

Advanced News Media Release

State of the Internet 2000



September 1, 2000



Prepared by International Technology and Trade Associates (ITTA) Inc.

State of the Internet 2000

United States Internet Council

&

ITTA Inc.

Foreword

Why this study?

In April 1999, the United States Internet Council released our first "State of the Internet" report to summarize key trends in the development of a social, political, and economic communications revolution that has emerged on the world stage in just a few years.

When President Bill Clinton took office in January 1993, most Americans outside of government and academic circles were completely unaware of the Internet as it then existed. Perhaps fewer than 90,000 people worldwide used the net at that time on a regular basis.

In the summer of 2000, industry monitors estimate more than 300 million people worldwide are using the net on a frequent basis for business, research, shopping, personal correspondence, social interactions, entertainment, listening to radio, and communications and information-sharing functions of every description.

The number of people using this still-young medium has grown in a geometric progression. The current online population is more than 3,000 times the number of people who were online just seven years ago.

Five years from now, some industry estimates predict that the number of users worldwide will pass the one-billion mark, with more than 700 million users living outside of North America. Already, users who speak English as their primary language constitute only a little more than half of all persons using the net. Those who speak English as a second language and the number of web sites hosted in the U.S. are two factors that will continue to support the dominance of English on the Internet for a few more years to come. Nevertheless, the trend noted in our 1999 report to more non-English web sites and content, along with more sites hosted outside English-speaking countries, continues to be a prominent feature in this year's analysis.

For these reasons, this year's report contains far more information about global trends and emerging Internet markets in Europe, Africa, and Asia and the Pacific Rim. While the net continues to be heavily influenced by American use and culture, the diversity of net users continues last year's trends in every way.

This summer, for the first time, women using the net have surpassed men in the United States. Racial, economic, and other manifestations of what was called the "digital divide" in our 1999 report continue to show that the diversity of users is accelerating.

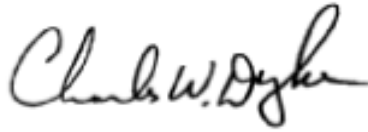
Our last section, "Looking Forward," presents some of our recommendations for both government policy and self-regulatory frameworks that are being developed by industry.

In this regard, it is useful and important for officials in government and users of the Internet alike to recognize that just as the net is changing the way we live our lives, it will also fundamentally challenge and change how we govern.

Those nations, states, corporations, and citizens who adapt to the net's constant innovation will continue to thrive.

A handwritten signature in black ink, appearing to be 'W.C. Myers', with a stylized, sweeping flourish extending to the right.

William C. Myers
Chief Executive Officer
United States Internet Council

A handwritten signature in black ink, appearing to be 'Charles W. Dyke', written in a cursive style.

Charles W. Dyke
President and CEO
International Technology
& Trade Associates, Inc.

Preface & Acknowledgments

The Internet has become a powerful research tool. With over 2 billion unique, indexable pages, the Internet today offers what often seems to be an unending reservoir of information and knowledge. This year's "State of the Internet 2000" report was researched primarily on the Internet, drawing from media and other publicly available resources. The authors have also included personal insights and applied their expertise in a concise and targeted manner to provide an easily accessible overview of the state of the Internet and the forces, practices, and technologies that are changing this dynamic medium. The report itself employs parenthetical references by section. A full list of references is included at the end of the report. Any omissions or oversights are the responsibility of the report's authors.

This year's report was written and researched by International Technology and Trade Associates (ITTA), Inc., for the United States Internet Council. ITTA writers included Douglas F. Ramsey (Analyst), Erica Colberg (Analyst), and George M. Dryden (Manager, Defense and Government Systems). Section 3.3 (*Wireless*) was written by Robert G. Allen, Director of the ITTA Telecommunications Consulting Group and section 3.4 (*Broadcasting*) was written by Kara Steele, Executive Director of the Center for the New West. Section 5. (*Looking Forward*) was provided by the staff of the U.S. Internet Council which include CEO Bill Myers, Vice President Mark Q. Rhoads, and Senior Fellow Gordon S. Jones, who also provided editorial support.

ITTA Inc. (www.itta.com) is an international business consulting company with offices in Washington, D.C., and Brussels, Belgium. ITTA is a U.S. Internet Council corporate member and represents the Council internationally.

Executive Summary

This year's report, *The State of the Internet 2000*, provides an overview of the continuing expansion of the Internet and gives special attention to the increasingly international nature of the Internet. The Internet has far surpassed its humble beginnings as the Department of Defense's ARPANET. It has become truly global in scope, growing more so with each passing day. The Internet draws people of all countries, cultures, and languages. This year over 300 million people are online, with fewer than half from North America. This gap is expected to widen further, as the world's online population becomes more nationally and culturally diverse and less "U.S.-centric."

The *Global Growth* section focuses on emerging Internet populations in various regions of the world. Online growth in areas such as the Asia-Pacific region and Latin America has surpassed expectations as e-commerce initiatives and personal Internet use have blossomed. Despite the bright outlook for continued Internet penetration, there is a significant global digital divide, primarily between the North and South. For example, only 1.5 million people are online in Africa, 1 million of whom are in South Africa. Poverty and inadequate telecommunications infrastructure in the developing world must be alleviated in order for Internet use to become fully established.

The section on *Social Trends* provides a discussion of the fundamental changes taking place in the way people communicate and conduct business. Although the digital divide still exists in the U.S., tremendous strides have been made in eliminating it, thus permitting more Americans to communicate via the Internet and opening up a world of new opportunities to low-income families. The Internet is quickly becoming an essential part of every classroom as students at all levels of education utilize it to do research and participate in a variety of online educational activities. Additionally, the emergence of virtual communities has drawn the world closer together as people from all walks of life may speak to each other in chat rooms and find a community with similar interests.

As highlighted in the *Technology* section, new technologies continue to transform how the Internet is used. Technologies such as XML, wireless Internet, and encryption are being standardized, thus strengthening e-commerce initiatives and other Internet activities. Alongside these new technologies, however, come new threats such as cyber-terrorism. The U.S. and the international community have made significant advances in tracking and halting hacking and other forms of cyber-terrorism.

Perhaps the *E-Business* section provides the best glimpse into the future of the Internet, which has given industry an entirely new way of conducting business. Companies have revolutionized industry practices, creating greater efficiency and monetary savings. E-commerce has similarly exploded with online retailing and industry marketplaces. Business-to-consumer and business-to-business e-commerce promise to continue seizing an increasingly larger share of the goods and services market in the coming years. Outside the U.S., companies have begun to take note of the online successes of North American businesses and are starting to follow suit.

The concluding section, entitled *Looking Forward*, examine future government and industry Internet challenges. Although most governments have maintained a laissez-faire approach to the online industry, there is more and more pressure by citizens concerned about privacy and security for some degree of regulation and monitoring. Within the U.S. and European countries, legislative bodies have already instituted minor measures geared towards the protection of personal information. Without a doubt, greater Internet regulation will occur in the coming years; however, industry and government should work together to insure that any regulation fully supports the continued growth of the Internet economy while protecting the interests of individuals. This is not just a national effort. The countries and companies of the world must collaborate and standardize guidelines for the Internet industry to avoid costly international disputes and to continue the dissemination of Internet technology to the entire world.

Overall, we can safely say that the State of the Internet is good. Rising technologies, new applications, and expanding usage indicate that the Internet will continue to grow. Although it remains possible that governments might smother the Internet in regulation, early signs suggest that this is unlikely. The Internet should continue to evolve into an open and global information environment, which we hope it can become.

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Section 1. *The Global Net*

In just the last seven years since 1993, the number of people worldwide who use the Internet on a regular basis has grown from fewer than 90,000 to more than 304 million in 2000. Today, this global phenomenon touches the lives of individuals from Tokyo to Brasilia.

But like any new technology, this rapid global dissemination has been far from uniform. A map of Internet users and innovators quickly reveals a stark global North-South divide. The Internet has planted deep roots in the regions that encouraged and fostered its early growth. Not surprisingly, these regions are also the world's wealthiest. North America, Europe, and parts of East Asia, such as Japan, Korea,

Taiwan, Hong Kong, and Singapore have experienced the greatest increase in Internet growth. Southern Hemisphere regions such as Latin America, Africa, the Middle East, and India have trailed much further behind.

This section will review Internet growth both globally and regionally, and describe some of the core trends. These include the internationalization of the net, the rise of multiple Internet hotspots around the world, the boom in regional *e-commerce*, and the impact of wireless innovations in Europe and Asia. This section will also examine the state of the Internet in developing countries and their efforts to bridge the international digital divide.

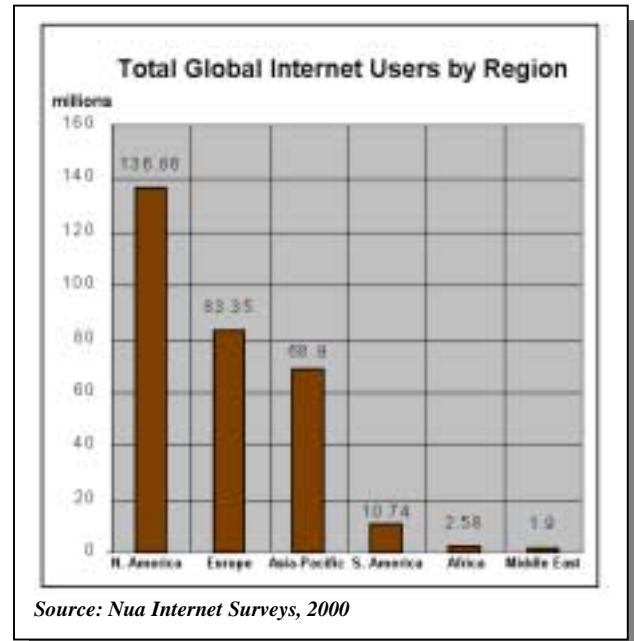
Section 1.1 Global Growth

The Global Net

The Internet continues to grow at a phenomenal pace. Internet users have soared from 171 million in 1999 to 304 million as of March 2000. North America remains far ahead with 136.86 million of the world's total users. Europe and the Asia-Pacific region follow with 83.35 and 68.9 million respectively. Current predictions indicate that Internet users could exceed the 1 billion mark by 2005, with 700 million located outside North America.

The Internet, by nature, is non-geographical. Yet, Internet geography could be defined by users and the information exchanged and posted on the web. Over the last decade U.S. users and English language content have defined the Internet as a U.S.-centric environment. However, as more users come online in Europe and Asia as well as the rest of the world, the Internet is becoming multicultural, multilingual, and multipolar.

Individuals and businesses all over the world are waking up to the possibilities of the web. In its July 2000 issue, *Wired* magazine identified the world's top Information Technology (IT) and Internet capitals, which

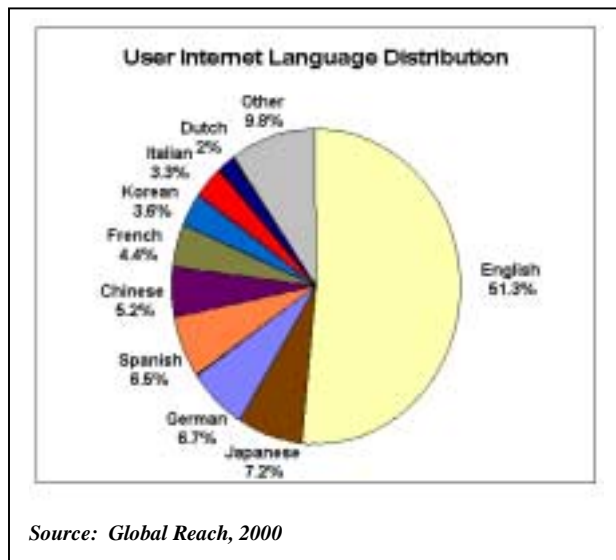


it called "Venture Capitals." Of the 46 regions and cities that made the list, only 14 were located in North America while the other 32 were scattered across the globe with large clusters in Europe (16) and the Asia-Pacific region (10).

English is also losing its dominant position on the World Wide Web in favor of increased linguistic diversity. Currently, only just over 50 percent of all Internet users' are native English speakers. Yet, English language web sites continue to dominate. Seventy-eight percent of all websites are currently in English, while 96 percent of *e-commerce* sites are in English. Additionally, 70 percent of all websites originate in the U.S. and the vast majority of these are in English.

Global Digital Divide

Not surprisingly, the Internet has grown fastest in developed countries. The majority of the Southern Hemisphere and large parts of Asia have been slow to join the web.



This is due in large part to a lack adequate Information and Communications Technology (ICT) infrastructure, domestic Internet/IT savvy companies, and employees with sufficient skills and training.

Global Internet “Venture Capitals”	
Ranking*	
16	Silicon Valley, USA
15	Boston, USA
15	Stockholm-Kista, Sweden
15	Isreal
14	Raleigh-Durham-Chapel Hill, USA
14	London, UK
14	Helsinki, Finland
13	Austin, USA
13	San Francisco, USA
13	Taipei, Taiwan
13	Bangalore, India
12	New York City, USA
12	Albuquerque, USA
12	Montreal, Canada
12	Seattle, USA
12	Cambridge, UK
12	Dublin, Ireland
11	Los Angeles, USA
11	Malmö, Sweden – Copenhagen, Denmark
11	Bavaria, Germany
11	Flanders, Belgium
11	Tokyo, Japan
11	Kyoto, Japan
11	Hsinchu, Taiwan
10	Virginia, USA
10	Thames Valley, UK
10	Paris, France
10	Baden-Württemberg, Germany
10	Oulu, Finland
10	Melbourne, Australia
9	Chicago, USA
9	Hong Kong, China
9	Queensland, Australia
9	Sao Paulo, Brazil
8	Salt Lake City, USA
8	Santa Fe, USA
8	Glasgow-Edinburgh, UK
8	Saxony, Germany
8	Sophia Antipolis, France
8	Inchon, South Korea
8	Kuala Lumpur, Malaysia
8	Campinas, Brazil
7	Singapore
6	Trondheim, Norway
4	El Ghazala, Tunisia
4	Guteng, South Africa

* Measure of venture capital, companies, & research centers
Source: Wired, July 2000

Nevertheless, several nations are pushing hard to get online. Despite having lagged in Internet development, India and China are quickly coming online, while encouraging

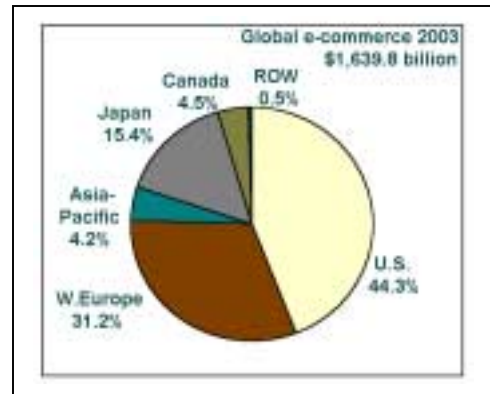
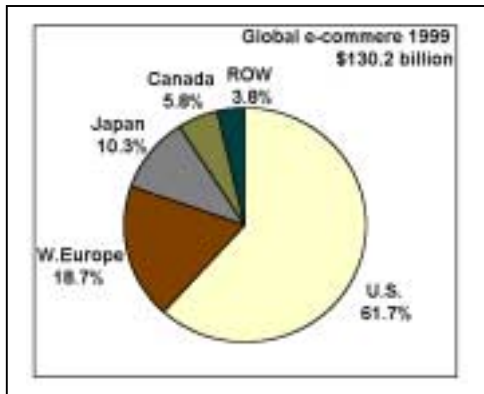
the creation of new IT industries (discussed in sections 1.4 and 1.5). Both have the advantage of large pools of well-educated domestic workers. However, other areas such as Sub-Saharan Africa will continue to fall behind the Information Revolution due to a lack of both resources and skilled workers.

The New Economy

In June 2000, the U.S. Department of Commerce (DoC) issued its annual assessment of the IT sector, which had been titled “The Emerging Digital Economy.” The 2000 report dropped “emerging” from the title and suggested that the digital economy has come into its own. According to this year’s report, the Internet and IT sector is at the heart of the U.S.’s unprecedented decade-long economic expansion. The adoption of IT and Internet tools have driven growth in almost every sector of the U.S. economy by practically doubling labor productivity. Despite only accounting for a projected 8.3 percent of total national output in 2000, IT industries have contributed nearly a third of all real U.S. economic growth between 1995 and 1999.

The U.S. economy has led the global IT revolution and has undoubtedly benefited the most. However, over the next several years the U.S. will see this lead diminish as Europe and Japan increasingly expand on to the web and affect the way business is done online. For example, both Europe and Japan are ahead in the development of wireless web technology and are beginning to match innovations in networking technology and the development of the Application Service Provider (ASP) market. In a recent White Paper, International Data Corp. (IDC) suggested that, by 2003, the U.S. will account for only 44 percent of the total

Worldwide e-commerce Spending 1999 & 2003



Source: International Data Corporation, 2000

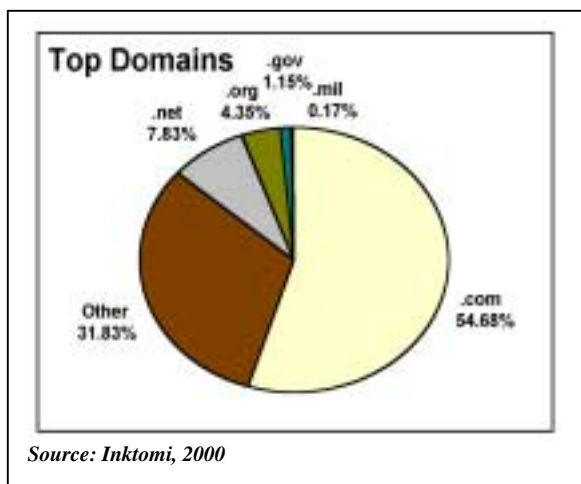
global e-commerce market, down from 61.7 percent in 1999. In the same time frame, Europe should move from an 18.7 to a 31.2 percent share, while Japan should increase from 10.3 to 15.4 percent.

The Size of the Net

The Web has grown at an incredible rate. According to a January 2000 Inktomi and NEC Research Institute study, the Web contains over 1 billion unique, indexable pages; 6.4 million servers; and 4.5 million sites. A study conducted by Cyveillance in

June 2000 found over 2 billion pages. This indicates that the Web doubled in size during the first 6 months of 2000. Total registered domains worldwide currently exceed 17.7 million. "Dot-com" domain names dominate the Internet with well over 9.4 million registered.

Historically a U.S.-centric effort, Internet governance is increasingly international. In 1998 the Internet Corporation for Assigned Names and Numbers (ICANN), a non-profit



Source: Inktomi, 2000

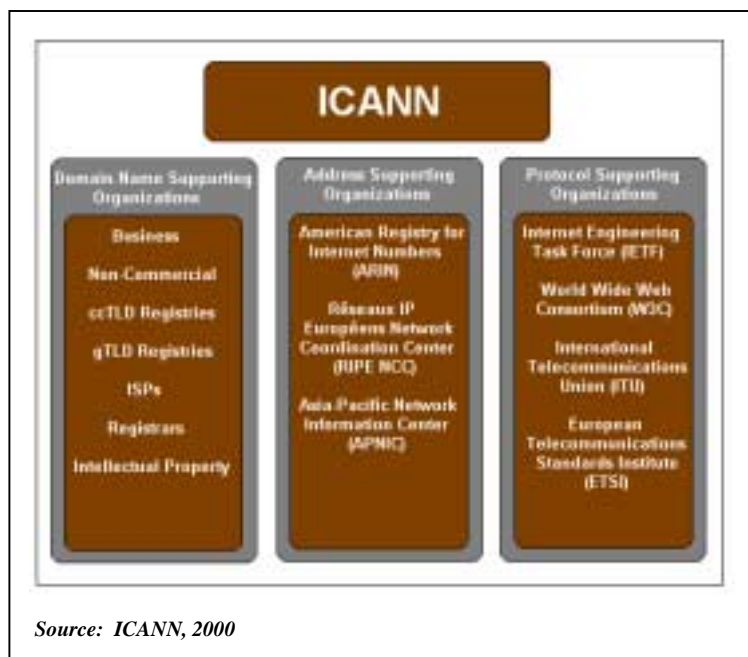
Top Country Level Domains (as of August 23, 2000)

.uk	United Kingdom	1,938,740
.de	Germany	1,732,994
.nl	Netherlands	399,411
.kr	Korea	325,203
.ar	Argentina	324,548
.it	Italy	283,860
.dk	Denmark	204,475
.jp	Japan	190,709
.au	Australia	150,505
.at	Austria	123,287
.ch	Switzerland	112,912
.ca	Canada	93,330
.za	South Africa	75,655
.nz	New Zealand	73,655

Source: DomainStats.com, 2000

corporation that provides the oversight necessary to maintain and develop the Internet, assumed responsibility for Internet Protocol (IP) and domain name allocation from the U.S. government. ICANN elects

its board members based on regional representation. ICANN Board members represent North America, Europe, Asia-Pacific, Africa, and Latin America. ICANN works in conjunction with numerous organizations to provide region and technology specific Internet promotion and governance. These organizations include regional address allocation organizations, protocol support organizations, and domain name support organizations.



Section 1.2 North America

Regional Growth

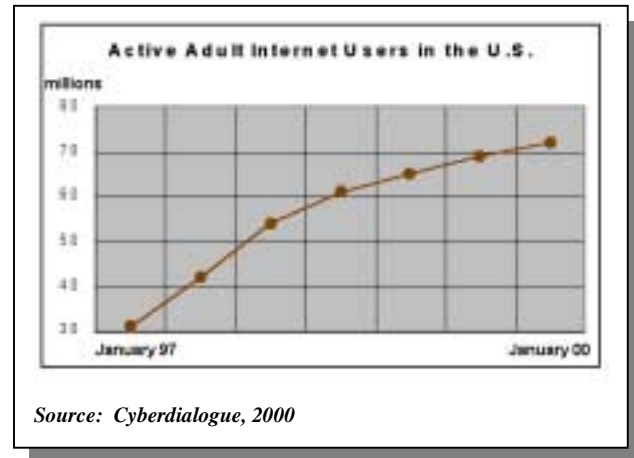
North America has experienced tremendous growth in the Internet and Internet-related industries. The Internet has strongly affected all sections of society and culture. It has greatly strengthened the economy and created jobs; changed the way Americans traditionally conduct business; and increased communication among family, friends, and business associates.

As of March 2000, approximately 136.68 million people were online in Canada and the United States. The U.S. is currently the leading Internet country with 36 percent of the world's online users. Canada has a much smaller percentage of the world's Internet users (4 percent), but its Internet penetration rate of 41 percent is nearly equal to that of the U.S. at 42 percent. In general terms, an Internet penetration rate is the percent of the population who consider themselves regular Internet users.

Although the Asia-Pacific and European regions are expected to surpass the North American region in users, U.S. Internet penetration will continue to increase and U.S. companies will maintain a major role in the Internet industry through innovation and further development of *e-commerce* initiatives.

Economic Transformation

The impact of the Internet on the U.S. economy has been profound. Leading analysts at the Federal Reserve give credit to the boom in IT for the tremendous growth and prosperity of the U.S. throughout the 1990s, driving more than 25 percent of economic growth. Since 1993, the U.S. high-tech industry has created over 1 million



new jobs and become one of the nation's largest industries. As of June 2000, the Internet economy directly supported 2.5 million jobs, a 36 percent increase from 1998.

Wages in the U.S. Internet economy are considerably higher than the national average. The average Internet economy worker earns \$46,000 a year, as compared to the national average of \$28,000 a year. Revenue generated from the Internet increased by 62% percent and totaled \$524 billion in 1999. That figure is likely to reach \$850 billion at end of 2000.

E-commerce is the fastest-growing layer of the Internet economy, producing over \$171.5 billion in revenues in 1999, a 72 percent increase over 1998. The infrastructure layer also experienced tremendous growth, generating over \$197 billion in revenue in 1999, and employment in this layer grew by 68 percent from 1998 to 1999.

Growth of *e-commerce*

E-commerce is the fastest growing sector of Internet economy. Currently, 44 percent of U.S. businesses sell goods or services over

the Internet, with an additional 36 percent expected to be online by the end of 2000. In 1999, revenues combined revenues for Business-to-Consumer (B2C) and Business-to-Business (B2B) were \$171.5 billion, a growth rate of 72 percent from 1998. As e-commerce has expanded, it has divided into two distinct sectors – business-to-consumer (B2C) and business-to-business (B2B). B2C e-commerce is primarily retail sales and is expected to grow from \$25 billion in 1999 to \$37 billion in 2000.

In the near term, B2B e-commerce is likely to overshadow B2C in terms of total revenue, however, even at this early stage, B2C is starting to boom. Holiday sales in late 1999 pushed fourth quarter B2C sales past \$5 billion or roughly 38 percent of all B2C revenue for 1999. Despite this sudden surge in late 1999, B2C sales continued to surge in the first quarter 2000, up almost \$700 million, representing a positive consumer attitude toward shopping online.

Quarterly U.S. Online (B2C) Retail Sales

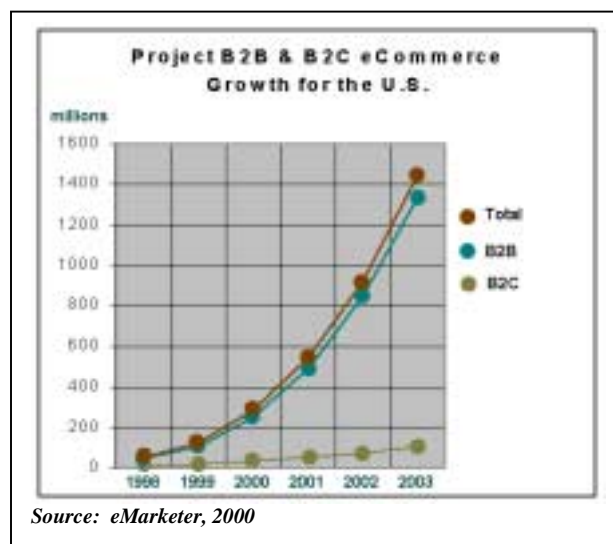
4 th Quarter 1999	\$5,198,000,000
1 st Quarter 2000	\$5,260,000,000

Source: eMarketer, 2000

U.S. Internet Usage Trends

The Internet has become a tool for Americans to pursue personal interests and communicate with friends and family. In the U.S., conducting online research is the leading Internet activity for 92 percent of users, followed closely by Internet communication with friends and family at 88 percent.

Dial-up access remains the primary means of Internet access in the U.S. However, alternatives such as DSL and cable modems are gaining in popularity. Both methods



offer a continuous link to the Internet, but they remain considerably more expensive than conventional dial-up access.

In 1999, free Internet services gained increased popularity. Several major Web portals such as Yahoo! and Excite offer free access. The majority of free access providers support their efforts through constant small screen advertisements that appear whenever a subscriber is online.

Jupiter Communications predicts that 6.2 percent of all North American Internet users will log on through some type of free connection in 2000, doubling to 13 percent by 2003. Launched in late 1998, the largest free Internet provider is NetZero, currently with more than 4 million subscribers.

Digital Divide

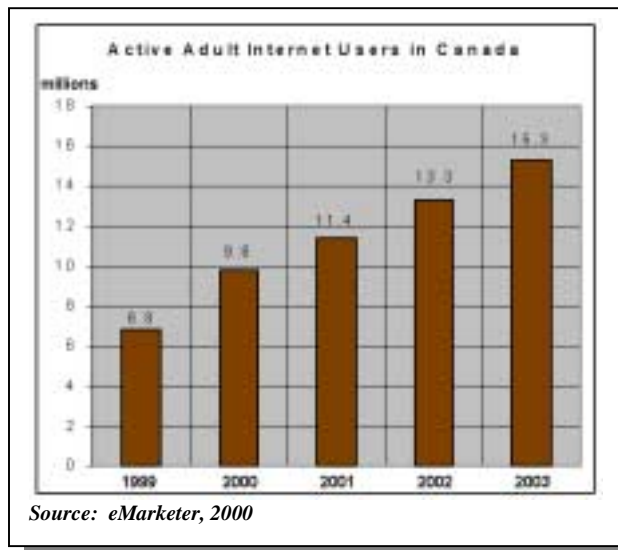
The so-called “Digital Divide,” often defined as a reflection of racial differences, is actually more of a function of income. Less than half of all households with annual incomes under \$15,000 (19 percent of the U.S. population) will be online by 2005. By 2005, there will be 20 million high-income households online compared to just 9 million low-income households.

The racial differences in Internet penetration are often more reflective of income disparities among ethnic groups. On average, African-Americans and Hispanics make less than do whites and Asians, who lead the U.S. in Internet penetration.

As the cost of computer hardware and Internet access continue to decrease, there should be a rise in Internet use among lower-income households. The U.S. government earmarked \$12.5 million in early 2000 to bridge the digital divide.

Canada

In terms of users and penetration, Canada's Internet industry is on a par with the U.S. The Canadian government is driving an ambitious agenda to make it the most wired country in the world by the end of 2001. Government support for Internet initiatives is evidenced by the appropriation of US\$1.2 billion in IT projects, increased internet use in schools, and a heavy government investment in Internet infrastructure.



The only significant difference between the Internet industries of Canada and the U.S. is the penetration of *e-commerce*. Canadian businesses continue to view online retail

economics as unproven and are slow to take their operations online. Canadian customers are also hesitant to purchase online due to privacy and security concerns.

Governance & Promotion

The U.S. government has taken several steps to encourage Internet use and growth of the Internet economy. Congress has allotted funds for a variety of initiatives such as increasing computer and Internet use in schools and libraries, combating the digital divide, and placing computers in low-income neighborhoods.

In June 2000, Congress passed the “*e-Sign*” Bill, which provided a framework for the use of digital signatures to be recognized as legally binding. Home and car loans, wills, and other important documents may now be signed electronically over the Internet, thus reducing the inconvenience and cost of paperwork. Congress is moving slowly on the issue of Internet taxation to avoid causing any disruption in *e-commerce* growth. Congress has indicated that before the federal government expects to become involved, State and local governments need to form plans to simplify differing sales tax rates and definitions of taxable transactions.

North America will remain the global powerhouse of the new Internet economy, as it continues on the leading edge of technology advancement and innovation. The U.S. was the first to recognize the enormous potential of the Internet and has taken extensive advantage of it. Now that the rest of the world is rapidly catching up, the U.S. government and the IT sector will need to continue to promote and support domestic Internet development and technological innovation to maintain the United States' leading position.

Section 1.3 Europe

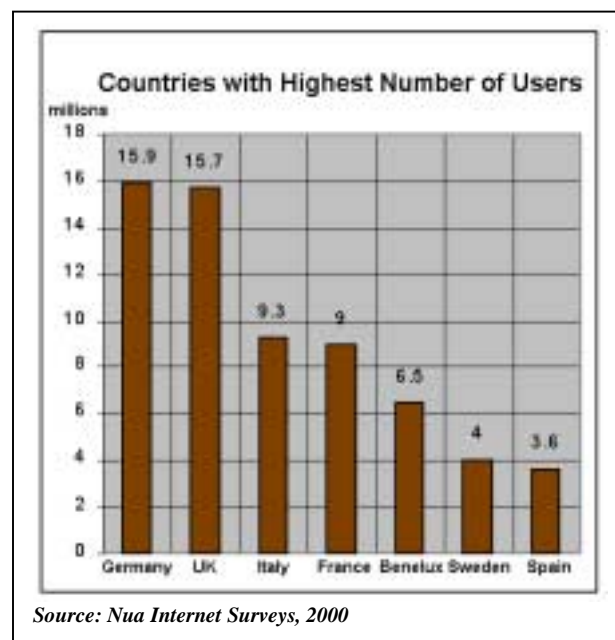
Growth in Europe

Europe boasts well over 83 million users, which places it close behind North America in Internet penetration. However, Europe remains a grouping of diverse nations with often stark differences in IT infrastructure development, regulatory practices, and Internet penetration. Europe is digitally divided from east to west and from north to south and shows a strong tendency toward regionalism, with Scandinavia overshadowing the rest of Europe in terms of Internet use. Sweden, Norway, Denmark, and Finland have all attained penetration rates of over 35 percent.

The UK, Germany, and the Benelux countries are some of the fastest growing countries. Some surprise success stories of Europe's IT revolution include Ireland, which has successfully courted numerous multinational corporations and has thus become a major European IT hub. Another success is Finland, which dominates Europe's wireless landscape with industry leaders such as Nokia and Sonera. Spain and Portugal are lagging behind the rest of Western Europe. Penetration in Eastern Europe is low and growth has remained sluggish, with the exception of Greece and Slovenia, which have achieved penetration rates of 12 and 23 percent respectively.

Governmental Promotion

Numerous European governments as well as European Union (EU) bodies have been active in promoting IT infrastructure development and the early adoption of Internet and IT technology for business, education, and social institutions. The EU has been proactive in Internet and e-commerce development through initiatives



National Internet Penetration Rates

Norway	49%
Sweden	44%
Finland	38%
Denmark	35%
UK	26%
Benelux	24%
Switzerland	23%
Slovenia	23%
Germany	19%
Italy	16%
France	15%
Greece	12%
Spain	9%
Portugal	6%

Source: Nua Internet Surveys, 2000

such as "eEurope," which aims to ensure that Europe fully leverages the social and economic benefits of the Information Revolution for all its member states. Other initiatives include directives on e-commerce designed to ensure the development of a single legal environment and efforts to promote infrastructure development and privatization in the telecommunications

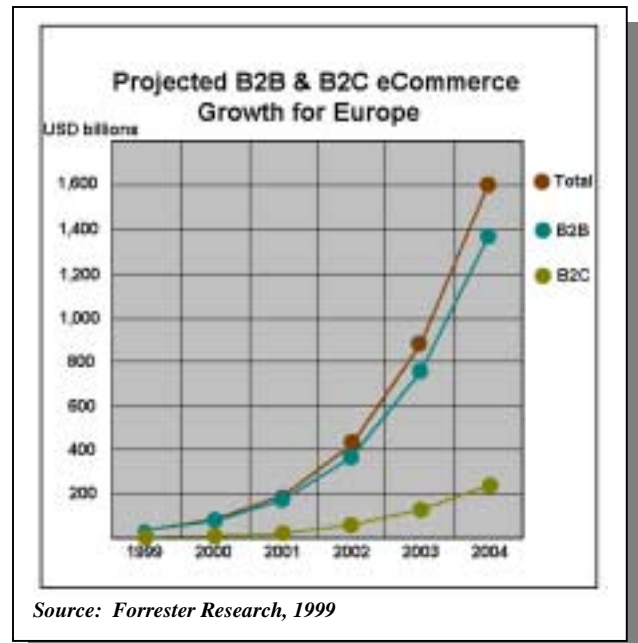
industry. For example, the Trans-European Network (TEN) initiative is designed specifically to address the need for reliable and inexpensive Internet access across Europe.

The UK government has been one of the most aggressive in Internet and *e-commerce* promotion. It has developed an *e-commerce* strategy to enable UK businesses to be among the world's best and is also implementing *e-government* and *e-procurement* policies. The UK has even created two special cabinet posts to address IT and Internet development known as the “*e-Minister*” and “*e-Envoy*.”

Industry Gearing Up

Businesses in many European industry sectors are gearing up to take advantage of what appears to be a coming boom in European online business. According to a recent Forrester report, *Europe: The Sleeping Giant Awakes*, European *e-commerce* is expected to grow annually by 100 percent through 2003 and should reach \$1.6 trillion by 2004. By 2004, European electronic business will be equivalent to 50 percent of the U.S. market. Similar to U.S. growth forecasts, the B2B sector should constitute the majority of this growth.

Despite recent setbacks, such as the collapse of Europe's premier *e-tailer* Boo.com, startups and venture capital are catching on in Europe. Young companies such as Freeserve and SAP continue to be successful. However, Internet companies in Europe will face substantial challenges in fending off North American competition and the need to create pan-European strategies in an effort to secure markets early in the game.



Wireless Leadership

With innovative companies such as Nokia, Mannesman, Vodafone, and Ericsson, and an equally receptive marketplace, Europe has captured the leadership position in the development of the wireless Internet applications.

Almost a third of Europeans own a cellular phone for personal use, and again, Scandinavia leads. Sixty-four point-four percent of Finns and 60.3 percent of Swedes

National Wireless Penetration Rates	
Finland	64.4%
Sweden	60.3%
Italy	44.2%
Denmark	43.1%
Austria	35.7%
UK	32.2%
Portugal	29.9%
Greece	29.3%
Ireland	28.3%
Spain	26.3%
Belgium	25.8%
France	25.5%
Netherlands	24.2%
Germany	19.4%

Source: EU Directorate-General XIII, 1999

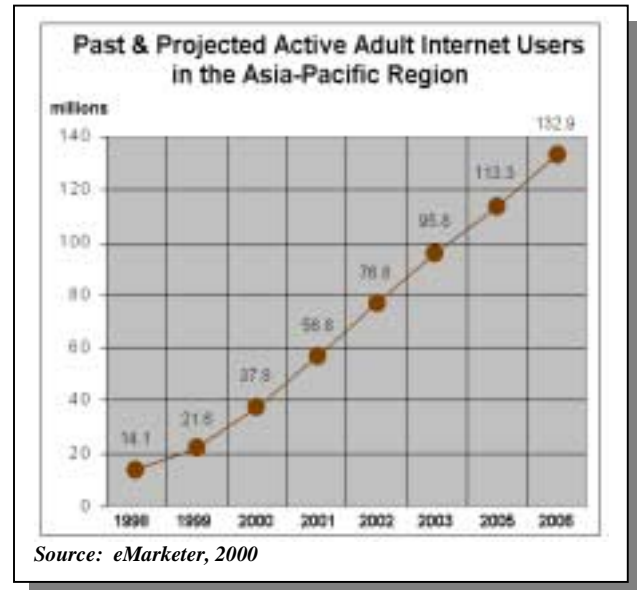
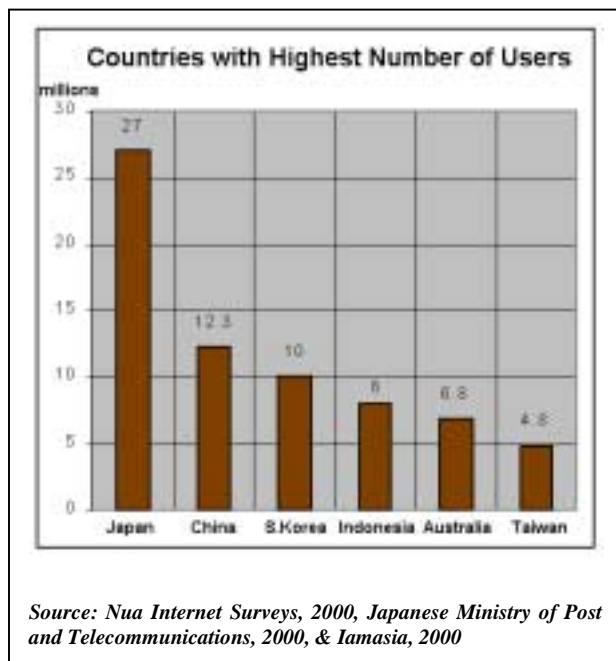
are wireless users. Hovering between 25 to 30 percent are the UK, Portugal, Greece, Ireland, Spain, Belgium, France, and the Netherlands. Although still relatively close to the average, Germany has fallen furthest behind with only 19.4 percent wireless penetration.

Section 1.4 Asia-Pacific

Growth in Asia-Pacific

Asia-Pacific is the third region of rapid Internet growth, currently boasting approximately 70 million Internet users. Representing almost half the world's population, the Asia-Pacific region has significant growth potential. Electronic business development is currently lagging in comparison to Europe and the U.S., with the general exceptions of Japan, Taiwan, Hong Kong, South Korea, and Singapore. However, the region as a whole seems set to play a dynamic role in future Internet development.

Regional growth forecasts estimate that by 2003 Asian users will surpass North American and European users and exceed 200 million. A corresponding growth in regional e-commerce is also anticipated. According to Forrester Research, by 2004, Asia-Pacific e-commerce should reach \$1.6 trillion and account for almost 20 percent of the global total.



Japan Leading

Not surprisingly, Japan is second only to the U.S. in terms of Internet use. Japan leads the region in most aspects of Internet growth, including of user growth and e-commerce.

According to Japan's Ministry of Posts and Telecommunications (MPT), the total number of Japanese Internet users has soared from around 17 million in 1999 to 27 million in 2000. MPT optimistically predicts that total users will approach 77 million by 2005. A large part of this boom can be attributed to the success of Internet-ready wireless phones, falling PC prices in Japan, and a rapid growth in Japanese language content on the Internet.

After a decade of economic gloom, the Japanese government and many Japanese companies are turning to the Internet to revive the economy. Japan is reshaping its business culture and becoming a regional and global Internet leader. Venture capital, foreign direct investment (FDI), and startup companies have all begun to flourish in

Japan despite traditional cultural resistance. Tokyo's Shibuya Ward, or "Bit Valley," has become the nation's hotbed for Internet startups. Companies such as Softbank and Hikari Tsushin are leading the way in this new dynamic marketplace. Significantly, two new stock exchanges designed especially for Internet and high-tech startups have been launched in the last 12 months: MOTHERS (Market for the High-Growth and Emerging Stocks) and NASDAQ-Japan.

China Rising

Despite facing structural and regulatory barriers, China has the potential to surpass Japan as the region's dominant Internet nation. The sheer size of the China market illustrates this point. Although Internet penetration remains low, China has already risen to second place, behind Japan, in terms of users, with 12.3 million on-line.

In 1998, the Chinese government launched the new Ministry of Information Industries (MII) as a hub for IT policy and industrial development. Today, China is leap-frogging a generation of communications technologies with wireless and optical fiber shaping the nation's newly developing communications backbone.

China must still face a number of issues. Many foreign investors have been discouraged from entering the China market due to government attempts to place controls on several areas including content reception, encryption technologies, and overseas investment. However, China's WTO membership and the development of separate Internet policy legislation in Hong Kong may pressure China to relax some of its more restrictive policies.

Wireless Boom

Wireless Internet access is growing rapidly across Asia. As in Europe, cellular telephones are becoming a mainstay for regular Internet users in the region. Japan, South Korea, Hong Kong, and Singapore are rapidly becoming the regional leaders in this sector. National leaders include NTT in Japan, sk Telecom in South Korea, and China Telecom in China.

National Wireless Penetration Rates

Hong Kong	54.4%
South Korea	45.1%
Singapore	41.4%
Japan	41.0%
Australia	36.0%
Taiwan	31.5%
New Zealand	27.8%
Malaysia	13.1%
Thailand	3.9%
Philippines	3.3%
China	3.0%
Indonesia	0.9%

Source: MPT and Baskerville Communications Corp, 2000

In Japan, NTT DoCoMo's i-mode cellular service has led the most recent boom in wireless communications and represents a revolution in wireless Internet technology. i-mode provides users with high-quality web-based visual content on ordinary, handheld

cellular phones. Currently, i-mode has over 5 million subscribers in Japan and over 7,000 websites have been adapted for this service, including 356 companies which provide unique services such as electronic banking, news, and games.

New Leaders & Asian Startups

The Asia-Pacific business world is undergoing an Internet shakeup. The

region's Internet savvy "Young Turks" claimed their first major victory in the spring of 2000 when Pacific Century Cyber Works (PCCW) successfully outbid Singapore Telecom for Hong Kong Cable & Wireless.

PCCW is one of several new companies shaping the future of the Internet in Asia. These new businesses are using the Web to penetrate numerous markets and, unlike traditional regional leaders, are aggressive venture capitalists with a multinational focus. Included in this list of new leaders is Chinadotcom in Hong Kong, Hikari Tsushin and Softbank in Japan, and Creative Technology in Singapore. Other major pure-play startups (businesses that operate almost exclusively via the Internet) include Sohu, Tom.com, and Rakutenichiba.

Old Economy Racing to the New

Across the region, businesses in every sector have begun to adopt the Internet to attract customers, facilitate communications, and reduce costs. In the electronics sector, especially in Japan and South Korea, industry leaders are awakening to the need to join the Internet revolution before they are left behind.

In Japan, companies such as Toshiba, Fujitsu, and NEC are in the process of making fundamental changes to business practices and product lines in an effort to maximize the possibilities of the Internet. In South Korea, a similar trend is occurring with electronics giant Samsung leading the way.

Governmental Promotion

To a far greater degree than is customary in the West, Asian countries have long looked to government to lead the way in new industries. The Internet economy is no exception. Several national governments are actively promoting technology pilot projects and the creation of national IT corridors. The government of Hong Kong is pursuing the creation of a \$1.7 billion "Cyberport" and Malaysia is ambitiously designing a multimedia super corridor known as "Putrajaya." The Japanese government continues to work closely with industry to develop new technologies. One of the most successful organizations, ECOM (Japan Electronic Commerce Promotion Council) entered its fifth year of operation in 2000. Singapore has even moved into a second generation of promotion activities, allocating \$1.5 billion in 2000 to expand e-government services.

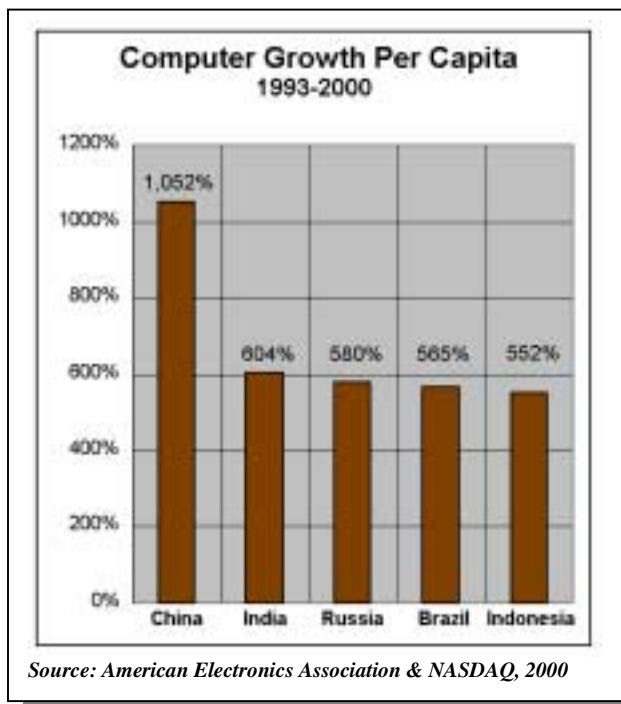
Section 1.5 Developing Countries

Growth in Developing Countries

The developing world is experiencing Internet growth at a much faster rate than expected. Despite problems with telecommunications infrastructure and poverty, officials and business owners in these countries understand the advantages of Internet access and e-commerce. As the cost of computers and Internet access continues to drop, penetration rates and e-commerce ventures will significantly rise. Africa in particular has surprised the West by its determination to link up to the World Wide Web. Latin America is experiencing penetration growth at a rate of 95 percent a year. Once established in these regions, the Internet industry will likely be a strong force for improving the economies of the developing world and assist in reducing poverty.

Africa: Slowly Coming Online

The Internet is making slow but steady progress into Africa. According to eMarketer, the online population of Africa is 1.15 million as of March 2000. A more optimistic assessment by Nua identified 2.58 million users in Africa. Yet, regardless of the exact numbers, the growth trends lag far behind other regions. As the following chart shows, for many countries, the number of active Internet users remains in the hundreds. South Africa is the only nation on the continent with a sizable Internet population, with just over a million users. Somalia (September, 1999) and Eritrea (March, 2000) were recently linked directly to the Internet and Congo remains the only African country without direct Internet access.



The number of African Internet Service Providers (ISPs) has grown to 288, of which 75 are South African. Nearly half are connected by satellite, and for this reason access cost is expensive, approximately \$60 for 5 hours a month, excluding telephone line rental. AfricaOnline, a multinational company, is Africa's most successful ISP with branches in 6 countries.

African Countries with Highest Number of Internet Users

South Africa	1,050,000
Egypt	50,000
Morocco	20,000
Kenya	15,000
Zimbabwe	10,000
Tunisia	7,000
Chad	5,000
Ghana	4,500
Mozambique	3,500
Uganda	3,000
Zambia	3,000
Senegal	2,500
Ethiopia	2,400

Source: eMarketer, 2000

While the total number of African host websites remains small, it has increased from a meager 290 in 1995 to 10,703 in 1999. Most websites are dated and very basic, utilizing only text and a few external/internal links. South African websites are the most diverse, technologically advanced, and up-to-date.

African *e-commerce* is similarly undeveloped. Only a handful of African businesses are online for purchasing or selling. The vast majority of African commercial sites are for informational purposes only. South Africa remains the exception, boasting a competitive *e-commerce* industry that is nearly as advanced as the West but much smaller in scale.

The World Bank blamed poor telecommunications infrastructure and low income for the slow Internet penetration rate in Africa. The telecommunications structure is sadly inadequate due to under-investment and strong government control, so that development of dial-up access has been slow. Deregulation and increased telecom investment will boost phone penetration and, as a result, Internet penetration.

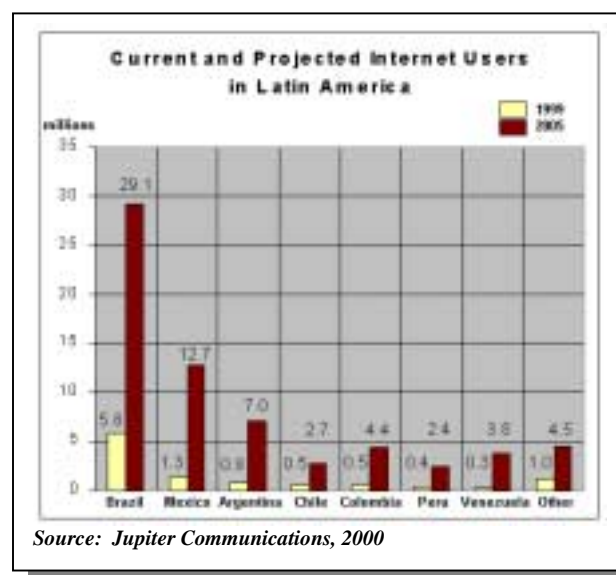
Poverty remains the greatest barrier to Internet growth in Africa. The monthly connection cost for the Internet in Africa exceeds the monthly income of a significant portion of the population. Until costs decrease, most of Africa will remain unconnected. Other problems stifling the Internet in Africa are low computer penetration, illiteracy, lack of trained personnel, disinterest, and a failure to understand the benefits of Internet access.

Despite the problems, there have been significant advances in African Internet penetration. All but one country is now

directly linked to the Internet. Eight countries have nation-wide dial-up access, and 42 countries have public access in the capital cities. Kiosks, cybercafes, and other forms of access are in development, and many telephone shops have added Internet services. Although still limited to a small urban elite, Internet access in Africa is growing.

Latin America: Steady Growth

Latin America is experiencing strong growth in Internet use, and Jupiter Communications predicts that the rate of growth in Internet penetration will surpass that of Asia, Europe, and the United States over the next several years. There are currently 13.3 million people online in Latin America, less than 3 percent of the population; however, this represents a 136 percent increase from 1998. By 2005, Jupiter Communications expects 66.6 million Latin Americans to be online. Internet penetration remains, however, concentrated in the most developed Latin American countries. Brazil leads the region in users and *e-commerce* initiatives followed by Mexico and Argentina.



The expected growth is based on the increasing availability and popularity of free ISP services in the region. As in the U.S., free Internet services have sprung up across the region. Terra Networks, Telefónica's ISP service, has become Mexico's second-largest ISP by offering free Internet access. Brazilian banks, particularly Bradesco, have been successful in luring Internet users to online financial services by offering free ISP service.

Other factors affecting Internet penetration include lower PC costs in Mexico, lower access rates in Brazil, and lower call charges in Chile and Argentina.

E-commerce in Latin America has experienced slow growth to date but is also expected to quickly increase. Total online spending in 1999 was \$192 million. Spending will reach \$15 billion by 2005, with Brazil, Mexico, and Argentina accounting for over 80 percent.

Internet Buyers & B2C Revenue in Latin America 2000-2003

Year	Buyers (millions)	B2C (billions)
2000	1.3804	\$0.67
2001	2.3680	\$1.55
2002	3.2676	\$1.75
2003	4.2476	\$1.95

Source: eMarketer, 2000

B2B e-commerce is expected to rapidly surpass B2C within a few years, accounting for 87 percent of total e-commerce revenues by 2003. This is primarily due to the dearth of B2C e-commerce in Latin America. The few users who buy online buy from foreign sites.

According to IDC and Jupiter Communications, the barriers to e-commerce growth are low computer penetration, low credit card ownership, and inefficient fulfillment mechanisms.

However, computer prices are dropping and alternatives to credit cards, such as smart cards, are under development to facilitate e-commerce.

In addition to these challenges, Latin America must also contend with an inadequate telecommunications infrastructure and a weak regulatory environment as it seeks to boost Internet use.

The future of the Internet in Latin America is bright, as computer and access costs decrease and the telecom infrastructure improves. Internet penetration is exceeding expectations, as ISP providers use improved marketing tools to garner interest. Latin American websites are also localizing their content, appealing to a variety of cultures and languages. Some companies are reaching out to low income individuals in an attempt to extend Internet use beyond Latin America's elite. Red Científica Peruana has established public Internet kiosks throughout major cities in Peru, and Mexico's Todito.com has offered portal software to the country's large school systems.

Future Opportunity in India

Indian government and business are going online rapidly and creating a positive environment for users and companies. India's National Association of Software and Service Companies (Nasscom) recently estimated India's online population is now approximately 4 million and will grow to 23 million by 2003.

Despite major infrastructure challenges, India has a rising Internet market. IT corridors in Bangalore, Hyderabad, and Mumbai (Bombay) have given birth to a surprisingly strong software industry. Additionally, India has attracted some major overseas IT companies including IBM,

Microsoft, and Oracle, due to its large pool of scientific and technical experts. For the first time in decades, India may finally be stemming the exodus of highly skilled workers. Yet, pervasive poverty on the sub-continent will limit the spread of Internet usage.

The Indian government has been receptive to the blossoming Internet industry and has taken concrete steps to strengthen the business environment. To date, the state-run telecom company, Videsh Sanchar Nigam Limited (VSNL), has had a monopoly on Internet access. However, governmental deregulation in the telecommunications sector has allowed India's first private Internet portal, Mantra Online, to come online in late July 2000.

The government has also actively promoted the creation of a "National Information Infrastructure" to increase IT usage across the country and has taken measures to lower import duties on IT equipment.

Additionally, in May 2000, the Indian Parliament passed the "2000 Information Technology Act," which provides a national legal framework for conducting online business and includes tough controls on Internet security. This Act recognizes the legality of digital signatures and includes provisions that authorize e-mail as a legal form of communication.

Section 2. *Social Trends*

The Internet is changing lives. The Internet has made more information more accessible to more people. It is fundamentally changing the way we communicate and live. E-mail is quickly outpacing traditional postal service. According to Messaging Online electronic mailboxes grew 83 percent in 1999, amounting to over 569 million. Online retailing is changing the way people shop and opening individuals to a global marketplace. Also, communities formed in cyberspace among individuals with mutual interests who are geographically distant are reshaping social and political debates on issues as diverse as banning landmines to controlling U.S. gun violence. These virtual communities are super-empowered by the net. They have the ability to reach farther and faster than ever before and can even mobilize their members through the efficiencies of the Web. The World Trade Organization (WTO) bore witness to this full power to mobilize individuals during last November's meeting in Seattle and few have underestimated the influence of virtual communities since. As the Internet moves toward wireless access, the Web will increasingly become an integral part of our daily lives. Soon the Web will be available

anywhere and anytime. The Internet is also changing the way we learn and creating new opportunities in education. Computers in schools and access to the Internet are improving the educational possibilities for millions of students. Moreover, classroom connectivity in the U.S. has increased dramatically over the last decade, giving more children the chance to receive the advantages of learning online. Distance learning on the Web is also offering opportunities to adults to continue learning with greater convenience. However, the digital divide remains and lower income households without access to the Web may feel more disconnected than ever.

This section will touch on all of these issues, from the growing importance of virtual communities to increased educational opportunities. Additionally, this section will consider the evolution of the Web toward wireless access and the global race to be out in front. However, the issue of the digital divide needs to be addressed first. The divide in the U.S. continues to close and soon access to the net will be more open than ever before.

Section 2.1 *Digital Divide*

Over the past several years, the term “digital divide” has become a common phrase to describe the separation between those with access to the Internet and those without. Closing the digital divide has become a “hot” global cause of 2000. Internet and computer usage has become nearly mandatory as the new economy focuses on the development of high technology. The digital divide is expected to widen further as individuals lacking computer skills do not receive necessary training so that the poor become poorer. There is no dispute that a digital divide exists; however, many disagree on the scope of the problem.

The digital divide is truly global in scope. As illustrated in Section 1, there is a vast difference in the online populations of the developing and developed countries. In June, a panel of IT experts commissioned by the United Nations recommended several measures to combat the digital divide including:

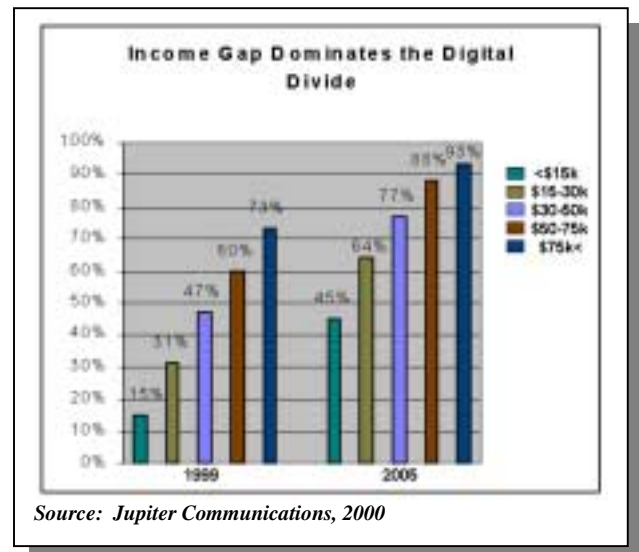
- Set a goal of worldwide access by 2005.
- Contribute \$500 million to the goal.
- Establish a task force.
- Permit forgiveness of foreign debt for an equal amount of spending on IT within developing countries.

Possible implementation of these ideas will be discussed at the UN millenium summit in September 2000.

Within the U.S., the digital divide is not as serious as it appears at first glance. Initially considered race-based, it now appears that the digital divide is primarily income-based. Any racial disparities that exist in America’s online population are, unfortunately, a result of income differences. Many blame the racial aspect of the digital divide on Internet

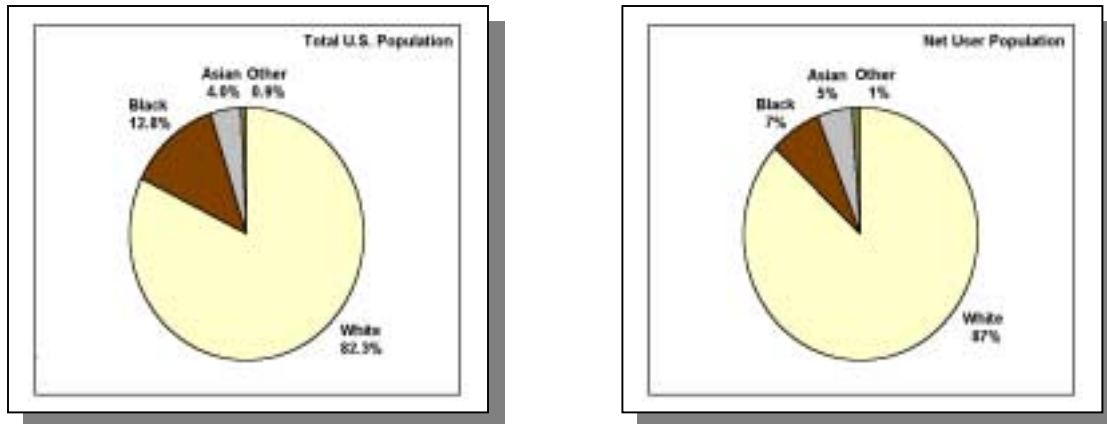
content, saying that American websites cater to white males. This is not the case, particularly when it comes to shopping and communication. In fact, according to a study by Media Metrix and Jupiter, U.S. Internet gender demographics reflect the general population, with women accounting for 50.4 percent of users and men 49.6 percent. Once online, minorities act in the same manner and participate in the same activities as white and Asian-American users.

Currently, there are 60 percent more white households online than African-American households. While African-American and Hispanic segments have the lowest Internet penetration, at 30 percent and 33 percent in 1999, respectively, each has exceeded critical mass. African-American households will reduce the access gap two-thirds by 2005, when only 18 percent more white households than African-American households will be online.



According to a recent study by Jupiter Communications, fewer than 50 percent of households with incomes below \$15,000 per year (19 percent of Americans) will have

Distribution of Net Users by Race



Source: U.S. Census Bureau, 1999

Internet access by 2005. However, it is important to note that the number of online users in this income bracket (currently three million) will triple to nine million users by 2005.

As the cost of computers and Internet access continues to decrease, more low-income households will have the opportunity to go online, boosting computer literacy.

Tremendous strides have been made in placing computers with Internet access in low-income area schools, libraries, and public housing, so that the young may learn essential computer skills. Earlier this year, the Clinton Administration earmarked \$12.5 million dollars to close the digital divide in America by supporting efforts to boost the online population in lower-income segments.

In addition, private organizations and companies have pledged resources and money to increase America's online

population. These organizations have donated computers, software, Internet access, and training. Among the non-profit

donors are high-tech names such as the Gates, AT&T, Waitt, and AOL Foundations, as well as the Hispanic Federation, Boys and Girls Clubs of America, Asian American Federation, YMCA, YWCA, NAACP, and the American Library Association.

Corporate donors include Applied Materials, Bell Atlantic, Cable & Wireless, Cisco, Gateway, Microsoft, Novell, People PC, Qualcomm, SBC, 3Com, and US West.

The U.S. should not fear a widening of the digital divide within the country.

Government and industry commitments to combating the digital divide, as well as the declining costs of computers and Internet access, indicate that it will continue to narrow. Because of these efforts, many more Americans will be able to access the Internet and contribute to the closure of the digital divide.

Section 2.2 *Virtual Communities*

Virtual communities, which just a few years ago were little more than chat rooms, have expanded into all-encompassing portal sites. Today's virtual communities allow users to read the latest news, conduct online banking and other financial transactions, participate in chat rooms, send and receive email, play online games, listen to music, shop, and receive career-building assistance, to name the more common applications. Larger portals such as **Yahoo!**, **eGroups**, and **About.com** cater to the general public, while other sites focus on a common link to attract Internet users.

Throughout 1999, a large number of these specialized portals were launched, covering all areas of life from child-rearing to auto repair. The purpose of these sites is to share information on topics of interest to the users. Here are a few examples:

- **The Women's Network** (www.ivillage.com) Launched in early 1999, The Women's Network is the leading women's online community providing practical solutions and everyday support for women between the ages of 25 and 54. In the first quarter 2000, there was an average of 155 million monthly page views and revenue exceeded \$20 million.
- **PlanetGov** (www.planetgov.com), PlanetGov launched in May 2000 is the first and only vertically targeted web portal created specifically for government and military employees. The creators of PlanetGov surveyed government employees and built the site according to survey responses.

- **The AFL-CIO Online Community** (www.workingfamilies.com) WorkingFamilies is a portal for union members and their families. In addition to providing many of the applications mentioned above, WorkingFamilies provides news on issues affecting unions and ways to become a politically active member of the AFL-CIO.

Another trend in the virtual communities arena is the use of websites, email, and chat rooms to raise awareness and support for grassroots organizations and their initiatives. Small local organizations have received national and, in some cases, international attention through their websites. The Internet has quickly proven to be vital to such movements as:

- **Town Hall** (www.townhall.com), online since 1992, is the central online address for dozens of conservative public policy, political, grassroots, and educational organizations and publishers. Sponsored by the Heritage Foundation, Town Hall promotes the exchange, discussion, and dissemination of the latest news and information from the conservative movement through chat rooms and news articles.
- **The International Campaign to Ban Landmines** (www.icbl.org), an organization dedicated to raising awareness of the dangers of landmines, uses its website to document national compliance with the 1997 International Landmine Ban Treaty. The Internet has allowed ICBL to reach a much wider audience, increasing public awareness and support since the organization began building its website.
- **The Million Mom March Foundation** (www.millionmommarch.com), initially

a small California-based gun-control organization, gained national attention and support for its Million Mom March on Washington, D.C. on Mother's Day 2000. Membership has swelled since the march, and organizers give much credit to their website and email campaign for the large turnout and continued support of the organization.

- **Conservative HQ** (www.conservativehq.com), a new venture led by Richard Viguerie, is a portal dedicated to becoming an international cyber-community of American conservative principles. The site offers chat rooms, email, bulletin boards, and up-to-date political news and information of interest to conservative-minded individuals.

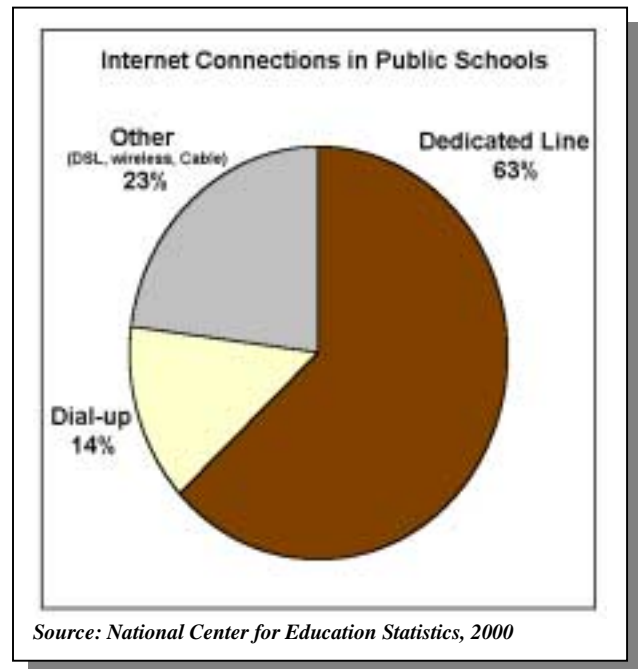
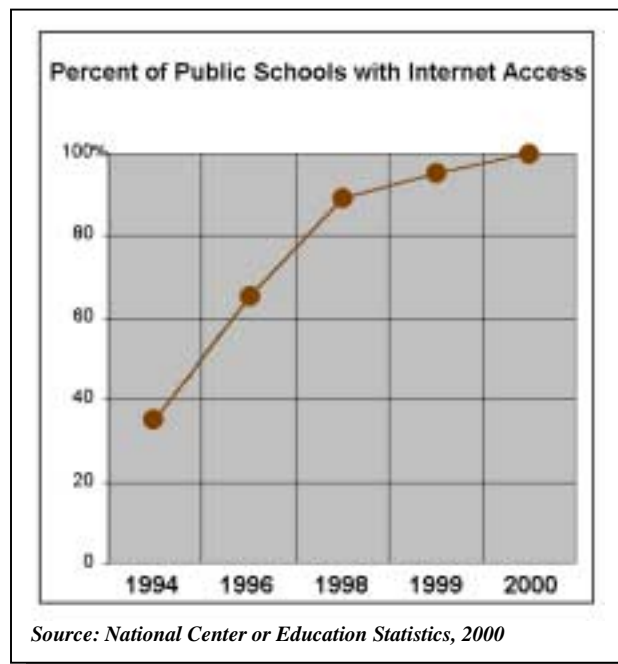
Section 2.3 Education

Learning Online

Within American education, use of the Internet and related information technology has exploded, particularly in higher education. At the secondary and primary levels, most children have some access to the Internet, yet Americans must continue to push for change until there are multiple connected computers in every classroom across the nation. In higher education, the Internet is a necessary tool for most students and administrators. Distance learning via the Internet has also developed into a very successful sector of American education.

Elementary and Secondary Education

In 1994, the National Infrastructure Initiative, sponsored by the White House, challenged all U.S. public schools to be connected to the Internet by 2000. At the end of 1999, nearly 94 percent of public schools were connected to the Internet, up from 35 percent in 1994. A seemingly far-fetched goal in 1994, nation-wide school Internet access may very well become a reality by the end of 2000.



Internet access has also grown in private (including various religious schools) and Catholic schools from 54 percent and 70 percent, respectively in 1998, to 70 percent and 80 percent in 1999.

Classroom connectivity has increased tremendously since 1994. Internet access in instructional rooms such as labs, classrooms, and libraries has grown from 3 percent in 1994 to 63 percent in 1999. The quality of these connections has improved as well. Dedicated lines now make up 63 percent of all public school Internet connections.

Many teachers and students now have continuous access to the Internet, greatly enhancing the learning environment for students. This does not only apply to higher-income school districts. A remarkable 90 percent of high-poverty schools are connected to the Internet; however, there is a significantly lower percentage (39 percent) of connected instructional rooms.

One of the most innovative educational uses of the Internet is distance learning. Through the Internet, students can watch, in real time, archeological digs in far away places; go on tours of European castles and museums; communicate regularly with students in Japan; attend a class held in another part of the U.S.; or participate in an Antarctic expedition. Thanks to the Internet, children now have more opportunities to learn about cultures and societies different from their own.

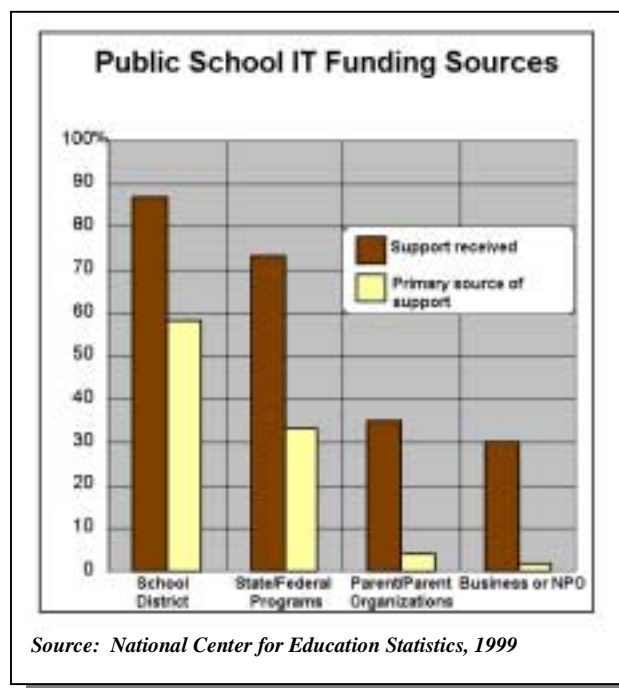
It is essential to continue support of greater Internet access in public schools. The Department of Education has allocated funds for the Education rate (*E-rate*) program which was established to make services and technologies in telecommunications available to schools and libraries at discounted rates based on income and location. This program, in addition to other government and private aid devoted to combating the digital divide, promises to help eradicate Internet and computer inequalities across school districts of varying incomes.

Higher Education

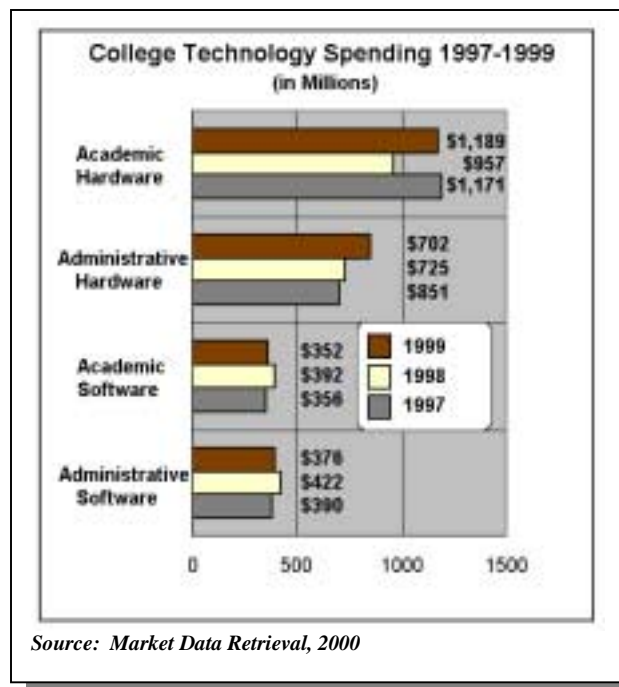
Information technology spending in higher education will swell in the next few years, approaching \$5 billion by 2003, up from \$3.1 billion in 1998.

A number of factors are driving this technology investment in higher education. They include increased competition for students, rapidly evolving products and services, the changing needs of students, and the shifting missions of educational institutions.

Like elementary and secondary students, college students are also experiencing greater integration of the Internet into their



programs of study and college life in general. Most major universities have launched online banner systems through which students may register for class, update and maintain personal records, register for financial aid, and request transcripts, among many other applications. Many university bookstores work in conjunction with online stores such as Varsitybooks.com and efollett.com, permitting students to buy books online and eliminate waiting time at the campus bookstore.



Nearly all colleges provide email addresses and Internet access to their students. By the end of 2000, 5.8 million college students will be logged into American university networks. As of early 2000, over one third of U.S. universities placed Internet-connected computers in student dormitories, up from 25 percent in 1999.

In addition to improving administrative functions, American universities are also increasingly using the Internet as a teaching tool. Students at community colleges and smaller schools have the opportunity, via the Internet, to attend classes at larger universities on subjects not offered at their own college. At some schools, lectures are placed online and downloaded by students, eliminating the need to be physically present in class.

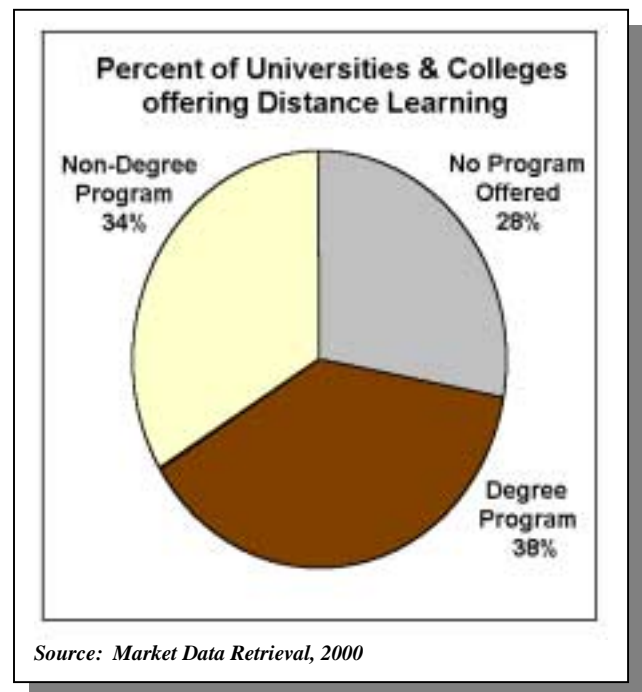
Distance Learning Opportunities

Many universities and colleges are also turning to distance learning as a means of enrolling more students. In fact, distance learning is the fastest-growing sector of higher education. According to IDC, in 1998, 58 percent of two-year colleges and 62 percent of four-year schools offered distance learning courses through the Internet. In 2002, these percentages are expected to increase to 85 percent and 84 percent, respectively. Seventy-two percent of colleges now offer some kind of distance learning in the form of notes, study groups, or online lectures, up from 48 percent in 1998.

Online courses constitute just \$350 million of the \$240 billion higher education industry today, but will grow to \$2 billion by 2003 according to Merrill Lynch. The number of students enrolled in distance learning will jump to 2.2 million (15 percent of all higher education students) in 2002, up from

710,000 in 1998. While the number of accredited colleges offering degrees via computer is quite low, many schools expect to offer online degrees within the next few years.

One of the most notable moves in this direction is the initiative undertaken by three prominent business schools – Berkeley's Haas School of Business, the University of Michigan business school, and the Darden School of Business at the University of Virginia. Initially offering courses in e-commerce online, the model could be expanded to undergraduate and executive programs and eventually lead to an online MBA.



An initiative by Rio Salado Community College in Phoenix, Arizona, offers an online degree program in police science geared to police officers in order to give them the opportunity for advancement. This program should serve as a model for similar occupations such as corrections officers and firefighters.

Section 2.4 *Mobile Internet*

Mobile Internet Access

The Internet is always “on” and soon it will be anywhere and anytime. The evolution of the cell phone into a wireless Internet device is revolutionizing the Internet’s information and service dissemination potential. The Mobile Internet promises to allow users access to information, services, and e-mail without the constraints of using a PC. Currently, over 300 million people worldwide are mobile phone users. However, according to IDC, by 2004 there will be over 1 billion mobile phone users and half of these phones will be Internet-enabled.

The transition from PC access to wireless access presents a number of opportunities and challenges. Because most new mobile Internet users will be PC Internet users, expectations will be high. Many new users may be turned off if the quality of the mobile Internet experience does not match PC access. However, great opportunities exist in providing users with increased convenience. Wireless platforms will not be able to match PC quality for some time, yet the ready availability of information, e-mail, financial services, and on-line shopping anywhere and anytime will make the mobile Internet very attractive to many users

Europe Soaring, Asia Rising, U.S. Lagging

Europe is leading the mobile Internet charge with Asia close behind. Northern Europe and parts of East Asia have the highest wireless penetration rates. According to the Japanese Ministry of Posts and Telecommunications (MPT) and Baskerville Communications Corp., five countries or regions exceed 50 percent wireless

Selected Regional Mobile Penetration Rates

Finland	64.9%
Norway	59.5%
Iceland	57.8%
Sweden	54.9%
Hong Kong	54.4%
Italy	45.5%
South Korea	45.1%
Singapore	41.4%
Japan	41.0%
Switzerland	36.3%
Australia	36.0%
United Kingdom	33.8%
U.S.A.	27.6%

Source: MPT & Baskerville Communications Corp., 2000

penetration. These include Finland, Norway, Iceland, Sweden, and Hong Kong. The U.S., however, lags behind 22 other nations with only 27.6 percent penetration. Yet, in terms of total number of users, the top three are the U.S., Japan, and China.

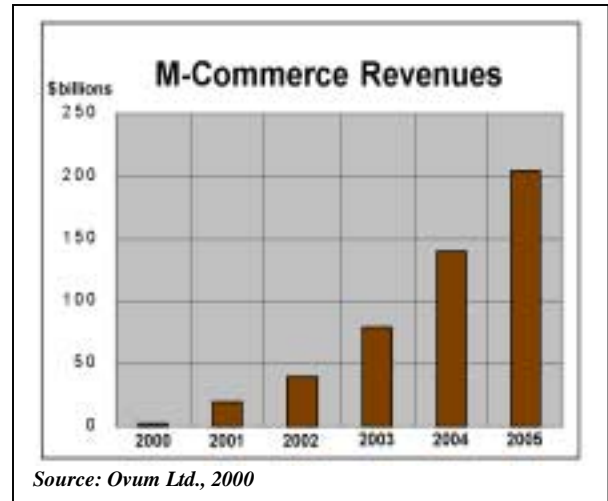
The European wireless market has taken the lead in developing the Mobile Internet due in large part to the agreement on a single wireless operating standard in Europe. This standard is the Global System for Mobile (GSM) communications. Most of Asia has also adopted GSM. In addition to operating on a common communications standard, both Europe and Asia have been early adopters of the Wireless Application Protocol (WAP). WAP is the widely accepted international standard that enables cell phone and other wireless devices to access the Web and view its Web content.

The U.S. wireless market is burdened with numerous competing standards that have resulted in interoperability problems and incompatible services. Many U.S. companies have also been hesitant to adopt

WAP because of concern over intellectual property rights. In the U.S., Geoworks and Phone.com continue to dispute the right to license WAP components. This will continue to slow any growth in U.S. WAP-based services. In contrast, no patents are held on WAP components in Europe, which has allowed European companies to push forward with new WAP-based services.

M-commerce

As more companies begin to recognize the expanded retail opportunities presented by wireless Internet access, *m-commerce*, or mobile commerce, will take off. According to Ovum, by 2005 *m-commerce* revenues will exceed \$200 billion in products and services as diverse as banking, ticket sales, online retailing, and media downloading. *M-commerce* will expand *e-commerce* and make it portable. In several Scandinavian countries wireless devices are already being used in innovative electronic payment schemes. Users are able to make purchases



from vending machines or pay for parking with wireless devices and have the transactions billed directly to their accounts. Increased bandwidth will open the door for new applications on wireless devices such as games or streaming video. Service companies and portals have already begun to vie for the right to control and charge for new and developing mobile services.

Section 2.5 *Government Online*

Government's Role

Government plays a key role in securing a favorable business environment for the IT and Internet industry. To date, government has largely taken a hands-off approach to the new economy while also promoting the dissemination of computers and other IT tools in schools and other public spaces. Bridging the digital divide has been a major concern for government and, as mentioned earlier, the effort is succeeding.

Governments across the globe have responded to the need to promote IT and Internet development through numerous programs and initiatives. International governmental bodies have also played a critical role in ensuring a standard approach to technology adoption and usage across borders, while also trying to bridge the growing gap between wired and unwired countries. For example, the UN Economic and Social Council (ECOSOC) is just one organization addressing methods to close this international divide in ICT usage and penetration. The recent G-8 summit in Okinawa, Japan, also placed international ICT and Internet promotion near the top of its agenda. This summit resulted in a Charter addressing ICT and Internet promotion. The G-8 "Okinawan Charter on Global Information Society" addresses both the opportunities made available by these new technologies as well as the necessity to make these technologies available to all. In addition, the G-8 agreed to appoint a taskforce called the "Digital Opportunity Task Force" to review the global digital divide and set forth recommendations at next year's summit.

E-government

The information revolution has pushed companies to change and adapt to new technologies, competitors, and business models while inspiring consumers to expect better service and competitive pricing. Today this revolution has reached government. Both businesses and consumers are asking more from government in terms of services, business practices, and cost-savings. The government has been challenged to keep pace with these rapid technological innovations and demands. Slowly, governments from the federal to the local level are coming online and providing better services while exploring new ways to interact with both citizens and businesses. Today's governments will be tomorrow's *e-governments*.

Streamlining government operations by moving services onto the Web will save significant taxpayer money and provide better services to citizens. The U.S. Internal Revenue Service (IRS) has already moved most of its forms online and now allows online filing and payment. Local government is also following suit. State governments from California to Virginia now allow citizens to pay certain fees online, register for licenses and permits, order forms, and locate local offices. Oracle's vice president of services industries recently observed that the government could cut 10 percent of its costs by being online.

Soon voting may also be available online. Included in the current Administration "e-society" initiative is a study of online voting. The Arizona Democratic primary of March 2000 allowed registered Democrats to cast their votes online and, according to the

Economist, 40,000 people voted online, a 600 percent increase over the primary of 1996.

Government website and available services have proliferated at a breakneck pace over the last few years. To better serve the public, the current Administration has launched an effort to collect these sites into a single repository called *firstgov.gov*. This initiative seeks to consolidate the forms and services of the top 500 government services by December 2000 at the latest. However, the administration now aims to have the site up and running by sometime in the early fall.

E-government efforts are also underway overseas. Central government portals and *e-government* initiatives are popping up everywhere across the globe. The UK is developing a single government web portal called UK Online. In East Asia, Japan, Singapore, and Taiwan are also making progress toward moving services and information onto the Web. In Taiwan, for example, the government aims to achieve an “intelligent” government, which provides online services to citizens and saves taxpayer money through online procurement, by the end of 2000.

Indeed, online government procurement may be another promising *e-government* innovation. In the U.S., several companies such as Digital Commerce Corp., GovPlanet, and FedBid have been early movers in bringing online procurement services to government. Online procurement, or B2G *e-commerce*, may permit government to realize substantial cost-savings and create new government-business partnering opportunities through reverse auctioning and service and application outsourcing. The U.S. Navy is aggressively pursuing such a partnership with industry

through the newly proposed Navy-Marine Corps Intranet (NMCI) system, which would be almost totally serviced by private industry partners. The UK has also been quick to adopt online procurement. On April 1, 2000, the UK Government Procurement Office (GPO) was established to assist in this transition toward New Economy practices in government.

Investments in *e-government* will be substantial over the next few years. According to the Gartner Group, U.S. *e-government* spending will grow from \$1.5 billion in 2000 to more than \$6.2 billion by 2005. The B2G segment will account for nearly 70 percent of spending in 2000. Spending in Government-to-Citizen (G2C) services are secondary and do not require the same type of procurement schedules. However, Gartner forecasts that \$2.2 billion will be spent on G2C by 2005.

The U.S. government has already allocated over \$4.7 billion to the IT Fund for fiscal year (FY) 2001, which will be a critical resource for developing IT resources at all levels of government. The Department of Commerce also requested approximately \$175 million for *e-commerce* initiatives to assist small businesses and help low-income families get online.

***E-government* Challenges**

Despite all the obvious benefits of bringing government services and activities online, the effort will face several challenges. The first two are security and privacy. Because of the sensitive nature of the information that is stored in government databases, both system security and information privacy will be key issues. If transactions such as online license registration or tax payments are to gain the trust of both citizens and public employees, the security of these transactions

must be guaranteed. Ultimately, securing the trust of the citizen users will be the test of the viability of *e*-government.

Even given improved efficiency and timesavings, many may simply be reluctant to deal with a computer screen instead of a live person, especially for handling sensitive government interactions. Substantial cultural change may be required before *e*-government services become widely used and accepted by the general public. Additionally, any government pursuing *e*-government policies will be challenged to ensure that these services are universally accessible by operating on common standards and being available to lower income families. *E*-government needs to avoid creating another digital divide whereby the efficient services of the state are reserved to only high income, well-educated individuals with access to the Internet.

Policy & Legislation

To date, those advocating a minimal approach to Internet governance have been successful in opposing government regulation and taxation of the Internet. The U.S. Congress has placed temporary moratoriums on the imposition of Internet taxes and the 1st Amendment has been successfully invoked to defeat restrictions on website content. It is unclear, however, how long this defense of the completely self-regulated state of the Internet can continue.

State and local officials across the U.S. are becoming increasingly concerned that business-to-consumer (B2C) *e*-commerce will, in the very near future, have a negative impact on their sales tax revenues. Internet retailers meanwhile argue that it would be difficult enough for a seller based on the

West Coast to comply with sales tax regulations in Manhattan, much less in all 50 States. This disagreement was made clear earlier this year when the Commission on Internet Taxation failed to reach unanimous agreement on a final report. Given the growing pressure, the complete moratorium on Internet taxes in the U.S. is unlikely to last out the decade.

Public outcry on other Internet issues is also driving legislative action. On July 18, 2000, the House of Representatives moved to alleviate the burden of unsolicited email known as "spam," by passing the Unsolicited Electronic Mail Act on a vote of 427 to 1. A number of efforts are also underway to protect consumer privacy and ensure that Internet businesses do not take undue advantage of children.

There are, however, areas such as the legalization of digital signatures where most would agree that governmental action is needed. While great progress has been made in moving many business transactions online, the lack of a legally recognized digital signature has become an obstacle to the growth of Internet commerce. It is hoped that the Electronic Signatures in Global and National Commerce Act, which President Clinton signed on June 30, 2000, will fill that void.

It must also be noted that Internet governance is no longer a purely domestic issue. Yahoo! is currently attempting to convince the government of France that it cannot prevent French users from accessing Nazi materials online. A number of other Internet ventures have run afoul of European privacy laws. There is little doubt that as the globalization of the Internet accelerates, this problem will grow with it. And non-Americans do not generally share in the U.S.'s cultural predisposition against

government regulation. In a recent survey of European business executives, the majority clearly felt that Internet commerce would benefit greatly from government oversight and regulation.

Currently the future of the Internet is a bright one and initial steps have been taken in the right direction. As the Internet grows and becomes increasingly ubiquitous, however, it will be increasingly difficult for governments to do no harm unless they have the full support and cooperation of the individuals, industries, and organizations, who are leading the development of the global Internet.

Section 3. *Technologies*

Common operating standards and protocols are what allow the Internet to function. Early innovations such as Hypertext Transfer Protocol (HTTP) and Hypertext Markup Language (HTML) formed the backbone of the Web as we know it today. However, as businesses move online and go wireless, new standards and supporting technologies are in demand. Wireless Application Protocol (WAP) and eXtensible Markup Language (XML) are some of these new innovations. New technologies are also changing the Web and creating new media. Enabled by ever-faster connections, online broadcasting is booming. Yet despite these changes, older standbys such as Electronic Data Interchange (EDI) continue to serve online business despite the rush toward web-based solutions.

Online security is also of major concern to government, business, and individual users. Incidents of cyber-mischief and cyber-crime are rising steadily. Users have become increasingly concerned about online privacy and, as in the offline world, have a strong desire to control the flow of personal information on the Web. Yet, the Web today is generally secure, but the fear of cyberterrorism, cybercrime and violations of online privacy are pushing government and industry to explore new technologies and practices to combat these threats.

This section will review this new wave of innovations transforming the Web. It will focus on standards including EDI and XML, address the issue of online security, review the revolution occurring in wireless technologies, and observe the rise of online broadcasting.

Section 3.1 Standards

Since the very beginnings of the Internet and electronic data interchange (EDI) systems in the 1960s, standards have been the key facilitator of all electronic communications. From TCP/IP to the latest variations of XML, commonly accepted standards are the indispensable, organizing element without which electronic commerce (EC), e-mail, and the Internet itself would cease to function.

The Internet Engineering Task Force defines an Internet Standard as “a specification that is stable and well-understood, is technically competent, has multiple, independent, and interoperable implementations with substantial operational experience, enjoys significant public support, and is recognizably useful in some or all parts of the Internet.” Put simply, an EDI standard is a structure for organizing data so that it can be recognized and read by other computers.

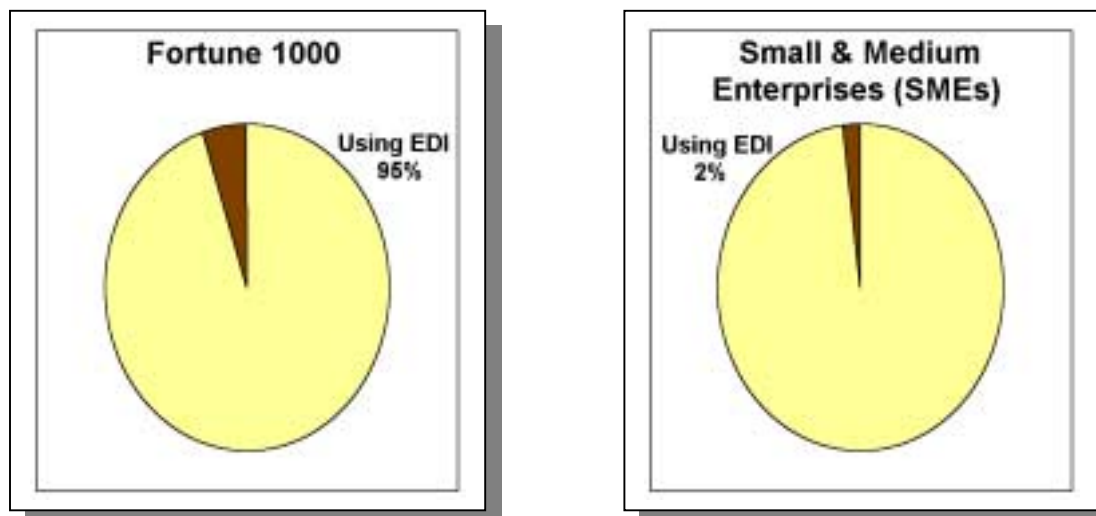
Electronic Data Interchange (EDI)

For many years, the bedrock U.S. EDI standards have been those produced by the American National Standards Institute’s (ANSI) X-12 Committee. ANSI X-12 has

defined all types of transactions ranging from insurance claims to invoices to purchase orders. Parallel to this, a United Nations standards committee, CEFAC (formerly EDIFACT), has been producing its own set of EDI standards, which are an outgrowth of earlier European standards. Because CEFAC has been led by government representatives and is more international in its outlook, it is not surprising that many of its standard transactions are government documents such as customs declarations. The industry led ANSI X-12 has focused primarily on domestic business transactions. Although there are efforts underway to reconcile these two standards, they remain distinct and are not interoperable without translation.

Unfortunately, in creating their EDI standards, both ANSI X-12 and CEFAC have created a somewhat esoteric body of knowledge that has become the purview of technical experts. Because their standards were first conceived in the low bandwidth, pre-Internet era, they emphasize streamlined and highly structured EDI transactions, which usually require customized software and extensive technical coordination

Global Business Penetration



Source: OASIS, 2000

between users. As a result, the equipment and expertise required to support these “traditional” EDI systems has typically been beyond the means of small and medium sized enterprises (SMEs). Because of this, most SMEs have been unable to participate in many EDI activities. As demonstrated by the following charts, a digital divide does exist between large businesses who use EDI and SMEs who cannot afford it.

Although many efforts have been undertaken to bridge the digital divide in EDI, they have met with little real success. Despite the best efforts of large corporations and various industry organizations, most EDI systems are still beyond the reach of the smallest companies at the lower reaches of the supply chain. Many industry observers are hopeful, however, that Internet-based supply chain management systems, using XML, will finally solve this problem.

eXtensible Markup Language (XML)

XML (eXtensible Markup Language), like HTML, is derived from Standard Generalized Markup Language (SGML) standards. Unlike HTML, which focuses only on the presentation of data, XML organizes data in a way which is useful for data processing as well as presentation, but without the cumbersome detail of SGML. XML documents can also be self-defining

and are therefore able to be read by different systems without prior coordination. It is these attributes that lead many to believe that XML will revolutionize EDI and electronic commerce in the years to come.

One only has to attend any one of the major electronic commerce (EC) and EDI industry conferences to see the widespread enthusiasm for XML. Today, the latest news in standards is news about the latest development in XML. A clear majority of those involved in EC/EDI have seized upon XML as a sort of holy grail, which they hope will enable the creation of off-the-shelf software packages that will finally enable SMEs to fully participate in EC and EDI activities, thus breaching the digital divide.

It is probably going too far, however, to say that XML will render all other standards obsolete. Given the existing investment in X-12 and CEFAC based EDI systems, their precision, and their advantages in economizing bandwidth, it is likely that both will be in widespread use for many years to come. It is also likely, however, that XML will dominate Internet-based EC/EDI systems in the near future. The greatest obstacle to the success of XML may simply be the unreasonably high expectations set for it. Though if it does live up to its promise, XML will help to close the digital divide in EC/EDI and greatly improve the State of the Internet.

Section 3.2 Security

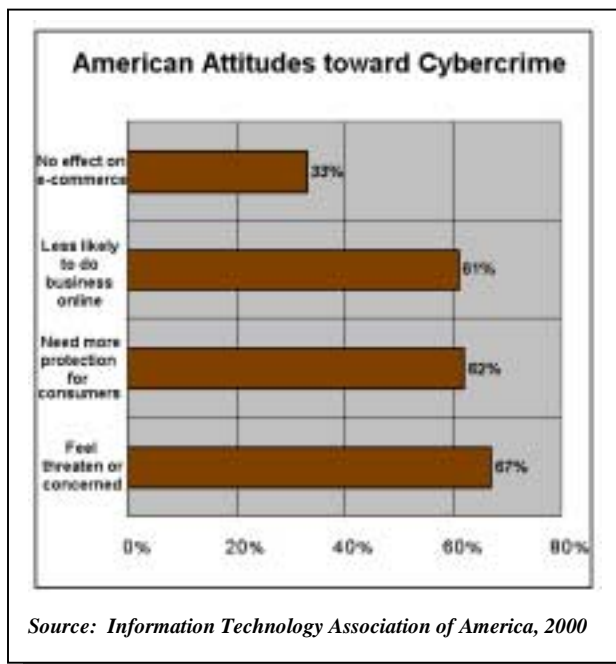
Rising Public Concern

As the Internet has become an increasingly important tool for businesses and individuals, concerns over security and privacy on the Web have grown. Guaranteeing privacy and information protection online is an increasingly critical element in the future success of the Internet.

A recent poll found that 67 percent of Americans feel either concerned or threatened by possible cybercrimes. In addition, 61 percent of respondents indicated that because of these concerns they are less likely to do business online, while 33 percent indicated little concern about online business security. Privacy is also a major concern. In the same poll, 62 percent of respondents agreed that consumers need greater protection.

Despite these numbers, Symantec Corp. found that cybercrime concerns tend to outweigh individual precautions online. Symantec found that 87 percent of consumers and almost 95 percent of IT professionals use anti-virus software. However, only 19 percent of consumers and 49 percent of IT professionals employ personal firewalls in their PCs which protect against possible cybercrimes.

Users may have good reason to be concerned about cybersecurity and other cyberthreats such as viruses. The Carnegie Mellon Software Engineering Institute's Computer Emergency Response Team Coordination Center (CERT/CC), the original Internet security body, has reported a relatively steady increase in computer security incidents throughout the 1990s, with a three-fold explosion of reported incidents in 1999. Moreover, incident



reports for the first and second quarter of 2000 have already approached 1999's total.

In the first half of 2000, user concerns have been exacerbated by a number of high profile cyberassaults on both large corporate websites and private PCs connected to the Internet. Denial of service attacks shut down Yahoo!, ZDNet, and CNN in

Carnegie Mellon CERT/CC Incident Reports

Year	Incidents
1988	6
1989	132
1990	252
1991	406
1992	773
1993	1,334
1994	2,340
1995	2,412
1996	2,573
1997	2,134
1998	3,734
1999	9,859
1 st & 2 nd qtr 2000	8,836

Source: Carnegie Mellon CERT/CC, 2000

February, and in May, the “Love Bug” computer virus hit networks worldwide, causing at least \$7 billion in damage. In June, hackers broke into AOL’s customer database, which contains information on 23 million users,. Because this attack seems to have been little more than a prank, AOL managed to protect the vast majority of its information. However, this breach emphasized the vulnerability of even the world’s best-protected commercial networks.

Combating Cyberthreats

Government and industry have been active in attempting to identify and combat both existing and potential cyberthreats. In mid-May 2000, the Group of Eight (G-8) industrialized nations met in Paris to discuss the growing threat of cybercrime, and efforts are under way at the 41-nation Council of Europe to draft a treaty to standardize cybercrime laws. The Council is working closely with the U.S., Japan, Canada, and South Africa.

In the U.S., through measures such as the 1998 Presidential Decision Directive (PDD-63) and the establishment of the National Infrastructure Protection Center (NIPC) within the Federal Bureau of Investigation (FBI), the U.S. government has stepped up efforts to protect the nation’s increasingly digitized critical infrastructures from cyberattacks. This year the President included \$2 billion in his 2001 budget request to protect the nation’s critical infrastructures. Of this sum, approximately \$91 million was earmarked to assist in the development of new technologies to combat cyberterrorism and cybercrime.

While government assists in the effort to develop new policies and technologies to combat cyberthreats, industry is leading the

fight against cybercrime. Industry is also challenged to keep ahead of increasing online assaults. Efforts are underway to present a united front against would-be cybercriminals. While the G-8 was meeting in Paris in May, over 80 Internet companies gathered in Menlo Park, California, for the first Internet Defense Summit. The summit was created to bring Internet industry leaders together to devise methods and standards to counter potential cyberthreats.

Government and industry are also coming together to fight cybercrime. An excellent example is the initiative by Interpol to provide intelligence to a private website, Atomic Tangerine, which assists businesses in defending themselves against known online criminal threats. Atomic Tangerine has also agreed to pass on information on cybercrimes to Interpol.

Law enforcement methodology also needs to change. In the U.S., the traditional tool of the court-ordered wiretap was legitimately needed and used by law enforcement agencies in the pre-1994 world of circuit-switch voice telephony. But that same concept can evolve into a more troubling invasion of the privacy of millions of law-abiding citizens when it is morphed into the packet-switch Internet arena. Law enforcement agencies need to find ways and means in this new technological environment to very carefully target the interception of Internet messages in the same way that older voice wiretaps could narrowly target only the suspects in an investigation.

In a similar vein, the sophisticated electronic surveillance methods that once were encrypted to be read by only by the world's most exclusive security agencies have now become commonplace in the Internet era. The way to advance legitimate National

security needs must be compatible with the realities of a more sophisticated world market.

Technologies

Encryption continues to serve as the backbone of Internet security. As the U.S. government continues to relax restrictions on exportable encryption technologies, the global online security environment will improve. Some of the key technologies enabling increased Internet security also include, old standbys like Secure Socket Layers (SSL) as well as newer applications such as Smart/IC Cards and Public Key Infrastructure (PKI). Some of the more interesting new approaches include the development of biometrics to verify user

identity and neural networks to identify hacker attacks and other potential network threats.

The tools available for combating cyberthreats are increasingly impressive. However, basic practices are often at the core of security breakdowns. As Brian O'Higgins of Entrust recently observed during an interview with *E-Commerce Times*, SSL continues to provide a secure method of transmitting sensitive information, such as credit card numbers over the Internet. However, companies need to continue to secure this data in encrypted form on their servers to prevent hackers or employees from easily viewing data once access is achieved.

Section 3.3 *Wireless*

In the chaotic world of “wireless Internet,” today’s R&D news can rapidly turn stale and predictions of ultimate technological outcomes can sometimes best be left on the shelf. Only one thing is certain, industry is rushing to discover the “ultimate wireless solution.” In this supercharged environment, we find telecom alliances of gargantuan proportions willing to invest unprecedented sums of capital to loosen the Internet from its tethers.

Clearly, the promise of a wireless Internet lies many paces ahead of today’s service realities. Most present-day users of fledgling “wireless Internet” services are, more accurately, provided with “snippets” of the Internet, generally consisting of a highly limited array of content passed to them through the narrowest of info-capillaries.

For example, Sprint’s initial foray into the mobile data field consisting of its much-publicized “wireless web” service is transmitted to subscribers at the unspectacular rate of 14.4 kilobytes per second (kbps). That’s half the rate attainable on the most ancient of copper-wire dial-ups. Higher transport rates are forecast for the future, but for now, subscribers are afforded ample opportunity to practice the virtue of patience.

Wireless Applications Protocol (WAP)

In 1997, Unwired Planet, Ericsson, Motorola and Nokia formed a group to study the feasibility and usefulness of developing a new protocol specifically tailored to the constraints of the wireless environment. Most notably, these constraints include the highly limited viewing area inherent in mobile and hand-held devices and the narrowband nature of most then-existing

wireless communications channels to access them. The study group began developing a new Wireless Application Protocol (WAP) and started the WAP Forum to facilitate continuing collaborative efforts of themselves and others.

WAP includes a set of protocols that are designed to mirror the characteristics of Internet Protocol (IP), although specially modified to accommodate the unique attributes of the mobile and hand-held markets. The WAP initiative had its earliest roots in the efforts of Ericsson in 1995 to develop a protocol for employing value added services on mobile networks (known as the Intelligent Terminal Transfer Protocol, or ITTP). In 1997, Unwired Planet developed a Handheld Device Markup Language (HDML) as the wireless counterpart to Hypertext Markup Language (HTML) widely used on the Internet. Nokia presented its “smart messaging” concept, employing another wireless alternative to HTML known as Tagged Text Markup Language (TTML). All efforts eventually evolved into development of the Wireless Markup Language (WML) employed in WAP.

Due to the small display area in virtually all mobile phones, WML formats documents in “decks” and “cards” rather than in the flat document structure resulting from the use of traditional HTML in IP settings. Each “card” is small enough to be displayed on the tiniest of screens, with the rest of the essential text stacked in a “deck” to be presented sequentially for viewing. This eliminates the need to scroll, which can be an especially tedious process when dealing with a small device.

The service sectors that may make special use of WAP protocols include banking, finance, shopping, gambling, ticketing, and weather reporting. WAP also has the capability of providing certain value-added telephony services, including incoming call selection, voice mail, call forwarding, enhanced messaging and other types of call management.

WAP is forecast to be “a big item” by some while being downplayed by others. For example, Ericsson forecasts that about 50 million WAP-equipped handsets will be sold by the end of 2000 and that 400 million users will be using “decks” and “cards” in their phones by 2004. Others are critical of the cost of mobile data services as being too high and say that WAP is falling under the weight of too few applications and too many restrictions on content. In the end, WAP may find a comfortable niche in providing data access to mobile phone customers and hand-held users, given the inherent size and space limitations of the devices that they use.

Wireless Technologies

A number of new technologies are shaping the wireless scene and are worth mentioning in detail:

Mobitex: This technology allows e-mail to go wireless. Mobitex wireless is a leading international data communication standard which provides a secure, reliable, two-way digital wireless packet switching network.

A basic Mobitex network is comprised of base stations, local switches, regional switches, and a network control center. Mobitex employs packet switching to deliver a transmission rate of 8 kbps over a single 12.5-kilohertz (kHz) channel. The use of cellular architecture for Mobitex

further extends its efficiency. In fact, Ericsson claims that more than 1,500 users can be served through a single base station, with no bottlenecks occurring even under high use conditions.

Mobitex networks in the United States generally utilize spectrum between 895 Megahertz (MHz) and 910 MHz. There are 29 Mobitex networks around the world in 22 countries on 6 continents. Some are operated publicly (such as the one in the United States) and others are used by privately owned companies for their own internal purposes. In the U.S., wireless devices that employ Mobitex networks include the Palm VII and Blackberry.

Bluetooth: This technology is taking the wireless LAN concept one giant step further. Bluetooth is equipped to create links with other Bluetooth devices. When two devices come within a 10 meter range of each other, they become interconnected. Unlike other wireless technologies such as infrared, Bluetooth utilizes a radio-based link, and therefore does not require a line-of-sight connection in order to communicate.

Ericsson released the first Bluetooth product in the Spring of 2000: it's a headset that communicates wirelessly with a mobile phone. In June 2000, Intel and Microsoft announced a joint collaboration to incorporate Bluetooth technology into the Windows operating system scheduled for release in 2001. Intel also launched a San Diego-based business group that will focus on development of a wider range of products containing Bluetooth technology.

Nokia, Toshiba, and IBM also have plans to incorporate the new science into their products. With Bluetooth, laptops won't need a wireless LAN to share files. PDAs and hand-helds won't be far behind in terms

of wireless connectivity, if electronics manufacturers follow through on early plans. Even makers of washing machines, refrigerators, vacuum cleaners and other home appliances are exploring ways to incorporate Bluetooth into their products. Industry interest continues to grow. By July 2000, over 1,800 parties worldwide had signed up to join the Bluetooth Special Interest Group.

Ricochet: While much industry attention is focused on wireless messaging and mobile e-mail services coming to market in 2000, one company became the nation's first, terrestrial, high speed mobile wireless Internet service featuring *full* IP capabilities. Metricom, Inc. unveiled its high speed Ricochet wireless system in San Diego on July 21st, with Atlanta following shortly thereafter. Since 1995, Metricom has provided a wireless mobile Internet service in 3 U.S. cities featuring data rates comparable to telephone dial-up connections. The new Ricochet system, however, supports raw data rates of 1 mbps and end-user rates of 128 kbps, making it comparable to ISDN, only without the need for any wires.

MCI Worldcom, a part owner of Metricom, employs its own marketing department to help sell Ricochet services. Metricom reports that construction of the full 128 kbps wireless Internet system is underway in 21 markets and that right-of-way acquisition is progressing in an additional 25 markets. Ricochet's mobility and high data capacity place it in the vanguard of the mobile Internet market in 2000.

High Data Rate (HDR): HDR technology is a high-speed, high-capacity wireless Internet technology optimized for packet data services. HDR is fully compatible with code division multiple access (CDMA) voice systems so it can share infrastructure with cellular and PCS networks. The fact that HDR is fully compatible with standard Internet protocols could mean that the ultimate utility of WAP will be limited to those applications where screen size alone dictates the "card" and "stack" formatting.

HDR is asserted to provide 2.4 megabytes per second (mbps) peak data rates with "always on" connect times of one-half second and efficient channel bandwidths of 1.25 MHz. Average throughput on a loaded sector is 600 kbps forward and 220 kbps return, with voice and data transmission on separate carriers, thereby eliminating the load balancing requirements that have traditionally presented a dilemma for cellular providers attempting to provide data transmission over second generation (2G) networks. HDR can be imbedded in handsets; laptops; notebooks; and other fixed, portable, and mobile devices.

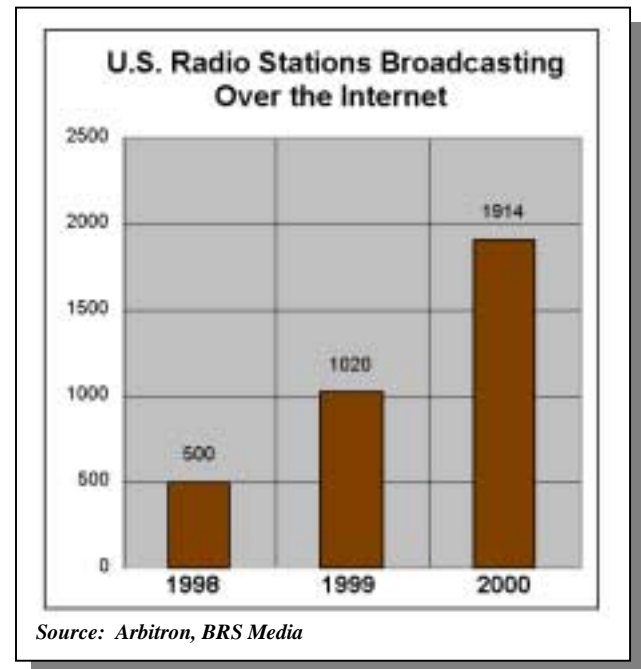
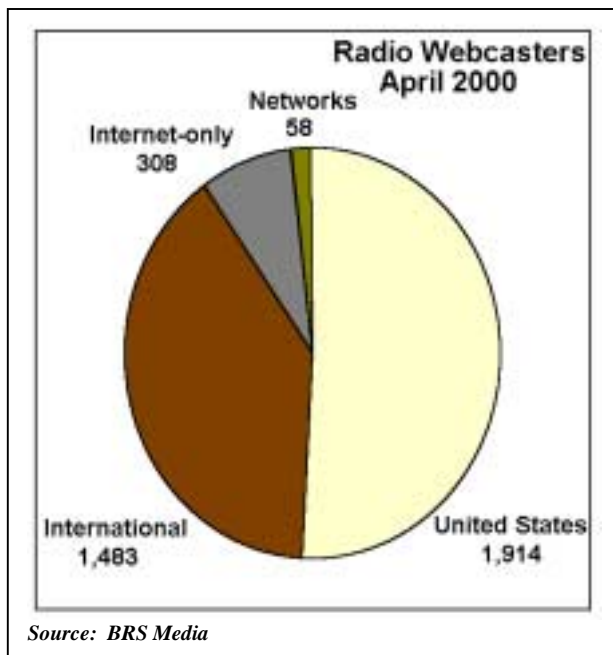
Timed to rollout with the advent of third generation (3G) spectrum, HDR could provide enormous added value to the 3G spectrum auction slated by the Federal Communications Commission for the Spring of 2001. Qualcomm and Lucent Technologies have announced the extension of their 3G alliance in order to deliver wireless mobile Internet services by means of HDR. If schedules are maintained, 2001 should see the first of this high-speed mobile service to subscribers.

Section 3.4 Internet Broadcasting

A quiet revolution came to radio last year, notes BSR Media, when the number of radio stations broadcasting, or streaming their content, on the Internet increased by more than 56 percent. This revolution has produced more than 3,700 radio and television stations around the world streaming audio and video on the Internet and has created a \$1 billion industry predicted to reach \$20 billion by 2008, according to RealNetworks.

Although infrastructure problems present the biggest challenge to the blossoming industry, Forrester Research notes that consumer interest in streaming media will drive a rapid growth in broadband access technologies.

Today, consumers with a 56K modem or better are able to listen to Internet radio stations, such as virginradio.com – the highest-rated station on Arbitron's survey that averages 171,000 listeners per month – at a relatively high sound quality. Of course, the high-speed connections produce

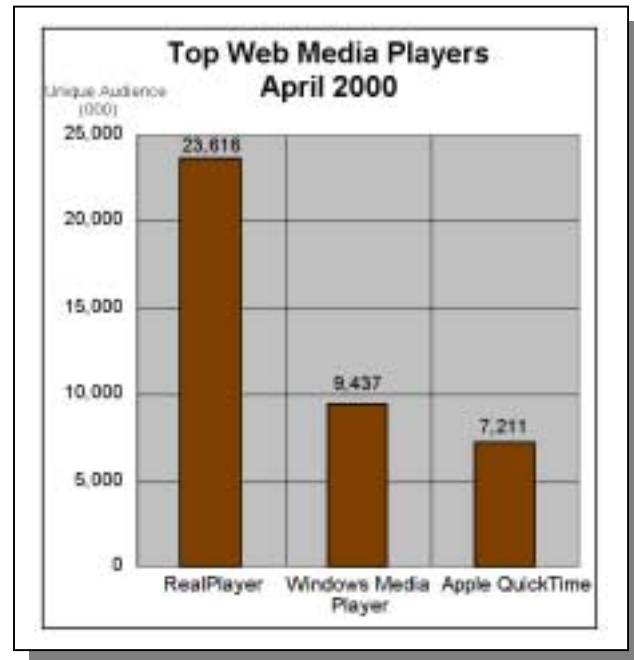


better quality and less interrupted audio. From California to Amsterdam and around the world, listeners can choose from 308 radio stations that are broadcasting only on the Internet, up from 168 just one year ago. In addition, 3,397 radio stations and 58 radio networks have joined the high-tech world of webcasting. Of the more than 12,000 traditional radio stations, one out of four with a site on the Internet are now webcasting live, such as WBYR out of Fort Wayne, Indiana (www.wbyr.com). BRS Media estimates that each month nearly 100 new radio stations sign on to the Internet around the globe.

Listening to radio or watching video on the Internet requires specific software. The most popular to date is RealPlayer by RealNetworks. First released in 1995, RealPlayer now has 125 million unique users, up from 95 million in 1999. According to RealNetworks, every week over 350,000 hours of live sports, music, news, and entertainment are broadcast over the Internet using RealSystem technology.

There are also hundreds of thousands of hours of content available on demand. The RealPlayer user base grows by over 200,000 new users per day, an increase of more than 300 percent since the beginning of 1998.

Although television, known as streaming video, on the Internet is developing at a slower rate than radio, a number of “broadband digital channels” have begun to appear. These sites, such as crushedplanet.com, Nibblebox.com and Pseudo.com, present original entertainment programming not found on standard television. For instance, Nibblebox.com offers a venue for college students to present their original work under the watchful eye of established directors, writers, and producers. The biggest problem associated with video on the Internet is the size of the files and the time it takes to download those files with currently available technology. As technology and high speed broadband access proliferate, watching television or a movie on a PC will become as easy as turning on the remote control.



Download Times Using Different Transport Speeds/Technologies

Titanic Movie

28.8 Kbps modem	42 hr., 30 min
ISDN (128 Kbps)	9 hr., 14 min.
T1 line (1.5 Mbps)	49 min., 20 sec.
DSL (1.5 Mbps)	49 min., 20 sec.
DSL or cable modem (4 Mbps)	18 min., 30 sec.
DSL or cable modem (8 Mbps)	9 min., 14 sec.
Cable modem (10 Mbps)	7 min., 23 sec.

Note: The movie Titanic is 3 hr., 14 min. (194 min. total). Download speeds will vary in the case of cable modems, depending on the number of users simultaneously online in a neighborhood because all the users on the same node have to share available bandwidth – like a broadband “party line.” DSL’s big limitation is distance from the central office – now about 3 miles.

Source: Center for the New West (1999)

Section 4. *Electronic Business*

The business world has benefited immensely from the evolution of the Internet. Not only has the Internet facilitated communications between businesses and consumers, as well as between businesses themselves, it has created a new medium within which to conduct business. This new medium, electronic commerce, or *e-commerce*, is changing relationships in the business world, linking businesses and consumers, and building new business communities. For retailers, the Internet is a direct portal to millions of users and potential customers around the world and is always on all year long. While for industry, the Internet has enabled new relationships and trading communities to flourish online. All involved in this revolution in business operations have benefited from the Internet, be it through cost-savings, efficiencies, or the creation of new business-to-business relationships.

The rise of the net economy and the success of the IT sector have fueled the U.S. economic boom of the last 10 years. The dot-com revolution of the 1990s and the emergence of new online business models have kept the U.S. economy vibrant and astonishingly healthy. This prosperity has not been limited to the United States. Europe, Japan, Korea, and Australia are just some of the other markets experiencing the Web's power to change business. Internet penetration and the creation of a business environment that is receptive to electronic business and increased investments in information and communications technology (ICT) have become the goals of nations around the world.

This section will examine the rise and development of electronic business. It includes special focus on ICT investment and IT sector growth, changing business practices and models, international electronic business environments, and an overview of *e-commerce* trends and forecasts.

Section 4.1 *Internet Business Models*

The Birth of Internet Business

Despite its rapid growth, Internet Business remains in a formative stage. Throughout the 1990s, computer hardware, software, and component makers have enjoyed the most success given the high demand for their Internet-enabling products. However, Internet pure-play companies, whether content providers or online retailers, have also been successful by focusing on attracting and retaining users. Yet much uncertainty remains in the development of Internet business models and practices. The potential to revolutionize how companies operate and grow has, however, become self-evident.

The IT Economic Driver

The Internet and the proliferation and integration of IT technologies across numerous industry sectors have fueled the U.S. economy's longest sustained periods of economic expansion. In this year's Digital Economy report, the Department of Commerce credited IT industries with contributing nearly a third of real U.S. economic growth between 1995 and 1998. The implementation of IT tools and an Internet strategy in more traditional businesses has produced phenomenal efficiencies and cost-savings for these companies. In the same report, the Department of Commerce also acknowledged that the use of IT contributed close to 50 percent of the total acceleration in U.S. productivity in the second half of the 1990s.

The cost of IT products has also fallen over the 1990s, adding to the cost-savings of companies that actively pursue Internet strategies. According to Department of

Commerce figures, annual declines in computer prices between 1987 and 1994 were approximately 12 percent. However, this price decline accelerated between 1995 and 1999 to almost 26 percent annually.

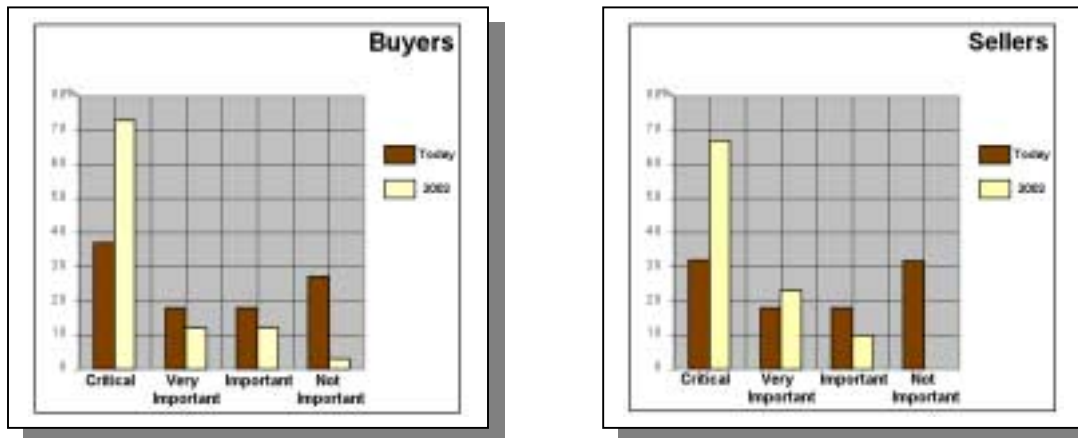
The IT sector has experienced extraordinary growth in the 1990s. According to a study conducted by the University of Texas and supported by Cisco Systems, the IT sector experienced a 62 percent surge in annual revenue in 1999, reaching \$523.9 billion. Revenue for companies leveraging the Internet in their businesses grew at an annual rate of 11 percent between 1998 and 1999. This figure is three times the growth rate of the economy as a whole for the same period.

The demand for workers with IT skills is adding to this growth. The University of Texas study identified over 2.4 million people working in IT-related jobs. In 1999, 650,000 new jobs were added to this figure. Workers in the Internet Economy now far outnumber several more traditional industries, such as insurance, communications, and public utilities.

Business Moving Online

As businesses have moved online, some fundamental business practices have changed. The use of networking, e-mail, Intranets, and Extranets has altered the way companies use and distribute information. The application of these IT tools has streamlined many business practices such as training, which can now be done over a company's Intranet. External relationships such as joint ventures, customer service, and investor relations have all benefited through the ability to rapidly exchange and retrieve information via e-mail and the Internet.

Importance of B2B e-commerce for your company



Source: Forrester Research

Companies that leverage the Internet have realized better internal operations, customer services, and significant cost-savings. According to Giga Information Group, moving business online will save companies around the world \$1.25 trillion by 2002. Cisco saves over \$800 million annually by placing key business applications on the Web. In terms of improved efficiency, IBM has reported improvements of up to 95 percent in on-time delivery by transferring supply chain management to the Web.

Internet Business Models

Internet business models have tended to revolve around two basic models, online retailing, or e-commerce, and content providers, be they media sites or portal services. Content providers focus on capturing and retaining users to leverage either advertising fees or service charges for access and unique content. In contrast, online retailers have a more traditional approach to Internet business by simply transferring retail operations on to the Web. The B2B market has grown faster than B2C e-commerce with the creation of B2B exchanges and the advantage of existing electronic information exchange standards such as EDI. However, while most

estimates indicate that B2B e-commerce will continue to grow more rapidly, the potential B2C market is nonetheless impressive. According to the Angus Reid Group, of the 300 million worldwide Internet users, nearly 120 million have made transactions online.

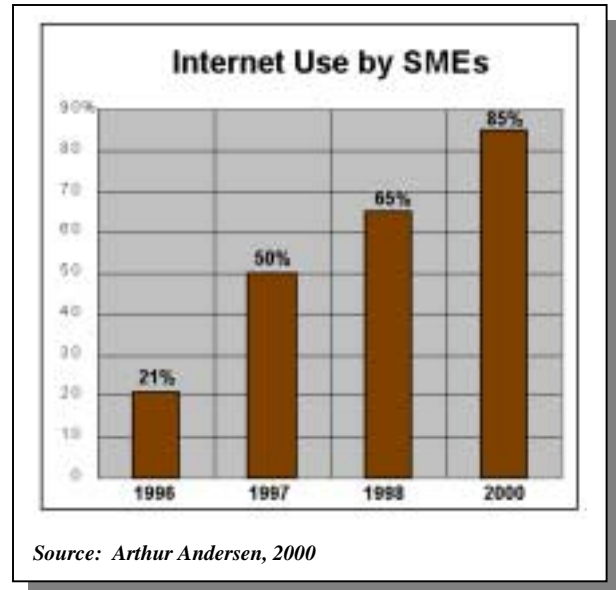
In the late 1990s, new players with diverse services have changed and built on these two basic models. Numerous companies now offer online services as diverse as banking, advertising, trading, investing, publishing, and reverse auctioning. Value added private information and consulting services have also made significant gains by shifting products and services to the Web. Government and industry are also reshaping how they do business through online procurement sites that also provide free information services to public sector workers.

One of the most promising new Internet business models is the Application Service Provider (ASP). ASPs offer both corporate and private clients software services on demand over the Web, without the need to invest in specific software products. ASPs provide technology and applications in a targeted fashion and create substantial cost-savings for users. The Gartner Group found

that by employing web-based application support, cost-savings could be as high as 80 percent. Moreover, in a recent Jupiter Communications poll, 57 percent of respondents indicated that they expect to use ASP services in the future. Innovative companies have begun to recognize the potential of this new market. Major ASP industry leaders, Hewlett-Packard, SAP, and Qwest have already formed an alliance to provide ASP services.

Big Plans for Small Businesses

Many small and medium size enterprises (SMEs) are also beginning to appreciate the potential of the Internet to provide product exposure and create cost-savings. According to a recent Arthur Andersen poll, 50 percent of SMEs rank the Internet as their favored growth strategy for the next 12 months. Additionally, Arthur Andersen concluded that 85 percent of SMEs currently use the Internet and 53 percent now have a homepage.



While SMEs are increasingly appreciating the potential of the Internet to enhance their businesses, many remain hesitant to conduct e-commerce. Arthur Anderson found that 54 percent of SMEs indicated that they do not conduct e-commerce and do not intend to launch an e-commerce-capable site in the next 12 months.

Section 4.2 *Internet Business Penetration*

Online Environments

Countries and companies around the world are rapidly plugging into the Internet. However, while the Internet is global, local conditions are still paramount in determining the success of doing business on the net. First, Internet businesses require “connectivity” or the availability of a sound information and communications infrastructure, which is both cost-efficient and interoperable across companies and countries. Second, Internet business requires the support of a local business culture that is receptive to online business practices.

According to the Economist Intelligence Unit (EIU), North America and Western Europe are the world’s most “*e-ready*” regions, defined as those that have high levels of connectivity and strong online business cultures. EIU ranked the world’s top 60 *e-ready* countries in May 2000, rating the U.S. as the most *e-ready* country followed closely by Scandinavia, the Netherlands, the UK, and Canada. Falling just short of the top 20 were Japan (21) and South Korea (24), which continue to face concerns regarding the development of a receptive online business environment. Rounding out the lower rankings were those countries which continue to struggle with developing adequate communication infrastructures and fostering a receptive business environment. Not surprisingly, these included Russia (44), India (50), China (51), and Iraq (60).

ICT Investment

Online success also requires investing in the tools of Internet business. Countries and companies that maintain high levels of

e- readiness rankings (top 20)

1	United States
2	Sweden
3	Finland
4	Norway
5	Netherlands
6	United Kingdom
7	Canada
8	Singapore
9	Hong Kong
10	Switzerland
11	Ireland
12	Denmark
13	Germany
14	France
15	Belgium
16	Australia
17	New Zealand
18	Austria
19	Italy
20	Israel

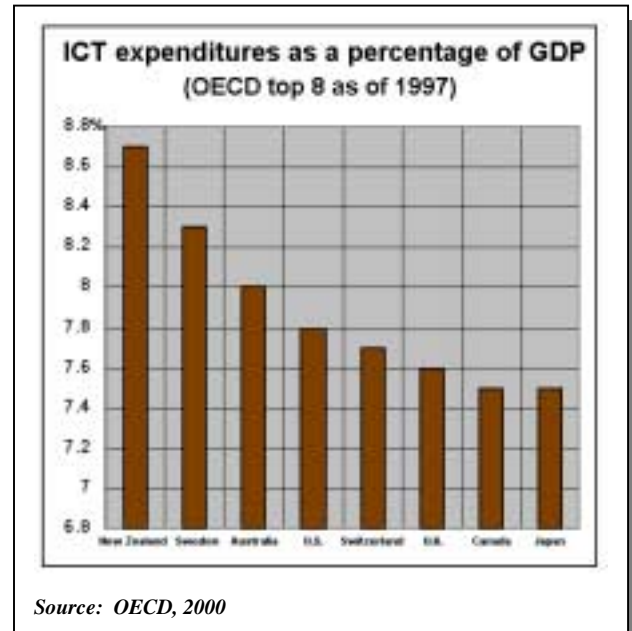
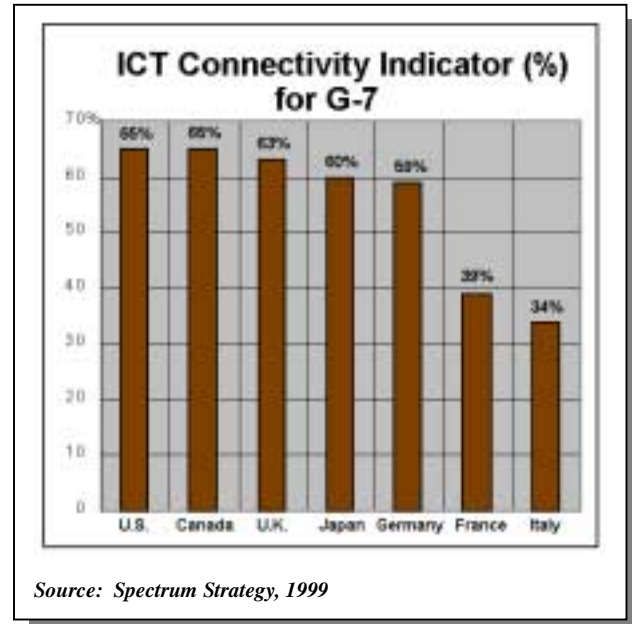
Source: *Economist Intelligence Unit (EIU), 2000*

investment and innovation in ICT gain competitive advantages in doing business on the Web. In 1999, Spectrum Strategy conducted an international benchmarking study to measure IT and Internet investment and progress in the leading global industrialized nations (G-7) for the UK’s Department of Trade and Industry. For this study, Spectrum devised an ICT usage ranking systems they referred to as an ICT Connectivity Indicator. This ranking indicates the number of companies using at least one of three selected electronic business technologies. These included websites, external *e-mail*, and EDI. Reflecting the findings of EIU, Spectrum ranked the U.S. and Canada first with a 65 percent ICT Connectivity Indicator. The UK ran a close third with 63 percent. Unlike EIU’s *e-readiness* rankings, Spectrum’s Connectivity Indicator does not measure business practices and environment. Because of this, Japan ranked

a comfortable fourth with 60 percent. Surprisingly, France and Italy lagged far behind other five, with 39 percent and 34 percent respectively.

Today, companies are investing aggressively to keep pace with changing technologies to ensure success on the net. Global spending on ICT in 1999 exceeded \$2.1 trillion according to a joint study conducted by the World Information Technology and Services Alliance (WITSA) and IDC. This study also forecast that global spending will surpass \$3 trillion by 2003. North America spent the most in 1999, reaching \$796 billion.

According to the Organization for Economic Co-operation and Development's (OECD) 2000 Information Technology Outlook, investment in ICT as a percentage of Gross Domestic Product (GDP) averaged 7 percent in OECD countries as of 1997. Currently, OECD countries account for more than 80 percent of global ICT production. However, markets such as Brazil and China are growing rapidly.



Section 4.3 E-Commerce Trends and Forecasts

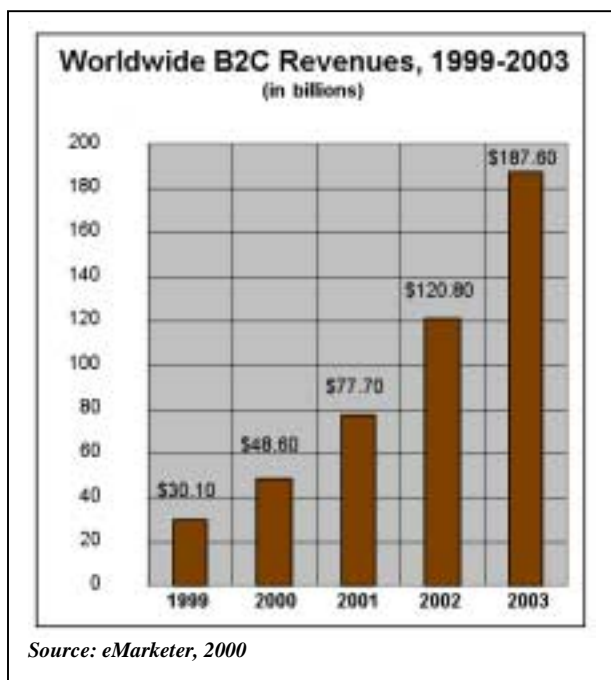
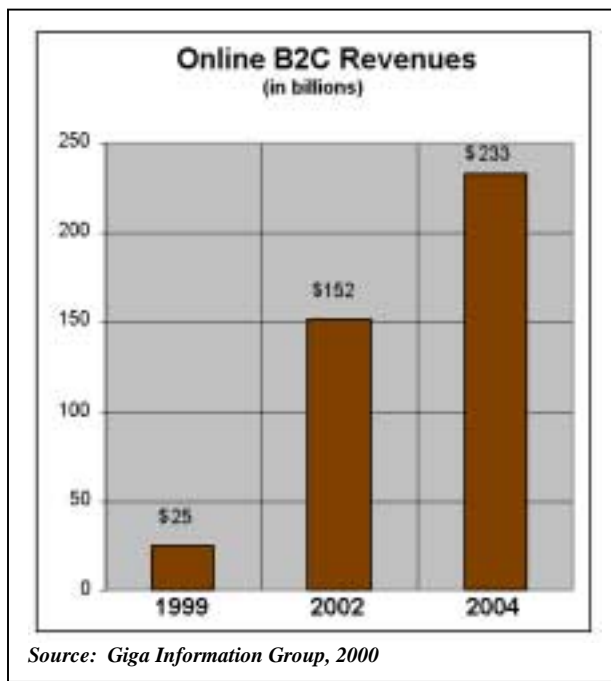
In the past few years, e-commerce has exploded, quickly establishing its place in the new economy. Consumers, businesses, and governments are taking advantage of the ease of the Internet to buy and sell goods and services online.

Business-to-Consumer (B2C)

B2C e-commerce is quite simply defined as businesses selling goods and services to consumers via the Internet. According to Giga Information Group and eMarketer, online spending, though healthy, will hit a stable plateau within the next few years. Online revenues are expected to surpass \$38 billion by the end of 2000, increasing to \$233 billion in 2004. In addition to actual online spending, in the first quarter of 2000, U.S. consumers spent \$13.8 billion over the phone and in stores as a direct result of shopping conducted on the Internet. By 2005, \$632 billion will be spent offline as a result of Internet research.

B2C e-commerce has maintained a steady growth rate through the first quarter of 2000. Spending \$7 billion for the quarter, online shoppers almost matched 1999's fourth quarter of heavy holiday shopping. Online shopping continues to grow, gaining more participants each day.

B2C e-commerce may be divided into two areas: pure-plays and click-and-mortars. Pure-plays, businesses that sell only via the Internet, accounted for half of 1999 B2C sales, a percentage that will soon shrink. Click-and-mortars, businesses with a physical as well as online presence, captured roughly 33 percent of online B2C sales in 1999 and are expected to command a larger share of the Internet market in the coming years.

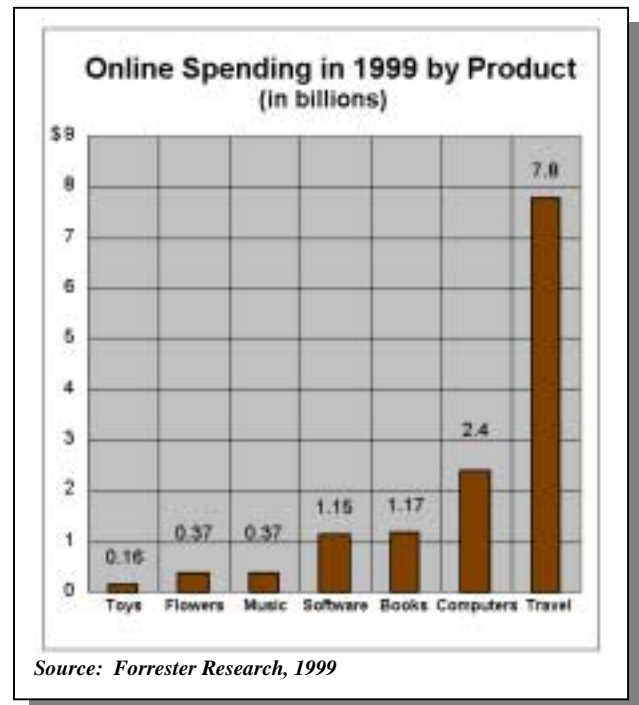


Nearly one-half (47 percent) of American Internet users have purchased something online with 11 million more consumers expected to make their first online purchase within the year. By December, 68 percent of U.S. users will be shopping online,

growing to 77 percent by 2003. In 1999, the average buyer purchased \$500 worth of goods online, increasing to \$627 by the end of 2000 and to \$1,033 by 2003.

Customers of online shopping are most attracted by low prices, followed by contests and brand names. The most popular sector of B2C *e-commerce* is travel, accounting for over \$2 billion in spending for the first quarter of 2000. Computer hardware, apparel, and auctions were also quite popular.

As B2C *e-commerce* extends to new product categories and attracts new consumers, online retail industry must continue to reassure the American public that Internet transactions are secure. Fifty-two percent of online users are not online buyers because they fear credit card fraud and the unauthorized distribution of personal information. As long as online sites can ensure a strong degree of information security and maintain a policy of not releasing customer information, the Internet retail market will prosper.

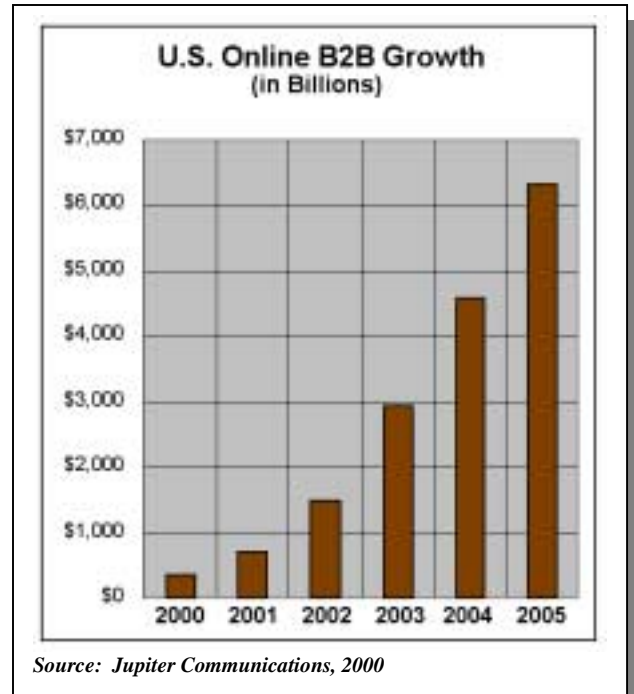
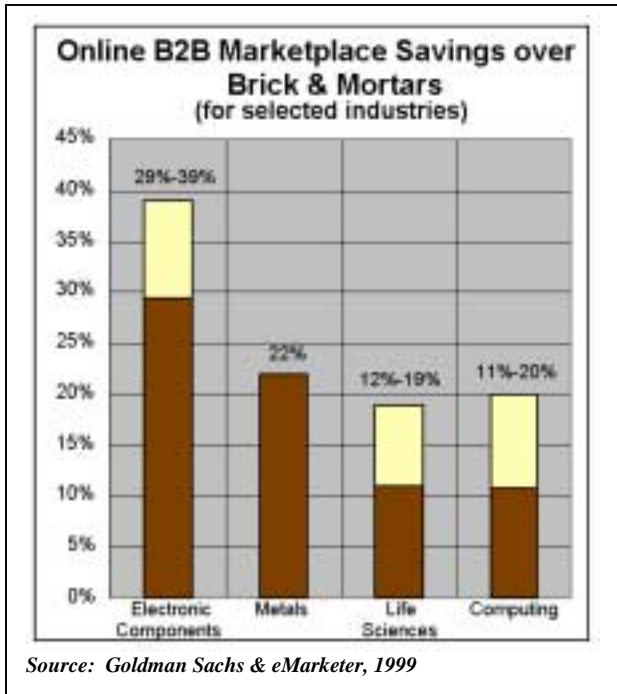


Business-to-Business (B2B)

In the next few years, B2B *e-commerce*, the online purchase of goods and services between companies, will greatly surpass B2C in terms of dollar amounts simply because companies purchase in much greater bulk than do individual consumers. The emergence of numerous new B2B initiatives marked 1999. This trend to should continue, making B2B one of the most successful sectors of the Internet economy.

Projected revenues for B2B in the coming years differ tremendously, ranging from \$1.2 trillion to \$10 trillion by 2003. Jupiter Communications predicts revenues of \$6 trillion within three years.

Contributing to the growth in revenue is expected savings from increased efficiency offered by Internet marketplaces and exchanges. This translates into less expensive goods for the consumer and increased profits for manufacturers. Savings through B2B online trade will reach \$180



billion in three years according to International Data Corporation. Goldman Sachs breaks the savings down by industry:

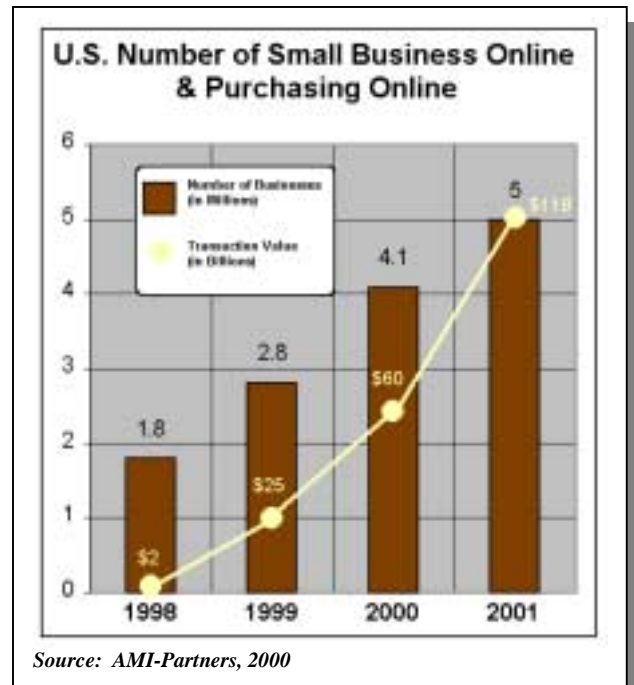
The number of firms participating in B2B e-commerce is also increasing at a rapid pace. Twenty-eight percent of global companies are already active in at least one B2B site, with an additional 25 percent planning participation within one year. eMarketer predicts that within three years, online buyers might reach 90 percent of firms. At a minimum, four out of five will buy online. However, firms selling on the Internet will not even reach 50 percent by then.

Large businesses are not the only ones gaining from B2B; small companies are steadily making their mark online. Small business B2B spending jumped 138 percent

in the first quarter of 2000. The number of medium and large businesses engaged in e-commerce is already above 40 percent, rising to 78 percent by the end of 2002. Small businesses won't be too far behind, with 58 percent online in 2001 and 72 percent by 2002.

Selling Online	30%-40%
Buying Online	80%-90%

Source: eMarketer, 2000



Tracking the growth of online B2B sites is difficult, with numbers ranging from 500 to 1,000 as of April 2000. By 2003, over 4,200 B2B sites will be operational. However, Forrester, Jupiter, and eMarketer all predict a period of intense growth in B2B sites, followed by a shakedown of up to fifty percent as the market adjusts and stabilizes.

B2B *e-commerce* is divided into two primary sectors – marketplaces (where prices are preset) and exchanges (where prices are negotiated between buyer and seller). B2B sites already in existence or in development include:

- **Cephren**, an exchange for construction materials and labor, charges a transaction fee to suppliers who include Standard Electric, Watsco, and Wesco-Liberty.
- **Ventro**, a marketplace for chemicals and laboratory supplies, also charges a transaction fee to suppliers. Ventro has more than 300 suppliers, including AG Scientific, Novagen, and Worthington Biochemical.
- **eSteel** is an exchange for the steel industry with suppliers such as Dofasco, National Steel, and U.S. Steel.
- **MedSite**, a reseller of medical supplies and equipment, includes suppliers such as 3M, Brandt, and Welch Allyn.
- **PlasticsNet** is an exchange and marketplace for materials and equipment for the plastics industry. It has 50 suppliers including A-Top Polymers, BP Amoco, and Eastman Chemical.
- **Covisint**, owned by General Motors, DaimlerChrysler, and Ford, is an exchange for parts and supplies for the automotive industry. Suppliers include Meritor Automotive Inc., Johnson Controls, Inc., Federal-Mogol, and Lear Corporation.

Business-to-Government (B2G)

E-commerce is also spreading to the federal government. B2G is similar to B2B, but businesses sell in bulk to the government instead of each other. It is an extraordinary opportunity for the public sector to take advantage of cost savings and greater efficiency offered by Internet commerce. The primary motivation behind B2G is the American citizen. As electronic government progresses, the American public has easier access to government information and officials and may reap the benefits of monetary savings through reduced taxation.

Here are a few examples of B2G *e-commerce*:

- **FedBid** is an online procurement marketplace for IT-related products that allows government purchasers to research products, specify the parameters of the bid, review and evaluate offers from competing vendors, make the purchase, monitor delivery, and even track their own purchasing history. FedBid operates a reverse auction – the buyer submits a bid and suppliers compete to meet that bid. Other similar government procurement marketplaces include **FedCenter**, **eFederal**, and **FedAmerica**.
- **Ezgov** and **govWorks** are two similar private sector initiatives in use at the local and state level. Each is a portal application that allows citizens to make secure transactions, such as paying of taxes and tickets and filing government forms online. Both expect to enter the federal market this year.
- **GSA Advantage!** is a procurement website that allows U.S. government employees to browse, search, order, and pay for items via the Internet. Registered government buyers can

choose from nearly one million items and over 2,000 vendors — everything from automobiles to paperclips are available. GSA Advantage! users currently place orders worth almost \$100 million annually.

- **Nationtax Online** offers a simple, fast, and accurate way for businesses to file sales, income tax withholding, and other state and federal business taxes over the Internet without costly software. Nationtax is expected to be fully operational by the end of 2000.

Section 5. *Looking Forward*

Few new media in the last century, including television, have made such a dramatic impact on daily life in so short a period. Under the circumstances, it is unrealistic to expect that governments will remain as passive in the face of new developments as they have been to date. Already there are increasing calls for government at one level or another to “harmonize” Internet protocols, “manage” or “encourage” developments in one direction or another, and to address taxation.

Internet Governance Issues

The question facing governments at many levels now is what role should they play in shaping Internet policies? What should governments do, or refrain from doing, to exercise legitimate tax and regulatory functions over a wide range of activities that once were confined to the physical world but are now migrating to the digital environment?

The question is all the more complex because government’s laws and legal enforcement mechanisms are rooted in physical geography. But the Internet is a global medium. The Internet allows for the free flow of information across regional and national borders.

Governments face serious obstacles to involvement in “managing” the Internet to any extent, and there is the very real danger that precipitous actions might do more harm than good. Here are some of the obstacles, and some suggestions about how governments can best proceed.

As indicated above, a major obstacle arises out of the fact that while governmental authority and Internet activities overlap, they

are certainly not coterminous. The government of the United States has jurisdiction over its citizens and the geographical landmass of 50 states and some territories. Likewise, the government of France exercises dominion over its citizens and numerous *départements* and a few overseas possessions. The Internet is less a geographic space than a cultural, linguistic, or social space, and is often times unfettered by traditional governmental authority.

A subscriber to *The Pokémon Times* online newsletter might just as easily be Belgian, Mexican, Japanese, or Canadian. Participants in a chat group devoted to the thought of Henri Bergson can argue in real time from their living rooms or offices in France, Greece, or Russia. These operational characteristics of the Internet that do not conform to existing legal frameworks, along with its unique packet-switch architecture, pose conceptual and practical problems for cities, states, and nations.

In the physical world, someone who violates a zoning ordinance against pornographic movies is arrested and goes to jail; someone who puts up a gambling casino in the middle of downtown Chicago is shut down in short order. And a merchant who does not collect sales taxes and remit them promptly to the state government faces serious legal sanctions. But in the Internet world, it is far from clear specifically who has the responsibility to deal with behavior of this kind, and it is even less clear how to go about it. The pornography received in Dubuque may originate in Botswana; the casino operator collecting bets from punters in Düsseldorf, Germany may be living in Caracas, Venezuela; and the merchant selling pants to buyers in Madrid, Spain may

reside in Oslo, Norway, while the pants themselves come from Thailand.

Regardless of whether a national, state, or local jurisdiction defines a certain activity as a crime, if committed on the Internet, it is often extremely difficult to identify both the perpetrator and the location of the crime. Likewise, while some countries define dissent against the state as a crime, they often lack the authority to halt such activity online. Which is one reason for authoritarian regimes to fear the widespread dissemination of a medium so difficult to control or track.

All governments face the need to devise regulatory and enforcement tools that are vastly different from what has been used in the past. Not just different in degree or geographic reach, but entirely different in character. There is no “beat” for cops to walk on the Internet, and no physical speakeasy to be broken up or shut down. Law enforcement in cyberspace is going to look very different from law enforcement on the sidewalks of New York. Governments should start thinking about what an Internet “cop” looks like, and how to train officers.

Not every online activity that requires a policing function need necessarily be monitored by traditional police forces. Many online communities are inventing new alternative mechanisms to apply principles of law for the digital world that were derived from existing legal frameworks. For example, one very effective anti-fraud strategy has been pioneered by eBay, the online auction clearinghouse. Every seller and buyer on eBay must submit to posted comments from customers and vendors that will either enhance or diminish the reputation of a party to a transaction. If a seller on eBay cheats a consumer once, that fraud becomes transparent to the entire

community and it becomes much more difficult for the seller to continue doing business on the site. Moreover, many large Internet Service Providers try to police excesses of their own subscribers by enforcing terms of service contracts that curtail fraud and privacy violations.

Continuing Challenges

The challenge faced by governments trying to shape Internet policy resembles the challenge that always faces civilization when a frontier begins to give way to waves of newcomers.

Perhaps the rise of the Internet is best comparable to the California Gold Rush of 1849. In nineteenth century California the first prospectors operated outside the law in an undeveloped land. But soon there was a second migration of church-going settlers with families. The new settlers wanted to elect a sheriff and separate the residential areas from the saloons. They also wanted to keep a watchful eye on the snake-oil salesmen who rode into town just to make a quick buck and then disappeared. Eventually the city jail got built, zoning separated the neighborhoods, white picket fences went up along plank sidewalks, and churches were welcome at the end of Main Street.

But the Internet poses challenges much larger than building plank sidewalks. The lightning-fast electronic communications of the Internet are characterized by speed and flexibility and governments around the world are challenged to keep pace. Research summarized earlier in this report indicates that Internet penetration and use are going to increase as much as ten-fold in some areas of the world over the next five years. On the basis of past performance, governments could be permanently behind

in developing policy. As bad as it is to be behind, it can be even more dangerous for governments to attempt to anticipate policy for technological developments that change so fast and can take very unexpected turns in a matter of months.

For example, early in the technology revolution, several states that passed digital signature laws that made the mistake of specifying a particular technology. By the time of the effective date of the legislation, the specified technology was obsolete. In its recent digital signature law signed by the President this summer, Congress wisely specified the characteristics that any valid electronic signature must have. For example, these characteristics included elements such as irrevocability and uniqueness. The law validated any application that provides the necessary characteristics. Such a law is far less likely to be overtaken by the tide of innovation. Given these limitations, what should governments do?

U.S. Internet Council Recommendations

I. Governments need to recognize the amazing benefits of the Internet, and do nothing to cripple it. As earlier sections of this report have shown, information technology industries are responsible for as much as one-third of U.S. economic growth since 1995. And the average Internet industry worker earns nearly twice what the average U.S. worker makes. Precipitate government actions—to protect privacy, for example—could create a web of conflicting rules that would make e-commerce, and that kind of economic growth, impossible.

II. National governments should focus on sending signals to industry and the Internet about the public policy goals that are priorities for that particular nation. In doing

this, it must also recognize that the Internet does not accommodate win/lose policy battles well. If there is a demand, the Internet tends to respond to it. Gambling and pornography provide thorny examples. Efforts by one governmental unit to ban these activities will only succeed in driving them to more hospitable locations, away from the less friendly physical jurisdictions.

Absent worldwide agreements on both definitions of crimes and enforcement mechanisms, the most effective role of government may be to encourage the tools by which people can protect themselves and their families from content on the Internet that they deem inappropriate. There is a market for personal-empowerment technology to tame unwelcome privacy violators and that market can fill the need.

III. Government should rely on technology itself to meet as many of its goals as possible, and that should be its first recourse. The characteristics of the Internet do not lend the medium receptive to government regulation.

The Computer Systems Policy Project (CSPP) has provided an excellent overview of the policy issues facing governments today, and have suggested several possible technological solutions that might be followed in meeting them. Some of these technological solutions exist today, others are on the near horizon. They address a wide range of concerns such as privacy, taxation, protecting intellectual property rights, harmful content controls, network and systems security, electronic authentication, electronic payments, and Internet infrastructure issues.

IV. Government should rely on the Internet community to regulate itself, where this is possible. Governments across the globe

have recognized the need to form new relationships with industry to allow the Internet to prosper. The U.S., EU, and Japan have all been bold advocates of industry leadership and have opened numerous channels of dialogue with industry leaders to permit this new relationship to take hold. These governments have recognized the strength of allowing Internet development to be market-driven, rather than government-directed.

Successful industry leadership and self-governance requires that industry is willing to cooperate and enforce a set of standards and practices. Open dialogue between industry, government, and academia form the foundation upon which industry can determine and set rules and standards. Industry leadership, while thriving on fierce competition, does not imply the right to unilaterally create new standards or codes of conduct. Rather the contrary is true. Industry leadership requires a certain degree of unity, cooperation, and compliance.

To ensure the success of this approach, legislators, at whatever level, need to become increasingly Internet-savvy. Not having grown up with the Internet, many legislators are simply unaware of the pace of technological innovation, or of the flexibility of what is almost an art form, as well as the rapid proliferation of both technological problems and solutions. Legislating in that environment is particularly perilous, and we advise all legislatures to reach out to experts on the cutting edge of the technological revolution, create committees staffed by technology-savvy personnel, and schedule briefings on digital policy challenges.

For example, the United States Internet Council suggested to the Florida state legislature in 1999 that it create an Internet policy study commission to build on

previous work done by a Virginia commission in 1998. The Council encourages lawmakers to create special committees that will develop institutional expertise in information technologies and to conduct “hands-on” demonstrations of emerging technology as soon as possible, so that legislators will be aware of the potential and the pitfalls in trying to regulate in such a dynamic area. In essence, observing how to provide technological solutions to technological challenges is a critical skill that future legislators will need to master.

V. Industry must recognize that there are areas where governments must act. For example, government must act in the prosecution of predators who stalk children. The current tools are ill suited to the task and success in prosecuting offenders is likely to be limited until there is a very well coordinated multi-jurisdictional plan. The same sort of aggressive multi-jurisdictional effort must be launched and sustained worldwide against cyber-terrorists and other malicious Internet mischief from viruses to threat and theft identity.

Industry should support such efforts. And governments should understand that industry support is likely only for the most universally shared goals. Governments must also face unique challenges to traditional regulatory governing mechanisms, which are dictated by the very nature of Internet architecture. Namely that both the direct, and indirect, costs of employing regulatory approaches to Internet challenges are very high.

VI. Government should focus on those areas where it can be most effective, and where its effectiveness is most important. These tend to be questions of access and infrastructure—helping to ensure sufficient public access points so that everyone can

reach the Internet; dramatically increasing the delivery of government services via the Internet and removing obstacles to the deployment of new infrastructure technologies (local access and transport area, or LATA, boundaries for example).

VII. Governments and industry need to sponsor continuing dialogues about how best to interface traditional geographic-

based legal frameworks with the rapidly changing digital world. Exactly this kind of conversation has been the primary mission of the United States Internet Council since its founding in 1996. The role of government at all times, but particularly in shaping Internet policies, is a balancing act where the responsibilities of industry and legitimate information needs of nations must be re-evaluated on an almost monthly basis.

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