

Equity Research  
Global

## Industry Report

# Internet: New Media & eCommerce & PC Software

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### Industry Overview

## *A Look at Global TMT Market Status and Internet User/Usage Propensity*

### • Introducing the first in a series of five Internet-related reports

In this Technology, Media, and Telecommunications (TMT) database report, we analyze what we believe are the near- and long-term opportunities for Internet user/usage growth on a global basis, both from the perspective of an analyst/investor and from a strategic/business development stance.

### • Internet evolution still in early innings

Based on our analysis, the Internet penetration rates in each region in our study are lower than the penetration rates of almost all other TMT products and services. Fundamentals for Internet Users, Uses, and Usage (we call this IU<sup>3</sup> or IU-cubed) growth should remain strong.

### • Potential for user/usage growth could be substantial

On a global basis, were Internet penetration to reach the levels of other more mature TMT products/services, global Internet users could rise 360% to 1.4 billion users.

### • Global Internet user conservative CAGR estimated at 23% to 2003

We believe this level of growth supports our long-held view that the select group of Internet leaders, if they execute, such as America Online, Yahoo!, Amazon.com, eBay, and VeriSign, should benefit (financially and with share price appreciation) from the growth.

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Please refer to important disclosures at the end of this report.

MORGAN STANLEY DEAN WITTER INTERNET RESEARCH

Overview of the Global TMT Markets - Sorted Regionally by Population

Country	Population (000s)	Households (000s)	Land Mass (000s sq. km)	GNP per Capita (US\$)	Telephone Lines (000s)	Telephone Line Penetration (%)	PCs (000s)	PC Penetration (%)	Mobile Subscribers (000s)	Mobile Penetration (%)	Cable Subscriptions (000s)	Cable Penetration (%)	Internet Users (000s)	Internet Penetration (%)	Credit Debit Cards (000s)	Credit Debit Card Penetration (%)
<b>North America</b>																
USA	276	101	9,159	29,340	182,436	66%	126,684	46%	69,000	23%	70,000	69%	91,000	33%	737,000	267%
Canada	31	12	9,221	19,170	19,654	63%	9,900	32%	5,456	18%	8,178	68%	9,700	31%	69,000	223%
<b>Total Average</b>	<b>307</b>	<b>113</b>	<b>18,380</b>	<b>24,205</b>	<b>202,090</b>	<b>66%</b>	<b>136,584</b>	<b>44%</b>	<b>74,456</b>	<b>24%</b>	<b>78,178</b>	<b>69%</b>	<b>100,700</b>	<b>33%</b>	<b>806,000</b>	<b>263%</b>
<b>Latin America</b>																
Brazil	173	40	8,457	4,630	20,000	12%	5,190	3%	7,800	5%	2,700	7%	6,100	4%	86,000	50%
Mexico	100	21	1,909	3,840	10,000	10%	4,700	3%	3,500	4%	1,570	9%	2,800	3%	13,200	13%
Colombia	41	9	1,039	2,470	7,100	17%	1,100	5%	2,000	5%	600	9%	500	1%	9,800	24%
Argentina	37	13	2,737	8,030	7,000	19%	1,600	4%	2,800	8%	5,900	59%	1,200	3%	17,200	46%
Peru	25	5	1,280	2,440	17,000	7%	450	2%	750	3%	353	12%	300	1%	3,200	13%
Venezuela	23	4	882	3,530	27,000	12%	989	4%	2,001	9%	600	15%	600	1%	6,200	27%
Chile	15	3	749	4,990	3,000	20%	720	5%	975	7%	672	17%	300	4%	3,600	24%
<b>Total Average</b>	<b>414</b>	<b>96</b>	<b>17,053</b>	<b>42,76</b>	<b>51,500</b>	<b>13%</b>	<b>14,749</b>	<b>4%</b>	<b>19,826</b>	<b>5%</b>	<b>12,485</b>	<b>13%</b>	<b>11,800</b>	<b>3%</b>	<b>139,200</b>	<b>34%</b>
<b>Europe</b>																
Russia	146	52	16,889	2,260	28,762	20%	5,986	4%	735	1%	11,461	19%	1,000	1%	2,800	2%
Germany	83	36	349	26,570	47,061	57%	25,315	31%	14,110	17%	17,804	53%	18,900	23%	88,000	106%
UK	60	24	242	21,410	33,420	56%	15,780	26%	15,120	25%	3,060	13%	18,800	31%	83,000	138%
France	59	24	550	24,210	33,630	57%	12,272	21%	11,092	19%	11,623	7%	10,700	18%	34,000	58%
Italy	58	23	294	20,090	26,158	45%	10,034	17%	20,590	36%	162	1%	6,600	11%	28,000	48%
South Africa	41	9	1,221	3,310	4,715	12%	1,927	5%	2,296	6%			600	1%	22,000	54%
Spain	40	15	499	14,100	16,000	40%	5,600	14%	6,900	17%	460	4%	5,400	14%	38,000	95%
Poland	39	12	304	3,910	8,892	23%	1,716	4%	0	0%	3,249	27%	500	1%	3,900	10%
Netherlands	16	7	34	24,780	9,488	59%	5,088	32%	3,408	21%	6,053	86%	5,100	32%	21,000	131%
Belgium	10	4	33	25,380	5,000	50%	2,860	29%	1,730	17%	3,673	92%	2,200	22%	8,600	86%
Czech Republic	10	4	77	4,510	3,640	36%	970	10%	940	9%	771	19%	500	5%	1,800	28%
Hungary	10	4	77	4,510	3,640	34%	590	6%	1,050	11%	1,465	38%	400	4%	2,900	19%
Portugal	10	4	92	10,670	4,130	41%	810	8%	2,200	22%	598	20%	800	8%	9,600	96%
Sweden	9	4	412	25,580	7,000	78%	3,300	37%	4,176	46%	1,993	48%	4,500	51%	5,000	50%
Austria	8	3	83	26,830	3,928	49%	1,864	23%	2,256	28%	1,113	37%	1,700	21%	5,900	74%
Switzerland	7	3	40	39,980	5,000	68%	2,954	42%	1,645	24%	2,469	82%	2,000	29%	5,000	84%
Israel	6	2	21	16,180	2,900	48%	1,302	22%	2,154	36%	0	0%	1,100	18%	2,000	48%
Denmark	5	2	42	33,040	3,000	60%	1,885	38%	1,820	20%	1,242	60%	2,600	52%	2,900	58%
Finland	5	2	305	24,280	3,000	60%	1,745	2%	2,860	57%	879	44%	1,900	38%	6,900	138%
Ireland	4	1	212	18,710	1,740	44%	1,900	2%	1,028	26%	684	68%	700	18%	4,400	110%
Norway	4	2	69	34,310	2,640	60%	1,492	37%	1,896	47%	640	32%	2,300	58%	4,700	118%
<b>Total Average</b>	<b>630</b>	<b>233</b>	<b>21,860</b>	<b>19,298</b>	<b>253,464</b>	<b>40%</b>	<b>105,390</b>	<b>17%</b>	<b>98,006</b>	<b>16%</b>	<b>59,398</b>	<b>24%</b>	<b>88,400</b>	<b>14%</b>	<b>381,700</b>	<b>61%</b>
<b>Weighted Average</b>																
Japan	127	42	377	32,350	63,000	50%	30,099	24%	47,000	37%	14,000	29%	29,000	23%	560,000	441%
<b>Non-Asian</b>																
China	1,261	340	9,326	750	87,000	7%	10,000	1%	43,238	2%	61,000	23%	10,000	1%	77,000	6%
India	1,014	195	2,973	440	22,308	2%	2,000	0%	1,584	0.1%	18,400	25%	2,000	0%	4,000	0%
Indonesia	204	48	1,812	640	5,508	3%	1,632	1%	0	0%	0	0%	1,700	1%	6,500	3%
Pakistan	132	21	771	470	2,508	2%	528	0%	132	0%	13	0%	300	0%	**	**
Philippines	75	14	1,280	1,050	2,775	4%	1,125	0%	1,650	6%	13	0%	300	0%	**	**
Turkey	63	15	770	3,160	16,002	25%	1,400	2%	3,339	5%	2	0%	1,500	2%	3,400	5%
Thailand	61	13	511	1,050	5,124	8%	1,342	2%	580	4%	580	4%	1,500	2%	26,500	42%
South Korea	61	13	770	3,160	16,002	25%	1,400	2%	3,339	5%	2	0%	1,500	2%	3,400	5%
South Korea	46	14	99	8,600	19,918	43%	7,000	15%	1,952	3%	616	5%	2,100	3%	17,400	29%
Australia	19	7	7,682	20,640	10,000	53%	8,000	42%	23,000	50%	1,700	10%	14,000	30%	64,400	140%
New Zealand	4	1	268	14,600	1,916	48%	1,100	16%	6,555	29%	0	0%	7,400	39%	26,000	137%
Singapore	3	1	1	30,170	1,686	56%	1,374	40%	1,038	35%	149	15%	1,100	37%	4,900	123%
<b>Total Average</b>	<b>2,882</b>	<b>669</b>	<b>25,493</b>	<b>7,415</b>	<b>174,745</b>	<b>6%</b>	<b>35,529</b>	<b>1%</b>	<b>83,300</b>	<b>2%</b>	<b>84,172</b>	<b>20%</b>	<b>42,200</b>	<b>1%</b>	<b>237,200</b>	<b>8%</b>
<b>Weighted Average</b>																
Rest of World (ROH)	1,583	339	50,503	136,519	136,519	9%	100,749	6%	45,717	3%	78,191	21%	31,909	2%	223,812	14%
<b>TOTAL</b>	<b>5,943</b>	<b>1,491</b>	<b>133,666</b>	<b>881,318</b>	<b>423,100</b>	<b>14%</b>	<b>423,100</b>	<b>7%</b>	<b>368,305</b>	<b>4%</b>	<b>326,423</b>	<b>23%</b>	<b>304,709</b>	<b>5%</b>	<b>2,347,912</b>	<b>9%</b>
<b>Global Rate Average Credit Card Penetration</b>	<b>1.4%</b>															<b>40%</b>

Population figures represent year 2000, data from the U.S. Census Bureau and GNP figures are from the 1999 World Bank's World Development Indicators. GNP per Capita is calculated using the data. Telephone lines represent total business & commercial lines in use, source - World Bank, MSDV estimates. The number of Credit Card Subscribers is based on information from The World Bank, cross referenced with Korea World Media Ltd. and reflects calendar year 1999, source - World Bank, MSDV estimates. PC numbers represent the total business and commercial PC figures for 1998, both desktop and laptop, source - World Bank, MSDV estimates. IC, the Yankee Group. Mobile Phone subscriptions data is for 1999 and is sourced from the World Bank, MSDV estimates. The International Telecommunication Union and ITC. Internet users reflect 2000 estimates representing the number of users accessing the Web; users may use multiple devices, users accessing the web from home and work are counted only once, source - MSDV estimates, ITC, Mafteier, Jupiter Communications. Credit Card figures are from 1998 and include debit cards, source - MSDV estimates. Fuller & Gray, 2001 Global Card Directory, The Nilson Report (CRMC/Graw Hill). Weighted average penetration does not include ROW figures.

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# A Look at Global TMT Market Status and Internet User/Usage Propensity

## Overview

We put two hats on when we started this report: an analyst/investor hat and a strategic/business development hat. We wanted to try to streamline our thinking on where the greatest near/long-term opportunities are for Internet user/usage growth on a global basis. We, along with our Technology, Media and Telecommunications (TMT) colleagues around the world, contributed a lot of data (see Appendix) that we have never seen gathered in one place before. This was a big project and this document is the first rev of something that will likely have many iterations and changes over time. We hope you find it useful and we welcome your feedback.

## Background

Yes, we still believe we are in the early innings of the evolution of the Internet but perspective is always key. Arthur Rock is widely viewed as one of the earliest Silicon Valley and finest venture capitalists ever -- his big winners include Teledyne, Intel and Apple Computer. Recently while reading the book *Done Deals*, edited by Udayan Gupta, and published in 2000, we came upon the following comments by Arthur. Now for perspective...

*I have this idea that there's been a major development of technology about every fifty years, 1850-1900 was the mechanical age with the development of the engine, 1900-1950 was the age of electricity, and then the big invention in 1950 of course was the transistor, which really is responsible for all of the technology we see today. Everything new in technology is a result of the invention of the transistor. I can't think of a single technology company that would have been able to exist without the semiconductor — from medical instruments and software, to bio-tech, and so on. There is nothing that doesn't trace itself to the invention of the transistor. During the last ten years, I really began worrying about the future without a new seminal invention.*

*The new invention, right about the turn of the century, is the Internet. It's not an invention in terms of somebody getting a patent or developing a process, but it really is an invention where no one knows what's going to happen within five or ten years.*

Given the current sentiment in many markets toward various aspects of the Internet, we have found it especially important to revisit the fundamentals/basics of global growth opportunities for Internet Users, Usage and Uses (we call this IU<sup>3</sup>, or IU-cubed).

Our thesis is: US rates of Internet growth, while robust, continue to slow from very strong growth levels, and non-US growth should continue to outpace US growth for some at least the next three years. In our view, the underlying growth in Internet users should conservatively increase at 20–30% annually for some time to come. Owing to slowing rates of economic growth, we have put our conservative forecasting hats on and we believe that there should be upside to our Internet user growth forecast. We will continue to monitor user growth aggressively. Note that a compounding effect should continue to be in place as expansion of *uses* of the Internet and ramps in *usage* (time spent per day) drive *usage* growth at levels that should exceed user growth.

Our approach to looking at global IU<sup>3</sup> is five-fold: 1) we look at market status/propensity for Internet users/usage (the focus of this note -- part 1). In subsequent reports, we will follow this up with a look at: 2) the growth of Internet Users, Usage, and Uses; 3) the relevance/importance of Internet brands/market leadership and monetization opportunities. Then our advertising research team will look at: 4) the viability of Internet advertising. And our communications team will look at: 5) what's really going on with the growth trends in broadband and wireless. Our highlights from Part 1 follow:

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## Highlights from Our Analysis

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- **North America has a higher Internet penetration rate (33% of the North American population uses the Internet)** than other major geographic regions including Japan (23%), Europe (14%), Latin America (3%), and Non-Japan Asia (1%). The US has significantly more Internet users than any other country. For example, at approximately 91 million (MM) Internet users, the US market is 5 times larger than Germany, 17 times larger than Spain, and 35 times larger than Denmark.
- More important in terms of IU<sup>3</sup> growth, the **Internet penetration rates in each region are lower than the penetration rates of other TMT products and services**, such as telephones, cable TV, PCs, and mobile phones. For example, in Europe, the Internet penetration level (14%) is lower than the mobile phone penetration rate (16%), the PC penetration rate (17%), the cable TV penetration rate (24%), and the telephone penetration rate (40%). In non-Japan Asia, the Internet penetration level (1%) is lower than the telephone line penetration rate (6%) and the cable TV penetration rate (20%). Outside North America, the levels of PC and mobile phone penetration are generally the closest among TMT services/products to current Internet levels. In the US, the significant delta between PC and Internet penetration levels should prove to be a solid indicator of Internet growth potential.
- This penetration gap — **the gap between Internet penetration and the penetration rates of other, more mature TMT products and services** — gives us confidence that we are still in the early innings of the development of the Internet. It also gives us confidence that the fundamentals for IU<sup>3</sup> growth should remain strong.
- Further, **this penetration gap allows us roughly quantify potential upside for IU<sup>3</sup>, and we conclude that this upside potential is substantial.** For example, in Latin America were Internet penetration (currently at 3%) to reach the level of cable TV penetration (currently at 13%), this would imply a 333% ramp in Internet users to 51MM, up from the current level of 12MM Internet users. On a global basis, were Internet penetration to reach the levels of other more mature TMT products/services penetration rates, we conclude that the global Internet users could rise 360% to 1.4 billion (B). We realize the somewhat specious nature of such extrapolations, as there are a number of structural

and socioeconomic barriers to the aforementioned Internet growth in the developing world. But while exact numbers incorrectly indicate scientific accuracy, we do believe that Internet growth will remain strong, and this directional significance is notable.

- This penetration gap thinking/effort also allows us to highlight regions with what we view are especially strong potential Internet user growth rates. Key points: **1) Europe, Latin America, non-Japan Asia, and Japan each have potential Internet user growth rates (in percentage terms) that are higher than rates of growth in North America, in our view.** 2) We also believe that Europe and non-Japan Asia each have potential Internet user growth (in absolute users) higher than North America, with Europe 50% higher than North America, and non-Japan Asia seven times higher than North America.
- Ranking individual countries in terms of their current TMT segment sizes, we find that the US has the largest current market size. **Our ranking** (based on the sum of each country's relative market shares within each segment) **of the top five countries in the world is: the USA No. 1, Japan No. 2, China No. 3, Germany No. 4, and the UK No. 5.**
- Finally, as for monetizing this IU<sup>3</sup> growth, **we have long held the belief that dollars (advertising, commerce, services, etc.) follow eyeballs.** If we are right on the potential for Internet user/usage/uses growth, then, **we believe the market opportunities for the leading Internet companies are significant.**

Net, after reviewing the data gathered in this document, and taking into account inherent difficulties in the methodology, **we believe that our global Internet user growth estimates (see Exhibit 1) are conservative and that global Internet user growth should be at least 23% compounded annually over the next three years. We believe this level of growth supports our long-held view that the select group of Internet leaders (such as America Online, Yahoo!, Amazon.com, eBay, and VeriSign) should benefit (financially and with share price appreciation) from the growth.** Once again, in light of expectations for slowing economies, we believe we are conservative in our estimates. Going forward, we will keep our forecasts current on a quarterly basis.

Exhibit 1

**Morgan Stanley Conservative Internet Growth Forecasts: 1997–2003E**

	1997	1998	1999	2000E	2001E	2002E	2003E	'00-03E CAGR
<b>Total Internet Users</b>	<b>77</b>	<b>133</b>	<b>205</b>	<b>287</b>	<b>365</b>	<b>449</b>	<b>536</b>	<b>23%</b>
US	39	63	76	91	107	125	144	17%
Western Europe	22	41	65	85	107	128	150	21%
Non- Japan Asia	8	13	38	68	90	115	141	28%
Japan	6	11	17	28	39	53	64	32%
Latin America	2	5	9	15	22	28	37	35%

Source: Morgan Stanley Dean Witter Internet Research (US - M. Meeker, M. Mahaney, D. Joseph), (Europe - M. Steib, J. Amaro, J. Marin), (Asia Pacific - S. Gupta), (Japan - H. Abe, Y. Motoyama), (Latin America - J. Zamora).

Note: There are some inconsistencies between these Internet user estimates and those in the Overview of Global TMT Markets tables and Exhibit 4. These inconsistencies are largely related to not including an estimated 17 million users in rest of world (ROW).

Exhibit 2

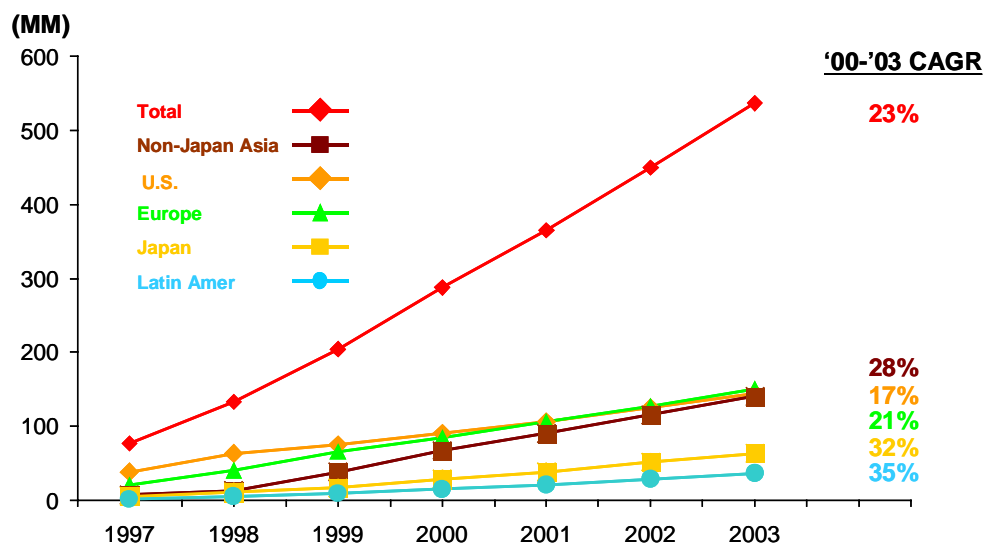
**Morgan Stanley Conservative Internet Research Annual Growth Forecasts: 1997–2003E**

	1997	1998	1999	2000E	2001E	2002E	2003E	'00-03E CAGR
<b>Total Internet Users</b>	--	<b>73%</b>	<b>54%</b>	<b>40%</b>	<b>27%</b>	<b>23%</b>	<b>19%</b>	<b>23%</b>
US	--	62%	21%	20%	18%	17%	15%	17%
Western Europe	--	86%	59%	31%	26%	20%	17%	21%
Non- Japan Asia	--	63%	192%	79%	32%	28%	23%	28%
Japan	--	83%	55%	65%	39%	36%	21%	32%
Latin America	--	150%	80%	67%	47%	27%	32%	35%

Source: Morgan Stanley Dean Witter Internet Research

Exhibit 3

**Morgan Stanley Conservative Internet Growth Forecasts: 1997–2003E**



Source: Morgan Stanley Dean Witter Internet Research

## Methodology

In this report, we endeavor to determine which countries and regions offer the greatest opportunities for IU<sup>3</sup> growth and for TMT companies. We have created a user-friendly database of the most tech-oriented countries and the leading companies in each market.

### 42 Countries (from the USA to Russia)

We have ranked and analyzed 42 countries along ten categories (see below).

We sought to determine the status/propensity of each region and country for IU<sup>3</sup> growth and TMT products and services. We have chosen the 42 countries based on population size and GNP. We assume that 1) the most promising markets for IU<sup>3</sup> growth would be those where current Internet penetration levels are significantly below penetration levels for other media/communications services, such as telephones, PCs, mobile phones, and cable TV; and 2) that the most promising markets for TMT products and services would be those with the greatest purchasing power/economic strength and the potentially fastest growing (in both percentage and absolute terms) TMT segments — telephone lines, PCs, mobile phone subscribers, and Internet users.

Based on our estimates, the 150 countries not included in our study account for approximately 16% of telephone lines, 24% of PCs, 13% of mobile phones, 24% of cable subscriptions, 10% of Internet users, and 10% of credit/debit cards, on a global basis. Note that to maintain analytical consistency, we have strived as much as possible to use one consistent source for each category for the most recent year available.

### Ten Categories (from Telephone Lines to Internet Users)

The ten categories are: 1) population; 2) landmass; 3) households; 4) GNP per capita; 5) telephone lines; 6) cable subscribers; 7) installed PCs; 8) mobile phone users; 9) Internet users, and 10) credit/debit cards in use.

We believe that the ten categories we selected are the best indicators of each region/country's propensity for TMT products and services. Population and the number of households are simple proxies for potential market size. In our view, landmass is also a proxy for market size, as well as a potential positive indicator of mobile phone penetration, because large landmass countries in development stages are more difficult to serve with landline telephony. We think GNP per capita is a good measure of consumer spending power. The number/penetration of telephone lines (both residential and commercial) is one of the most basic measures of a country's level of connectivity, and provides insight as DSL service ramps. The number/penetration of cable subscribers is another measure of a country's connectivity, as well as the potential for broadband services. In our opinion, the number/penetration of installed PCs is a key indicator of potential Internet penetration. The number/penetration of mobile phone users is an indicator of the market potential for connectivity and wireless Internet services. The number/penetration of Internet users is an indicator of the technology adoption propensity of countries. And the number/penetration of credit/debit cards should allow for easier online purchasing.

Overall, the annual global growth rates for these categories vary widely. The newer categories have stronger growth rates. For example, the mobile phone subscriber and Internet user categories have recently grown at 41% and 40%, respectively.

Exhibit 4

### Global Annual Growth Rates of Categories (for most recent year available)

Category	Annual Growth Rate	Current Size (MM)	Year	Source
Population	1.4%	5,943	1998	World Bank
GNP	1.7%	\$589,000	1998	World Bank
Telephone Lines	12%	881	1998	World Bank
Cable TV Subscribers	9%	326	1998	World Bank; Kagan Associates
Installed PCs	14%	423	1998	World Bank
Mobile Phone Subscribers	41%	368	1998	World Bank
Internet Users	40%	305	2000	MSDW Equity Research
Credit Cards	9%	2,348	1998	Global Card Directory

Source: Morgan Stanley Dean Witter Internet Research

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These indicators encompass both consumer and business propensity for TMT products and services adoption. In particular, telephone lines, PCs, mobile phones, and Internet users (both absolute levels and penetration rates) measure market opportunities for both consumer- and business-oriented products and services, while cable TV subscription are more of a pure consumer service.

**Penetration Levels of TMT Products/Services by Region**

We sought to determine what a “natural” level of market penetration was for TMT services on a regional and country-by-country basis. Given that telephone lines, cable lines, PCs, and mobile phones have been in the market for years, we use these TMT products/services as our benchmark for the current market penetration opportunity for Internet usage.

First, we sorted the 42 countries into five regions (North America, Latin America, Europe, non-Japan Asia, and Japan). We then determined for each country and for each region (with a weighted average) telephone line penetration, PC penetration, mobile subscriber penetration, cable penetration, and Internet penetration. (Note that for some regions, we have included only the largest countries in our analysis.) With the exception of cable penetration (which was calculated on a TV household basis because the service is more of a household vs. individual use), penetration levels were calculated using populations. Specifically, telephone penetration was calculated as telephone main lines divided by population; PC penetration was calculated as installed PCs divided by population; mobile phone penetration was calculated as mobile phone subscribers divided by population; cable TV penetration was calculated as cable TV households divided by TV households; Internet penetration was calculated as Internet users divided population; and credit/debit card penetration was calculated as credit/debit cards divided by population.

On a regional basis, those regions with the highest penetration levels were North America, Japan, and Europe, and those regions with the lowest penetration rates were

Latin America and non-Japan Asia. Specifically, North America had the highest penetration rates in telephone lines (66%), PCs (44%), cable (69%), and Internet users (33%). Japan had the highest penetration rates in mobile phone subscribers (37%).

North America generally had higher levels of penetration for TMT products/services. Below, we also highlight comparisons with European and Japanese penetration rates.

- North America had the highest telephone line penetration rate (66%), while Japan’s penetration rate was 50% and Europe’s was 40%.
- North America had the highest PC penetration rate (44%) and Japan’s penetration rate was 24% and Europe’s was 17%.
- North America had the highest cable TV penetration rate (69%) and Japan’s penetration rate was 29% and Europe’s was 24%.
- North America had the highest Internet user penetration rate (33%) and Japan’s penetration rate was 23% and Europe’s was 14%.

Note that Japan had the highest mobile phone penetration rate (37%). This high level of mobile phone penetration in Japan also helps explain that country’s high Internet penetration rate — mobile Internet access has clearly been a strong development in Japan with the very rapid growth of services like i-mode.

**Penetration Levels of TMT Products/Services by Country**

On a country basis, the country with the highest telephone line penetration level is Sweden (78%). The two countries that share the highest PC penetration rate are the US and Singapore (46%). The country with the highest mobile phone penetration level is Finland (57%), while the country with the highest cable TV penetration rate is Belgium (92%). Finally, the country with the highest Internet user penetration rate is Norway (58%).

Exhibit 5

**Penetration Levels of TMT Products/Services — Country**

Category	Highest Penetration Country	Lowest Penetration Country
Telephone Lines	Sweden (78%)	Pakistan (2%)
PCs	USA/Singapore (46%)	India/Pakistan (<1%)
Mobile Phone Subscribers	Finland (57%)	India/Pakistan/Indonesia (<1%)
Cable TV	Belgium (92%)	Indonesia (<1%)
Internet Users	Norway (58%)	India/Pakistan (<1%)

Sources: Morgan Stanley Dean Witter Internet Research, World Bank, IDC, Jupiter Communications, Kagan Associates

Exhibit 6

**Average Penetration Levels of TMT Products/Services — Country**

Top 5 Countries	Avg. Penetration Level	Lowest 5 Countries	Avg. Penetration Level
Sweden	52%	South Africa	5%
Denmark	49%	Thailand	4%
Switzerland	49%	Philippines	3%
Norway	48%	Indonesia	1%
USA	48%	Pakistan	1%

Sources: Morgan Stanley Dean Witter Internet Research, World Bank, IDC, Jupiter Communications, Kagan Associates

If penetration rates across the five categories are averaged, European countries (especially Northern European countries) rank highest. For example, Sweden has the highest average TMT penetration level at 52%, followed by Denmark and Switzerland at 49%, and Norway at 48%. Also, at 48%, is the US.

**Upside Penetration Potential for Internet Users by Region**

Based on our assumption that the most promising markets for IU<sup>3</sup> growth are those where current Internet penetration levels significantly lag the penetration levels for other media/communications services, we compared within regions the different penetration levels of telephone lines, cable TV, mobile phones, and the Internet. A key conclusion is that Internet penetration levels in each region are lower than the penetration rates of other TMT products and services.

In North America, for example, Internet penetration at 33% is below PC penetration at 44% and significantly below cable TV penetration at 69%. This gap, in our view, gives a sense of the upside penetration potential for Internet usage in the US. Not surprisingly, Internet penetration in each region is below PC penetration. Our overall assumption is that Internet penetration will ramp up to match PC penetration — as Internet usage becomes a key driver of PC purchases — then expand beyond it — as non-PC Internet devices gain more of a foothold. Given the strong presence of mobile phones in Japan and Europe — these are the two regions where mobile phone penetration is significantly greater than PC penetration — we expect these countries to be the first markets where Internet penetration surpasses PC penetration.

To quantify potential penetration gap upside, we simply subtracted current Internet penetration levels from the penetration levels of the other TMT products and services (see Exhibit 8). For example, in Europe, the gap between

Internet penetration and telephone line penetration is 2,600 basis points, the gap between Internet penetration and cable TV penetration is 1,000 basis points, the gap between Internet penetration and PC penetration is 300 basis points, and the gap between Internet penetration and mobile phone penetration is 200 basis points.

Three points come out of this analysis:

- The only region where Internet penetration is greater than the penetration of another TMT product/service is North America, where Internet penetration is actually 900 basis points greater than mobile phone penetration. We believe that the cause is less the fact that mobile penetration is low in the US — it is roughly in line with Europe — but that Internet penetration is high — 1,000 basis points higher than in Japan and more than 1,900 basis points higher than in Europe.
- The gap between Internet and PC penetration is consistently small across all regions, with the exception of North America. This is likely the result of the earlier and more pervasive adoption of PCs in North America than in other regions.
- In every region outside the US, either telephone lines or cable TV provide the greatest gap with Internet penetration. These are the more mature penetration benchmarks for Internet usage.

The final step is to quantify, on a regional basis, what the Internet penetration gap means in terms of Internet user and usage growth. We calculated what an increase in Internet penetration levels to the levels of other, more mature TMT products/services could imply in terms of user growth and revenue growth. The results are shown in Exhibit 11.

- In North America, were Internet penetration to reach the level of cable TV penetration (69%), Internet users would increase 110MM (or 109%) to reach 211MM.

Exhibit 7

**Regional Penetration of TMT Services, Sorted by Population**

Region	Population	HIGHER PENETRATION <<<----->>> LOWER PENETRATION				
		Telephone	Cable	PC	Mobile Phone	Internet
Non-Japan Asia	2,882MM	6%	20%	1%	2%	1%
Europe	630MM	40%	24%	17%	16%	14%
Latin America	414MM	13%	13%	4%	5%	3%
North America	307MM	66%	69%	44%	24%	33%
Japan	127MM	50%	29%	24%	37%	23%
Rest of World	1,583MM	9%	21%	6%	3%	2%
<b>WEIGHTED AVERAGE</b>		<b>15%</b>	<b>23%</b>	<b>7%</b>	<b>6%</b>	<b>5%</b>

Sources: Morgan Stanley Dean Witter Internet Research, World Bank, IDC, Jupiter Communications, Kagan Associates; Weighted average does not include ROW figures.

Note: Refer to appendix for graphical presentation of regional TMT penetration.

Exhibit 8

**Penetration Gap Between Internet and other TMT Services**

Gap between Internet Penetration and:	Telephone	Cable TV	PC	Mobile Phone
North America	3,300bps	3,600bps	1,100bps	(900bps)
Latin America	1,000bps	1,000bps	100bps	200bps
Europe	2,600bps	1,000bps	300bps	1,200bps
Non-Japan Asia	500bps	1,900bps	0bps	100bps
Japan	2,700bps	600bps	100bps	1,400bps
Rest of World	700bps	1900bps	400bps	100bps

Sources: Morgan Stanley Dean Witter Internet Research, World Bank, IDC, Jupiter Communications, Kagan Associates

bps = basis points = 1/100th of a percent

- In Latin America, were Internet penetration to reach the level of cable TV penetration (13%), Internet users would increase 39MM (or 333%) to reach 51MM.
- In Europe, were Internet penetration to reach the level of telephone line penetration (40%), Internet users would increase 164MM (or 186%) to reach 253MM.
- In non-Japan Asia, were Internet penetration to reach the level of cable TV penetration (20%), Internet users would increase 817MM (or 1,900%) to reach 860MM.
- In Japan, were Internet penetration to reach the level of telephone line penetration (50%), Internet users would increase 34MM (or 117%) to reach 63MM.

Why do we think that Internet usage could rise to these levels? The Internet is a tremendous communications, media and information tool, and the fact that the Internet enables heretofore unheard of levels of interactivity gives it a powerful draw. Other uses, such as commerce and entertainment promise substantial opportunity, in our view. Furthermore, there is a tangible sense of not wanting to fall

behind in the global economy, and the Internet is seen as a necessity to keep pace. As an aside and as an example of the increasing presence of the Internet as a necessity in modern society, we note one of our favorite datapoints from the annual America Online/Roper Starch Cyberstudy: Two-thirds (66%) of online Americans who participated in the study said that if they were alone on a desert island, they would prefer a computer connected to the Internet to either a telephone or television.

Key points are:

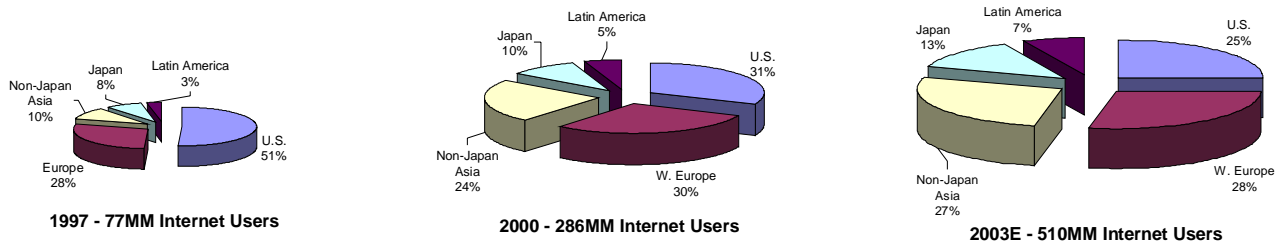
- Europe, Latin America, non-Japan Asia, and Japan each have potential Internet user growth rates (in percentage terms) higher than North America. We have already seen this trend manifesting itself over the past three years, and expect it to continue through the next three years.
- Europe and non-Japan Asia each have potential Internet user growth (in absolute users) higher than North America, with Europe 50% higher (164MM vs. 110MM) than North America and non-Japan Asia 7 times higher (817MM vs. 110MM) than North America. For Europe, we would anticipate a fair degree of variance in potential growth rates (both absolute and in percentage terms) across the region. Absolute growth will likely be greatest in the three big economies (Germany, UK, and France), while

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Exhibit 9

Internet Users on a Regional Basis



Source: Morgan Stanley Dean Witter Internet Research

Exhibit 10

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

Region	Current Internet Users	Internet Penetration	Benchmark Penetration	Benchmark Level Internet Users	Benchmark Implied Internet User Growth	Benchmark Implied Internet User Growth
North America	101MM	33%	69%	211MM	110MM	109%
Latin America	12MM	3%	13%	51MM	39MM	333%
Europe	88MM	14%	40%	253MM	164MM	186%
Non-Japan Asia	43MM	1%	20%	860MM	817MM	1,900%
Japan	29MM	23%	50%	63MM	34MM	117%
Rest of World	32MM	2%	21%	335MM	303MM	950%
Regional Total	305MM	5%	23%	1,402MM	1,097MM	360%

Sources: Morgan Stanley Dean Witter Internet Research, World Bank, IDC, Jupiter Communications, Kagan Associates

percentage growth will be largest in the smaller countries (e.g. Spain, Italy).

- Overall, we anticipate stronger IU<sup>3</sup> growth outside North America than within North America.
- The total potential growth rates for IU<sup>3</sup> are impressive — were Internet penetration to reach the levels of other more mature TMT products/services, the implied global Internet user level would be 1.4B, a 360% increase from today's levels.

Current/Potential Size of TMT Products/Services by Country

Based on our assumption that the most promising markets for TMT products and services would be those with the greatest purchasing power/economic strength and with the largest existing TMT segments — telephone lines, PCs, mobile phone subscribers, and Internet users — we also sought to determine the current status of each regional and country market in terms of market attractiveness. Essentially, we sought to determine the attractiveness of markets for TMT products and services by quantifying the size of each market in select segments. We assumed that the markets with the largest relative presence in key technology segments would be the markets with the greatest

propensity to adopt TMT products and services. For example, we ranked the US as the most attractive market in the cable subscriber segment because there are more cable subscribers in the US (70MM) than in any other market. And because the US ranked high in this category, we believe the US has a high propensity for TMT services, such as broadband.

We then calculated each country's relative share of the global market in each category, and rank ordered all the countries based on summing up these relative shares. The weightings were derived by adding up each country's market shares in each segment. For example, a 10% share of the telephone lines plus a 15% share of the cable subscribers plus a 7% share of the Internet users produces a weighting of 0.32 (.10+.15+.07 = .32).

Several background thoughts follow. First, it was key to the analysis to evaluate the current size/attractiveness based on the size of the market and not on penetration rates (e.g. cable subscribers vs. cable subscriber penetration rate), because very large countries with limited penetration are often much larger markets than very small countries with high penetration, although the high penetration levels reached in some countries can be an indicator of potential penetration rates in larger countries. For example, in the

mobile phone user category, Finland, which boasts one of the world's highest mobile phone penetration rates (3MM mobile users with 57% penetration) ranks lower than China (43MM mobile users with 2% penetration), where far less impressive penetration rates are more than counter-balanced by larger absolute levels generated by a population 250 times larger.

Second, one somewhat unusual category is credit/debit cards. Our thinking here is that credit/debit cards are, and are likely to continue to be, a leading payment mechanism for e-commerce. And low levels of credit/debit card penetration in countries have been an impediment to e-commerce adoption. So as an indicator of market opportunity, we believe credit/debit cards are an important element. Note that we have included both credit and debit cards within our data but that in certain markets, like the UK, debit cards are widely used in e-commerce transactions. In other markets, like Germany and France, they are not. Finally, there are countries like Japan, where there are very high levels of credit and debit cards in use, but bank drafts are more regularly used for e-commerce transactions. There is no single rule of thumb across all countries for how strong of an indicator the presence of credit/debit cards is for e-commerce potential.

The country with the largest current market size is the US. Our ranking (based on the sum of each country's relative market shares within each segment) of the top 10 countries in the world is: the USA No. 1, Japan No. 2, China No. 3, Germany No. 4, the UK No. 5, South Korea No. 6, France No. 7, Canada No. 8, Italy No. 9, and Brazil No. 10. Based on our relative weighting, the US is significantly ahead of other countries in terms of market share, with a weighting (1.86) more than 2 times greater than No. 2 Japan (0.80). The gap between the other leaders becomes progressively

Exhibit 11

#### TMT Market Size/Potential — Country Rank

Country	Rank	Relative Weighting
USA	1	1.86
Japan	2	0.80
China	3	0.60
Germany	4	0.41
UK	5	0.30
South Korea	6	0.22
France	7	0.22
Canada	8	0.21
Italy	9	0.20
Brazil	10	0.15
Remaining 32 countries	--	2.02

Sources: Morgan Stanley Dean Witter Internet Research, World Bank, IDC, Kagan Associates, Faulkner & Gray 2000 Global Card Directory, DRI/McGraw Hill

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smaller No. 3 China at 0.60, No. 4 Germany at 0.41, No. 5 the UK at 0.30. (See exhibit 12).

As shown in Exhibit 12, the top 10 countries, representing 24% (10) of the 42-country database, account for over 70% of the total weighting. In other words, these 10 countries account for over 70% of the combined market share. While not exactly the normal 80-20 rule, this market share concentration (24% of the countries accounting for 71% of the market opportunity), in our view, is fairly significant and highlights the importance of focussing on the largest markets, and consequently, the largest companies within those markets. While it is difficult to gauge market share concentration for the areas of the world excluded from our analysis, we do not believe that it is significant at present. Regions such as Africa (exclusive of South Africa) and the Middle East (exclusive of Israel) have been laggards in adoption of new technologies, largely due to, we believe, socioeconomic obstacles and a lack of governmental support.

Across the TMT categories (not including GNP per capita, population, households, landmass, and credit cards), the US ranked No. 1 by our screen, with, for example, more telephone lines (182MM lines, 24% of the total market) than any other country, more mobile phone users (69MM, 21%), and more Internet users (90MM, 33%). In terms of global market share, the US's largest share categories are: PCs (39% of all PCs in the world are in the US), credit/debit cards (35%), Internet users (33%), and cable users (28%). The one overall category where the US did not rank No. 1 was GNP per Capita, where it ranked No. 6, behind, in order, Switzerland (No. 1), Norway, Denmark, Japan, and Singapore.

Japan ranked No. 2 in four of the six TMT categories — PCs, mobile phone users, Internet users, and credit/debit cards. Japan's greatest share was in credit/debit cards (26%) and mobile phone users (15%).

And China ranked No. 2 in two of the six TMT categories — telephone lines and cable subscribers. China's greatest share was in cable subscribers (24%) and its share in telephone lines being 12%. Penetration rates in China are relatively low across all segments. For example, PC penetration rates are currently well below 5% in China versus 25% in France, 30% in the UK, and 45–50% in the US.

#### Current Size of TMT Products/Services by Region

Looking at the TMT market opportunities on a regional basis — dividing the markets into North America, Latin

America, Europe, non-Japan Asia and Japan – one key conclusion is that several of the regions are fairly evenly balanced in terms of market share. In telephone lines, Internet users, and mobile phones, Europe is the largest market. (Given the size of the European landmass and the general level of technology adoption in Western European countries, this is not too surprising, in our opinion. The issue with Europe, in our view, is the fragmented nature of the European market.) In PCs and credit/debit cards, North America is the leader. And in cable subscribers, it's non-Japan Asia. (Again, there is the issue of a large but highly fragmented market.)

One conclusion of our analysis is that while the North American market is very significant as a target for TMT products and services, several non-US markets offer potential almost as attractive as the North American market. And in certain segments, such as mobile phones, we believe the largest current opportunities are already outside North America. In our view, some of the more interesting markets outside of the US would include Japan, China, Germany, and the UK.

Exhibit 12

**Current Market Size — Regional Sort (regions with the largest share of each category)**

Category	Region	Region Size	Population	Landmass
Telephone Lines	Europe	253MM	630MM	22MM sq km
Cable Subscribers	Non-Japan Asia	84MM	2,882MM	25MM sq km
PCs	North America	136MM	307MM	18MM sq km
Internet Users	North America	98MM	307MM	18MM sq km
Mobile Phone Subscribers	Europe	98MM	630MM	22MM sq km
Credit/Debit Cards	North America	806MM	307MM	18MM sq km

Sources: Morgan Stanley Dean Witter Internet Research, World Bank, IDC, Kagan Associates, Faulkner & Gray 2000 Global Card Directory, DRI/McGraw Hill

**Interesting Facts or a Darn Big Data Dose...**

- Of the 42 countries in the TMT Database, 15 (36%) have cable penetration rates that exceed telephone line penetration. The most significant disparity occurs in India where cable penetration is 25% and telephone line penetration is only 2%.
- Twenty-two of the 42 countries in the TMT Database (52%) have higher mobile phone penetration than PC penetration. In Portugal, there are nearly 3 times as many mobile phones as PCs.
- The Internet is accessed through telephone lines, cable lines and mobile phones. Countries with a high ratio of phone lines, cable subscribers, and mobile phone users to Internet users would, all things being equal, appear poised for rapid Internet growth. In this analysis, Russia tops the list with more than 40 times as many Internet delivery units as Internet users. Poland is second at 24 times, China third at 21 times, followed by India and Colombia at 20 times.
- Sweden has the highest level of telephone line penetration with 78% ahead of Switzerland (68%), the US (66%), and Norway (66%).
- If China's Internet penetration were equal to Norway's (58%), this would add over 700MM users, approximately 2.5 times the current worldwide total.

- Despite GDP per capita of only \$440, India boasts higher cable penetration rates (25%) than both the U.K. (13%) and France (7%), both of which have GDP per capita roughly 50 times higher than India's.
- The US has more PCs (127MM) than Europe (105MM) and Latin America (15MM) combined, and has the highest PC penetration rate (46%) of all countries and regions in our TMT database.
- Japan has the second highest level of total outstanding credit/debit cards (560MM) in the TMT database behind the US (737MM), but has the largest credit/debit card penetration rates (441%) by a wide margin over the US (267%), Latin America (34%), Europe (61%), and non-Japan Asia (8%).
- Note that Japan had the highest mobile phone penetration rate (37%). This high level of mobile phone penetration in Japan also helps explain that country's high Internet penetration rate — mobile Internet access has been a strong development in Japan with the very rapid growth of services like i-mode.

**Leading TMT Companies on a Global Basis — Can You Say Fragmentation?**

As for determining which companies are the world's leading technology/media/telecommunications players, we determined the market share leaders for each segment for

each country (see Exhibit 13 and Appendix for more detail). We conclude that, in the US mobile phone services segment, market leaders are Verizon (24% share), SBC (15%), AT&T (12%), GTE (9%), and Sprint (8%). In the US ISP segment, we believe market leaders are AOL (43% share), EarthLink (8%), Juno (6%), MSN (5%), and Prodigy (5%). In a very different market, the Japanese mobile handset market, the leaders are Panasonic (33% share), NEC (16%), and Mitsubishi (15%).

Some of the major corporate alliances — within countries and between countries — are not captured in this dataset, although the strong potential competitive positioning of the alliances can be drawn from the data — e.g. NTT DoCoMo (59% share of Japanese mobile Internet subscriber base) with AOL (43% share of US ISP market). Another example, we think Vodafone's strong network of mobile telephony alliances — both within Europe as well as in the Asia-Pacific region — positions it as a strong competitor in numerous large markets. Specifically, we are referring to Vodafone's ownership of Mannesmann, Germany's second largest mobile operator, and its attempt to create a pan-European wireless portal through Vizzavi.

As analysts, one of our consistent objectives has been to focus on the largest market segments and the No. 1 and No. 2 players within each segment. It is the market share leaders in the largest markets that often have the greatest revenue and earnings potential. With that in mind, we note several key points from our company database: First, in the telephone line segment, companies with very large market shares among the top markets are NTT in Japan (99% share), China Telecom in China (100%), Deutsche Telecom in Germany (82%), and BT in the UK (75%). (Telephone lines are arguably the most regulated of the segments, thus the very strong presence of government/quasi-government companies in this segment should not come as too much of a surprise.)

Second, as a point of contrast, in PCs — arguably the most competitive of the segments — the highest country market share belongs to Fujitsu Siemens in Germany, with a 27% share. Across the other countries, the market share leaders generally have a 20% share (e.g., Dell 20% in the US, NEC 22% in Japan).

Third, mobile handsets show slightly more concentration, with Nokia having 30%-plus share in the US, China, Germany, and the UK. In the Japanese market, Panasonic has the largest share at 33%.

Fourth, in the ISP segments, several market leaders have close to 50% share — AOL 43% in the US, NTT DoCoMo's iMode 59% in Japan, ChinaNet 50% in China, and T-Online 45% in Germany. The fact that AOL has a 43% share in an ISP market that is almost three times as big as the next closest country (US 90MM Internet users versus Japan 29MM users) is an indication of AOL's strong positioning as a TMT provider. On a regional basis, some of the more interesting datapoints come from Europe, where several country segment leaders (like Vodafone, T-Online, Nokia, and Terra Networks) have established strong presences outside of their home markets.

Also, note that certain TMT companies, like Yahoo! which has very strong global positioning in its segment (Web portals), Amazon.com, which has a very strong global positioning in its segment (e-commerce), and eBay, which has very strong global positioning in its segment (e-commerce trading platforms), have not been included in this report. This is in part because this report does not focus specifically on new media and e-commerce categories.

And fifth, handheld devices provide one of the few competitive segment examples of truly high market concentration. Specifically, Palm's 65%-plus share of the US handheld devices market really sticks out as an example of first-mover advantage in a fast growing segment. Note, however, that the recent entrance of Handspring has already had a significant impact on market share. Handspring's market share is 22%.

Key takeaway is that those companies that are best positioned in the leading market segments are often — but certainly not always — best positioned in global markets. Economies of scale, alliances, learning curves, and the skills that come with and help create success in highly competitive markets are all factors that tend to apply outside of home markets. Note, however, that cultural/language barriers are always impediments to significant global reach.

Exhibit 13

Leading TMT Companies in Top 5 Ranked Countries

	Telephone Lines	Cable Subscriptions	PCs	Mobile Phone Subscriptions	Mobile Handset	Internet Service Providers (ISP)	Handheld Devices	DSL	Credit Cards
<b>USA</b> Pop. - 276MM	<b>182MM</b> Verizon - 34% SBC Comm. - 33% Bell South - 13% Qwest - 9% Sprint - 4%	<b>70MM</b> AT&T - 23% Time Warner - 16% Comcast - 12% Charter - 9% Cox - 9%	<b>126MM</b> Dell - 20% Compaq - 17% HP - 11% Gateway - 9% IBM - 6%	<b>69MM</b> Verizon - 24% SBC - 15% AT&T - 12% GTE - 9% Sprint - 8%	Nokia - 35% Motorola - 21% Qualcomm - 11% Ericsson - 10% Samsung - 8%	<b>91MM users</b> AOL - 43% EarthLink - 8% Juno - 6% MSN - 5% Prodigy - 5%	Palm - 65% Hspring - 22% Casio - 4% HP - 3% NEC - 2%	SBC - 30% Verizon - 20% Qwest - 12% Covad - 12% Bell South - 8%	Visa - 54% Master Card - 34% Discover - 8% AMEX - 5%
<b>Japan</b> Pop. - 127MM	<b>63MM</b> NTT - 99%	<b>14MM</b> Jupiter-Titus - 21%	<b>30MM</b> NEC - 22% Fujitsu - 21% IBM - 10% Toshiba - 7% Sony - 7%	<b>47MM</b> NTT DoCoMo - 59% Jphone - 16% DDI Cellular - 11% IDO - 7% Tu-Ka - 7%	Panasonic - 33% NEC - 16% Mitsubishi - 15% Toshiba - 9% Kyocera - 8%	<b>29MM users</b> NTT (iMode) - 50% '@nifty - 18% BIGLOBE - 15% NTT (OCN) - 7% So-Net (Sony) - 5%	Sharp - 35% Casio - 35% NEC - 24% Compaq - 2%	Tokyo Metallic - 50% eAccess - 30%	Visa - 53% Master Card - 30% JCB - 14% AMEX - 2%
<b>China</b> Pop. 1261MM	<b>87MM</b> China Telecom - 100%	<b>61MM</b> Shanghai Cable Beijing Cable Guangdong Cable	<b>10MM</b> Legend - 22% IBM - 6% Founder - 6% HP - 6% Great Wall - 4%	<b>43MM</b> China Mobile HK - 63% China Unicom - 18% Others - 19%	Nokia - 34% Motorola - 26% Qualcomm - 11% Samsung - 7% Siemens - 4%	<b>10MM users</b> ChinaNet - 50% China Unicom - 2% China Netcom - 2% GBNet - 2%	HT With 25% Legend - 25% Palm - 15% Leo - 15% HP - 12%	ChinaNet - 70% China Netcom - 5% GBNet - 5% China Unicom - 5%	Visa - 53% Master Card - 30% JCB - 14% AMEX - 2%
<b>Germany</b> Pop. - 83MM	<b>47MM</b> Deutsche Telecom - 82% Mannesmann - 7% Mobilcom - 3% COLT - 1% Viag Interkom - 1%	<b>18MM</b> Deutsche Telecom - 29% Tele Columbus - 8% Bosch - 6% PrimaCom - 4% EWT, TSS - 4%	<b>25MM</b> Fujitsu Siemens - 27% Voibis - 14% Compaq - 10% IBM - 6% Dell - 5%	<b>14MM</b> Mannesmann - 41% T-Mobile - 40% E-Plus - 14% Viag Interkom - 5%	Nokia - 30% Motorola - 14% Siemens - 10% Ericsson - 10% Phillips - 7%	<b>19MM users</b> T-Online - 45% AOL - 22% Freenet - 13% Lycos - 11% Arcor - 10%	Palm - 39% Psion - 23% Casio - 3% PMCG - 3% HP - 2%	Deutsche Telecom Arcor QSC	Visa - 70% Master Card - 28% AMEX - 3%
<b>UK</b> Pop. - 60MM	<b>33MM</b> BT - 75% Cable & Wireless - 9% NTL - 6% Telewest - 3%	<b>3MM</b> Telewest - 34% Cable & Wireless - 30% NTL - 29% Diamond - 4% Other - 2%	<b>16MM</b> Compaq - 19% Dell - 14% Packard Bell/NEC - 7% IBM - 6% Toshiba - 6%	<b>15MM</b> Vodafone - 31% BTCellnet - 25% Orange - 24% One 2 One - 20%	Nokia - 30% Motorola - 14% Siemens - 10% Ericsson - 10% Phillips - 7%	<b>19MM users</b> Freeserve - 39% BT - 33% AOL - 18% Xstream - 10%	Psion - 33% Palm - 20% PMCG - 6% Casio - 4% TI - 3%	BT AOL Concentric Demon Internet Freeserve	Visa - 70% Master Card - 28% AMEX - 3%

Source: Morgan Stanley Dean Witter Internet Research

Appendix Exhibits

Overview of Global TMT Markets — Sorted Regionally by Population

Meta-Regional Sort of Categories — Based on Users/Units per Region and Based on Penetration

TMT Regional Sorts (Broken Out By Individual TMT Category)

TMT Country Penetration Levels — Sorted by Average Penetration

TMT Totals — Top 10 Markets by Country

TMT Penetration Levels — Top 10 Markets by Country

Overview of Global TMT Markets — Sorted Regionally by Telephone Lines

Overview of Global TMT Markets — Sorted Regionally by PCs

Overview of Global TMT Markets — Sorted Regionally by Mobile Phones

Overview of Global TMT Markets — Sorted Regionally by Cable Subscribers

Overview of Global TMT Markets — Sorted Regionally by Internet Users

Overview of Global TMT Markets — Sorted Regionally by Credit/Debit Cards

TMT Countries sorted by Relative Weighting

Market Share Leaders; Countries Sorted by Relative Weighting

For all the exhibits in the appendix the source is Morgan Stanley Dean Witter Research.

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**Companies Mentioned in this Report (Additional Companies Mentioned in the Appendix)**


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Company	Ticker	Rating	Price (1/3/2001)
Amazon.com	AMZN	Outperform	\$17.56
America Online	AOL	++	37.50
AT&T	T	Neutral	20.13
ChinaNet	CNHD	Not Rated	2.56
Dell	DELL	Neutral	20.00
Deutsche Telcom	DTEGn.DE	Neutral	32.19
EarthLink	ELNK	Neutral	6.44
eBay	EBAY	Outperform	38.00
Fujitsu Siemens	FULD30	Not Rated	73.54
Juno	JWEB	Not Rated	0.31
MEC Mitsubishi	MIEL20	Not Rated	61.40
Microsoft	MSFT	Outperform	47.94
NEC	6701.T	Outperform	97.50
Nokia	NOK1V.HE	Outperform	44.69
NTT (DoCoMo)	9432.T	Outperform	39.06
Palm	PALM	Strong Buy	27.88
Prodigy	PRGY	Not Rated	1.81
SBC Communications	SBC	Strong Buy	51.00
Sprint PCS	PCS	Strong Buy	20.69
Terra Networks	TRLY	Not Rated	12.19
T-Online	TOIGn	Neutral	12.00
VeriSign	VRSN	Outperform	80.63
Verizon	VZ	Strong Buy	53.13
Vodafone	VOD	Strong Buy	36.69
Yahoo!	YHOO	Outperform	30.56

Source: ILX, MSDW Research

++ Estimates for this company have been removed from consideration in this report because, under applicable law and/or Morgan Stanley Dean Witter policy, Morgan Stanley Dean Witter may be precluded from issuing such information with respect to this company at this time.

