

Equity Research
North America

Industry

Technology Team

Communications/Telecom Software

david.raezer@morganstanley.com

Computer Services

david.togut@morganstanley.com

EMS/Distributors/Connectors

scott.craig@morganstanley.com

julie.santoriello@morganstanley.com

Enterprise Software: Systems & Infrastructure

joseph.farley@morganstanley.com

Imaging Technology

solin.cho@morganstanley.com

Internet Portals/Commerce & PC Software

mary.meecker@morganstanley.com

mark.mahaney@morganstanley.com

david.joseph@morganstanley.com

Enterprise Software Applications

charles.phillips@morganstanley.com

ryan.rathman@morganstanley.com

Semiconductors

mark.edelstone@morganstanley.com

louis.gerhardy@morganstanley.com

john.cross@morganstanley.com

Semiconductor Capital Equipment

steven.pelayo@morganstanley.com

Systems & Enterprise Hardware

rebecca.runkle@morganstanley.com

stirling.levy@morganstanley.com

Telecom Equipment & Data Networking

alkesh.shah@morganstanley.com

george.kelly@morganstanley.com

arindam.basu@morganstanley.com

david.jackson@morganstanley.com

michael.lynch@morganstanley.com

barry.lebovits@morganstanley.com

RECENT TECHNOLOGY SECTOR REPORTS

Tech EPS Misses at 14% in CQ4; Lowest Miss Rate in 5 Qtrs; Better Than CQ3's 34%

February 28, 2002

CQ4:01 Tech Revenue — Who Had Mo' and No?

February 28, 2002

Global Chipwatch

February 26, 2002

The Global Communicator

February 23, 2002

The Internet User/Usage Ecosystem Framework - 4Q01 Update

February 21, 2002

Tech Revenue Declined 21% Y/Y, up 4% Q/Q in CQ4:01

February 21, 2002

Morgan Stanley CIO Survey Series: Release 3.0

February 11, 2002

The Morgan Stanley Technology Primer

December 3, 2001

Industry Overview

March 08, 2002

Highlights of Tech Sector Reports

- In this report, we provide a brief overview (in slide format) of recent core Technology Sector research reports, consolidating our points of view on the current state, key drivers, and underlying business trends of key areas of Technology
- *2/02 CIO Survey*-- We Saw a Decrease in CIOs' Caution Regarding Current Economic Conditions and IT Budgets
- *2/02 Internet User/Usage Ecosystem*-- Trends of Recent Quarters Continue to Point to Strong Internet User and Usage Growth, but at Slowing Rates
- *2/02 Global Chipwatch*-- The Semiconductor Industry Shows Clear Signs of Having Bottomed and is in the Process of Steadily Building Momentum
- *2/02 Global Communicator*-- Outlook Remains Cautious for Telecom Equipment & Data Networking Industry Group

Note: All of Morgan Stanley's technology research reports are available through Client Link at <http://www.morganstanley.com>. If you wish to receive this service, please contact your institutional sales representative.

This report, the reports mentioned in it, and many other Technology Research reports can also be downloaded from <http://www.morganstanley.com/institutional/techresearch/>

Please see the important disclosures at the end of this report.

Highlights of Tech Sector Reports

Summary

The CIO Survey Series – Chuck Phillips, Ryan Rathman

CIOs are less fixated with the slowing economy and spending cuts. The percentage of CIOs indicating that the slowing economy has caused them to re-evaluate IT budgets in the last month declined in January to 44% from 67% in November.

We saw an increase in respondents who said they would spend more on technology products and services in 2002 from 31% in November to 40% in January. The percentage of CIOs saying that they have a positive or slightly positive outlook on the US economy increased from 44% in November to 60% in January.

47% of CIOs responded that they expect to spend more in the second half of the year, compared to 24% of respondents in the November survey. The year is looking more backend loaded, as management wants to see how the economy plays out. 42% of respondents indicated that they are likely to spend evenly throughout the course of the year, versus 55% in the November survey.

The top priorities for CIOs remained the same in January, compared to November, although they changed positions within the top three. Our survey indicated the top three technology priorities in 2002 are application integration (from No. 3 to a tie for No. 1), security software (from No. 2 to a tie for No. 1), and e-commerce initiatives (from No. 1 to No. 3).

View the full research note via Client Link at:
<https://secure.ms.com/ER/ebs/2002/ny/cp/cphi0211.pdf>

The Internet User/Usage Ecosystem – Mary Meeker, David Joseph, Mark Mahaney

Normalized trends of the past few quarters continue to point to strong Internet user and usage growth, but at slowing rates. Although the weaker economy and the law of large numbers have clearly hit Internet-related purchases and usage this year, CQ4 data continue to support solid Internet user and usage growth rates.

CQ4:01 Y/Y user growth metrics ranged from 8% to 40%, with a mean increase of 23% and a median increase of 22% — this compares with the CQ3:01 Y/Y user growth range of

27% to 37%, with a mean increase of 29% and a median increase of 27%.

CQ4:01 Y/Y usage growth ranged from (7)% to 117%, with a mean increase of 41% and a median increase of 39% — this compares with CQ3:01 Y/Y usage growth of a range of (1)% to 128%, with a mean increase of 48% and a median increase of 46%.

For CQ4:01, the Internet growth metrics continued to support strong, though slowing, rates of growth. Mean year-over-year usage growth outpaced mean user growth in CQ4:01 by a multiplier of 1.8.

The CQ4:01 quarter-to-quarter metric cut was as follows: of the 21 quarterly metrics presented in this report, 48% saw an increase in the rate of growth Q/Q in CQ4:01, while 52% saw a decrease, versus 57% up and 43% down in CQ3:01.

View the full research note via Client Link at:
<https://secure.ms.com/ER/ebs/2002/ny/ec/eco0214.pdf>

The Global Chipwatch – Mark Edelstone, Louis Gerhardy, John Cross

We believe the semiconductor industry reached a cyclical trough in the third quarter. We expect the industry to bounce along the bottom during the fourth quarter of 2001 and the first quarter of 2002, with first-quarter revenues unchanged plus or minus 2% Q/Q. However, we continue to believe that the rate of recovery will be choppy and muted during the next four to six quarters.

Excess capacity, subdued economic growth, and a lack of killer applications indicate that near-term visibility will remain limited, pricing power will be difficult to achieve and overall growth rates will probably remain under pressure.

We currently expect revenues to be flat to down 5% Y/Y in 2002, but easy comparisons suggest that strong growth should be recorded in 2003 — we currently expect 20-25% Y/Y revenue growth in 2003.

While we are becoming increasingly positive on near-term stock-price performance, we believe that there are four key risk factors to monitor. Near-term visibility is still limited by low backlogs. A lack of pricing power caused by excess capacity should remain in force during the next four to six quarters. The potential for a 'double-dip' in the economy would adversely impact our earnings estimates and, finally, we think valuations remain rich.

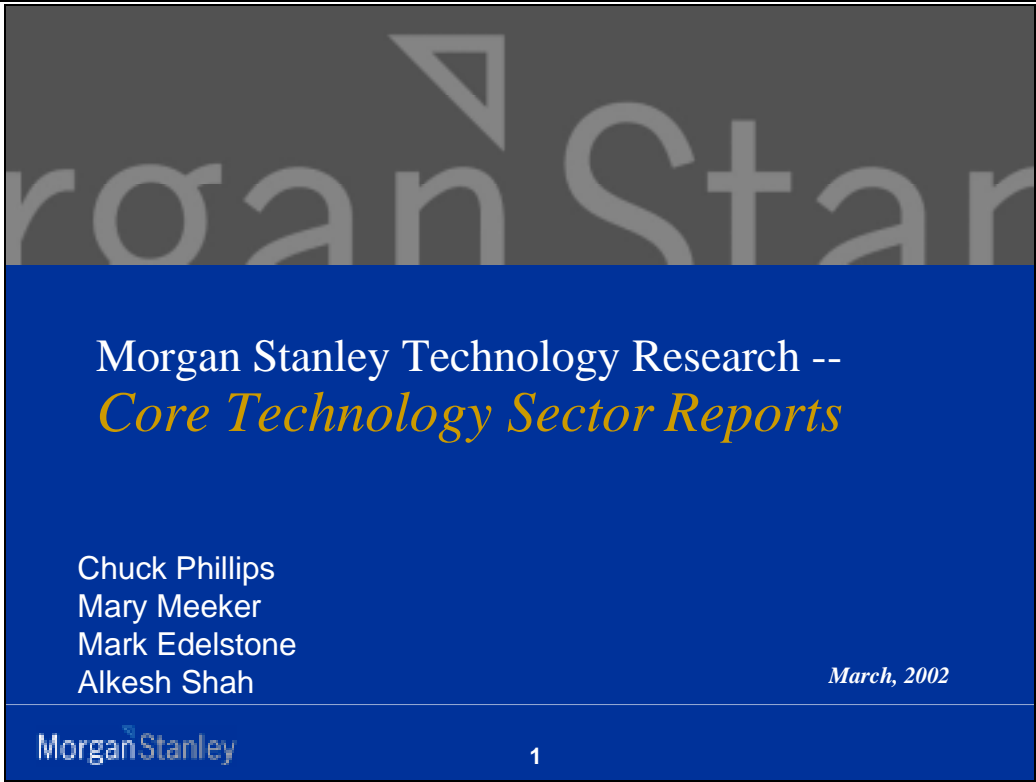
View the full research note via Client Link at:
<https://secure.ms.com/ER/reports/2002/ln/msb520/msb5207.d01.pdf>

The Global Communicator – Alkesh Shah

Coming on the heels of flattish stock performance in December and strong performance in November, telecom equipment stocks have recently experienced deep selling pressure due, we believe, to cautious carrier commentary, below-consensus capex guidance, limited visibility from most equipment vendors, and accounting/liquidity fears resulting from several bankruptcy filings. The Morgan Stanley Diversified Telecom Equipment Index (MS-DTI) was down 5% M/M in January, and declined an incremental 8% during February to date.

We maintain the cautious outlook we articulated in the January and February editions of the *Global Communicator*, and point to challenging results and guidance from a spectrum of carriers and equipment vendors during the January earnings season for support. We do not expect a recovery in industry fundamentals until late 2002/early 2003, and think stocks could trade within a narrow band until investors have evidence of improving or worsening conditions. At this point, we believe most stocks already discount much of the negative news flow that has surfaced over the past few weeks. However, we believe there is risk to our CQ1:02 estimates, particularly for vendors with heavy Inter-Exchange Carrier (IXC) exposure.

View the full research note via Client Link at:
<https://secure.ms.com/ER/ebs/2002/ny/as/asha0225.pdf>



Morgan Stanley Technology Research --
Core Technology Sector Reports

Chuck Phillips
Mary Meeker
Mark Edelstone
Alkesh Shah

March, 2002

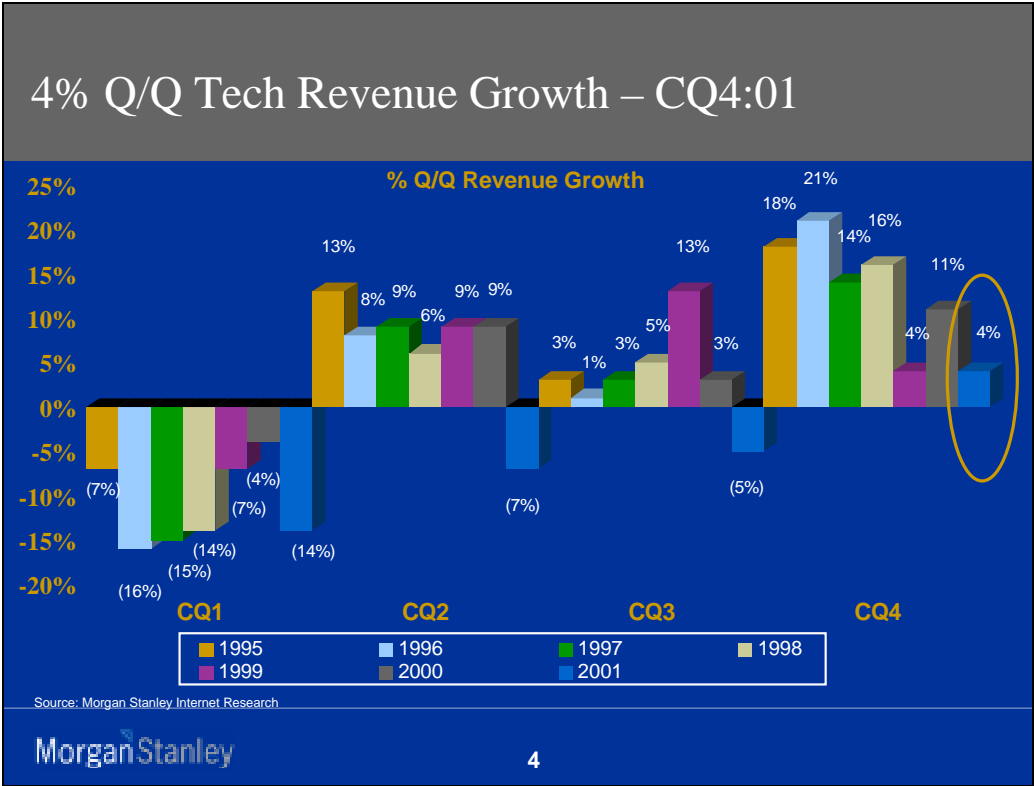
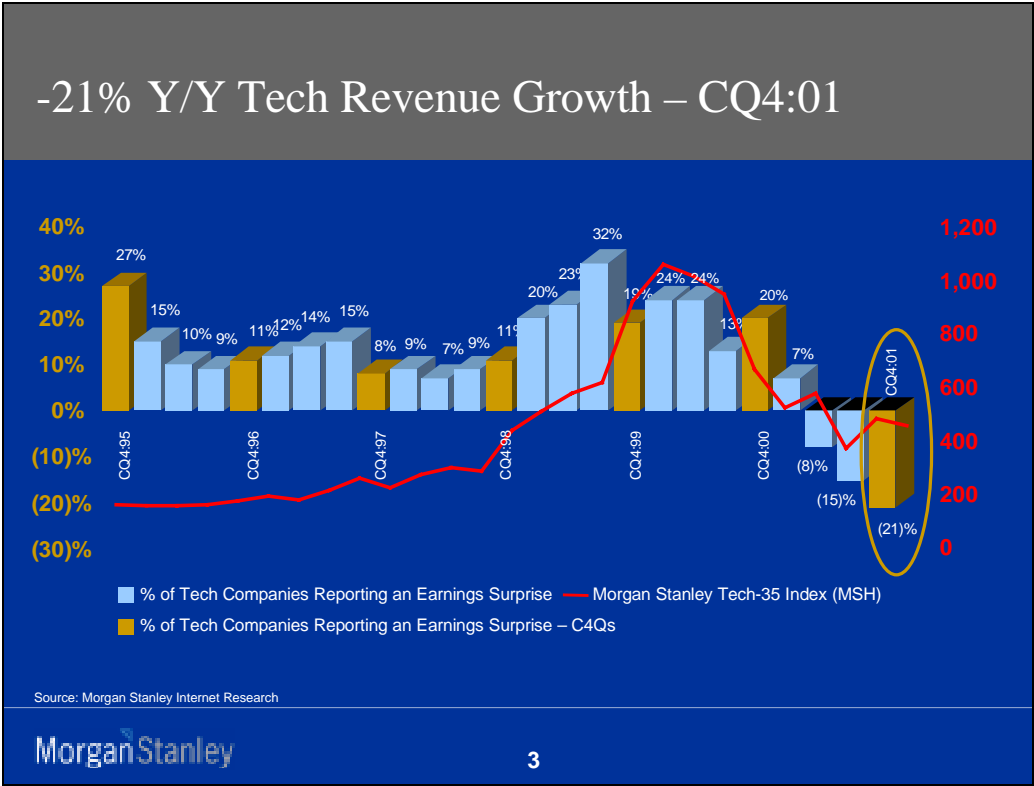
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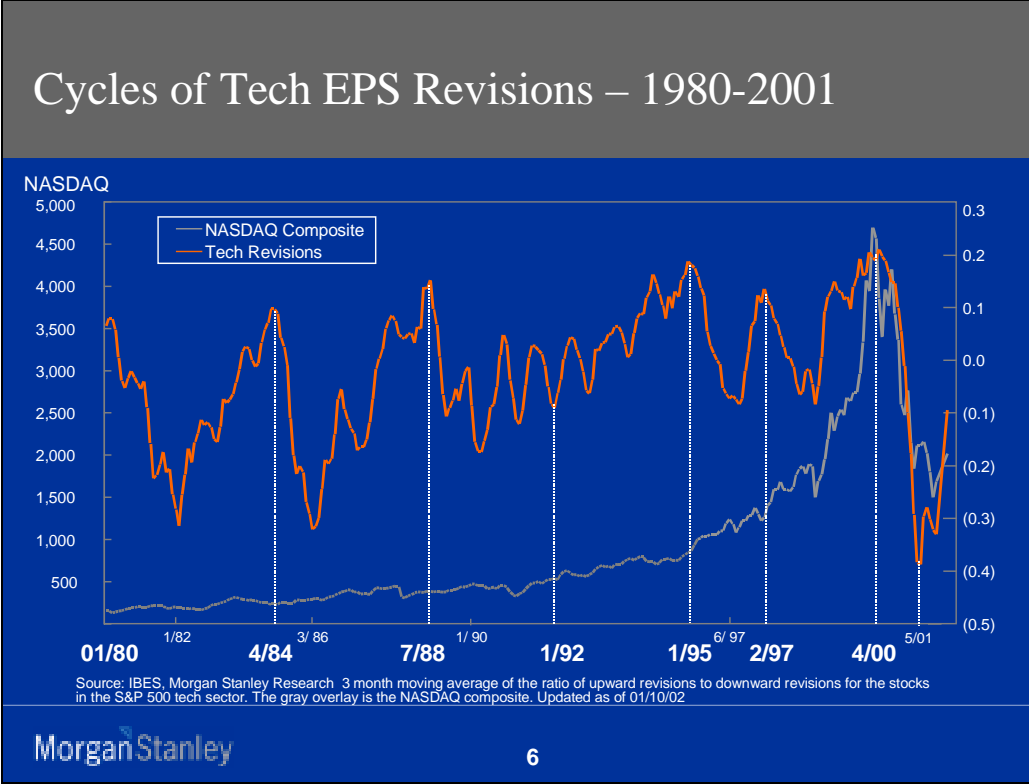
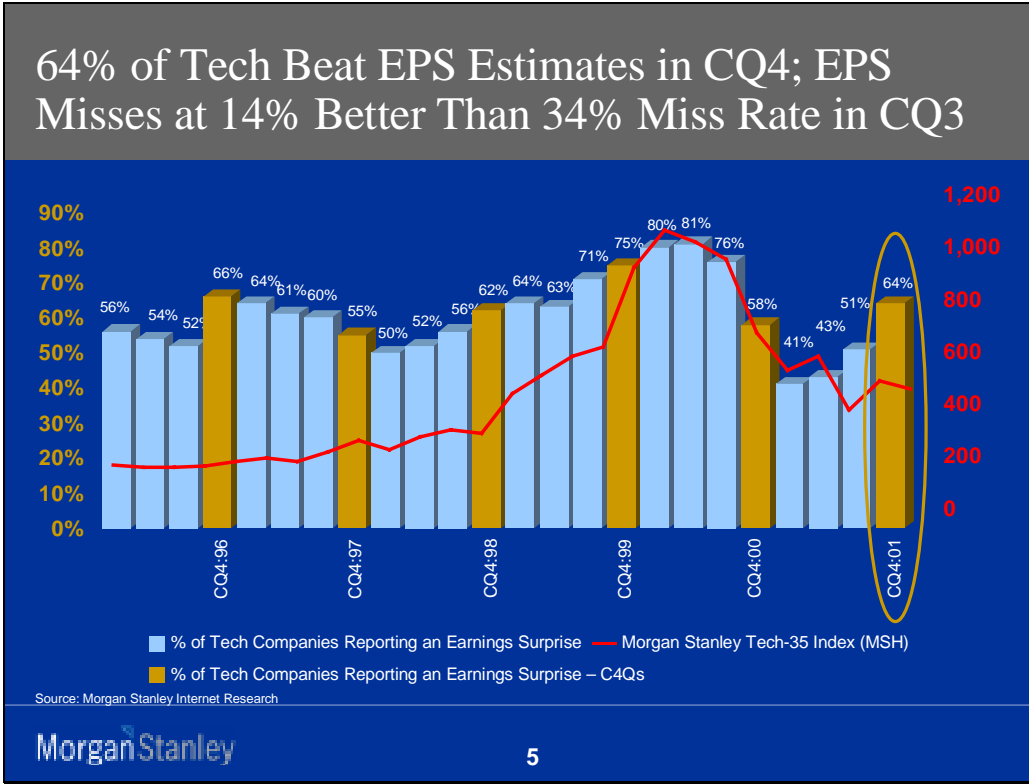


Technology Stocks -- Market Context

March, 2002

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Morgan Stanley Technology Research -- Core Technology Sector Reports

CIO Survey Series
monthly

Internet Ecosystem
quarterly

Global Chipwatch
monthly

Global Communicator
monthly

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7

The Morgan Stanley CIO Survey Series

Charles Phillips
Ryan Rathman

February, 2002

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8

The Morgan Stanley CIO Survey Series

Objective

Determine direction of technology trends and spending patterns by surveying 225 Chief Information Officers ten times a year.

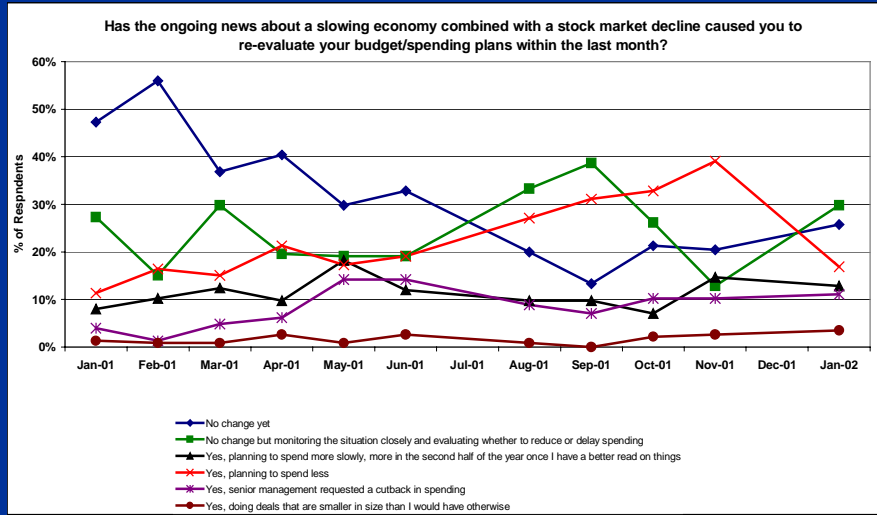
Summary of Recent Surveys ...

- In our November 2001 survey, CIOs indicated relatively flat IT spending in 2002 versus 2001. We estimate that IT budgets will grow 2.0% in 2002.
- In our January 2002 survey, we saw a decrease in CIOs' caution regarding current economic conditions and IT budgets. The percentage of CIOs indicating that the slowing economy has caused them to re-evaluate IT budgets in the last month declined in January to 44% from 67% in November.
- Our January 2002 survey indicated the top three technology priorities in 2002 are application integration, security software, and e-commerce initiatives.

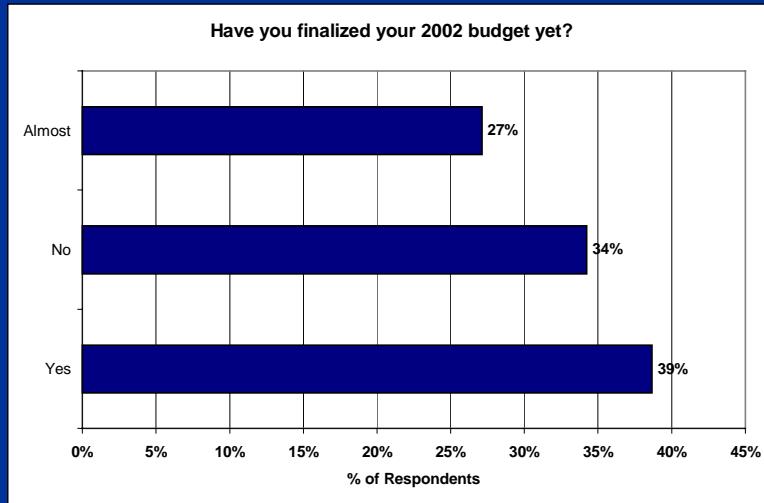
The Process ...

- Members of the Morgan Stanley Technology Research Team draft a series of questions based on current critical topics or hypothesis that analysts would like vetted through IT executives
- Outside research firm conducts telephone interviews with members of a group of 300 IT executives
- Each survey results in a collection of responses from 225 of the 300 IT executives
- Results are published in a timely manner after we receive them from our outside research firm

IT Budgets are Directly & Quickly Impacted by Global Economic Conditions ...

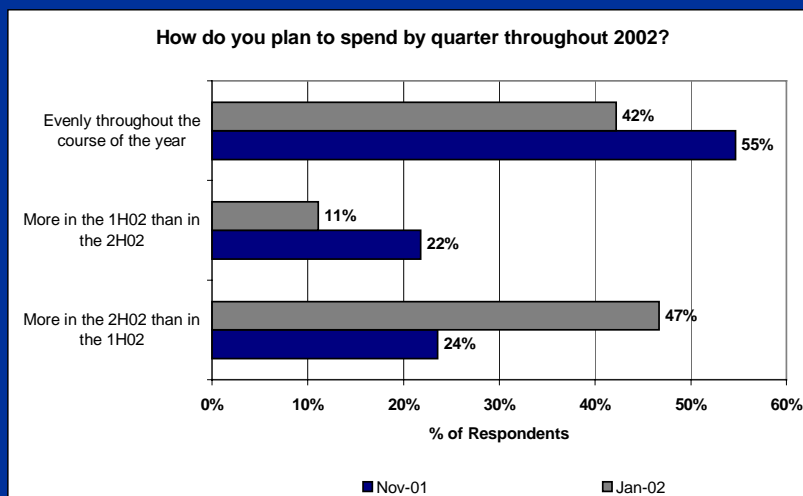


2002 IT Budgets Likely to be Reset more Frequently throughout the Year than in than Past...



Source: Morgan Stanley CIO Survey Series, Release 2.9, November 2001.

2002 IT Spending Geared Toward the Second Half of the Year...



Source: Morgan Stanley CIO Survey Series, Release 3.0, January 2002.

CIOs Forecast IT Budget Growth for 2002, Compared to Actual 2001 IT Spending, is Flat

	Hardware	Networking Equipment	Software	Outsourced Services / IT Personnel	Overall IT Budget
High	50%	75%	50%	50%	35%
Low	-100%	-100%	-55%	-75%	-60%
Median	0%	0%	0%	0%	0%
Average	0%	1%	2%	-1%	0%
	n=224	n=222	n=224	n=221	n=222

	Hardware	Networking Equipment	Software	Outsourced Services / IT Personnel	Overall IT Budget
% (+) increase	37%	46%	44%	32%	40%
% Flat	43%	37%	42%	43%	34%
% (-) decrease	20%	16%	15%	25%	26%

Source: Morgan Stanley CIO Survey Series, Release 2.9, November 2001.

Morgan Stanley Estimate for 2002 IT Budget Growth is 2.0%

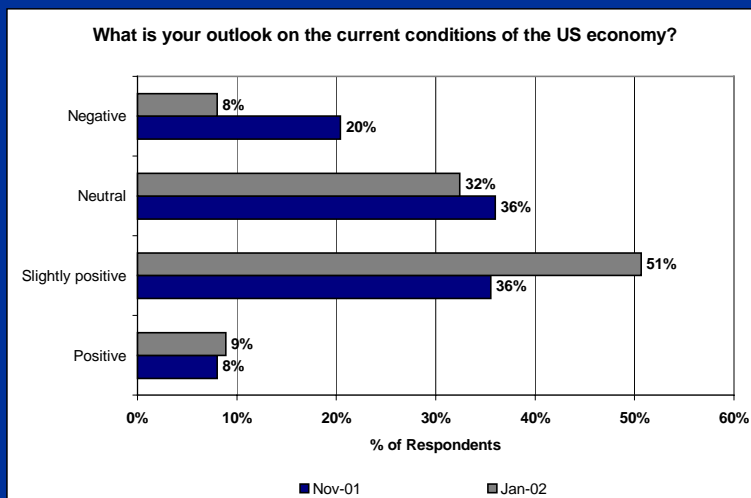
	1998	1999	2000	2001E	2002E
Global IT Budget Growth	6.2%	9.0%	12.0%	1.5%	2.0%

Top 15 IT Priorities in 2002 ... E-commerce & Security Software lead the Pack

	Response	%
Application integration	79	35%
Security software	79	35%
E-commerce initiatives	71	32%
Windows 2000/XP upgrade – desktop	59	26%
Web site enhancements	57	25%
XML-based applications	52	23%
Windows 2000 upgrade – server	51	23%
ERP software/ERP upgrade	49	22%
Content Management software for Web site	47	21%
Network equipment	47	21%
Wireless initiatives	45	20%
Data mining/OLAP tools	44	20%
CRM software	41	18%
Storage hardware	40	18%
Employee/Enterprise data portal projects	38	17%

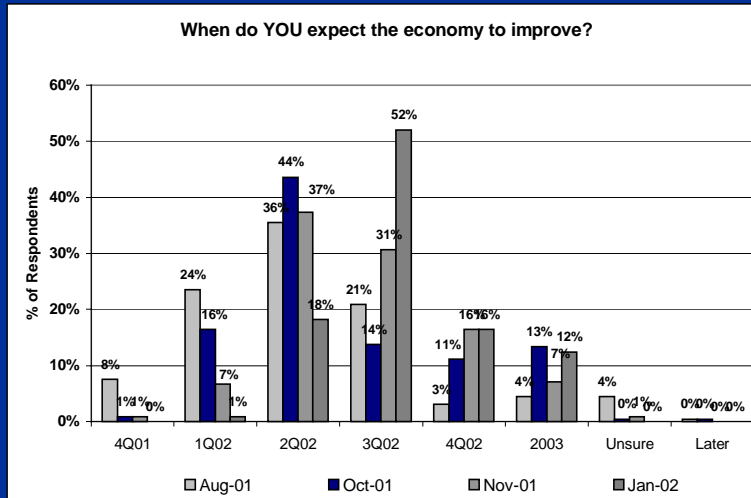
Source: Morgan Stanley CIO Survey Series, Release 3.0, January 2002.

CIOs' View of the Economy ... Neutral to Slightly Positive



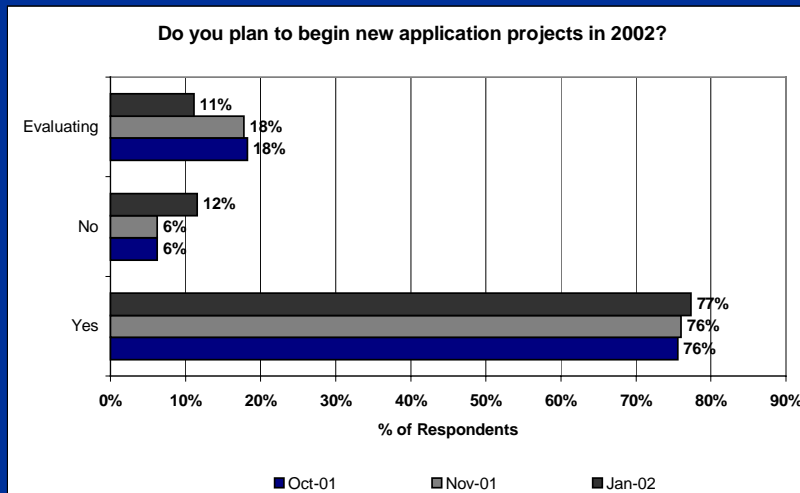
Source: Morgan Stanley CIO Survey Series, Release 3.0, January 2002.

CIOs' View of the Economy ... Looking for a Recovery Later in 2002



Source: Morgan Stanley CIO Survey Series, Release 3.0, January 2002.

New Projects Are Slated for '02 ... but They May be Smaller in Size and Scope



Source: Morgan Stanley CIO Survey Series, Release 3.0, January 2002.

The Morgan Stanley Internet User/Usage Ecosystem

Mary Meeker
Mark Mahaney
David Joseph

February, 2002

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21

The Morgan Stanley Internet User/Usage Ecosystem Framework

Objective

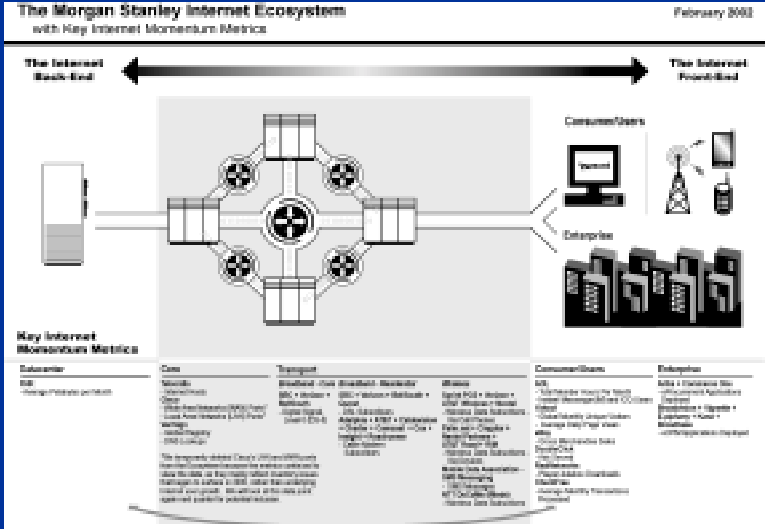
*Determine the basics of the health/growth/
direction of the Internet -- worldwide -- by
looking at 22 (21 quarterly, 1 annual)
metrics from 37 (primarily U.S.-based)
companies with leading market positions
in various parts of the Internet Ecosystem*

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22

mary.meeker@morganstanley.com

The Internet Ecosystem Back-End to Front-End



Source: Morgan Stanley Internet Research

The Internet User/Usage Ecosystem – Key Internet Momentum Metrics

- Internet Users**
 - Global Monthly Unique Visitors (Yahoo)
 - WAN Ports (Core & Edge) (Cisco)
 - LAN Ports (Cisco)
 - Internet Hosts (Telcordia Technologies)
 - Global Registry (VeriSign)
- Core Internet Usage (General)**
 - Average Daily Page Views (Yahoo)
 - Est. Total Digital Media Usage Mins. Per Qtr. (Media Matrix)
 - Instant Messenger – IM/ICQ Users (AOL)
 - Average Daily DNS Queries (VeriSign)
 - Gross Merchandise Sales (eBay)
 - RealPlayer and Gold Pass – Unique Users (RealNetworks)
 - Ads Served (DoubleClick)
 - Est. Average Transactions Processed Per Month (CheckFree)
 - Average Petabytes Per Month (RHK Inc.)
 - eProcurement Applications Deployed (Ariba, Commerce One)
 - eCRM Applications Deployed (Broadvision, Vignette, E.piphany, Kana, Broadbase)
- Core Internet Usage (Narrowband)**
 - Average Member Hours Per Month (AOL)
- Core Internet Usage (Broadband)**
 - Digital Signal, Level 0 (DS-O) – Top 3 (SBC, Verizon, BellSouth)
 - DSL Subscribers – Top 4 (SBC, Verizon, BellSouth, Qwest)
 - Cable Modem Subscribers (Adelphia, AT&T, Cablevision, Charter, Cox, Insight, RoadRunner)
- Core Internet Usage (Wireless)**
 - Wireless Data Subscribers – Via Cell Phones – Top 4 (Nextel, Sprint PCS, Verizon, AT&T Wireless)
 - Wireless Data Subscribers – Via Devices – Top 5 (Palm.net, Cingular, Nextel Partners, AT&T Road, RIM)
 - Wireless Data Subscribers – Japan (NTT DoCoMo - iMode)
 - SMS Messages – Europe (Mobile Data Association)

Source: Morgan Stanley Internet Research

Internet Ecosystem Highlights

- For **CQ4:01**, the Internet growth metrics continue to support very strong, though slowing, rates of growth. **Usage** growth outpaced **User** growth by a factor of **1.8**
- **CQ4:01** Y/Y user growth reflected a **mean increase of 23%** – compared with **CQ3:01's 29%**
- **CQ4:01** Y/Y usage growth reflected a **mean increase of 41%** – compared with **CQ3:01's 48%**
- Of the 21 CQ4:01 quarterly metrics, **48%** had accelerating Q/Q growth rates, while **52%** saw decelerating Q/Q growth.

Source: Morgan Stanley Internet Ecosystem Framework; 2/21/02

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25
mary.meeker@morganstanley.com

Internet User/Usage Ecosystem Growth Is Strong, But Slowing ...

	Q1:00	Q2:00	Q3:00	Q4:00	Q1:01	Q2:01	Q3:01	Q4:01
User Y/Y Growth – Mean	140%	133%	121%	97%	60%	40%	29%	23%
Usage Y/Y Growth – Mean	171%	163%	148%	118%	79%	57%	48%	41%
Mean Y/Y Usage/User Multiplier	1.22	1.22	1.23	1.21	1.31	1.42	1.64	1.77

Source: Morgan Stanley Internet Ecosystem Framework; 2/21/02

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mary.meeker@morganstanley.com

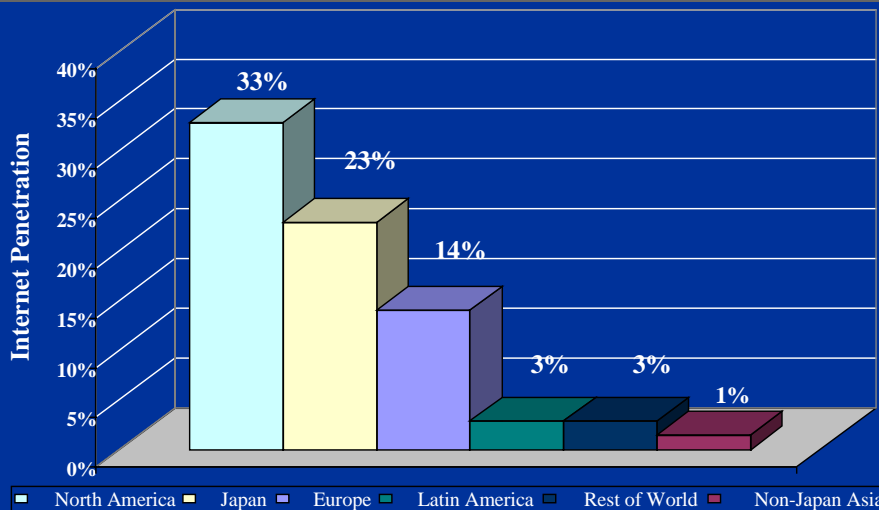
For Usage, 9/11 May Have Been An Inflection Point For The Leaders

	Week Ending							
	6/24/01	9/9/01	9/16/01	12/02/01	12/09/01	01/27/01	02/03/02	02/10/02
Total Usage	22,061	26,765	27,111	33,474	32,831	32,173	33,247	32,973
AOL Time Warner Network	6,659	8,216	9,180	9,502	9,569	8,007	8,400	8,151
MSN-Microsoft Sites	1,930	2,303	2,653	2,921	2,654	3,000	3,081	3,109
Yahoo!	1,829	2,118	2,103	2,847	2,716	3,070	3,185	2,964
eBay	383	556	435	823	753	860	804	818

Source: Media Metrix Weekly Analysis; Usage Minutes in Millions; Record usage levels are for measured period beginning March 2001.

= Record High Usage Levels

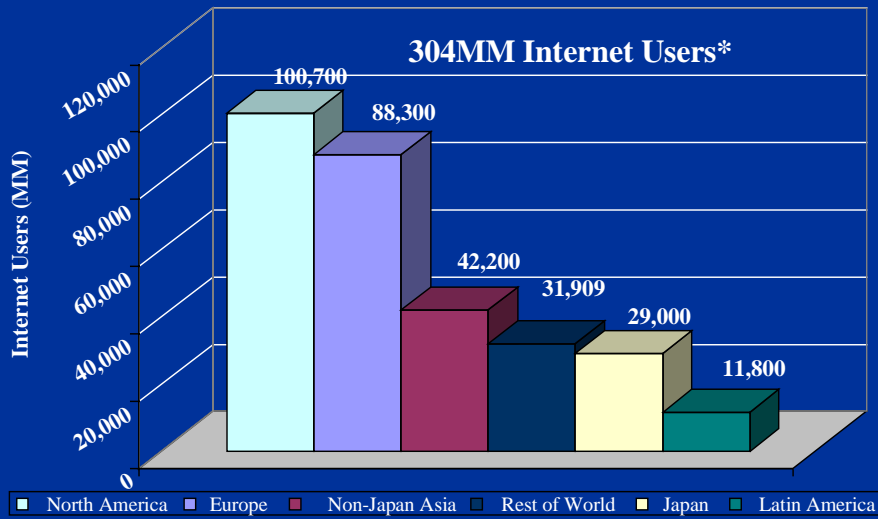
For Users, Internet Penetration Rates Are Highest in North America



Source: Morgan Stanley Internet Research - 12/31/00 estimate

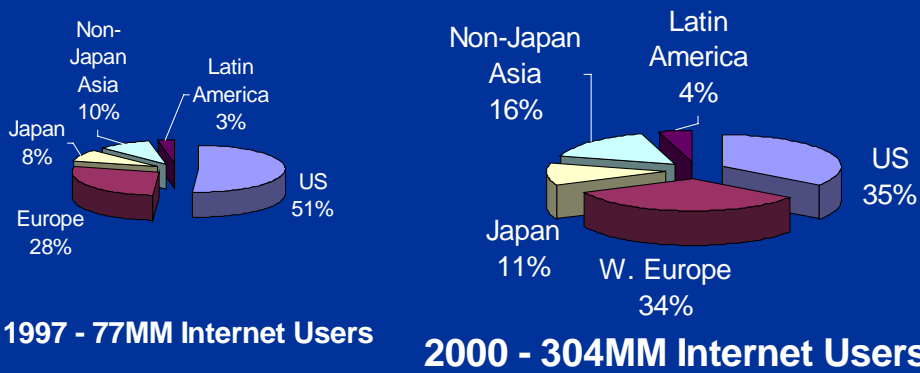
Penetration rates on a population basis

And Internet Users Are Highest in North America



Source: Morgan Stanley Internet Research *Including Rest of World (ROW) figure - 12/31/00 estimate

US Accounts For 35% of Internet UsersDown From 51% in 1997



Source: Morgan Stanley Internet Research *Excluding Canada and Rest of World (ROW) figure the regional total is 262MM on 12/31/00 estimate

Quantifying IU³ via Penetration Gaps. . . Internet Users Could Rise 350+% to 1.4B Users

Penetration Gap Between Internet and Other TMT Services: Implied Internet Growth

Region	Current Internet Users	Internet Penetration	Benchmark Penetration ¹	Internet Users At Benchmark Level	Benchmark Implied Internet User Growth	Benchmark Implied Internet User Growth
North America	101MM	33%	69%	211MM	110MM	110%
Latin America	12MM	3%	13%	56MM	44MM	373%
Europe	88MM	14%	40%	253MM	165MM	187%
Non-Japan Asia	42MM	1%	20%	587MM	545MM	1292%
Japan	29MM	23%	50%	64MM	35MM	120%
Rest of World	32MM	2%	21%	337MM	305MM	957%

**TOTAL /
WEIGHTED
AVERAGE**

304MM

5%

23%

1,378MM

1,074MM

353%

Sources: Morgan Stanley Internet Research, World Bank, IDC, Jupiter Communications, Kagan Associates; Data from 12/00

¹ The "Benchmark Penetration" is the highest penetration level of the 5 TMT technologies (Telephone Lines, PCs, Mobile Phones, Cable, Internet); North America - Cable (69%); Latin America - Telephone/Cable (13%); Europe - Telephones (40%); Non-Japan Asia - Cable (20%); Japan - Telephone (50%); Rest of World - Cable (21%)

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33

mary.meeker@morganstanley.com

The Morgan Stanley Global Semiconductor Chipwatch

Mark Edelstone

Louis Gerhardy

John Cross

February, 2002

Morgan Stanley

34

The Morgan Stanley Chipwatch

Premise

Semiconductors are the raw materials that provide the intelligence and most of the the value-added functionality in electronic products.

The Morgan Stanley Chipwatch

Objective

To monitor and analyze the global supply chain to better understand semiconductor industry fundamentals and stock price potential.

The Morgan Stanley Chipwatch

Process

We track semiconductor capital equipment, wafer production, back-end operations, IC product development and design win activity, and end demand of the major semiconductor users, including computer, communications, consumer, industrial, and automotive applications.

The Cycle Is Unfolding According To Expectations

•Revenues are bouncing along the bottom

We believe that global semiconductor industry revenues are in the third and final quarter of a rounding bottom and year-over-year revenue comparisons are becoming less negative.

•Negative earnings surprises have declined sharply

A record number of semiconductor companies reported negative earnings surprises in the first half of last year, but they declined to a slightly lower than normal level in the fourth quarter.

The Cycle Is Unfolding According To Expectations

- **Inventory levels have declined sharply**

Further declines in the EMS and distribution channels are necessary, but a severe inventory correction has enabled overall supply chain inventories to decline sharply.

- **Near-term visibility is still limited**

Backlogs declined in 4Q, and when combined with seasonally weak demand in 1Q, near-term earnings risk has increased again, but it should become less significant as 2002 unfolds.

Rolling Recessionary Environment Should Last For Another 4-6 Quarters

- **Pricing power will be limited until the 2nd half of 2003**

Excess capacity suggests that pricing power will be limited during the next one to two years.

- **The rate of recovery will be muted in 2002**

A weak global economy, the lack of killer applications, and a pricing recession suggest that the recovery phase will be sluggish and choppy in 2002.

Rolling Recessionary Environment Should Last For Another 4-6 Quarters

•Rolling recession should create many opportunities for equity investors

Similar to the late 1980s/early 1990s, we believe that the global semiconductor industry will be characterized by a rolling recession, which should cause stocks to remain in a broad and volatile trading range.

•Stock selection and timing will be crucial

We favor well-managed companies with proprietary products that can expand margins and grow faster than the overall industry.

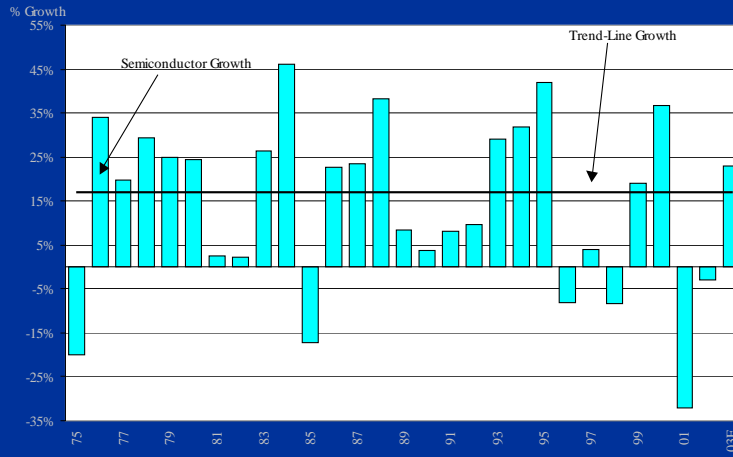
Long-Term Industry Dynamics Are Changing

Asia is gaining in importance

- The severe cyclical downturn has caused the importance of foundries to increase and we believe the trend toward outsourcing of wafer fabrication will accelerate.
- As profit margins get squeezed, more design activity in the computer, communications, and consumer market should originate in Asia.

A Rolling Recession Should Pressure Revenue Growth Until 2003

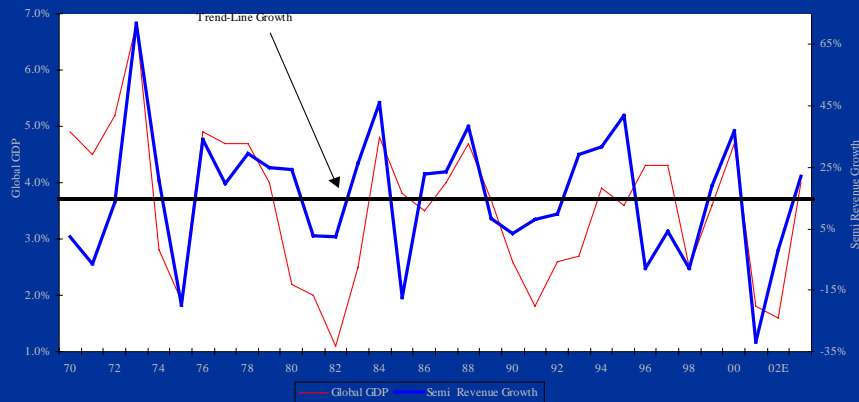
(Year-over-year semiconductor industry revenue growth rates)



Source: Morgan Stanley Research

Semiconductor Revenue Growth Should Accelerate With A Stronger Economy in 2003

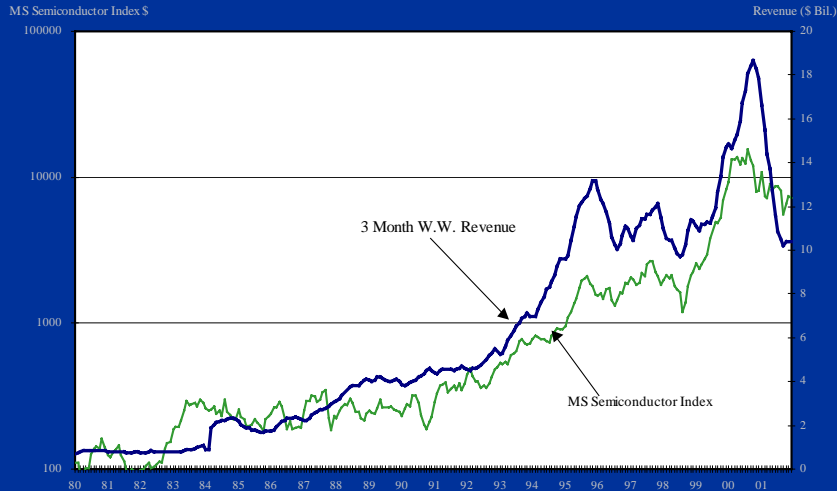
(Year-over-year semiconductor industry revenue growth rates versus global GDP)



Source: Morgan Stanley Research

Revenues Have Collapsed Faster Than Anytime In History

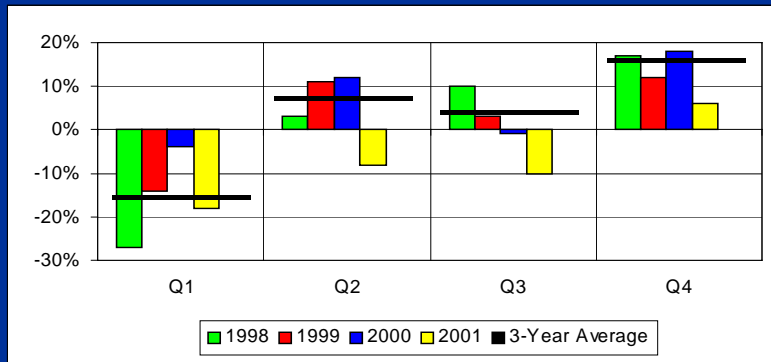
(W.W. revenue data through Dec 2001 and MS Semiconductor index through February 4, 2002)



Source: Morgan Stanley Research

End Market Revenues Began To Recover In The Fourth Quarter

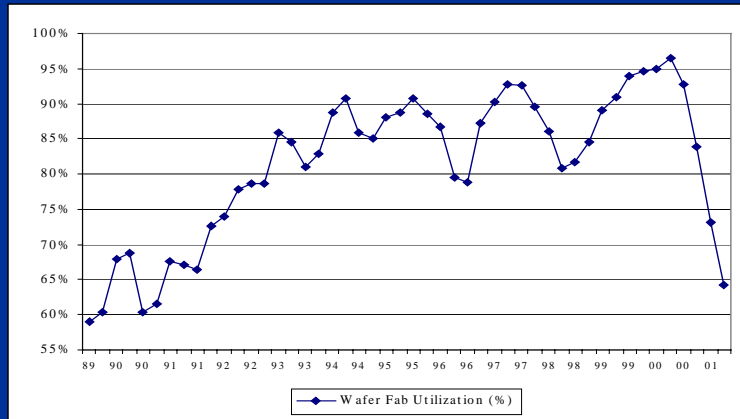
(Sequential change in revenues of leading computer, communication, distribution, and EMS companies)



Source: Morgan Stanley Research

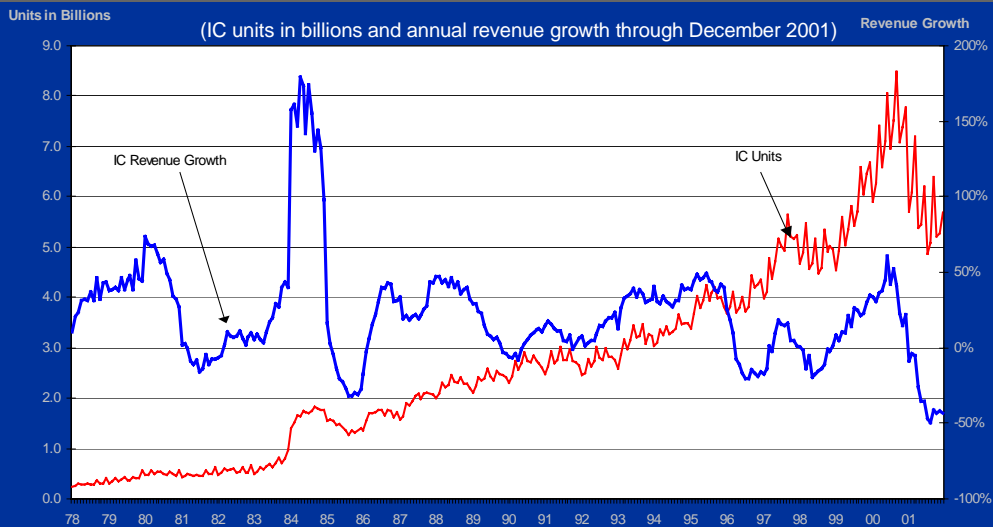
Pricing Power Will Be Limited Until Capacity Utilization Rates Improve Significantly

(Wafer fab utilization)

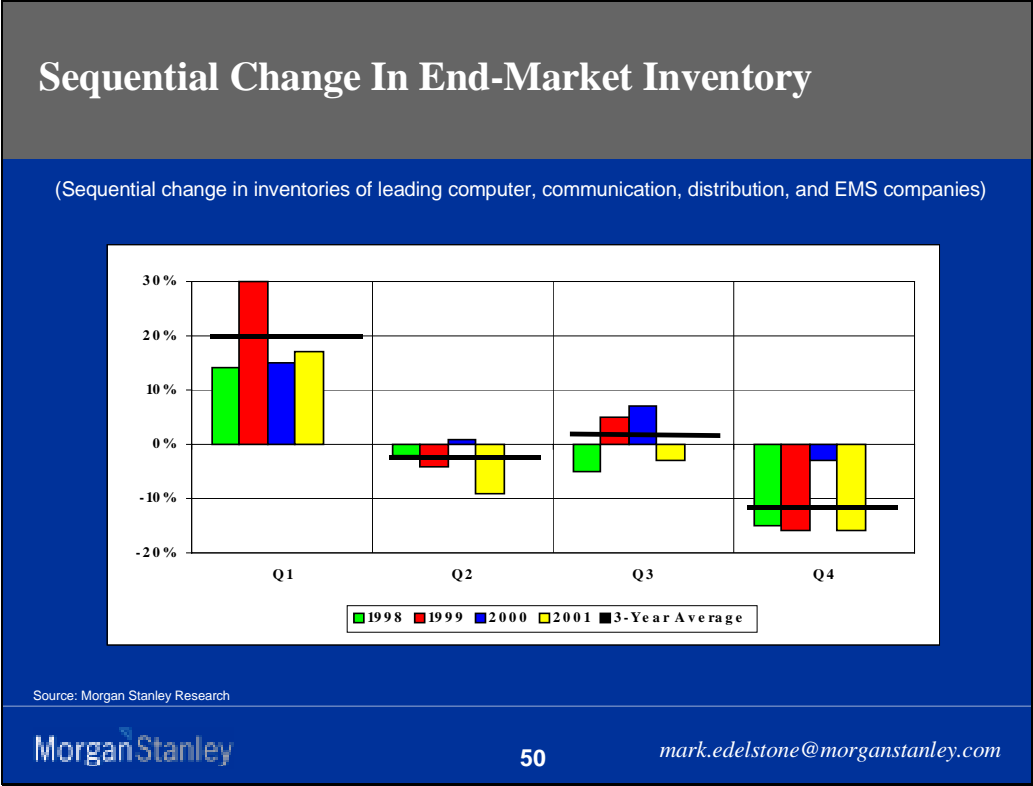
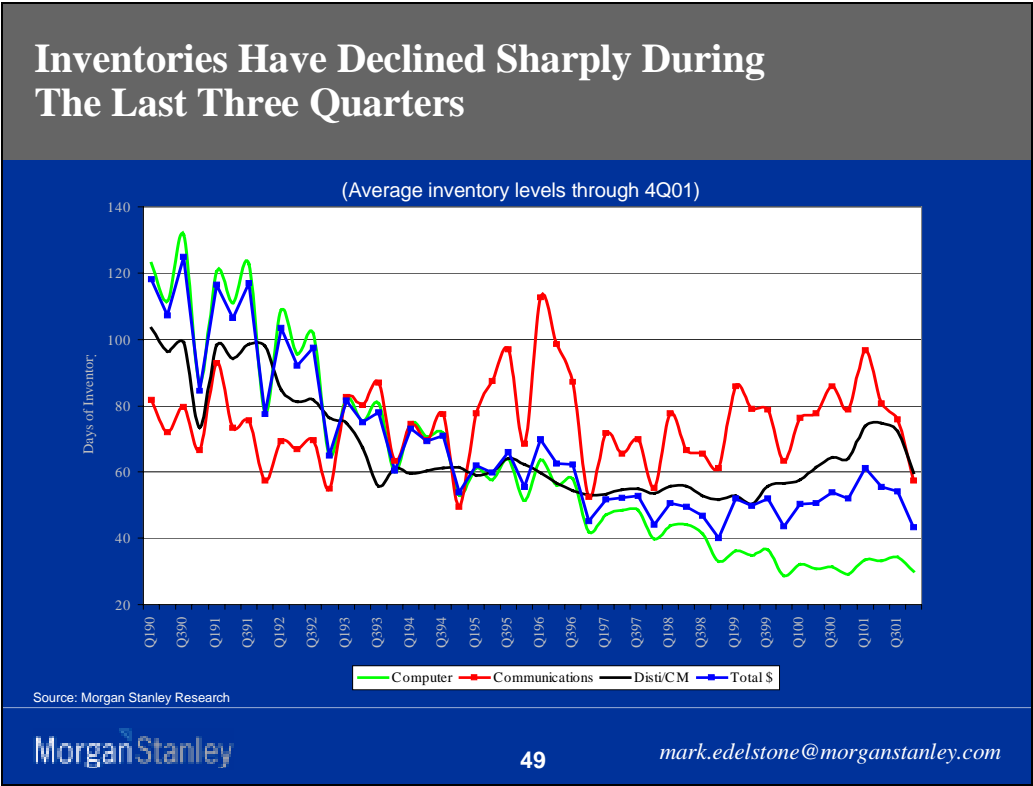


Source: Morgan Stanley Research

A Lack of Pricing Power Should Limit Revenue Growth Even As Unit Demand Recovers

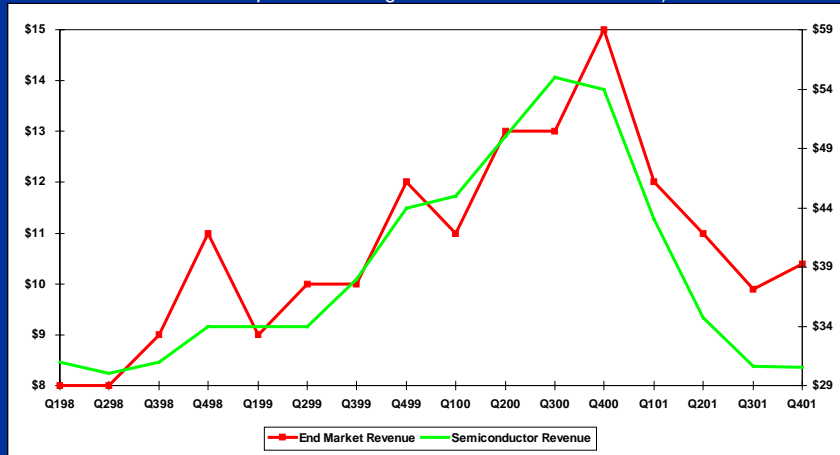


Source: Morgan Stanley Research



Significant Inventory Liquidation Has Occurred

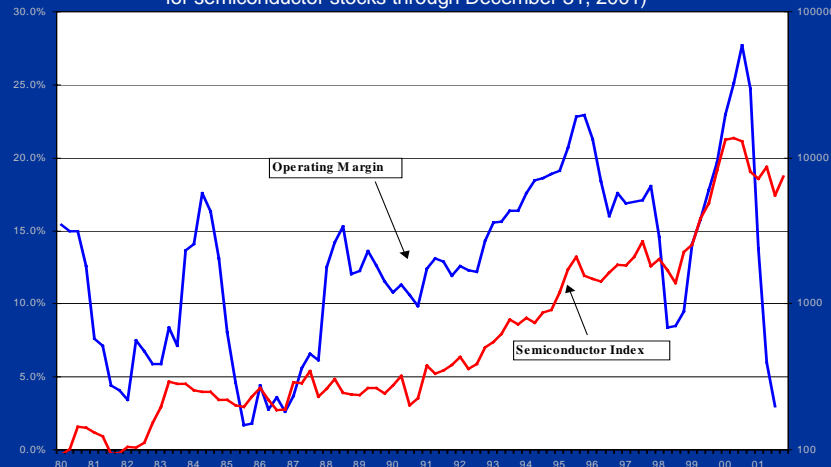
(Revenues of leading computer, communication, distribution, and EMS companies versus global semiconductor revenues)



Source: Morgan Stanley Research

Margins Have Come Under Pressure with Declining Revenues

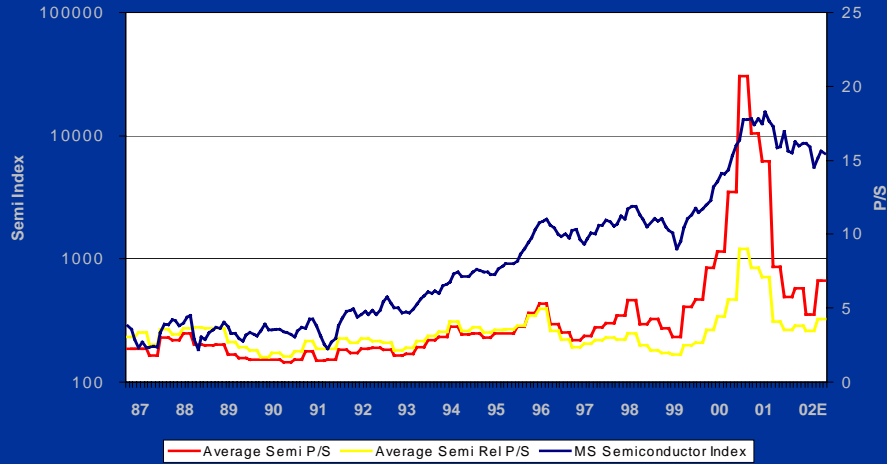
(Average operating margins through 4Q01 and stock price performance for semiconductor stocks through December 31, 2001)



Source: Morgan Stanley Research

Valuations Declined Sharply in 2001, But Are Still High When Compared to Prior History

(Semiconductor stock index with average P/S and P/S relative to S&P 500 as of February 4, 2002)



Source: Morgan Stanley Research

The Morgan Stanley Global Communicator

Alkesh Shah

February, 2002

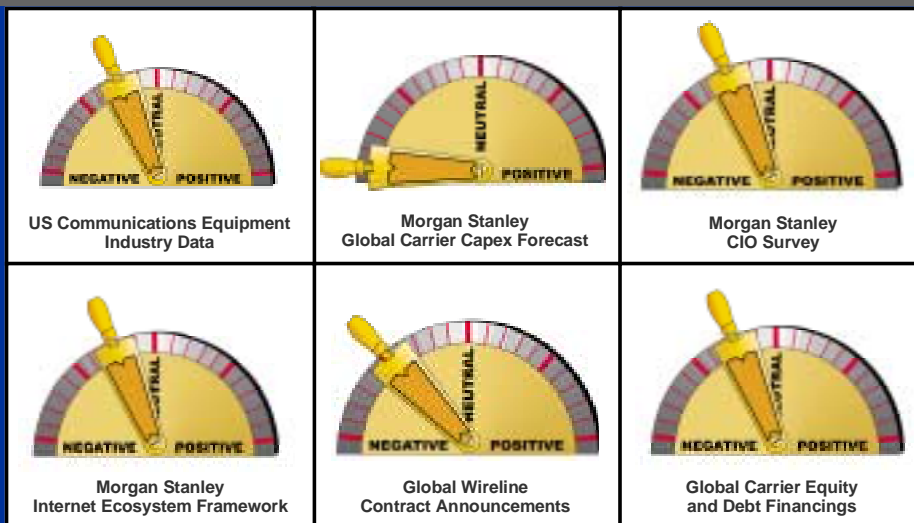
The Morgan Stanley Global Communicator

Objective

Determine trends in the wireline telecom equipment/data networking industries by examining a wide spectrum of indicators, including global carrier capex/financings, CIO spending trends, Internet usage, and signals from the telecom food chain.

Overview of Our Leading Wireline Indicators

February 2002 - Six Negative Indicators



Source: Morgan Stanley Global Communicator, February 2002

Overview of Our Leading Wireline Indicators

February 2002 - Six Negative Indicators (Cont'd)

US Communications Equipment Industry Data

- Data negative in December, with orders down **2%** q/q (still below August levels) and inventories declining **8%**, the second largest downtick in our dataset following a **10%** q/q decline in September 2001.
- We were encouraged by the inventory workdown in December, but believe inventories remain high. We currently estimate **US\$1 billion** in industry-wide excess optical components inventory.

Global Carrier Capex Update

- Our latest forecast shows an **18%** y/y decline to **US\$190 billion**, with wireline capex down **25%** y/y to **US\$123 billion** and wireless capex down **1%** y/y to **US\$67 billion**.
- We believe there is downside risk to our North American capex estimates, as aggregate capex-to-sales ratios of **25%** remain well above the low **20%** average over 1990-2000. Asia-Pacific (particularly China) could be weaker than anticipated. Recent data suggest Europe has deteriorated, though it should be stronger than most regions in 2002.

Morgan Stanley CIO Survey

- Survey results negatively-biased, as CIOs view networking equipment as strategically important, but appear to be taking a cautious stance towards any capital spending in 2002.
- A number of CIOs previously expecting **1-10%** y/y growth in network equipment spending for 2002 now expect their budgets will be flat relative to 2001.

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57

alkesh.shah@morganstanley.com

Overview of Our Leading Wireline Indicators

February 2002 - Six Negative Indicators (Cont'd)

Morgan Stanley Internet Ecosystem

- Internet usage growth rates, our best proxy for Internet traffic, stabilized at **8%** (mean) sequential growth in 4Q/01, but are well below early periods (**14%** q/q growth in 1Q/01 and **31%** q/q in 1Q/00).
- While Internet traffic growth rates appear to have stabilized, we think excess capacity and additional carrier bankruptcies may offset any benefit associated with a modest recovery in growth rates.

Global Wireline Contract Announcements

- Announced contracts declined from **36** to **34** in January (re-stated to include data networking vendors).
- January contract announcements increased in Europe and US with all other regions of the world decreasing; foreign contracts comprised **62%** of total announcements from **71%** in December.

Global Carrier Equity and Debt Financings

- Equity and equity-related financings decreased **37%** sequentially to **US\$4.7 billion** in January, while debt financings decreased **5%** sequentially to **US\$10.9 billion**.
- We are encouraged by an improvement in financing proceeds, but we think historically low interest rates are sparking a balance sheet restructuring by most carriers. Given widespread capex cuts, we think it's unlikely that majority of proceeds in any financing are being earmarked for network expansion.

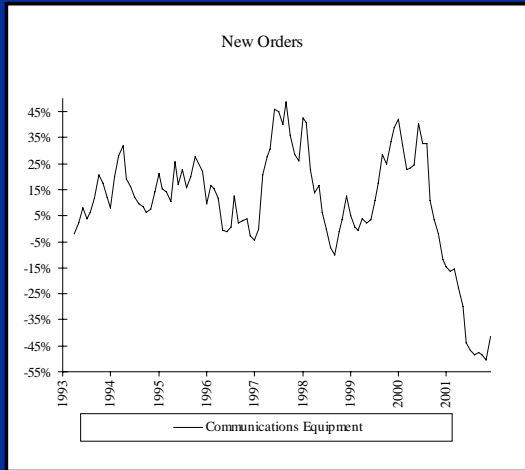
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58

alkesh.shah@morganstanley.com

US Communications Equipment Industry Data

New Orderflow Suggests Few Signs of Recovery



New Orders

- New orders declined **2% m/m** and **34% y/y** in December to **\$5.4 billion**, following following two consecutive months of sequential growth.
- Although the industry has largely recovered from the events of September 11th, muted growth in new orders reinforces our view that the industry is still suffering from weak fundamentals. January earnings season provided cautious commentary from carriers and 2002 capex targets generally below expectations.

Source: Morgan Stanley Global Communicator, February 2002. Figures represent three month y/y monthly average.

Global Carrier Capex

No Warmth In Sight During The Capex Chill

Morgan Stanley February Forecast - Global Capex

YY Growth in Capital Expenditures							Capital Expenditures / Sales							
Carrier Type	1999A	2000A	2001E	2002E	2003E	2004E	2005E	1999A	2000A	2001E	2002E	2003E	2004E	2005E
Asia Pacific	36%	22%	-2%	-12%	-3%	-9%	-8%	27%	34%	34%	21%	20%	18%	16%
Europe	23%	0%	-2%	-2%	-1%	-1%	-2%	20%	24%	23%	20%	20%	18%	17%
Japan	3%	-17%	-2%	-4%	-2%	-1%	-1%	24%	21%	20%	19%	18%	17%	16%
Latin America	21%	23%	-36%	6%	-2%	1%	1%	27%	29%	35%	21%	20%	18%	17%
North America (US/Canada)	47%	-3%	-26%	-8%	-6%	1%	1%	30%	40%	36%	25%	22%	20%	19%
Global Capex	33%	-1%	-18%	-5%	-4%	-1%		26%	31%	29%	23%	20%	19%	18%

Capital Expenditures By Carrier							% of Total Capital Expenditures							
Carrier Type	1999A	2000A	2001E	2002E	2003E	2004E	2005E	1999A	2000A	2001E	2002E	2003E	2004E	2005E
Asia Pacific	13,836	18,590	22,732	17,654	15,322	15,015	13,972	8%	8%	10%	9%	9%	9%	8%
Europe	39,763	49,049	49,127	48,369	49,321	48,649	47,586	22%	21%	21%	25%	27%	28%	27%
Japan	29,318	30,273	25,209	24,647	23,734	23,366	23,106	17%	13%	11%	13%	13%	13%	13%
Latin America	7,948	9,631	11,823	7,574	7,994	7,858	7,974	4%	4%	5%	4%	4%	4%	5%
North America (US/Canada)	86,982	128,224	124,343	92,196	85,239	80,450	81,093	49%	54%	53%	48%	47%	46%	47%
Global Capex	177,647	235,768	233,234	190,440	181,810	175,348	173,631	100%	100%	100%	100%	100%	100%	100%

Everyone knows North America is suffering from a capex hangover. . . but Asia-Pacific represents the greatest risk to 2002. While recent data suggest Europe has weakened, it should remain stronger than other regions during 2002.

Source: Morgan Stanley Global Communicator, February 2002.

Global Carrier Capex

Regional Commentary

North America

- Capex reduction #1 priority for carriers
- Liquidity concerns, high debt and margin pressure are causing a focus on cash flow
- Industry has not recovered from full impact of excess capacity and carrier bankruptcies
- RBOCs more stable than IXC and CLECs

Europe

- Modest spending and high-capacity levels mean less scope for capex cuts compared to N. America
- However, recent datapoints (Alcatel) suggest environment has proved more challenging in recent weeks

Japan

- Intense competition and eroding profitability have led to restructuring and reduced capex
- Quick to IP

Latin America

- Fewer regulatory buildouts and tempered growth expectations should drive lower capex
- Capex cuts most severe in Brazil with Chile several years behind Brazil; slow economic growth could depress capex in Mexico

Asia-Pacific

- Carriers could generate **US\$4B** in free cash flow - not enough worthwhile investment opportunities especially in developed markets
- China Telecom restructuring significantly impeding wireline capex in early 2002; return to normal spending not likely before 2H/02
- Bright spots: resumption of broadband network spending and OSS software sales to wireless operators

Global Carrier Capex

Recovering From Capex Hangover Following Act of 1996

Morgan Stanley February Forecast - The Americas

YY Growth in Capital Expenditures								Capital Expenditures / Sales							
Carrier Type	1999A	2000A	2001E	2002E	2003E	2004E	2005E	Carrier Type	1999A	2000A	2001E	2002E	2003E	2004E	2005E
RBOCs	35%	-6%	-20%	-1%	2%	3%	3%	RBOCs	24%	29%	27%	21%	21%	21%	21%
IXCs	61%	-16%	-54%	-12%	2%	3%	3%	IXCs	35%	56%	47%	22%	19%	19%	19%
non-RBOC ILECs	28%	36%	-32%	-1%	-1%	-1%	-1%	non-RBOC ILECs	22%	26%	32%	21%	19%	18%	17%
MSOs	43%	-4%	-14%	-17%	-7%	1%	1%	MSOs	39%	49%	42%	35%	26%	21%	19%
CLECs	100%	-37%	-75%	-5%	-12%	3%	3%	CLECs	244%	305%	148%	34%	26%	19%	17%
Total Wireline Capex	47%	-9%	-32%	-5%	0%	2%	2%	Average Wireline	30%	40%	35%	24%	21%	20%	20%
US / Canada Wireless	51%	35%	2%	-14%	-23%	-6%	-6%	US / Canada Wireless	32%	36%	37%	33%	25%	17%	15%
Total Wireless Capex	51%	35%	2%	-14%	-23%	-6%	-6%	Average Wireless	32%	36%	37%	33%	25%	17%	15%
Total Capex	47%	-3%	-26%	-5%	-6%	1%	1%	Average	30%	40%	36%	25%	22%	20%	19%

Capital Expenditures By Carrier Type								% of Total Capital Expenditures							
Carrier Type	1999A	2000A	2001E	2002E	2003E	2004E	2005E	Carrier Type	1999A	2000A	2001E	2002E	2003E	2004E	2005E
RBOCs	33,535	45,242	42,695	34,029	34,479	35,229	36,330	RBOCs	39%	35%	34%	37%	40%	44%	45%
IXCs	19,826	31,974	26,869	12,259	10,819	10,997	11,366	IXCs	23%	25%	22%	13%	13%	14%	14%
non-RBOC ILECs	4,582	5,871	8,003	5,455	5,411	5,334	5,258	non-RBOC ILECs	5%	5%	6%	6%	6%	7%	6%
MSOs	13,815	19,812	19,070	16,403	13,772	12,830	12,946	MSOs	16%	15%	15%	18%	16%	16%	16%
CLECs	4,345	8,930	5,635	1,505	1,436	1,269	1,205	CLECs	5%	7%	5%	2%	2%	2%	2%
Total Wireline Capex	76,103	111,829	102,271	69,741	65,917	65,659	67,195	Total Wireline Capex	87%	87%	82%	76%	77%	82%	83%
US / Canada Wireless	10,879	16,395	22,072	22,455	19,322	14,801	13,898	US / Canada Wireless	13%	13%	18%	24%	23%	18%	17%
Total Wireless Capex	10,879	16,395	22,072	22,455	19,322	14,801	13,898	Total Wireless Capex	13%	13%	18%	24%	23%	18%	17%
Total Capex	86,982	128,224	124,343	92,196	85,239	80,460	81,093	Total Capex	100%	100%	100%	100%	100%	100%	100%

Given poor secular fundamentals and potential consolidation, we are more concerned with IXC capex than RBOC capex

Source: Morgan Stanley Global Communicator, February 2002.

Morgan Stanley CIO Survey

A Telecom Equipment/Data Networking Perspective

2002 IT Budgets Look Soft But Still Better Than Carrier Capex

- CIOs appear slightly more comfortable with impact of economy and stock market on their budgets, as number of CIOs planning to spend less fell sharply from **67%** in November to **44%** in January.
- However, **30%** of CIOs are closely monitoring situation for cutbacks compared to **13%** in November. It appears that economy is largest swing factor in shaping IT budgets for 2002.

More CIOs expect flat spending on networking equipment in 2002

- **43%** of CIOs expect flat spending on networking equipment in 2002 relative to 2001, compared to **37%** in November; just **24%** of CIOs expect spend up **1-10%** versus **36%** in November.
- Spending in 2002 appears back-end loaded with **47%** of CIOs expecting to spend more in 2H/02 than in 1H/02 versus **24%** in November.

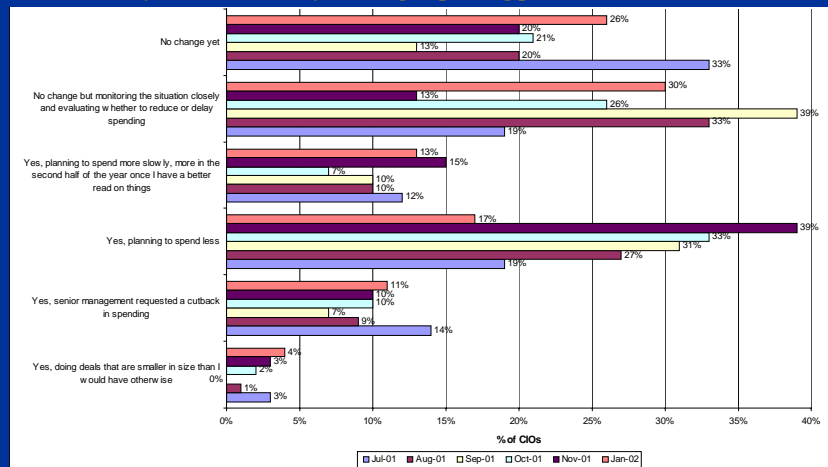
Networking Equipment more strategically important than many other projects

- **21%** of CIOs view networking equipment as a top priority vs **17%** in November.
- Only Windows 2000 server upgrades, e-commerce initiatives and security software were viewed as strategically more critical.

Morgan Stanley CIO Survey

A Telecom Equipment/Data Networking Perspective (Cont'd)

Has the ongoing news about a slowing economy combined with a stock market decline caused you to re-evaluate your budget/spending plans within the last month?

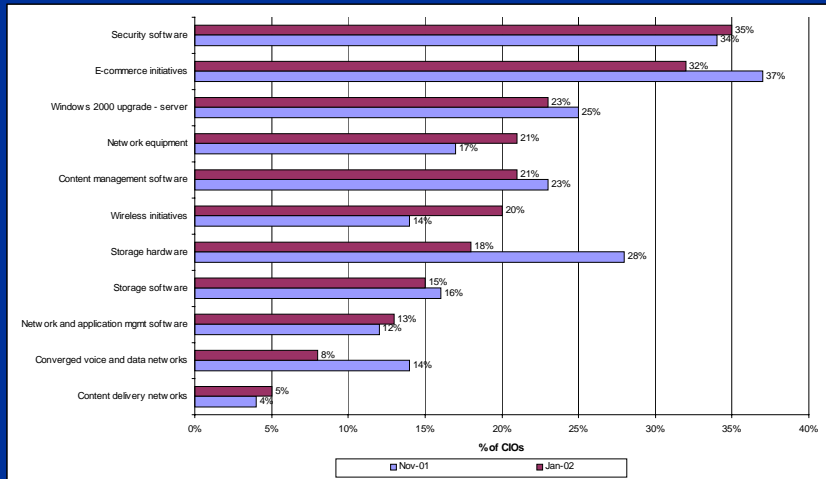


Source: Morgan Stanley Global Communicator, February 2002.

Morgan Stanley CIO Survey

A Telecom Equipment/Data Networking Perspective (Cont'd)

In your organization, which are top priorities for you in 2002?

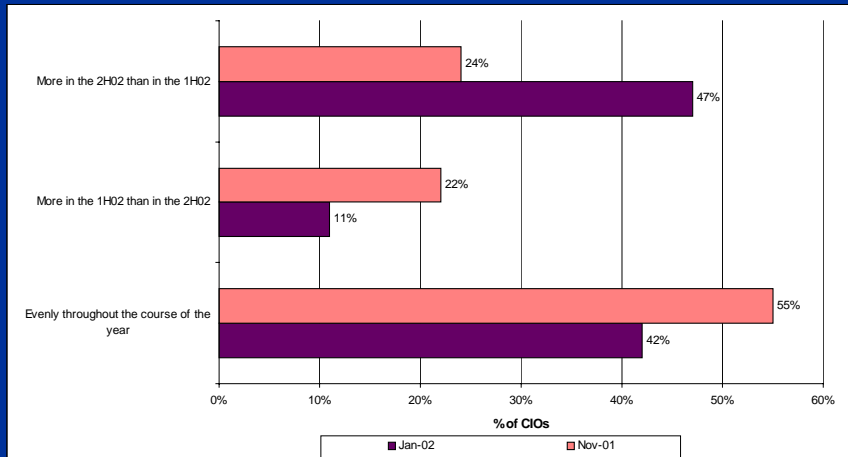


Source: Morgan Stanley Global Communicator, February 2002.

Morgan Stanley CIO Survey

A Telecom Equipment/Data Networking Perspective (Cont'd)

How do you plan to spend by quarter in 2002?

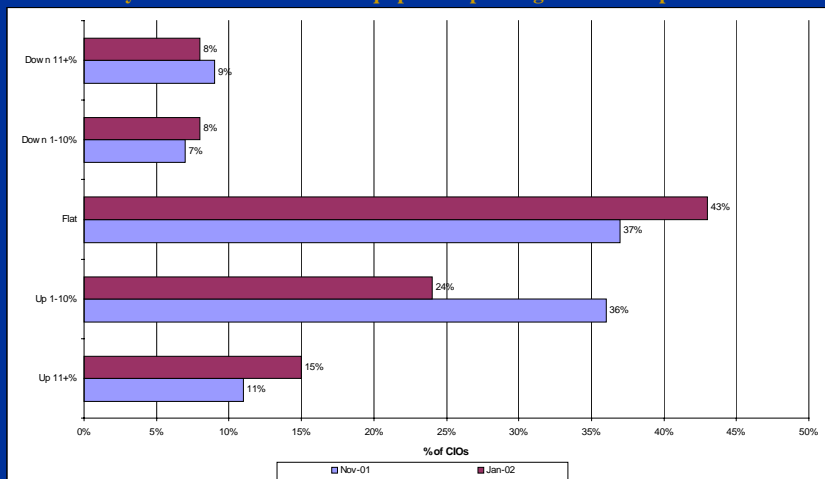


Source: Morgan Stanley Global Communicator, February 2002.

Morgan Stanley CIO Survey

A Telecom Equipment/Data Networking Perspective (Cont'd)

What is your outlook on network equipment spending in 2002 compared to 2001?



Source: Morgan Stanley Global Communicator, February 2002.

Morgan Stanley Internet User/Usage Ecosystem

A Telecom Equipment/Data Networking Perspective

Slowing Internet Usage Growth = Lower Demand For Networking Equipment

- Mean Internet usage (our best proxy for Internet traffic) growth rates have stabilized at **8%** sequentially in 4Q/01, flat with 3Q/01 but well below **14%** posted in 1Q/01
- While Internet traffic has stabilized, we think excess capacity may offset any benefit associated with any potential acceleration in growth rates.

Broadband Growth At Expense of DS-0 Growth at RBOCs

- Sequential DSL subscriber growth at BellSouth (BLS-\$39-O), Qwest (Q-\$10-N), SBC (SBC-\$39-SB) and Verizon (VZ-\$48-SB) accelerated to **19%** in 4Q/01 from **15%** in 3Q and 2Q/01 and cable modem subscriber growth at several MSOs increased slightly to **16%** q/q in 4Q/01 from **15%** in 3Q/01 and was flat with 2Q/01.
- DS-0 growth at BellSouth, SBC and Verizon increased slightly to **6%** q/q in 4Q/01 from **5%** sequentially in 3Q/01 but well below **9%** q/q growth in 1Q/01. We think slowing DS-0 growth is particularly negative for broadband access stocks, such as ADC (ADCT-\$4-N-V), ADTRAN (ADTN-\$27-N-V) and Tellabs (TLAB-\$12-N-V).
- Implications of strong broadband growth should be positive in long-run, but near-term impact is clouded by excess capacity, ASP erosion and regulatory uncertainty.

Global Wireline Contract Announcements

Key Takeaways

Pace of Contract Announcements Has Slowed In Recent Months

- While contract announcements represent a portion of overall equipment deals, we believe they reflect a broad slowdown in capital spending by carriers on a worldwide basis.

Region	November	December	January
Non-Japan Asia	11	9	7
Europe	7	6	10
Latin America	3	2	1
North America	16	10	13
Japan	3	2	0
Rest of World	4	7	3
Total	44	36	34

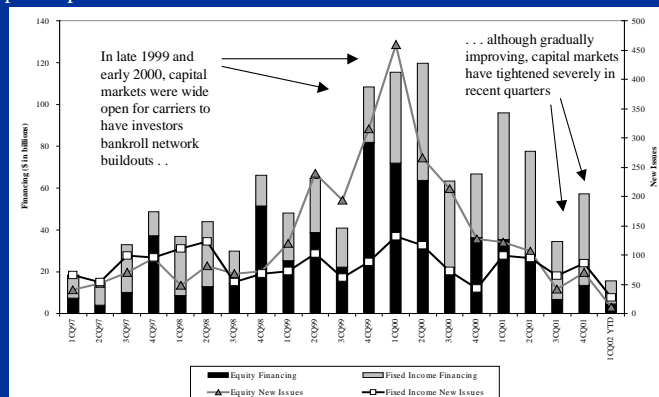
Source: Morgan Stanley Global Communicator, February 2002.

Global Carrier Equity and Debt Financings

Key Takeaways

Global Equity and Debt Financings Increase But Not For Network Expansion

- While we are encourage by a rebound in equity and debt financings from summer lows, we believe a low-interest rate environment is sparking a balance sheet refinancing among carriers, so proceeds are not for equipment purchases in most cases.



Source: Morgan Stanley Global Communicator, February 2002.

So What Does This All Mean?

The Bottom Line

Wireline Fundamentals Likely Worsen *Before* Improving . . .

- January earnings season offered shaky reports from carriers (particularly long-distance carriers such as Qwest) with capex cuts below consensus expectations. Our checks indicate that many telecom equipment and data networking vendors have limited visibility.

. . . But Correction Is *Necessary* For Long-Run Industry Health

- Telecom Act of 1996 fueled unprecedented growth in carrier capex, but significant capacity rationalization is required before a gradual recovery begins, likely in late 2002.

Vendors With Incumbent Carrier Exposure Appear Best Positioned

- Although all carriers are suffering from poor secular fundamentals, incumbent carriers (e.g., RBOCs, non-RBOC ILECs) possessing strong balance sheets are likely to cut capex least, with a capex rebound as early as 1H/02. Plagued by weak balance sheets, margin pressure on long-distance voice and pending competition from the RBOCs, IXC capex may weaken throughout 2002 and not trough until late 2003.

Enterprise Vendors Should Rebound Ahead of Telecom Vendors

- Enterprises were not as aggressive on the upside as carriers, and should provide a more attractive customer base than service providers during 2002.

Morgan Stanley Global Technology Research Teams

Semiconductors:

Mark Edystone (<i>mark.edystone@morganstanley.com</i>)	(415) 576-2381
Louis Gerhardy (<i>louis.gerhardy@morganstanley.com</i>)	2391
John Cross (<i>john.cross@morganstanley.com</i>)	2382
Sonia Kimotsuki (<i>sonia.kimotsuki@morganstanley.com</i>)	2388
Gary Chia (<i>gary.chia@morganstanley.com</i>)	2383
Harlan Sur (<i>harlan.sur@morganstanley.com</i>)	2359

Computer Services:

David Togut (<i>david.togut@morganstanley.com</i>)	(212) 761-6388
Elizabeth Vigano (<i>elizabeth.vigano@morganstanley.com</i>)	7339
Charles Murphy (<i>charles.murphy@morganstanley.com</i>)	4990
Yuliya Grodskaya (<i>yuliya.grodskaya@morganstanley.com</i>)	7454
Courtney Cook (<i>courtney.cook@morganstanley.com</i>)	6347

Enterprise Software: Systems & Infrastructure

Joe Farley (<i>joseph.farley@morganstanley.com</i>)	7409
Aaron Brann (<i>aaron.brann@morganstanley.com</i>)	6126
Linda Tsai (<i>linda.tsai@morganstanley.com</i>)	3324

Communications/Telecom Software:

David Raezer (<i>david.raezer@morganstanley.com</i>)	3461
Robert Blinn (<i>robert.blinn@morganstanley.com</i>)	4217

Electronics Manufacturing Services:

Scott Craig (<i>scott.craig@morganstanley.com</i>)	4967
Julie Santoriello (<i>julie.santoriello@morganstanley.com</i>)	8582
Michael Bodenstab (<i>michael.bodenstab@morganstanley.com</i>)	7038

Imaging Technology:

Solin Cho (<i>solin.cho@morganstanley.com</i>)	6140
Dahniel Buie (<i>dahniel.buie@morganstanley.com</i>)	0532

Systems & Enterprise Hardware:

Rebecca Runkle (<i>rebecca.runkle@morganstanley.com</i>)	6466
April Henry (<i>april.henry@morganstanley.com</i>)	4669
Stirling Levy (<i>stirling.levy@morganstanley.com</i>)	6430
Jack Chung (<i>jack.chung@morganstanley.com</i>)	3384
Kathryn Huberty (<i>kathryn.huberty@morganstanley.com</i>)	6249
Max Gross (<i>max.gross@morganstanley.com</i>)	3735
Sherrese Clarke (<i>sherrese.clarke@morganstanley.com</i>)	4144

Semiconductor Capital Equipment:

Steven Pelayo (<i>steven.pelayo@morganstanley.com</i>)	(415) 576-2324
Bill Lu (<i>bill.lu@morganstanley.com</i>)	2608
Gary Hsueh (<i>gary.hsueh@morganstanley.com</i>)	2610

Cross Industry:

Brian Fitzgerald (<i>brian.fitzgerald@morganstanley.com</i>)	(212) 761-4276
Michael Doody (<i>michael.doody@morganstanley.com</i>)	3470

European Technology:

Angela Dean (<i>angela.dean@morganstanley.com</i>)	(London) 425-6614
William Farrell (<i>william.farrell@morganstanley.com</i>)	6744
Ross MacMillan (<i>ross.macmillan@morganstanley.com</i>)	8606
Stuart Adrian (<i>stuart.adrian@morganstanley.com</i>)	2611
Marcus Nash (<i>marcus.nash@morganstanley.com</i>)	3748
Angus Lund (<i>angus.lund@morganstanley.com</i>)	8238
Goran Ivemark (<i>goran.ivemark@morganstanley.com</i>)	4619
Nicolas Gaudois (<i>nicolas.gaudois@morganstanley.com</i>)	8137
Sean Gardiner (<i>sean.gardiner@morganstanley.com</i>)	2175
James Lindsay (<i>james.lindsay@morganstanley.com</i>)	3504
Kirsten Parker (<i>kirsten.parker@morganstanley.com</i>)	8617
Rajesh Nathwani (<i>rajesh.nathwani@morganstanley.com</i>)	5919
Anuj Mutreja (<i>anuj.mutreja@morganstanley.com</i>)	3731
Maximilian Nelte (<i>max.nelte@morganstanley.com</i>)	3016
Gregory Ness (<i>greg.ness@morganstanley.com</i>)	9835
Jonty Starbuck (<i>jonty.starbuck@morganstanley.com</i>)	4610

Japan Technology:

Takat Yamamoto (<i>takat.yamamoto@morganstanley.com</i>)	5424-5301
Noriko Oki (<i>noriko.oki@morganstanley.com</i>)	5330
Tomohiro Murata (<i>tomohiro.murata@morganstanley.com</i>)	5341
Masaharu Miyachi (<i>masaharu.miyachi@morganstanley.com</i>)	5321
Shunji Yamashina (<i>shunji.yamashina@morganstanley.com</i>)	5363
Koichiro Nakamura (<i>koichiro.nakamura@morganstanley.com</i>)	5924
Ema Yamakawa (<i>ema.yamakawa@morganstanley.com</i>)	5378

Internet Portals/Commerce & PC Software:

Mary Meeker (<i>mary.meeker@morganstanley.com</i>)	(212) 761-8042
Mark Mahaney (<i>mark.mahaney@morganstanley.com</i>)	4864
David Joseph (<i>david.joseph@morganstanley.com</i>)	3365
Fabrizio Cascianelli (<i>fabrizio.cascianelli@morganstanley.com</i>)	8949
Michael L. Brown (<i>michael.l.brown@morganstanley.com</i>)	6030

Enterprise Software Applications:

Chuck Phillips (<i>charles.phillips@morganstanley.com</i>)	4450
Ryan Rathman (<i>ryan.rathman@morganstanley.com</i>)	6377
Evan Bloomberg (<i>evan.bloomberg@morganstanley.com</i>)	3659
Matt Miksic (<i>matt.miksic@morganstanley.com</i>)	6261

Telecom Equipment & Data Networking:

Alkesh Shah (<i>alkesh.shah@morganstanley.com</i>)	(212) 761-6554
George Kelly (<i>george.kelly@morganstanley.com</i>)	6242
David Jackson (<i>david.a.jackson@morganstanley.com</i>)	3366
Michael Lynch (<i>michael.lynch@morganstanley.com</i>)	8342
Scott Coleman (<i>scott.coleman@morganstanley.com</i>)	6055
David Siniscalchi (<i>david.siniscalchi@morganstanley.com</i>)	3722
Arif Mawji (<i>arif.mawji@morganstanley.com</i>)	0207

Telecom Equipment-Wireless:

Alkesh Shah (<i>alkesh.shah@morganstanley.com</i>)	6554
Arindam Basu (<i>arindam.s.basu@morganstanley.com</i>)	(415) 576-2329
David Feinberg (<i>david.feinberg@morganstanley.com</i>)	(212) 761-0216

Telecom Equipment-CommsCap Equipment:

Alkesh Shah (<i>alkesh.shah@morganstanley.com</i>)	(212) 761-6554
Barry Lebovits (<i>barry.lebovits@morganstanley.com</i>)	3459

Internet Advertising & Direct Marketing Services:

Michael Russell (<i>michael.russell@morganstanley.com</i>)	6352
Rod Feuer (<i>rod.feuer@morganstanley.com</i>)	8091

Asia-Pacific Technology:

Dickson Ho (<i>dickson.ho@morganstanley.com</i>)	+886 2 2730-2999
Sunil Gupta (<i>sunil.gupta@morganstanley.com</i>)	+65 834-6732
Bon Jun Koo (<i>bonjun.koo@morganstanley.com</i>)	+822 399-4939
George Chu (<i>george.chu@morganstanley.com</i>)	+886 2 730 2865
Evelyn Ou (<i>evelyn.ou@morganstanley.com</i>)	+886 2 730-2866
John Chan (<i>john.chan@morganstanley.com</i>)	+65 834-6735
Viktor Ma (<i>viktor.ma@morganstanley.com</i>)	+852 2 848-5903
Ellen Tseng (<i>ellen.tseng@morganstanley.com</i>)	+886 2 730-2864
Anan. Narayan (<i>anantha.narayan@morganstanley.com</i>)	+ 65 209-7053
Heather Hsu (<i>heather.hsu@morganstanley.com</i>)	+886 2 730-2870
Naiwen Kerr (<i>naiwen.kerr@morganstanley.com</i>)	+886 2 730-2869
James T. Lin (<i>james.t.lin@morganstanley.com</i>)	+886 2 730-2860
Peili Shen (<i>peili.shen@morganstanley.com</i>)	+886 2 209-7053
Gaurang Bhatia (<i>gaurang.bhatia@morganstanley.com</i>)	+65 834-6728

European Internet:

Michael Steib (<i>michael.steib@morganstanley.com</i>)	(London) 425-5263
Javier Marin (<i>javier.marin@morganstanley.com</i>)	3503
Jens Brueckner (<i>jens.brueckner@morganstanley.com</i>)	5392

Asia-Pacific Internet:

Minyan Liu (<i>minyan.liu@morganstanley.com</i>)	+852 2 848-6729
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Japan Internet:

Yoshiko Motoyama (<i>yoshiko.motoyama@morganstanley.com</i>)	424-5912
Shuichi Hirukawa (<i>shuichi.hirukawa@morganstanley.com</i>)	5913

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The Americas

1585 Broadway
New York, NY 10036-8293
United States
Tel: +1 (1)212 761 4000

Europe

25 Cabot Square, Canary Wharf
London E14 4QA
United Kingdom
Tel: +44 (0)20 7513 8000

Japan

20-3, Ebisu 4-chome
Shibuya-ku,
Tokyo 150-6008, Japan
Tel: +81 (0)3 5424 5000

Asia/Pacific

Three Exchange Square
Central
Hong Kong
Tel: +852 2848 5200