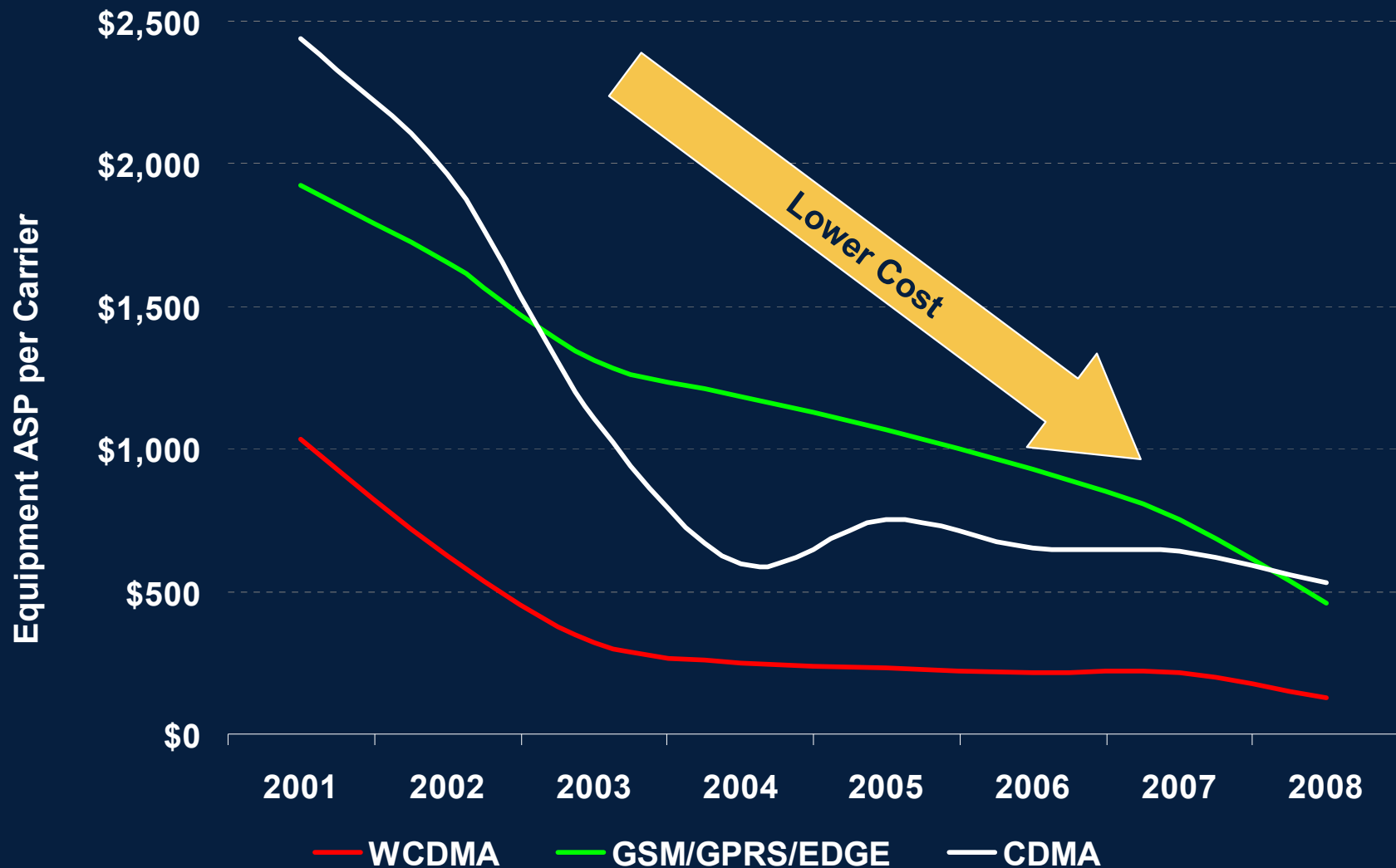
Technology Innovation Quickly Driving Down Mobile Data Cost per Bit in the Radio Access Network

Mobile Broadband Cost per Bit Decreases Exponentially With Each Generation of Technological Advancement



Falling Wireless Data Networking Equipment ASPs (Related to Low-Cost Manufacturers like Huawei + ZTE) Have Helped Carriers Scale Networks at Lower Relative Costs

Wireless Data Networking Equipment Cost Declining Rapidly from 2001 to 2008



Mobile Internet Implications for Equipment Vendors

Key Dynamics

- Carrier capex is not projected to increase materially, so networking / infrastructure equipment vendors don't broadly win in the mobile Internet
- However, three areas of this industry do stand to benefit materially: carrier Ethernet + mobile packet core / DPI vendors + managed services providers

What Types of Equipment / Services Will Carriers Need for Next-Gen Networks

Backhaul

- Carrier Ethernet – carriers will increasingly depend on IP-based, high-bandwidth Ethernet technology to connect base stations to the network backbone, allowing them to alleviate some of the network bandwidth bottlenecks at the backhaul level.

Mobile Packet Core / DPI

- Mobile packet core / deep packet inspection technologies will grant carriers a higher degree of control over the traffic on their networks
- These technologies allow carriers to prioritize high-value (VoIP / web browsing) traffic in real-time + redirect low-value traffic (P2P) to off-peak periods of the day

Telecom Managed Services

- Wireless carriers have recently begun outsourcing the architecture / build out / management their networks to equipment + managed service providers as a way to reduce capex and make the transition to next-generation networks more efficient

Equipment Beneficiaries

Fujitsu, Huawei, Juniper Networks,
Alcatel-Lucent, DragonWave

Cisco, Huawei, Nokia
Siemens

Ericsson, Alcatel
Lucent, Nokia Siemens

Compelling Opportunities in Emerging Markets.

Compelling Opportunities in Emerging Markets

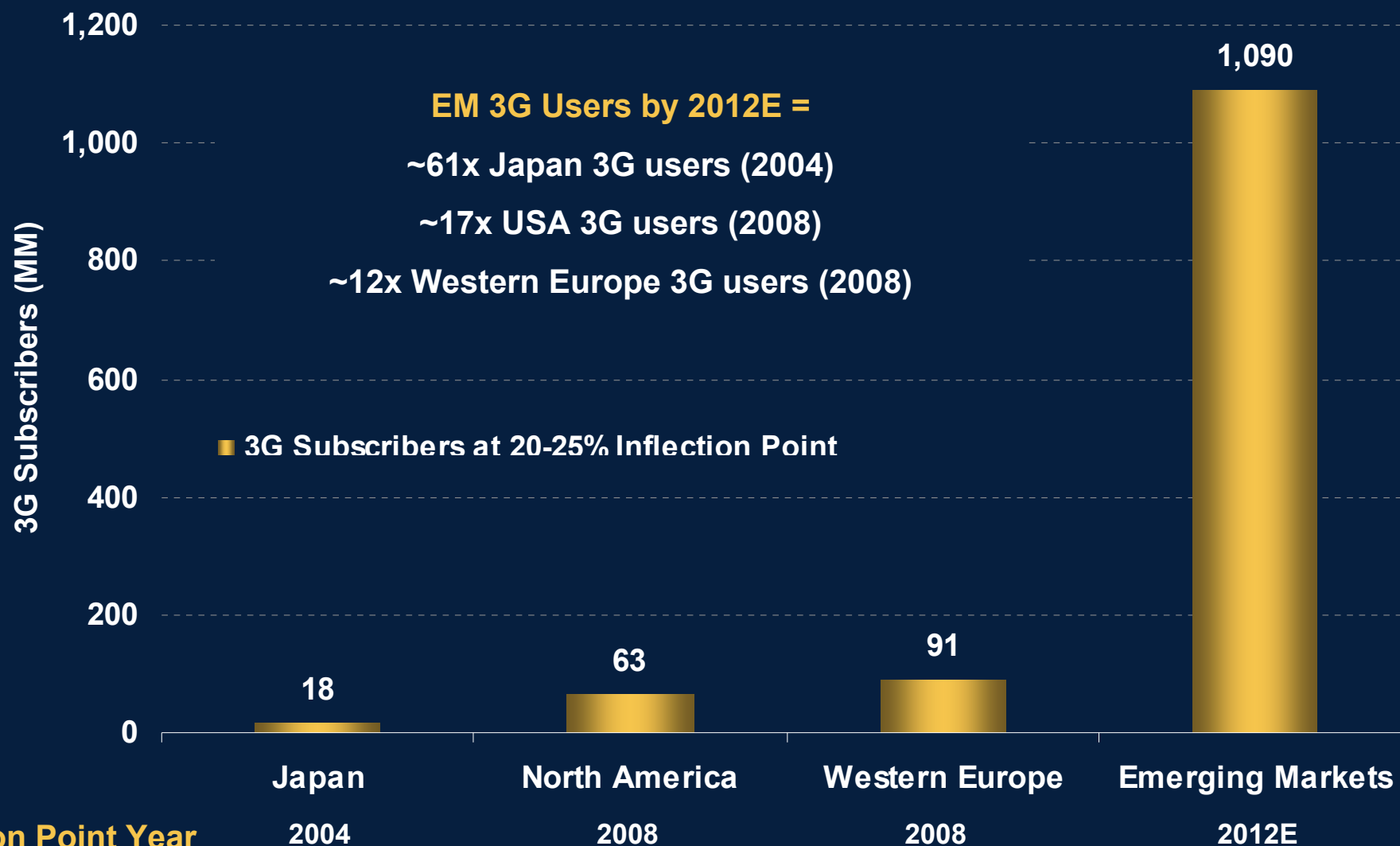
Emerging Markets (EM) have material potential for mobile Internet user growth. Low penetration of fixed-line telephone + already vibrant mobile VAS mean that for many EM users and small / medium enterprises (SMEs), the Internet will only be mobile.

We are still in the nascent stages of the market, but there are already encouraging signs of adoption of mobile broadband driven by falling prices for already low-cost 'netbooks', availability of smartphones, and rollout of 3G.

We expect carriers in emerging Asia & Africa to be better positioned than carriers in Eastern Europe and the Middle East when markets hit inflection points, driven by stronger subscriber growth.

At Inflection Point, Long-Term EM Opportunity at a Different Order of Magnitude – By 2012, EM 3G Users = ~6x Total Developed Market 3G Users

3G Subscribers in Year of 3G Inflection Point (~20-25% Penetration)

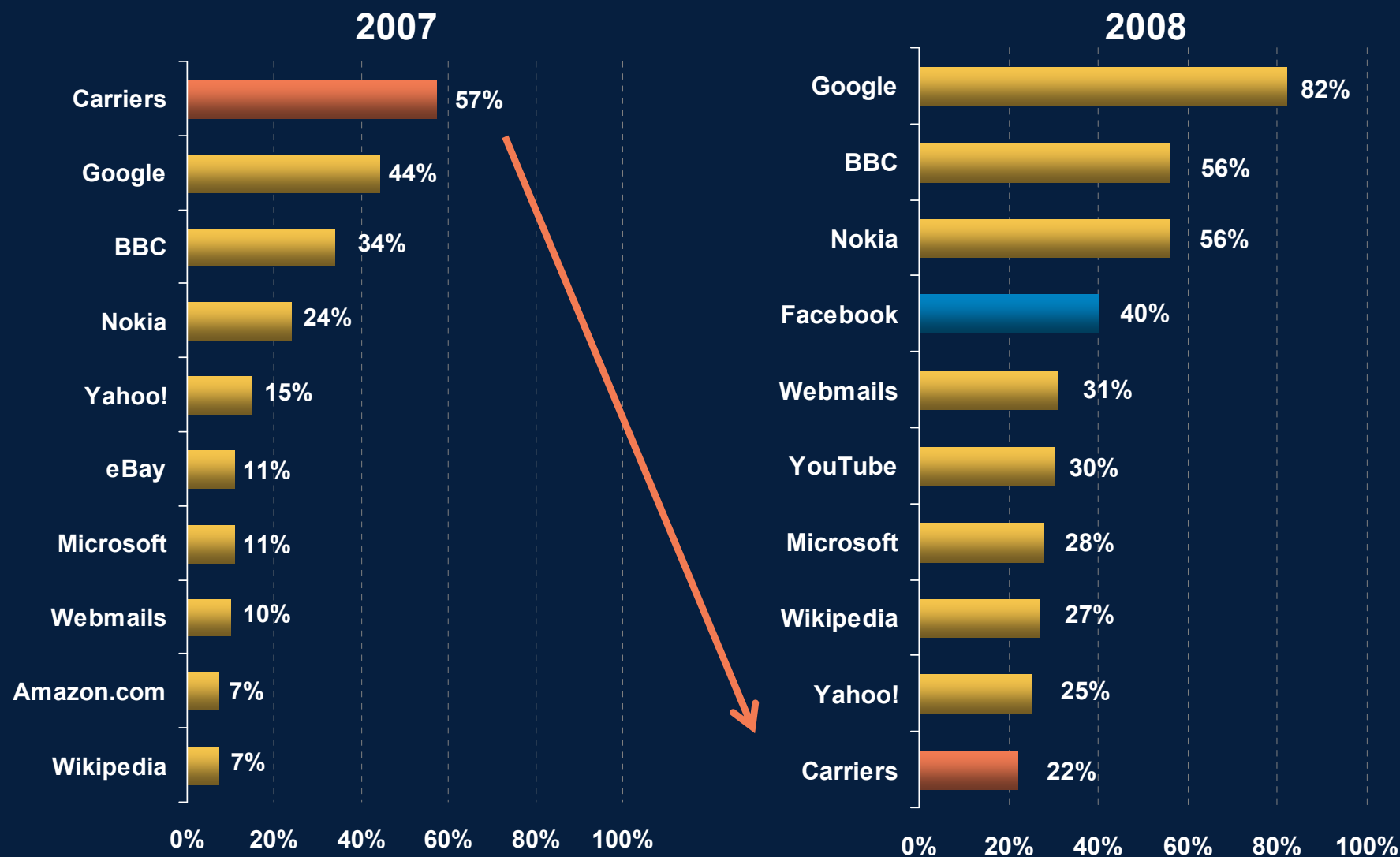


*Growth / Monetization Roadmaps Provided from
Japan Mobile + Desktop Internet.*

When Consumers are Empowered by the Internet,
Usage Changes Can Occur Very Quickly

Carrier 'Walled Gardens' Collapsed Extremely Rapidly – UK Mobile Users Are Fleeing from Carriers' Portal Sites

Mobile Web Sites' Share of UK Mobile Internet Users



Advertising Dollars Ultimately Follow Eyeballs

\$46 in Annualized Ad Revenue per Internet User vs. \$28 in 2005 vs. Nada in 1994

	CQ3:05 Annualized Global Ad Revenue per User (\$)	CQ3:09 Annualized Global Ad Revenue per User (\$)
Total Internet	\$28.20	\$46.41
Global Internet Users (MM)	644	1,165
Google (ex. YouTube)	\$10.22	\$20.06
Yahoo!	\$6.94	\$6.26
MySpace	--	\$3.55
Microsoft	\$2.97	\$2.37
AOL	\$7.66	\$4.29
YouTube	--	\$0.59

Source: Global online ad revenue per ZenithOptimedia 12/05 and 10/09. Google and Yahoo! ad revenue are net revenue (ex. Traffic Acquisition Cost). Google revenue per user excludes YouTube users who are not Google users. Unique user data per comScore global, which reports a lower global Internet user stat vs. ITU.

*New Business Models are Often Created During
Technology Changes*

China (Owing in Part to Tencent's Success) Shows 'Virtual Goods' Can be Big Business – \$2.2B in 2009E Revenue & \$24 Annual ARPU

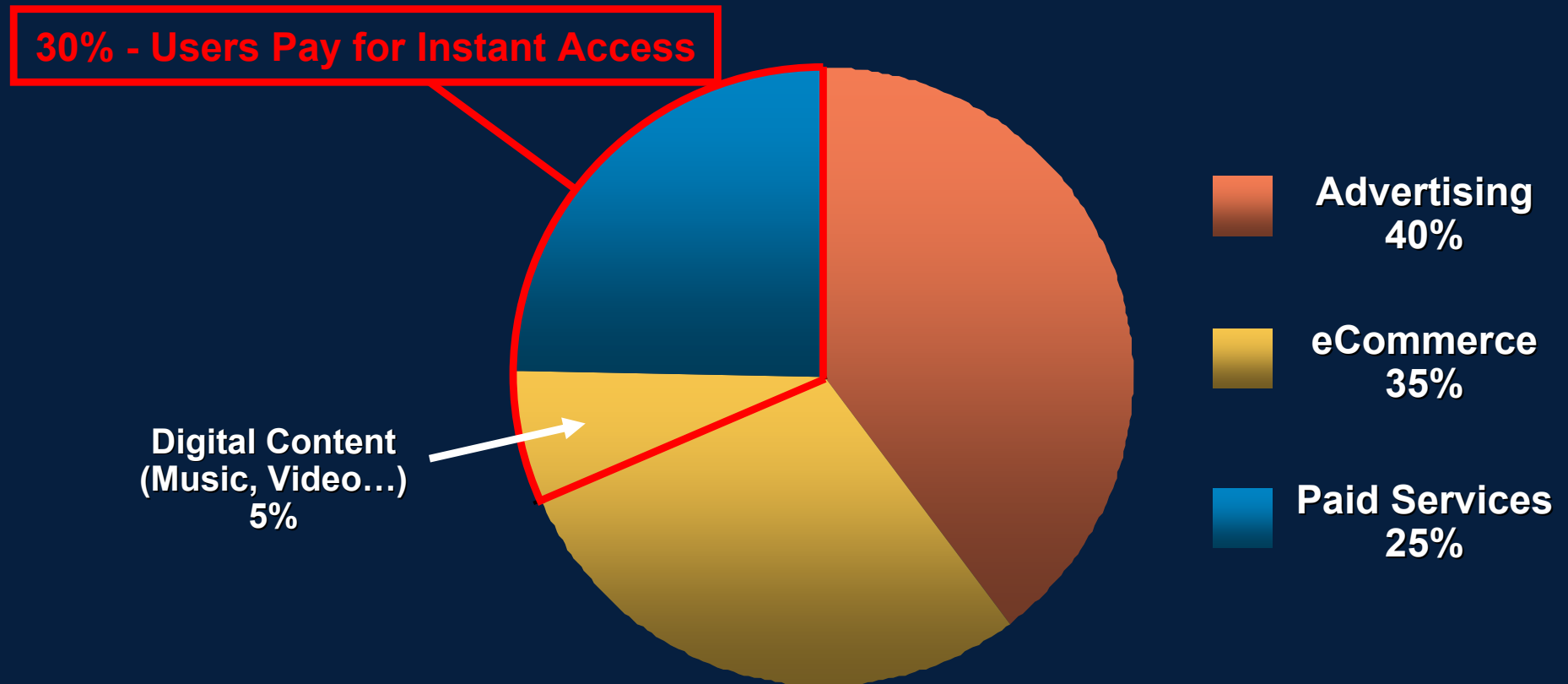
Virtual Goods Sales in China, 2006E – 2013E

	2006E	2007E	2008E	2009E	2010E	2011E	2012E	2013E
Total virtual item sales (\$MM)	\$547	\$889	\$1,464	\$2,207	\$3,132	\$4,307	\$5,763	\$7,359
<i>Y/Y Growth</i>	--	62%	65%	51%	42%	38%	34%	28%
Game virtual item sales (\$MM)	\$296	\$490	\$841	\$1,288	\$1,858	\$2,564	\$3,418	\$4,439
<i>Y/Y Growth</i>	--	66%	72%	53%	44%	38%	33%	30%
Paying gamers (MM)	18	26	37	46	55	64	74	84
<i>Y/Y Growth</i>	--	44%	43%	25%	20%	17%	15%	14%
ARPU (US\$ per Month)	\$1	\$2	\$2	\$2	\$3	\$3	\$4	\$4
<i>Y/Y Growth</i>	--	15%	20%	23%	20%	18%	16%	14%
Non-game virtual item sales (\$MM)	\$252	\$399	\$623	\$918	\$1,274	\$1,743	\$2,346	\$2,920
<i>Y/Y Growth</i>	--	58%	56%	47%	39%	37%	35%	25%

*In-Place Billing Systems (with likes of Carriers + iTunes)
Should Create Better Monetization Opportunities than
Experienced on Desktop Internet*

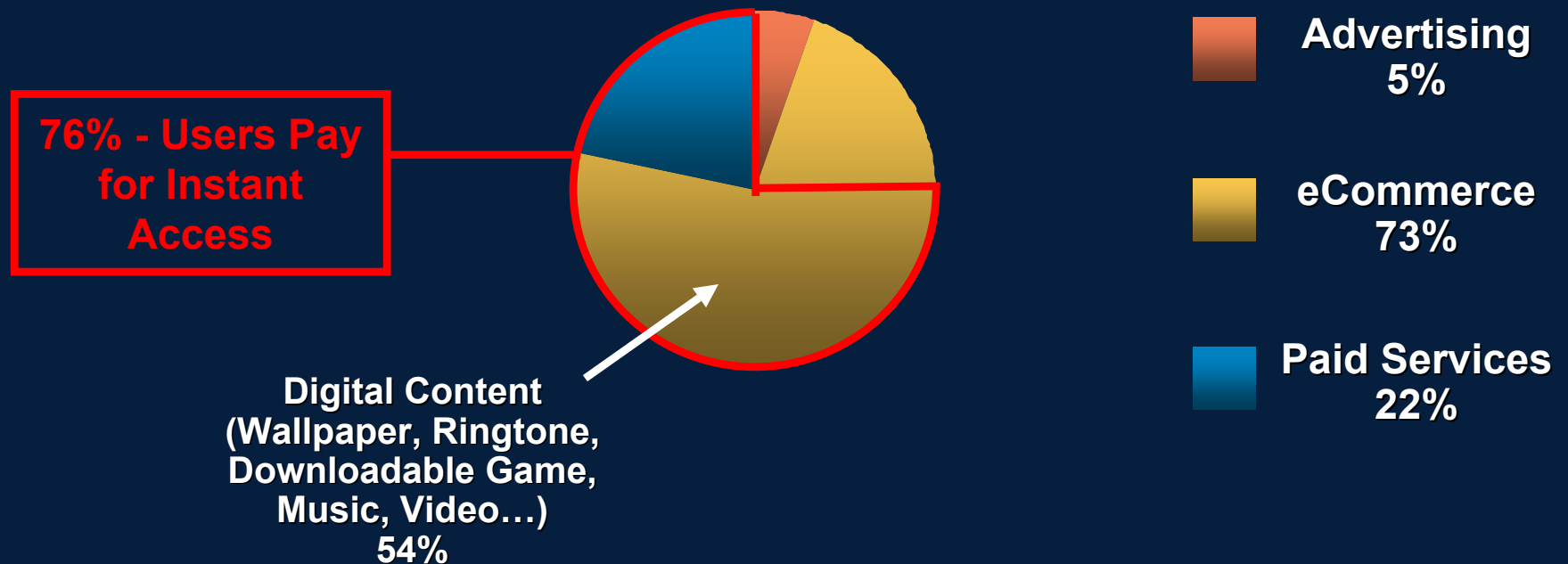
Advertising + eCommerce (Vendor + Advertiser Paid) = Dominate Desktop Internet Revenue...

Revenue Mix for Top 50 Global Internet
(ex. Data Access) Companies
2008E – \$91B



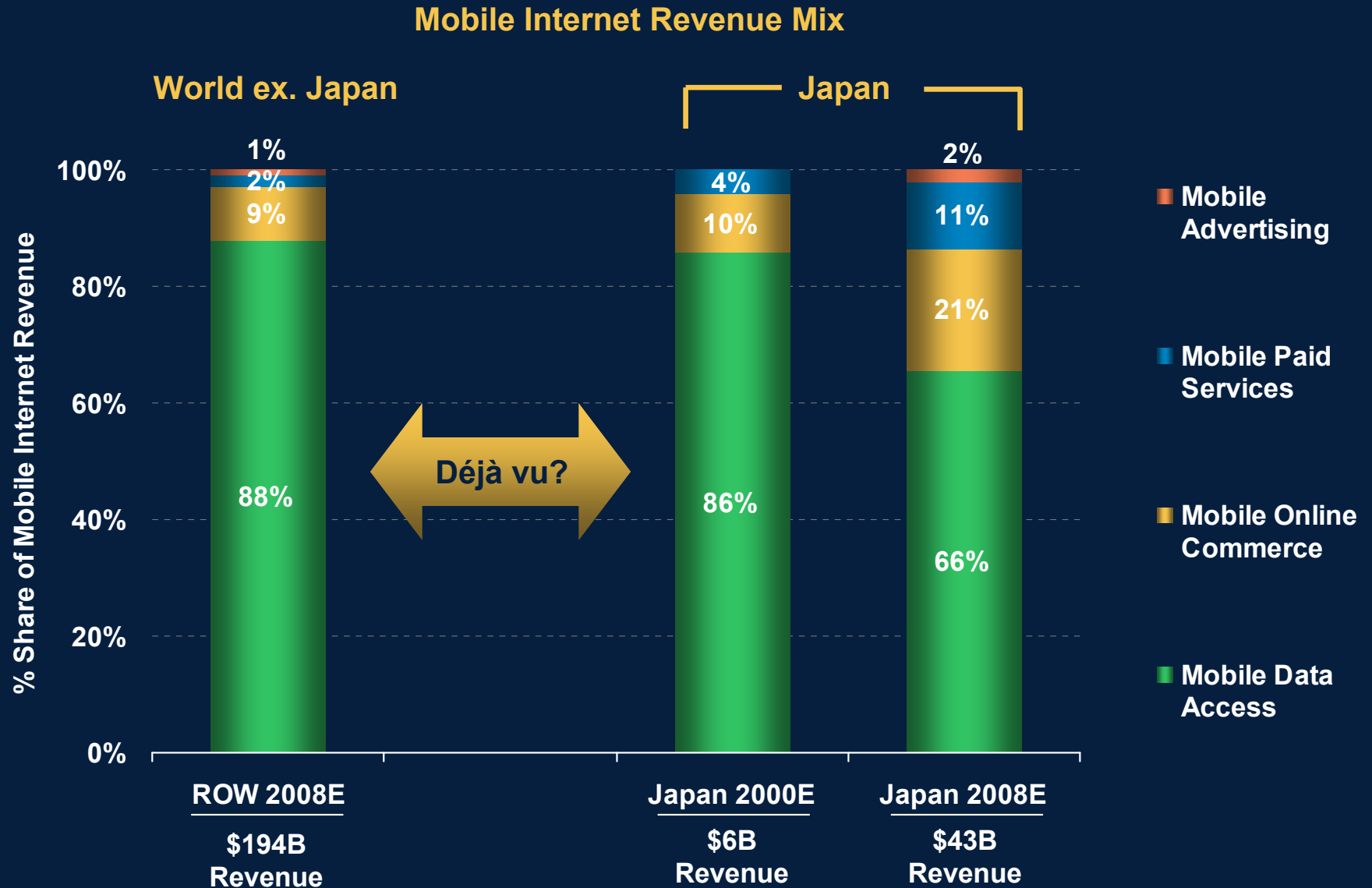
...While Premium Content Revenue (User Paid) = Dominate Mobile Internet Revenue

Revenue Mix (ex. Data Access) for Global Mobile Internet
2008E – \$37B



*Rapid Mobile Internet Growth in Japan Over Past
Decade Sheds Light on How Internet Monetization
May Develop in Rest of World (ROW)*

ROW's Mobile Internet Revenue Mix in 2008 = Japan's in 2000 – Data Access = 66% in Japan vs. 88% in ROW in 2008



*Rapid Revenue + Market Capitalization Growth of
Recent Internet Leaders Demonstrates How
Innovative Products Can Drive Change + Success*

Google – Internet Search Innovation / Leadership Has Driven \$186B in Wealth Creation Over 11 Years

Google Key Financial & Operating Metrics, 2000 – 2009E

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009E
Revenue (ex. TAC) (\$MM)	\$19	\$86	\$345	\$939	\$1,961	\$4,024	\$7,296	\$11,660	\$15,857	\$17,483
Y/Y Growth	8585%	352%	299%	172%	109%	105%	81%	60%	36%	10%
Operating Income (\$MM)	-\$12	\$23	\$208	\$583	\$1,131	\$2,330	\$4,049	\$5,957	\$7,847	\$9,464
Margin (%)	-64%	27%	60%	62%	58%	58%	55%	51%	49%	54%
Users (MM)	20	54	181	233	284	389	452	532	685	812
Revenue per User (\$/yr)	\$1	\$2	\$2	\$4	\$7	\$10	\$16	\$22	\$23	\$22
Aggregate Paid Clicks (MM)	--	--	--	--	--	14,410	23,773	33,829	40,182	46,157
CPC (Cost per Click) (\$)	--	--	--	--	--	\$0.42	\$0.44	\$0.49	\$0.53	\$0.50
Market Capitalization (\$B)	--	--	--	--	\$51	\$122	\$142	\$216	\$97	\$186
Market Cap per User (\$)	--	--	--	--	\$181	\$313	\$315	\$407	\$142	\$229

Note: Google became a publicly-listed company on 8/14/04. Revenue excludes TAC (traffic acquisition cost); Users are annual averages per comScore global, excludes YouTube unique users who are not Google users; Global user data prior to 2005 are Morgan Stanley Research estimates based on MediaMetrix (US only) data; Market capitalization data are year-end values per FactSet, 2009E data as of 12/08/09. Source: comScore, FactSet, Morgan Stanley Research.

Tencent – Virtual Goods Leadership in China Has Driven \$35B in Wealth Creation Over 11 Years

	2001	2002	2003	2004	2005	2006	2007	2008	2009E
Revenue (\$MM)	\$7	\$39	\$108	\$168	\$210	\$412	\$562	\$1,052	\$1,803
Y/Y Growth	--	436%	179%	56%	25%	96%	36%	87%	71%
Virtual Goods (IVAS)	\$0	\$6	\$34	\$65	\$116	\$268	\$370	\$723	\$1,391
Mobile (MVAS)	\$6	\$29	\$69	\$94	\$76	\$103	\$119	\$206	\$268
Advertising	\$1	\$3	\$5	\$8	\$17	\$39	\$73	\$121	\$139
Other	\$0	\$1	\$1	\$1	\$1	\$1	\$1	\$2	\$5
Operating Income (\$MM)	\$2	\$21	\$49	\$69	\$71	\$171	\$240	\$477	\$877
Margin (%)	21%	54%	46%	41%	34%	42%	43%	45%	49%
Active Users (MM)	22	49	68	108	168	217	266	338	446
Revenue per User (\$/yr)	\$0	\$1	\$2	\$2	\$1	\$2	\$2	\$3	\$4
Market Capitalization (\$B)	--	--	--	\$1	\$2	\$6	\$14	\$12	\$35
Market Cap per User (\$)	--	--	--	\$10	\$11	\$29	\$51	\$34	\$78

Note: Tencent became a publicly-listed company on 6/16/04. Virtual goods revenue reported as IVAS (Internet Value-Added Services) revenue; Mobile revenue reported as MVAS (Mobile Value-Added Services) revenue. Active users are averages of number of active QQ accounts during the year. Market capitalization data are year-end values per FactSet, 2009E data as of 12/05/09. Revenue and Op. Income data assume constant exchange rate 1USD = 6.8RMB. Source: comScore, FactSet, Tencent, Morgan Stanley Research.

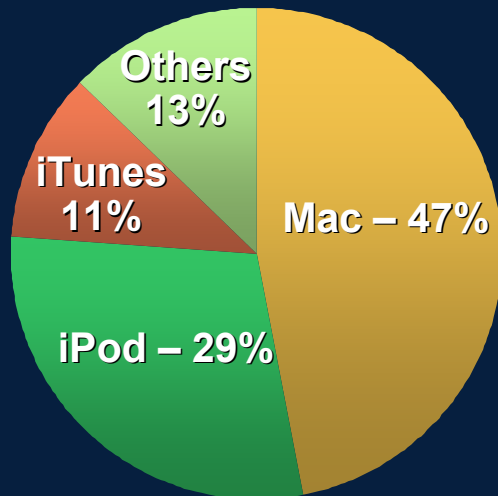
Amazon.com – Online Shopping Experience / Logistics Leadership Has Driven \$58B in Wealth Creation Over 15 Years

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009E
Revenue (\$MM)	\$16	\$148	\$610	\$1,640	\$2,762	\$3,122	\$3,933	\$5,264	\$6,921	\$8,490	\$10,711	\$14,836	\$19,166	\$23,694
Y/Y Growth	--	839%	313%	169%	68%	13%	26%	34%	31%	23%	26%	39%	29%	24%
Media	--	--	--	--	\$2,176	\$2,456	\$3,099	\$4,049	\$5,102	\$5,931	\$7,066	\$9,243	\$11,083	\$12,307
EGM	--	--	--	--	\$481	\$594	\$747	\$1,103	\$1,686	\$2,329	\$3,361	\$5,209	\$7,541	\$10,748
Other	--	--	--	--	\$104	\$73	\$87	\$112	\$133	\$230	\$284	\$384	\$542	\$639
Operating Income (\$MM)	-\$6	-\$32	-\$61	-\$352	-\$317	-\$45	\$180	\$361	\$490	\$559	\$501	\$849	\$1,094	\$1,495
Margin (%)	-38%	-22%	-10%	-21%	-11%	-1%	5%	7%	7%	7%	5%	6%	6%	6%
Active Customers (MM)	--	--	--	14	20	25	31	39	47	55	64	76	88	101
Revenue per Customer (\$/yr)	--	--	--	\$116	\$139	\$126	\$127	\$133	\$147	\$154	\$167	\$195	\$218	\$234
Market Capitalization (\$B)	--	\$1	\$17	\$26	\$6	\$4	\$7	\$21	\$18	\$20	\$16	\$39	\$22	\$58
Market Cap per User (\$)	--	--	--	\$1,863	\$281	\$163	\$236	\$537	\$386	\$357	\$255	\$507	\$249	\$575

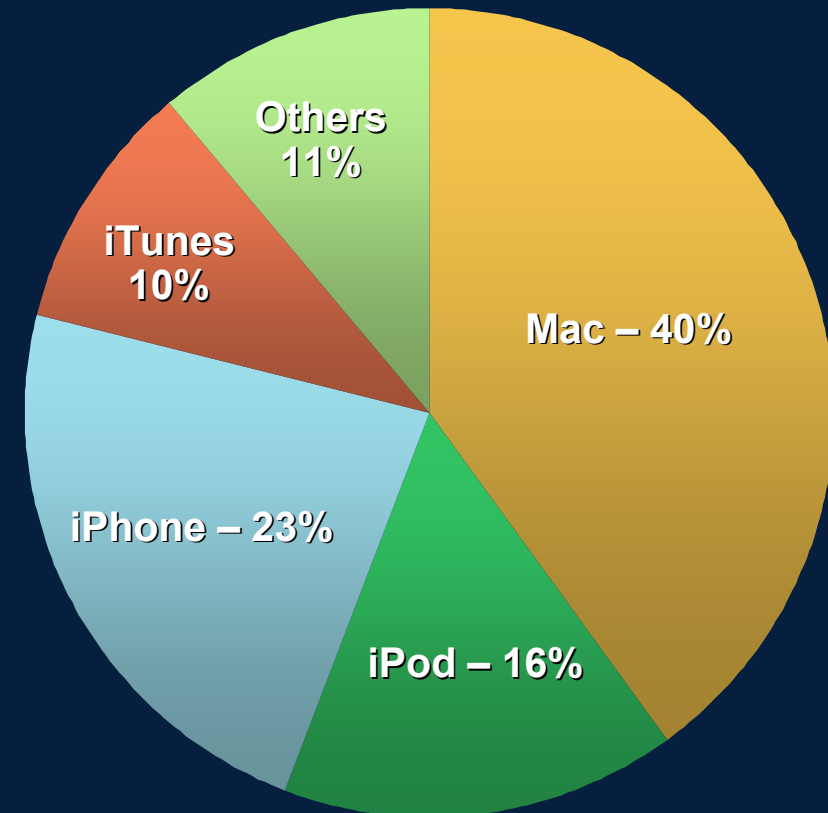
Note: Amazon.com became a publicly-listed company on 5/17/97. EGM is Electronics and other General Merchandises. Market capitalization data are year-end values per FactSet, 2009E data as of 12/08/09. Source: Amazon.com, FactSet, Morgan Stanley Research.

Apple – Mobile Device / Service Leadership Has Driven \$166B in Wealth Creation Over 8 Years

Apple's Revenue Mix, Free Cash Flow & Operating Margin, CQ2:07 vs. CQ3:09



CQ2:07	Revenue (\$MM)	CQ3:09
\$2,533	Mac	\$3,952
\$1,571	iPod	\$1,563
\$5	iPhone	\$2,297
\$608	iTunes	\$1,018
\$693	Others	\$1,040
\$5,410	Total Revenue	\$9,870
19%	Operating Margin	22%
\$134B	Market Cap	\$171B



*Some Companies Can Benefit From Technology
Changes by Being in the Right Place at the Right Time*

Microsoft – While Not Viewed as an Internet Innovator / Leader, Growth in Internet Usage Drove Significant Growth in PC / Windows-Related Sales and Helped Drive \$240B in Wealth Creation Over 16 Years

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009E
Revenue ((\$MM))	\$4,159	\$5,358	\$7,661	\$9,891	\$13,849	\$17,524	\$21,855	\$23,776	\$26,847	\$30,785	\$34,268	\$38,474	\$41,360	\$46,060	\$57,898	\$61,981	\$57,447
Y/Y Growth	--	29%	43%	29%	40%	27%	25%	9%	13%	15%	11%	12%	8%	11%	26%	7%	-7%
Client	--	--	--	--	--	--	--	--	--	\$10,058	\$10,921	\$11,851	\$12,569	\$12,391	\$17,552	\$16,738	\$15,109
Server and Tools	--	--	--	--	--	--	--	--	--	\$5,494	\$6,534	\$7,857	\$8,868	\$10,432	\$11,992	\$14,164	\$14,206
Online Services	--	--	--	--	--	--	--	--	--	\$1,737	\$2,104	\$2,344	\$2,337	\$2,304	\$2,845	\$2,810	\$2,136
Enterprise	--	--	--	--	--	--	--	--	--	\$10,297	\$11,719	\$13,160	\$13,993	\$14,453	\$18,388	\$19,838	\$18,058
Entertainment and Devices	--	--	--	--	--	--	--	--	--	\$3,166	\$2,990	\$3,262	\$3,593	\$6,457	\$7,093	\$8,305	\$7,686
Other	--	--	--	--	--	--	--	--	--	\$33	\$0	\$0	\$0	\$23	\$28	\$126	\$252
Operating Income (\$MM)	\$1,469	\$1,925	\$2,575	\$3,567	\$6,235	\$8,705	\$11,304	\$11,505	\$12,301	\$11,643	\$11,908	\$15,715	\$16,907	\$16,466	\$24,119	\$23,448	\$19,878
Margin (%)	35%	36%	34%	36%	45%	50%	52%	48%	46%	38%	35%	41%	41%	36%	42%	38%	35%
Active Users (MM)	--	--	--	--	--	328	382	443	504	562	625	695	772	859	955	1072	1160
Revenue per User (\$/yr)	--	--	--	--	--	\$54	\$57	\$54	\$53	\$55	\$55	\$55	\$54	\$54	\$61	\$58	\$50
Market Capitalization (\$B)	\$25	\$30	\$53	\$72	\$152	\$268	\$461	\$423	\$393	\$293	\$276	\$310	\$266	\$234	\$276	\$252	\$265
Market Cap per User (\$)	--	--	--	--	--	\$817	\$1,205	\$955	\$779	\$522	\$442	\$446	\$344	\$273	\$290	\$235	\$229

Note: Microsoft became a publicly-listed company in 1986. Market capitalization data are year-end values per FactSet, 2009E data as of 12/08/09. Source: Microsoft, FactSet, Morgan Stanley Research.

Rapid Ramp of Mobile Internet Usage Will be a Boon to Consumers and Some Companies Will Likely Win Big (Potentially Very Big) While Many Will Wonder What Just Happened

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(as of November 30, 2009)

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Total	2,401		687		

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Attractive (A): The analyst expects the performance of his or her industry coverage universe over the next 12-18 months to be attractive vs. the relevant broad market benchmark, as indicated below.

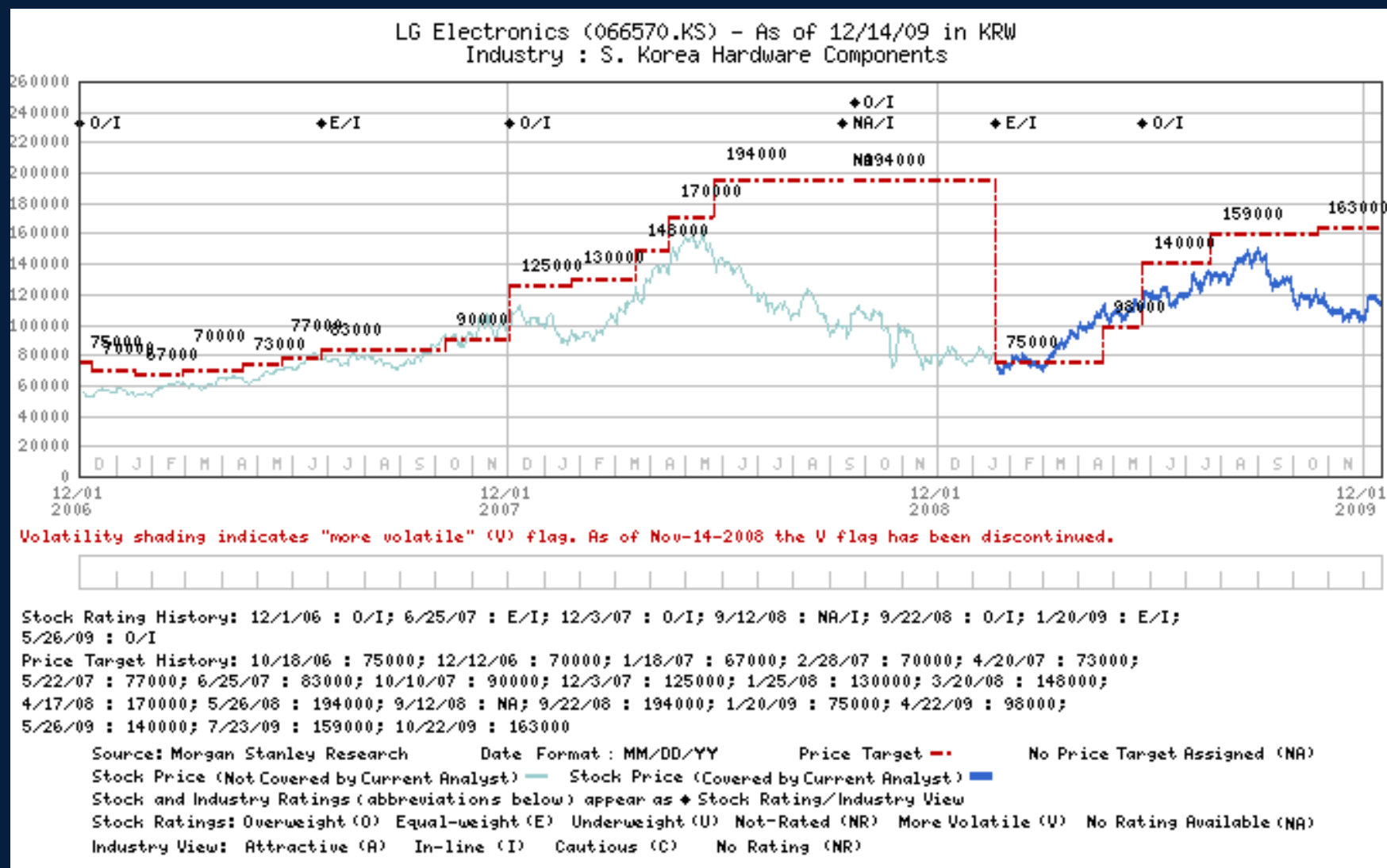
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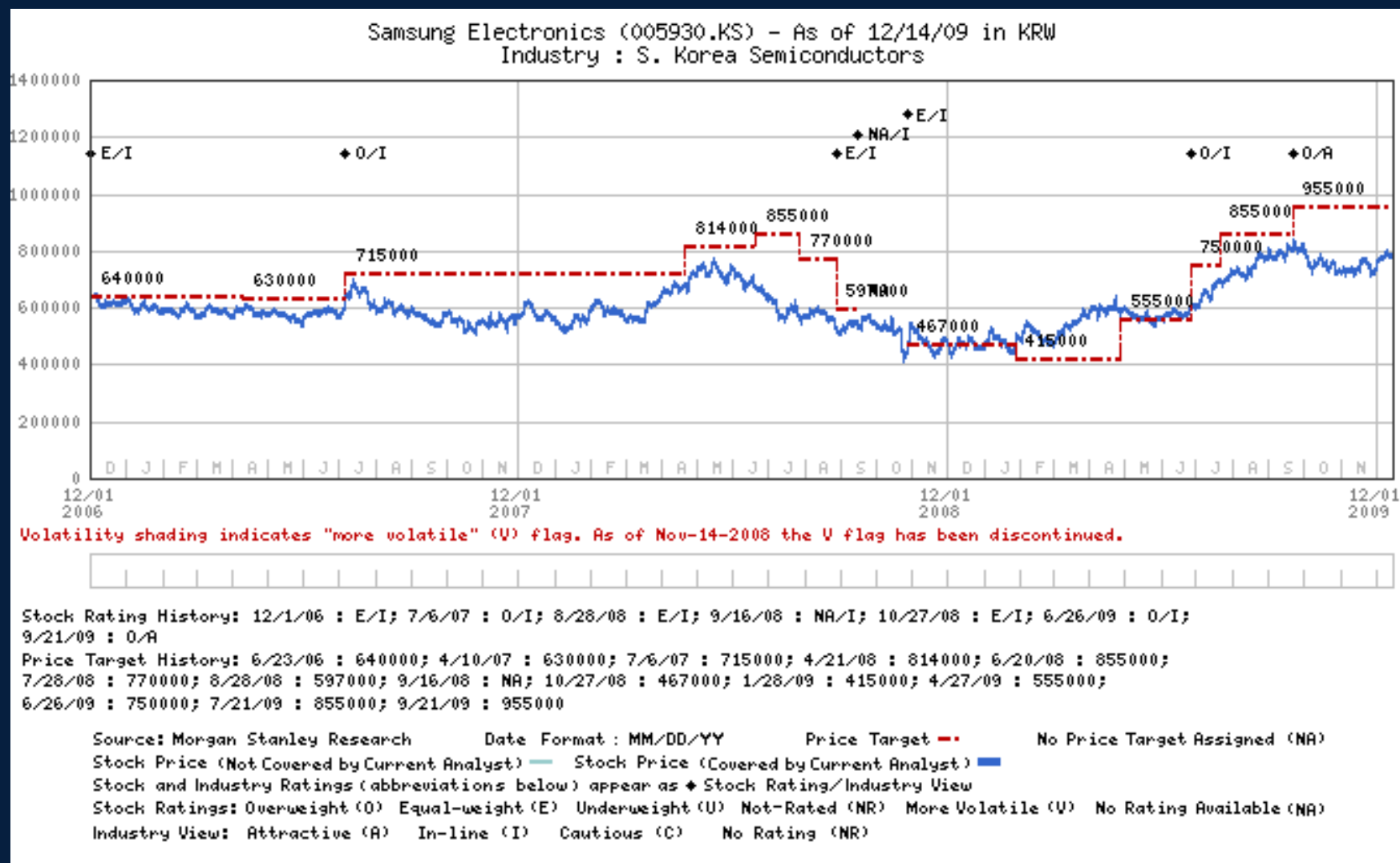
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Stock Price, Price Target and Rating History (See Rating Definitions)



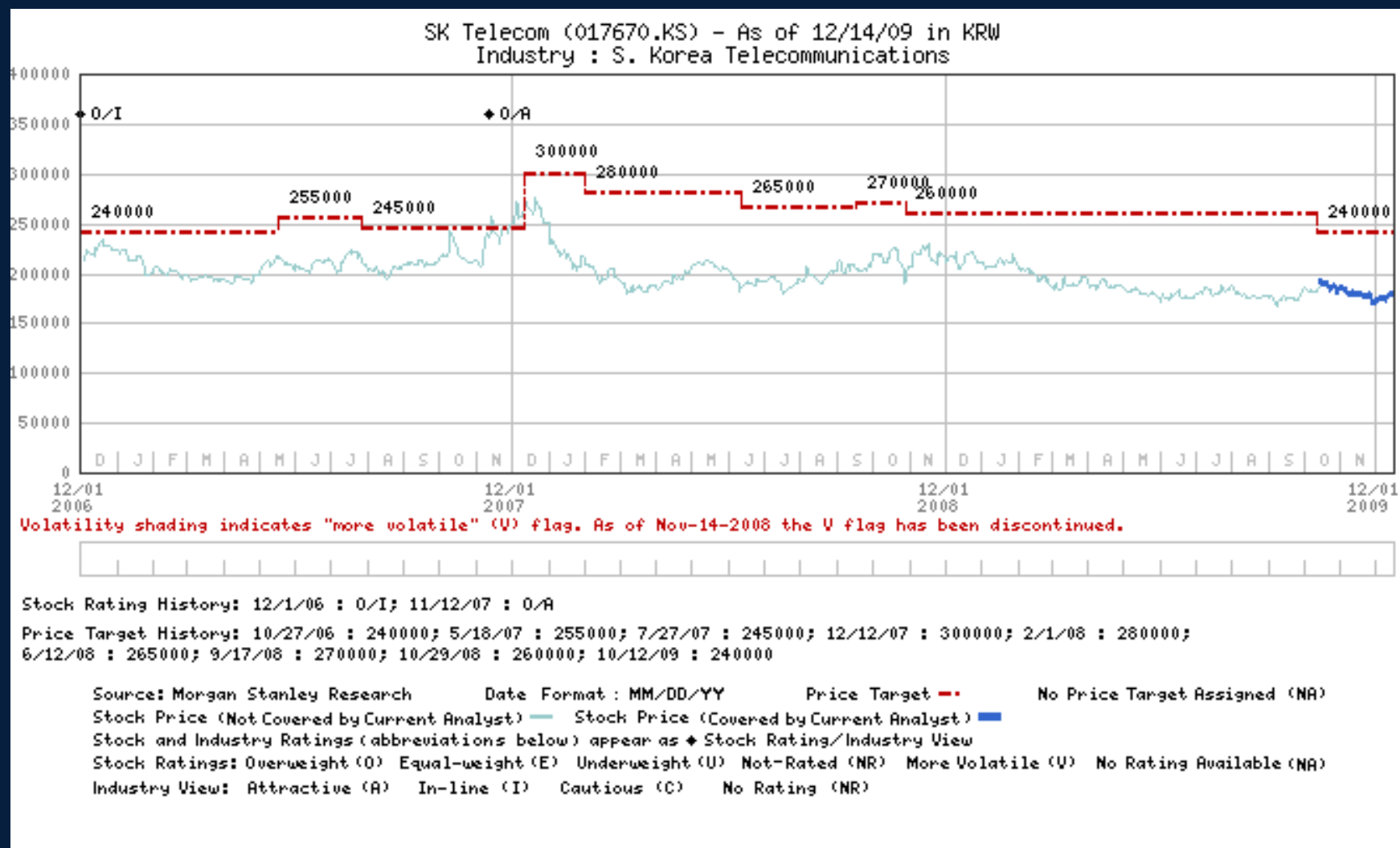
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