

Digital Planet | 2000

the global information economy



Digital Planet 2000: The Global Information Economy

Published by the World Information Technology and Services Alliance (WITSA)

Based on Research Conducted by International Data Corporation (IDC)

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INTRODUCTION

Growing bigger than ever. Redefining the social landscape. Building the first truly global economy. And the story is just beginning. What is it all about? Information and communication technology (ICT), of course.

The surge in the ICT industry, documented in the 1998 *Digital Planet* study, continued through the final two years of the twentieth century. The worldwide ICT market surpassed the \$2 trillion mark in 1999, even as growth continued at almost an eight percent rate.

Digital Planet 2000, produced by the World Information Technology and Services Alliance (WITSA) using data provided by the International Data Corporation (IDC), continues to plot the trajectory of this incredible economic force. Here in a single comprehensive reference, covering the world's 55 largest ICT buying nations and regions and 98 percent of global spending, the financial dimensions and social impacts of the ICT revolution take shape. WITSA publishes this guide to help policymakers, technology developers and the general public understand the ICT trends reshaping society today, from the global marketplace to the local classroom.

For the purposes of this study, ICT is the sum of external and internal IT spending, plus telecommunications and other office equipment. The social impact of ICT is measured by looking at the number of personal computers (PCs) networked, the installed base of PCs in homes and schools, and the percentage of homes with telecommunications access.

Finally, an industry of this magnitude has an impact on (GDP), new businesses and the like. This study contains country-to-country comparisons of the investment of ICT, effects of ICT growth on GDP growth, changes in the number of industry-related businesses and related factors.

Digital Planet 2000 brings current the first version of this book, published in 1998. Like the earlier work, this edition differs from other studies because:

- The scope is global rather than regional or national
- Data are generated from primary sources rather than estimates
- The work provides actual ICT spending from 1992 to 1999

The surge in the ICT industry, documented in the 1998 *Digital Planet* study, continued through the final two years of the twentieth century. The worldwide ICT market surpassed the \$2 trillion mark in 1999, even as growth continued at almost an eight percent rate.

- ICT definitions have been harmonized across countries and are broader and more complete (see Appendix for complete definitions)
- The study includes not only spending data but social and economic indicators.

Why WITSA?

As an association of 41 information technology industry associations around the world, WITSA is uniquely qualified to create this study. *Digital Planet* fulfills an important part of the organization's mission, bringing clarity and insight to the role of ICT in building the global economy.

Why IDC?

International Data Corporation is the information technology industry's most comprehensive resource on worldwide IT markets, trends, products, vendors and geographies. IDC provides data, analysis, and advisory services to the world's leading IT suppliers, to Wall Street and investment analysis firms, and to IT professionals and Internet executives in industries as diverse as insurance, packaged goods, media, and manufacturing. IDC's research and opinions are based on the results of more than 300,000 end-user surveys, in-depth competitive analysis, broad technology coverage, and strategic analysis. IDC is committed to providing global research

with local content through its 700 analysts in more than 40 countries worldwide. IDC is a division of International Data Group, the world's leading IT media, research and exposition company.

A Word about Methodology

Digital Planet is a unique publication; it represents the largest view of global information and technology spending ever assembled. Data were collected through a variety of means. The principal source was an in-depth vendor supply analysis consisting of both surveys and interviews designed for this project. This review was supplemented in a variety of ways, including comparison with the financial records of major public companies, the surveys of other professional organizations, channel partners and IT end-user groups, and official statistics of multinational bodies like the World Bank, Organization for Economic Cooperation and Development (OECD) and other entities.

The phrase “information and communication technology” refers to computer hardware, software and services (consulting, training, systems development and integration, etc.), telecommunications hardware and services, office equipment and internal IT spending —IT employee salaries, equipment depreciation and the internal portion of IS spending budgets.

A RISING TIDE

Momentum within the global ICT industry is both building and sustained over time. Having surpassed the \$2 trillion mark in 1999, the industry will smash through the \$3 trillion threshold in just four short years (See Figure 1). As this expansion occurs—at a compound annual growth rate of over seven percent—the industry will find itself almost doubling in size between 1992 and 2002, from \$1.3 trillion to over \$2.4 trillion.

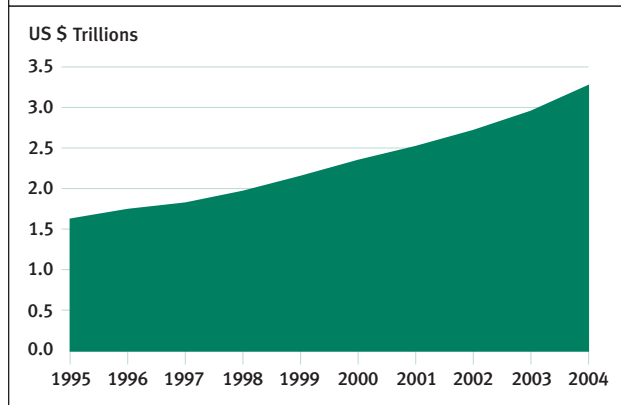
Momentum within the global ICT industry is both building and sustained over time. Having surpassed the \$2 trillion mark in 1999, the industry will smash through the \$3 trillion threshold in just four short years.

The ongoing development of the ICT industry is a global phenomenon, as many nations around the world are now committed to creating and supporting the policy frameworks, infrastructures, capital pools, partnerships, skill bases and applications necessary to facilitate ICT growth. Every country in this study, including those hard hit by financial crises and economic recessions, increased compound annual ICT spending between 1992 and 1999. The ability of ICT to inoculate countries from the “Asian Flu” and other economic woes appears to remain strong, with those nations most invested in this infrastructure feeling the mildest effects of the economic turmoil.

ICT Goes Global: Regions and Nations

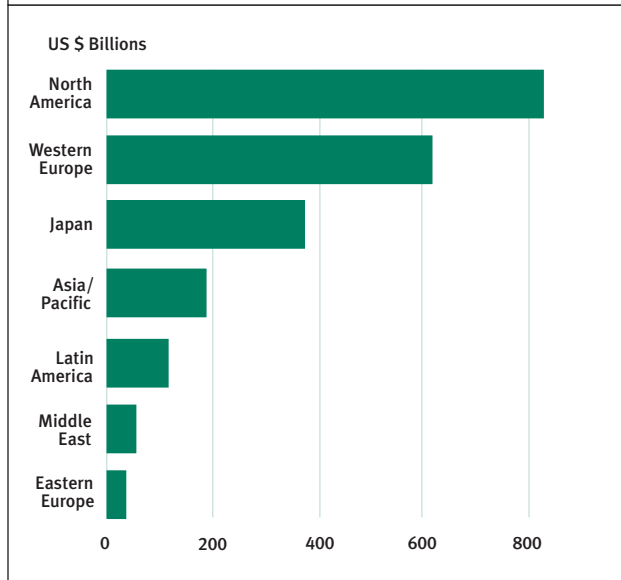
The global reach of the ICT revolution can be seen in the performance of both regions and individual nations. North America remains the world’s largest ICT regional market with \$817 billion in 1999 spending. Figure 2 illustrates the size of regional ICT markets; figure 3 (next page) shows the percentage of global ICT spending conducted in each region. The ranking of regional spending remains unchanged from 1997; North America leads, Eastern Europe lags.

FIGURE 1
ICT Ten-Year Growth

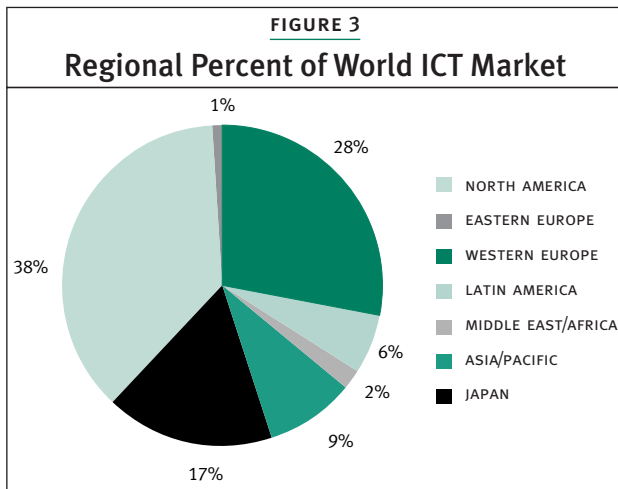


Source: IDC

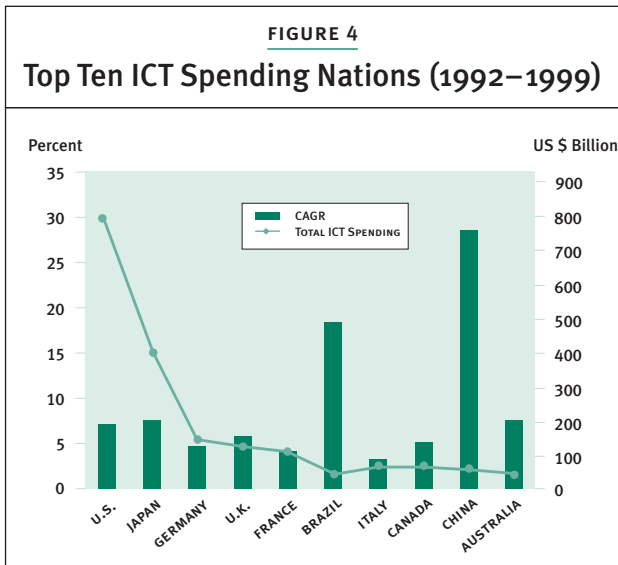
FIGURE 2
Total ICT Spending by Region (1999)



Source: IDC



Source: IDC



Source: IDC

A closer look reveals that the U.S. remains world leader in 1999 ICT spending with \$762 billion, followed by Japan (\$362 billion) and Germany (\$139 billion). The top ten list is rounded out by the United Kingdom, France, Italy, Canada, China, Brazil and Australia (See figure 4). While this list of top spending countries remains unchanged from 1997, the ranking of countries within the list has changed. China has moved from tenth to eighth position, ahead of Australia and Brazil. Even with this movement, developed nations clearly dominate the top ICT spending list.

This view, however, shifts dramatically when the

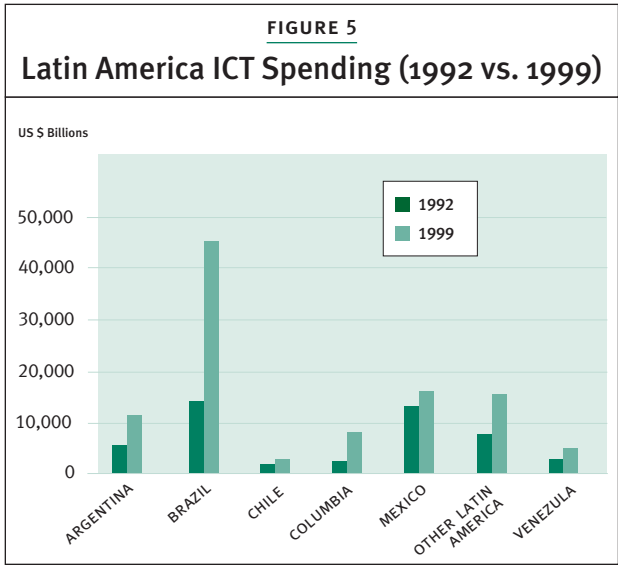
...regions with the smallest base of ICT are outpacing North America and Western Europe—regions now with mature ICT infrastructures.

emphasis changes from total spending to growth in spending. Here, the regions with the smallest base of ICT are outpacing North America and Western Europe—regions now with mature ICT infrastructures.

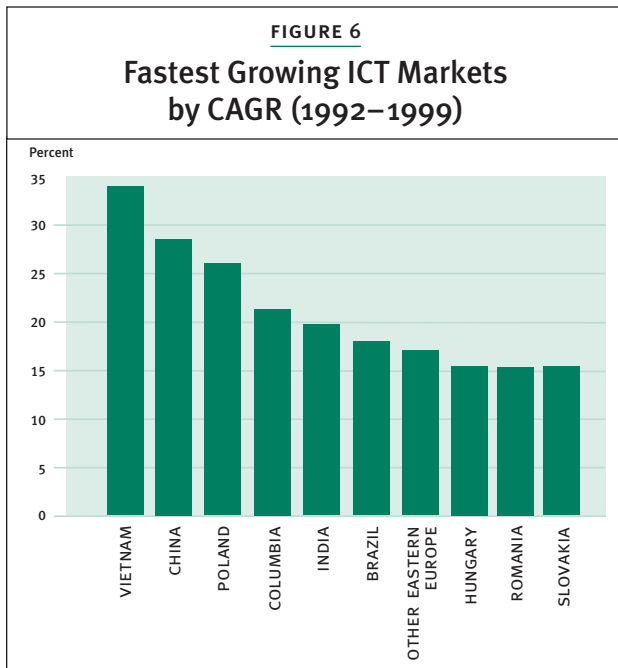
But changes in relative position can be observed from this perspective too. In the first edition of *Digital Planet*, Asia Pacific (excluding Japan) led the global pack for fastest growing ICT region. Latin America has moved even with Asia Pacific, enjoying a compound average growth rate between 1992 and 1999 of 13 percent, versus the latter's 13.3 percent. Compare Latin America's ICT growth rate with that of Western Europe, 6.2 percent, and the difference becomes even sharper.

The source of this Latin American growth spurt can be further reduced to one country: Brazil (See figure 5 on next page). Almost one of every two ICT dollars spent in Latin America is spent by Brazil. The country's explosion in ICT spending, from \$13.2 billion in 1992 to almost \$50 billion in 1999, is no doubt due in part to trade liberalization, privatization and moves during the mid '90s to control inflation and stabilize the Brazilian economy.

The story is no different when a shorter lens is used.



Source: IDC



Source: IDC

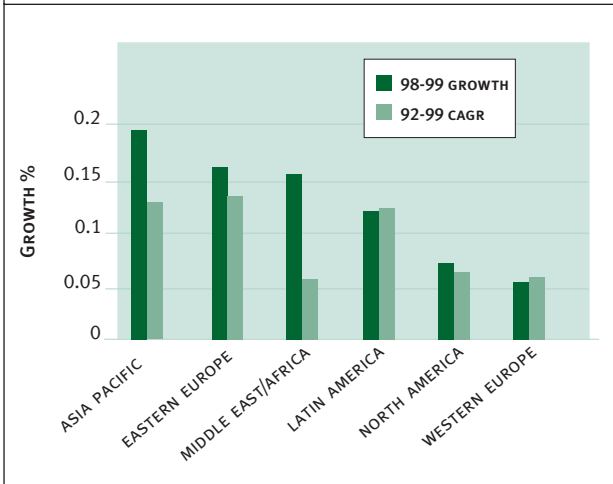
Latin America ICT growth in spending was almost twice that of North America and Western Europe between 1998 and 1999 (12.7 percent versus 7.3 percent and 5.7 percent, respectively). Indeed, Latin America saw more ICT spending growth than its neighbors to the north combined. Again, Brazil generated much of this year-to-year activity. The year’s hottest markets, however, Middle East/Africa and Asia Pacific, set a blazing pace of 15.9 and 19.5 percent, respectively. An Olympic year for both regions.

This acceleration among developing nations is also apparent among the top ten spending nations, where China’s compound annual growth rate (CAGR) from 1992 to 1999 is approximately seven times that of France and almost nine times that of Italy; Brazil over four times the growth rate of those countries. As it was when this report was first published two years ago, Vietnam remains the world’s fastest growing ICT market, sprinting at an almost 35 percent CAGR over seven years. Other countries growing at better than 10 percent include Poland, Columbia, India, Hungary, and Romania and Slovakia (See figure 6). Countries leaving the “fast ten” crowd are Greece, Singapore, Philippines and Portugal.

**For most regions of the world...
the tide appears to be rising, with
ICT spending rates in 1998-1999
larger than their respective
1992-1999 compound average.**

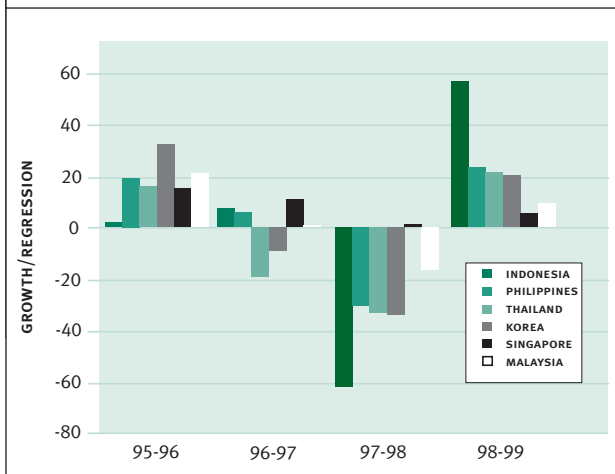
This suggests that while the installed base for ICT remains in the richer Northern economies, the “hot market” for build out of the ICT global infrastructure is elsewhere (See figure 7 on next page). This “rich versus poor” disparity will be pursued in greater length below. For most regions of the world, however, the tide appears to be rising, with ICT spending rates in 1998-1999 larger than their respective 1992-1999 compound average. Recovering countries such as Indonesia, Thailand and Korea, which saw precipitous ICT spending drops just a few years ago, have also seen their currencies strengthen and their ICT

FIGURE 7
Regional ITC Growth:
Short and Long Term



Source: IDC

FIGURE 8
Asia Pacific Year to Year ICT Growth



Source: IDC

spending rebound (See figure 8). Japan, which represented 72 percent of the region’s spending in 1992, has seen that share shrink to 66 percent in 1999.

Filling the Global Shopping Cart:
A Shifting Technology Focus

Along with shifting patterns in growth come changes in

The emphasis on hardware that generated the early momentum for the ICT revolution appears to have given way to an emerging focus on software and services.

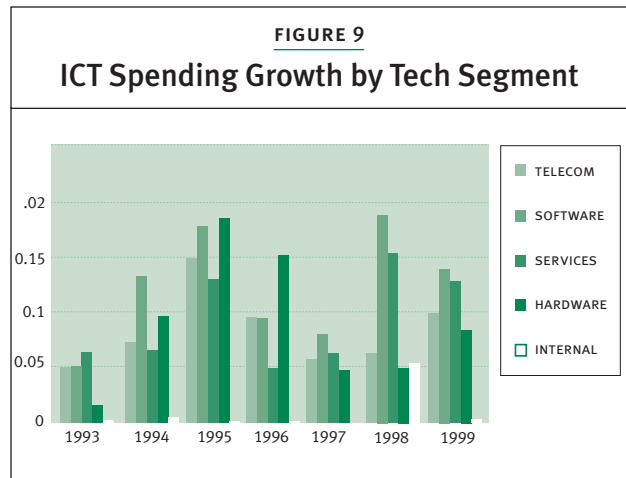
the global industry’s technology focal point (See figure 9 on next page). The emphasis on hardware that generated the early momentum for the ICT revolution appears to have given way to an emerging focus on software and services. While the hardware market grew by eight percent in 1999, the software and services segments increased by 13 percent and 12 percent, respectively.

The global 1999 spending total on software is over twice the 1992 total. In recent years, as the world scrambled to prepare for the Year 2000 date rollover, many organizations responded to the challenge by replacing and updating legacy software systems. These investments no doubt accelerated the pace of software spending. Many firms went a step farther, acquiring the business process and systems re-engineering expertise needed to turn Y2K from a frustrating and time consuming distraction to a timely opportunity to reinvent their use of ICT. This watershed event, along with the onset of important new e-business models, the marketplace quest to address ICT challenges on an enterprise-wide basis, and growing momentum for web-hosting and other forms of outsourcing, all served as significant spurs to growth in the services sector.

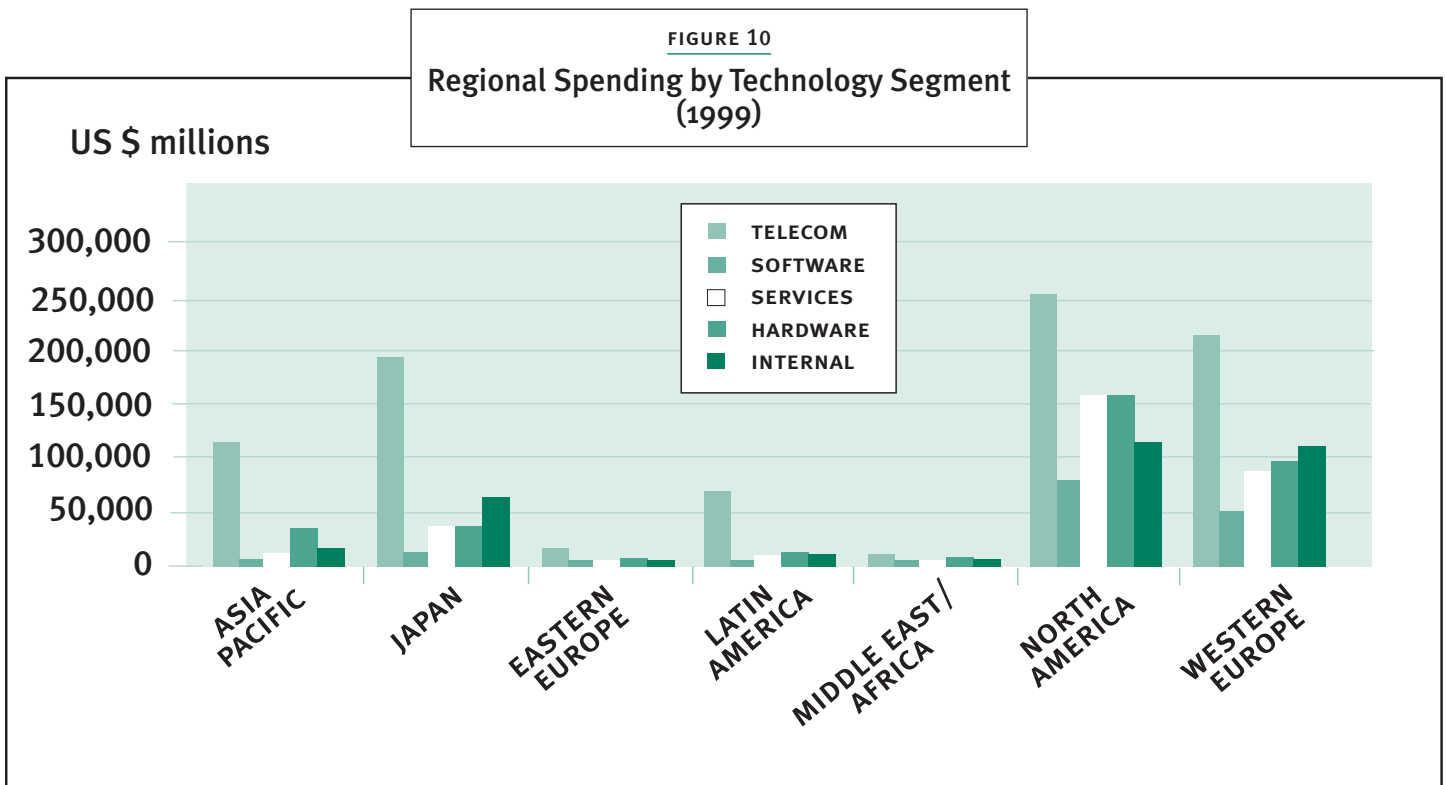
Other ICT segments have witnessed gains of 70 percent or more. The exception is internal spending, virtually flat between 1992 and 1997, while the bump up between 1997 and 1998 is a modest six percent. This up-tick in internal spending may also be caused by the Y2K conversion, the result of organizations taking a “go it alone” approach to the necessary system and software repairs.

On a regional basis, telecommunications represents the majority of technology sector spending (almost one of every two ICT dollars flows to this area). While North America spends the most here, its ratio of telecom spending to other technology areas is also the most

evenly balanced (See figure 10). The \$262 billion in 1999 telecom outlays is, for instance, about 1½ times as much as the amount (\$165 billion) spent in North America for ICT services. By contrast, Japan spends almost five times as much on telecom as IT services. The same is true in Latin America, which spends over eight times the amount on telecom (\$71 billion) as it does on IT services (\$9 billion). These sector spending disparities hint at several interpretations, including the dramatic onset of cellular technology, the privatization of telecommunications facilities and services in specific regions, and the natural progression of technology adoption that makes telecommunications the roadbed of the digital infrastructure.



Source: IDC



Source: IDC

ECONOMIC ENGINE

Call IT something special. Federal Reserve Board Chairman Alan Greenspan seemed to in testimony last year, giving credit to information technology for the growth of the U.S. economy:

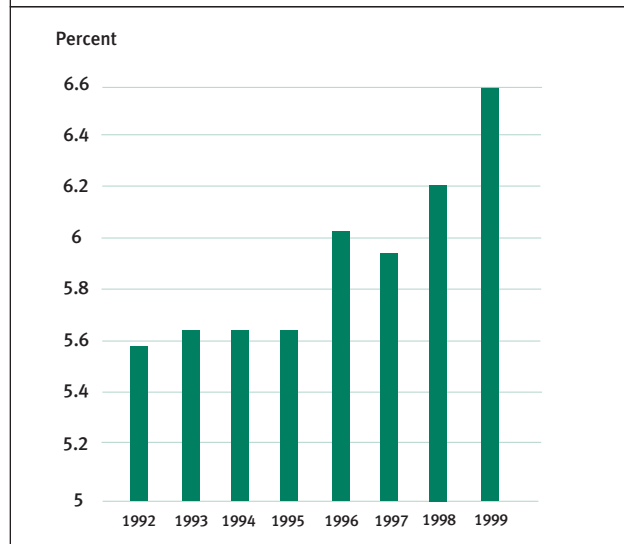
“I have hypothesized on a number of occasions that the synergies that have developed, especially among the microprocessor, the laser, fiber-optics, and satellite technologies, have dramatically raised the potential rates of return on all types of equipment that embody or utilize these newer technologies. But beyond that, innovations in information technology—so-called IT—have begun to alter the manner in which we do business and create value, often in ways that were not readily foreseeable even five years ago.”

His views are no doubt shared by business and government leaders in other nations as well. ICT as a percentage of GDP jumped between 1998 and 1999 by four-tenths percent to 6.6 percent—the largest such annual increase since 1996 (See figure 11). As Chairman Greenspan’s remarks indicate, ICT triggers a substantial multiplier effect with synergies enjoyed both within the information technology marketplace itself as well as the economy at large.

This multiplier effect can be seen in projects selected this year by WITSA to receive its inaugural IT Excellence Award. These included:

- **Spain’s State Tax Administration Agency of the Spanish Ministry of Finance (AEAT)** Covering the tax payers in one of Europe’s most populous nations, AEAT offers Internet access to individual tax returns and payment, on-line certificate applications, information on processing state of tax refunds, consulting fiscal information available to the Agency, and assistance programs for the preparation and presentation of tax refunds.
- **Finland’s Leonia WAP Bank**
Approximately 30 percent of Leonia’s customers are linked to its Internet bank, one of the highest percentages of online users in the world. Leonia is one of the first banks in the world to offer a full range of financial services to its customers wirelessly via the Internet, in-

FIGURE 11
ICT as Percent of World GDP



Source: IDC

cluding balance and statement enquiries, bill payment, list of open payments, VISA transactions, loan information, online trading in stocks and shares, as well as insurance and bond portfolio management.

- **Seven-Eleven Japan Co., Ltd.**

This firm operates one of the world’s largest networks, comprising satellite communications and an integrated services digital network (ISDN). The Fifth-Generation Total Information System, as an outstanding backbone infrastructure, has contributed significantly to an increase in the rate of sales while competing stores have registered a decrease in the same period.

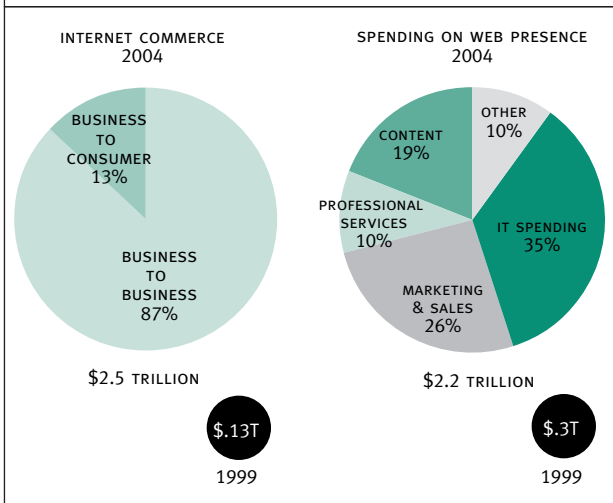
- **South Africa’s Post Office & Department of Communications**

This agency was chosen for the introduction of Public Information Terminals (PITs) at post offices to give access to Internet, E-mail, education and government information for citizens who cannot afford private access.

The Internet Economy

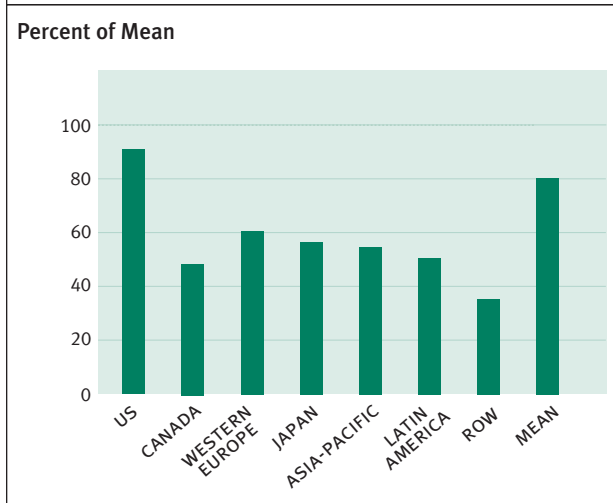
While this report is titled *Digital Planet*, it could have been called the *Global Internet Phenomenon*. No change in emphasis has been more pronounced than the

FIGURE 12
The Internet Economy



Source: IDC

FIGURE 13
Domestic Web Spending by Region



Source: IDC

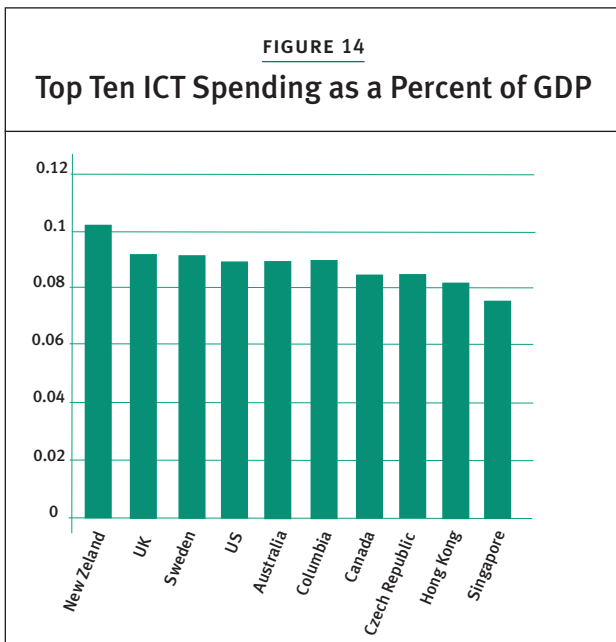
transformation in the ways consumers and businesses do business online. The total value of Internet purchases in 1999 rose to \$130 billion, a figure projected to reach \$2.5 trillion by 2004 (See figure 12).

The takeoff of the Internet Economy has created a boom in entrepreneurial activity as well. In the US alone, venture capitalists pumped \$32 billion into technology start-ups in 1999, nearly triple the figure from the previous year.

Companies worldwide invested \$142 billion in ICT to create a web presence . . . and they spent an additional \$140 billion in business infrastructure related to electronic commerce (marketing, content creation, management consulting, etc.). By 2004, as this phenomenon continues to permeate every facet of traditional commerce, the cost of doing business on the Internet is expected to outstrip the cost of Internet infrastructure by a margin of three to one.

Although at first glance at Figure 12 it appears that organizations are spending one dollar for every dollar of online revenues, in fact that's not the case. The return for the investment in building a web presence is much higher. To begin with, only a fraction of such spending is devoted to sites that conduct commercial transactions. Many support marketing, customer support, and internal applications. In addition, many companies instituting Internet commerce applications have discovered that the real payoff comes in cost savings or increased speed of doing business. For example, a major network equipment manufacturer used the greater accuracy of Internet based orders to cut its error rate to less than one percent. Similarly, banks and airlines report that their call handling costs for Internet customers is anywhere from one tenth to one fiftieth of the costs for customers served by phone.

The takeoff of the Internet Economy has created a boom in entrepreneurial activity as well. In the US alone, venture capitalists pumped \$32 billion into technology start-ups in 1999, nearly triple the figure from the previous year.



Source: IDC



Source: IDC

Figure 13 (previous page) shows that a healthy percentage of regional purchases over the web stays within that region. With its far larger installed base and global economic leadership, the U.S. appears to be practically parochial with its domestic web dollars—spending nine out of every ten at home. Compare that to Japan and Asia Pacific, where only half of online spending stays within regional boundaries and Latin America, where a majority of cyber shopping is done elsewhere. Major variations in regional spending patterns and behavior will no doubt dissipate over time as nations build out their Internet infrastructure, businesses increase their web presence, and web access flows to a greater percentage of companies and consumers.

**The vision to invest in ICT
may in some ways be
as important as enjoying the
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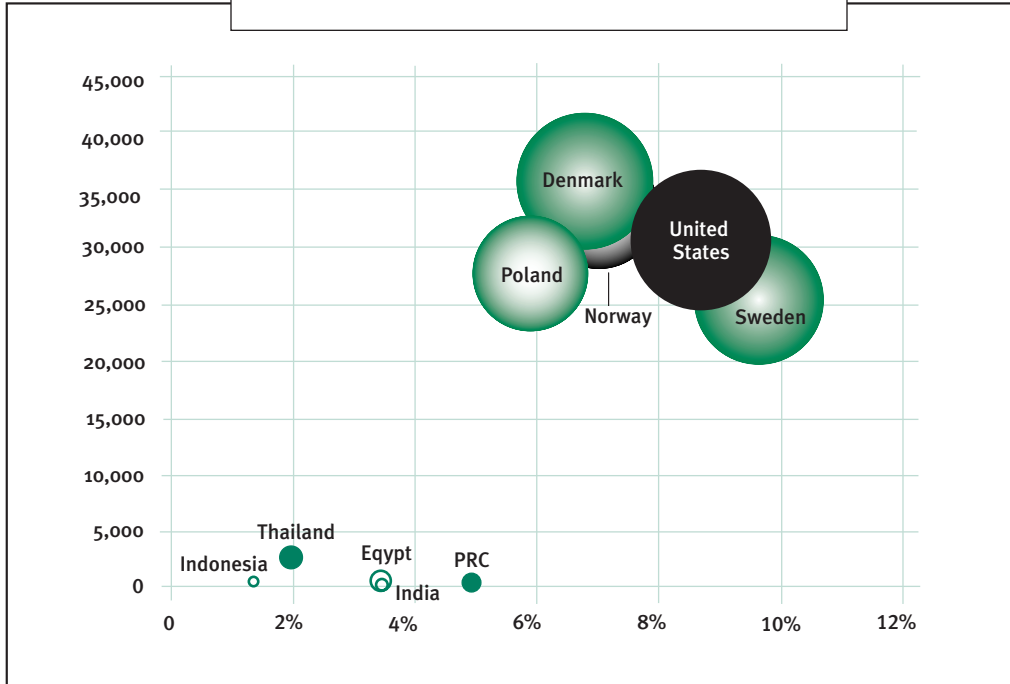
This rush to the Internet is creating a groundswell in emerging markets, like India, Hungary, Slovakia, Poland, Turkey and Romania. Each has witnessed impressive short-term ICT spending gains.

National Wealth: ICT and GDP

The international flavor of the industry’s growth has also served to emphasize differences in ICT development among nations. Figure 14 shows the ten nations, led by Sweden, spending the most on ICT as a percentage of GDP. While several countries on this list are among the world’s most affluent nations, other countries represented, Columbia and the Czech Republic, are not. This suggests that the vision to invest in ICT may in some ways be as important as enjoying the means to be able to do so. Indeed, only three of the world’s largest economies (US, Canada and the UK) are represented.

Using this metric, the intervening two years have witnessed significant shifts among nations. The United Kingdom, the country spending the greatest percentage of its national wealth on ICT in 1997, has slipped to the number two slot. In making its own jump forward from number nine to number three, Sweden increased its spending on

FIGURE 16
Digital Divide or Opportunity



Source: IDC

■ Table 1: Year on Year Growth in ICT Spending, 1996-1999 (%)

COUNTRY	95-96	96-97	97-98	98-99
Hong Kong	21%	16%	1%	3%
Indonesia	3%	7%	-63%	53%
Korea	32%	-9%	-29%	4%
Malaysia	22%	5%	-20%	23%
Philippines	20%	5%	-20%	23%
Singapore	16%	12%	0%	8%
Taiwan	10%	19%	11%	19%
Thailand	17%	-16%	-30%	18%

Source: IDC

ICT from less than seven to over nine percent of GDP. The U.S. has dropped in the rankings from third to fourth. Columbia moved forward eight places in the rankings and the Czech Republic nine places; South Africa and Switzerland left the top ten list.

A Palmpilot in Every Pot?

National wealth appears to reassert itself when per capita spending patterns are included. Figure 15 (page 15) shows the world's largest per capita ICT spending nations, with Switzerland topping the list. Six of ten countries with the world's largest per capita GDP are represented here; the number included might even be greater were very wealthy, very small nations like Luxemburg, Liechtenstein, and Monaco included in the IDC survey.

Using 1999 population totals to refine these numbers affirms the suspicion that the U.S. is far more likely to be vested in the desktop computing model than its wealthy and more cell phone oriented fellow nations. Per capita personal computer installations (i.e. units) in the U.S. is approximately 1.6, compared with 108 in China, 3.5 in the UK and 4 in Japan. Telecommunications outlays in 1999 paint a different picture, with per capita spending in Japan of \$1522, \$28 in China, \$880 in the U.S., and \$644 in the U.K.

Bridging the Divide

No matter how the money is spent, one socioeconomic discontinuity remains a major world challenge: the top 10 information economies represented 80 percent of the global ICT market; the bottom 10 in the rankings represented a collective share of less than one percent. This disparity has come to be known as the "Digital Divide" - the gap between nations that can and cannot afford technology investments. Figure 16 (on previous page) paints this dramatic picture. Countries and regions spending the least on ICT as a percentage of GDP are: Indonesia, Russia, Romania, Bulgaria, Thailand, Turkey, other Middle East/Africa, Philippines, other Eastern Europe, Saudi Arabian Gulf States.

Still, countries like China and Brazil make the "divide" look much more like a digital opportunity. Since 1992, China's ICT spending has experienced a compound annual growth rate of approximately 30 percent. Were this rate of growth to be continued over the next five years, China would represent a \$177 billion ICT marketplace by 2004.

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This strong positive momentum—the digital opportunity—presents itself in other measures as well. In comparative terms, China's share of worldwide ICT spending has increased more than any other country. Back in 1992, China accounted for just .6 percent of the global ICT spending. By 1999, this percentage had jumped almost four fold to 2.2 percent. Compare this to Germany, which slipped from 8.2 percent of world ICT spending to 6.5 percent during the same period; France, moving down from 5.9 percent to 4.8 percent; or Italy, down from 3.5 percent to 2.6 percent. The transformation of the Chinese economy from agriculture to industry, coupled with its enormous population and demand for technology access, will no doubt keep this one of the world's fastest growing ICT markets for the foreseeable future.

The ICT Bounce

As it has in the past, ICT spending continued to help power the economic engines of many countries during times of trouble. In Asia, for instance, countries most vested in ICT—Hong Kong, Singapore, Taiwan—appeared least likely to fall victim to the Asian Flu, to plunge the shortest distance, and to recover the fastest. Countries like Indonesia, Philippines and Thailand, with just a fraction of the per capita spending, experienced longer recovery periods (table 1).

ICT spending appears to resist the "gravitational pull" of economic bad times. This resilience is reflected in the fact that world ICT spending does not fall as far as GDP and recovers sooner; conversely, when GDP grows, so does ICT spending.

Hear that giant sign-on sound? In 1999 alone, 90 million Internet devices were added to the on-line community, bringing the total to more than 260 million. That's up from a total of 33.4 million devices in 1996. By 2003, make the total almost 800 million (See figure 17). These machines are drawing a crowd. Today the Internet attracts 300 million users and this number will double by 2003.

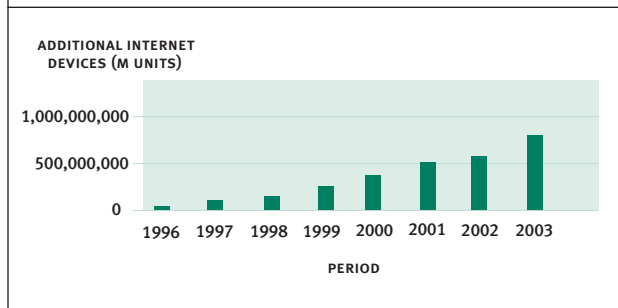
The U.S. contains the world's largest installed base of PCs, with 177.4 million units on the job, in the home and at school. The U.S. may also be hitting the steady state; of the ten countries with the largest consignment of personal computers (see figure 18), the 17.3 percent compound annual growth rate (1992-1999) in the U.S. is lower than all countries but Canada (15.2 percent) and Australia (16.3 percent). Per capita PC installations in the U.S. is more than twice that of Japan, Germany, UK, France—and almost 70 times that of China (figure 19, next page). With much ground to reclaim as its economy develops, China leads the top ten installed PC base list with compound annual growth of 42.7 percent.

The social impact of the surging ICT industry rivals its economic leverage and is especially evident in the growing use of technology in homes and classrooms. The number of PCs installed in classrooms tripled from 1992 to 1999, with the number of educational users of the Internet projected to exceed 110 million by the year 2003. In the U.S., 95 percent of schools and 72 percent of classrooms are connected to the Internet.¹

Figure 20 illustrates the regional distribution of PCs in the classroom and school offices. While North America and Western Europe appear to dominate the chart, Latin America and Eastern Europe actually dominate the rate of growth. Both have increased the number of PCs in schools by a factor of ten over the seven years covered in this report. North America and Western Europe have increased a far more modest 2.7 and 3.5 percent, respectively. Clearly, high growth rates favor under developed markets.

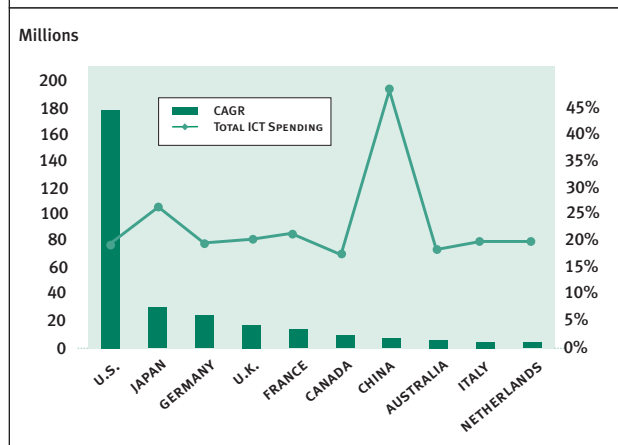
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FIGURE 17
Devices Added to the Online Community



Source: IDC

FIGURE 18
Top Ten Countries Installed Base of PCs



Source: IDC

Almost three-fourths of the world's school-based PCs are found in ten countries: U.S., Japan, U.K., China, Canada, Germany, Netherlands, France, Australia and Korea. With a seven-year CAGR of 48.8 percent, Singapore has witnessed the most dramatic growth in this regard, followed by China and Brazil. Portugal sits at the back of the world's PC classroom, with a CAGR of just 5.8 percent.

Innovative uses of ICT in education abound on this digital planet with social benefits far beyond what can be measured by counting PCs in classrooms. Take Project ESTRELLA, for instance. This highly creative program developed by the U.S. Department of Education provides laptop computers to migrant farm worker students. Working via the Internet from Montana, Illinois and other

¹ CEO Forum Reports, The Power of Digital Learning, Integrating Digital Content, Summer 2000.

states, these high school students keep up with their Houston, Texas-based classes, correspond with teachers, interact with classmates, receive mentoring and career services and maintain the continuity of their education.

In Canada, students from across the country collaborate to publish SchoolNet News (SNN), an online multimedia journalism network. This monthly e-paper combines news, opinion, sports and more in an innovative program aimed at helping young people acquire critical thinking skills, gain hands-on writing, editing and research experience, and receive exposure to emerging multimedia technologies. SNN is just one of many facets to SchoolNet (<http://www.schoolnet.ca/home/e/>), which harnesses the power of the Internet to enrich the lives of Canadians.

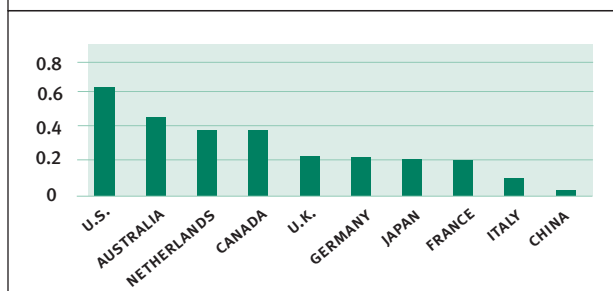
On the web, the I*Earn project (<http://www.iearn.org/infounique.html>) has created a network of schools in 88 countries, giving students the opportunity to participate in 50 plus projects in the humanities, math and sciences, and creative and language arts.

Home PC users are also making significant strides. Between 1992 and 1999, the population of home-based PCs jumped over 200 percent. As PC prices continue to fall and performance to increase, this trend will no doubt continue. Senior citizens have emerged as one of the fastest growing segments of the first-time PC buyer marketplace. The multi-PC home is becoming anything but the exception, and new houses built with integrated voice and data networks may soon become the rule. Figure 21 (page 20) presents a regional view of this explosive PC growth. As the Internet flood tide spreads to other household appliances, the consumer market is likely to enjoy even greater gains. To no parent's surprise, teenagers are the fastest growing segment of the cell phone marketplace.

Countries are awakening to the idea that ICT is not only good economic medicine—it also helps build stronger, more stable and viable societies:

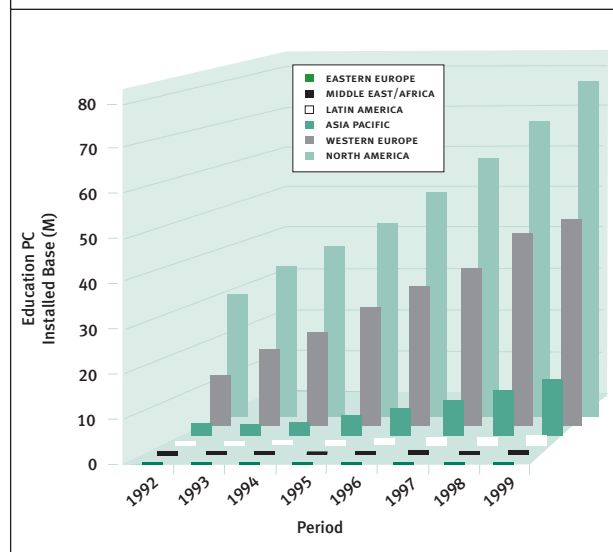
- Korea works towards a knowledge-based society with Cyber Korea 21, a plan to promote technological literacy, build high speed fiber optic communications and create a national Internet-based standard;
- Nordic countries work to create tax breaks for companies willing to sell nominally priced PCs to employees;
- Malaysia and Taiwan encourage Internet entrepreneurs through science parks and business incubators.

FIGURE 19
Top Ten Installed Base PCs Per Capita



Source: IDC

FIGURE 20
PC Installed Base in Education Sector by Region



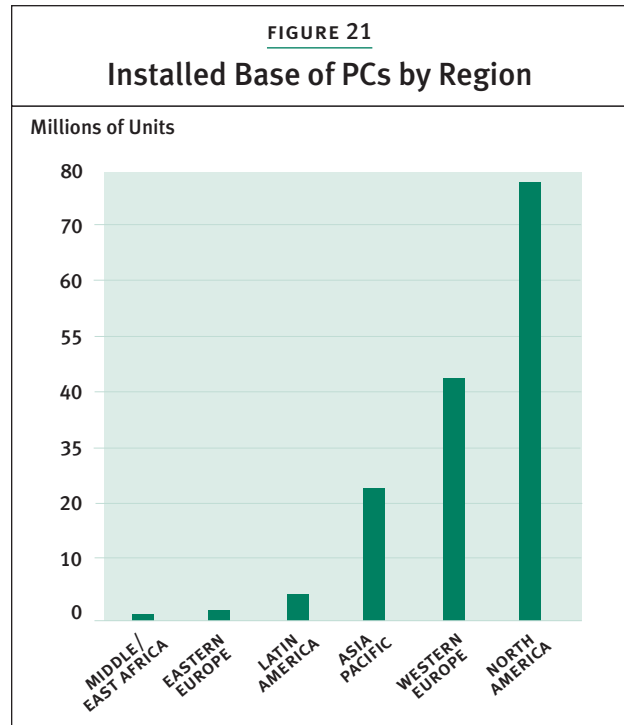
Source: IDC

One of ICT's most striking attributes is its popular embrace by young people. And it's not all about electronic games and Internet chat. ICT-enabled businesses seem more likely than others to reach into the cradle for their executive leadership. An IDC survey of 1,100 Internet executives in the U.S. and Europe found the average age was 36. Over 25 percent were under 30.

Many of these "young" firms are popping up as dot.coms, B2B auctions and exchanges, B2C websites and more. The Internet underpinnings of this phenomenon are nowhere as apparent as in the U.S., where 80 percent of PCs exist on a network. The U.S. leads the

world in percentage of networked PCs at 82 percent. Other world leaders are U.K., Chile, Brazil, Canada, Belgium, Finland, Norway and Sweden.

The picture created by these data suggests countries turn to the potential benefits of information and communication technology like a plant to the sun. While retaining their unique cultures and customs, nations see ICT as the mechanism to build common understandings among people and create social stability. They see it as a force to eradicate ignorance and misunderstanding, to leverage the known and to collaborate in the exploration of the unknown. From medicine and commerce to the arts and humanities, from the individual student to the society in which that student will one day contribute, ICT is fostering individual freedom, wide-spread economic well being and the common good.



Source: IDC

PAST IS PROLOGUE

The forecast for ICT for the next five years is bullish - a global market exceeding \$3 trillion by 2004, growth at rates faster than those of the economy generally. The pace of this expansion will be accelerated by a number of factors:

- continued global build out of the Internet, with new “on ramps” created using wireless networks, high speed broadband technologies and a multitude of intelligent devices;
- privatization of government owned infrastructure and the opening of markets to international investment;
- transformation of business models and the global adoption of e-business based exchanges, auctions, integrated supply chains and the like;
- harmonization of international laws and regulations on policy issues like taxation, privacy and security; and
- emergence of major new ICT markets on the world stage, including China, India and Brazil.

In the daily lives of many of the world’s citizens, ICT plays a lead role in activities both quotidian and extraordinary - from mapping routes for family vacation trips to mapping the human genome and the history of genetic illness within families, from on-line shopping to on-line supply chain management, from the simplest e-mail to the most complex international videoconferencing. So pervasive are ICT applications in many economies that it would be hard to imagine major advances in health, science, business or education that don’t have ICT at their core.

Language and customs may be different, but people around the globe share a common vision. They see the strong positive impact of ICT on national economies. They see the nonpareil ability of ICT to erase social inequalities and improve the quality of life for young and old alike. They see how ICT is changing the rules of engagement for companies as well as countries. In short, they seek a common destiny by becoming full citizens of a truly digital planet.

Language and customs may be
different, but people around the globe
share a common vision...they seek
a common destiny by becoming full
citizens of a truly digital planet

At the outset of the 21st century, the impact of ICT seems clear...A world moving ever faster into the realm of fingertip access to information. A society devising ever more innovative means to turn this information into knowledge. A civilization using this knowledge to fill gaps in understanding and build new bridges to the future.

THE EXCHANGE RATE FACTOR

When analyzing worldwide markets, it is critical to remember the enormous impact that currency exchange rates can have on market growth rates and values. While this is clearly a major factor in volatile regions such as Southeast Asia or Latin America, where currencies can fluctuate dramatically in a single year, it is also a major factor in looking at more stable regions.

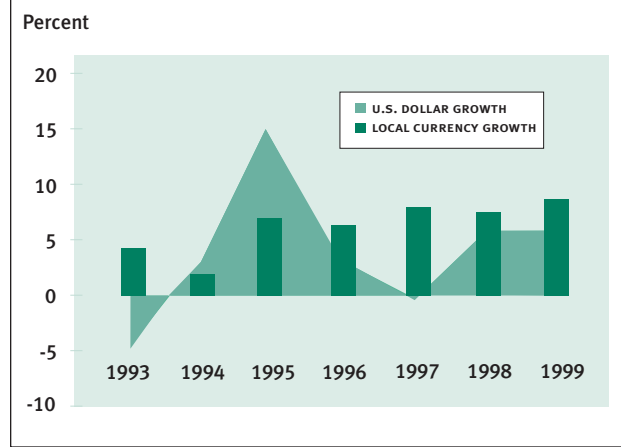
There are three exchange rate policies that are viable when examining worldwide markets.

1. **Local Currency Rate Policy.** The market sizing data are gathered and represented in local currency. All exchange rate effects are eliminated, but it is difficult to impossible to roll the numbers up into a regional total and make regional comparisons.
2. **Constant Exchange Rate Policy.** This policy represents all markets using the most recent, complete year's average exchange rate for a base currency (normally the U.S. \$). All historical data are then retrocast into the rate. This removes all exchange rate fluctuations from the market data, thus providing actual market growth rates. This policy is generally for providing data to regional clients, who are not interested in real dollar values earned.
3. **Current Exchange Rate Policy.** This policy represents all historical data in the average exchange rate of that year. For example, 1992 values would be represented in 1992 exchange rates, 1993 similarly and so on. This policy allows the analyst to understand what each market was worth in each year. This is useful to multinational companies who account in a single currency, and wish to understand their actual revenue flows vis-à-vis market growth in a given year.

Thus, high market growth rates can be obscured by a currency depreciating rapidly against the base currency. Similarly, slow growth rates can be bolstered by an appreciating local currency.

In this report, the current exchange rate policy—with the base currency being the U.S. dollar—has been used at the request of WITSA. It is critical to remember this fact when reviewing the data of all regions. Most countries' exchange rates have experienced mixed fortunes with respect to the U.S. dollar over the period examined. For

FIGURE 22
US Dollar vs. Local Currency



Source: IDC

example, between 1992 and 1999, the Western European ICT market grew 34% when measured in US dollars. But when measured in local currency, it grew 45%. The difference? The slow strengthening of the dollar against most Western European currencies. Figure 22 shows the year-to-year fluctuation in the Western European ICT market growth in U.S. dollars versus local currency.

Consequently, market growth rates are significantly lower than if the exchange rate effect was excluded. Effects in individual countries have been quite profound.

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DEFINITIONS

ICT/GDP: Total ICT spending as defined below as a percentage of gross domestic product.

- **IT Company:** A business entity involved in the sale, distribution or manufacture of technology-related hardware, software, or services.
- **Telephone Lines/Household:** The number of telephone lines connected to household.
- **PCs Installed to Schools and Homes:** The sum total of PC shipments installed which were purchased from household budgets (consumer disposable income) and PC shipments installed in educational establishments, whether primary or secondary schools or universities.
- **Internet Hosts:** A server that is assigned a domain name or number of domain names in compliance with the public network and addressing system.
- **Percentage of PCs on a Network:** The proportion of the installed base of personal computers that are connected to a local area network.
- **Information Technology (IT):** For the purposes of this study, information technology refers to the combined industries of IT hardware for office machines, data processing equipment, data communications equipment, and of IT software and IT services.
- **Information and Communications Technology (ICT):** For the purposes of this study, information and communications technology refers to information technology plus telecommunications equipment and services.
- **External IT Spending:** The tangible portions of the expenditures on IT products by businesses, households, government and education. These expenses are attributed to a vendor or organization outside the purchasing entity. Business spending includes the external portion of the IS operating budget, the capital budget, and the external portion of the business unit IT spending. This is broken into IT hardware, IT software, and IT services.
- **Capital Budget:** A list of planned spending on large, long-term projects to be specifically financed. Long term may mean multiple-year of up to 5-to-10 year periods but with annual updates. Examples of such financing include long-term loans or extended credit.
- **External Portion of the Business Unit IT Spending:** Business unit IT spending is defined as spending on the part of individual units within a corporation above and beyond what is allocated to IT by the capital budget or IS operating budget.
- **Government Spending:** Includes all external spending by central governments and local governments on IT to support all administration, defense, and justice activities.
- **Governments:** The governmental structure associated with national self-identity and responsible for all citizens, typically headquartered in one or more capital cities, but radiating throughout society.
- **Local Governments:** Any governmental structure (state, province, county, city, town, etc.) other than and lower-ranking than the central government.
- **Home Spending:** For purposes of measuring the IT market, the sale of hardware, software, and services to individual consumers, usually in a multi-person, multi-function environment (I.E. different family members can and will use the products for different purposes ranging from business use to education to games.
- **Education Spending:** Spending by primary and secondary institutions dedicated to academic and/or technical/vocational instruction.
- **IT Hardware:** Servers, personal computers, workstations, data communication equipment and add-ons purchased by a corporation, household, school or government agency from an external agent or corporation, including:
 - **Computer System Central Units:** Basic CPU or central electronic complex, with initial memory, processor upgrades, cooling as necessary, etc., including multi-user systems (servers) and single-user

DEFINITIONS

systems (PCs and workstations)

- **Storage Devices:** Including those sold initially with systems and those incorporated later as add-ons, for both multi-user and single-user systems

- **Printers:** Both for multi-user systems and for PC/workstations

- **Bundled operating systems:** Within system values, both single-user and multi-user

- **Data communications equipment:** Summing the total for LAN hardware and other data communications equipment.

- **IT Software:** Includes the purchase of all software products and external customization of computer programs. Excludes expenses related to the internal (e.g., wages, rent) customization of computer programs. Includes systems software and utilities, application tools, and application solutions.
- **IT Services:** IT services provided to a corporation by an external agent or corporation, above and beyond the services provided by an internal IS team. Includes IT consulting, implementation services, operations management, IT training and education, processing services, and IT support services.
- **Internal Spending:** While external spending includes, for the most part, the tangible portions of the IT market, internal spending is made up of the intangible portion or the "ripple effects" of external spending. These expenses cannot be attributed to a vendor and are therefore termed internal spending. Thus, internal spending includes internal portion of IS operating budget, internally customized software, capital depreciation, any other expense related to IT that cannot be directly tied to a vendor.
- **Internal Portion of IS Operating Budget:** All short-term spending on budgetary items allocated to human resources and facility rental expenses associated with supporting the products and services acquired from external agents or corporations used in the IS infrastructure. Does not include the external expenditure of products and services acquired from an external agents or corporations, as this is included separately in the external portion defined above.

- **Internally Customized Software:** The general and administrative expenses of a business that cannot be directly allocated to a particular product or department. Internal overhead includes people and facilities.
- **Capital Depreciation:** A reduction in the value of capital assets because of wear and tear from use or disuse, accident, inadequacy, or from obsolescence. Capital depreciation is taken as an annual expense from the operating budget.
- **Telecommunications:** Brings together expenditures by businesses, household, government, and education on public network equipment, private network equipment and telecommunications services.
- **Public Network Equipment:** All equipment used by carriers to provide voice/data network services. Includes switching, transmission, and mobile communications infrastructure.
- **Private Network Equipment:** All equipment installed at telecommunications user's premises. Includes: PBXs and key systems, telephone sets, mobile equipment, and other equipment.
- **Telecommunications Services:** Telephone services, mobile telephone services, switched data, leased line services, and cable TV services.
- **Office Equipment:** Typewriters, calculators, copiers, and other office equipment (duplicating equipment, cast registers, point-of-sale systems, etc.)

WITSA MEMBERS

The World Information Technology and Services Alliance (WITSA) WITSA consists of the national information industry representative bodies from around the world. Its role is to develop public policy positions on issues of concern to the information industry and present these positions to governments and international organizations. WITSA members are:

Argentina	Cámara de Empresas de Software y Servicios Informáticos (CESSI) URL: http://www.cessi.org.ar / E-mail: camara@cessi.org.ar
Australia	Australian Information Industry Association (AIIA) URL: http://www.aiia.com.au / E-mail: aiia@aiia.com.au
Bangladesh	Bangladesh Computer Samity (BCS) URL: http://www.samity.org E-mail: samity@dhaka.agni.com
Brazil	Sociedade de Usuários de Informática e Telecomunicações - Sao Paulo (Sucesu-SP) URL: http://www.sucesusp.com.br E-mail: sucesusp@sucesusp.com.br
Canada	Information Technology Association of Canada (ITAC) URL: http://www.itac.ca / E-mail: info@itac.ca
China, Taipei	Information Service Industry Association of China, Taipei (CISA) URL: http://www.cisanet.org.tw/english/index.html / http://www.worldcongress2000.org E-mail: cisa@mail.cisanet.org.tw
Colombia	Colombian Software Industry Federation (FEDESOFIT) URL: www.fedesoft.org E-mail: fedecolsoft@impsat.net.co
Czech Republic	Association for Consulting to Business (Asociace Pro Poradenství v Podnikání - APP) E-mail efficiency@post.cz
Ecuador	Association Ecuatoriana de Tecnología de Información y Servicios (AETIS) actis@usa.net
Egypt	The Co-operative Society for Computers of Egypt (CSCE) E-mail: jumboco@starnet.com.eg
Finland	Information Technology Services Association (Tietotekniikan Palveluliitto - TIPAL) URL: http://www.tipal.fi/index.html E-mail: tipal@tipal.fi
France	Syntec Informatique URL: http://www.syntec-informatique.fr/syntec/ow/home.cgi/jpeybert@syntec-informatique.fr
Germany	Bundesverband Informationstechnologien (BVI TeV) URL: http://www.bvit.de/home-eng.htm E-mail: INFO@BVIT.de
Greece	Federation of Hellenic Information Technology Enterprises (SEPE) URL: http://www.sepe.gr/sepe1en.htm E-mail: sepe@compulink.gr
Hong Kong	Hong Kong Information Technology Federation (HKITF) URL: http://www.hkitf.org.hk/ E-mail: Edward@abc.com.hk
India	National Association of Software and Service Companies (NASSCOM) URL: http://www.nasscom.org/ E-mail: nasscom@nasscom.org
Israel	Israeli Association of Software Houses (IASH) URL: http://www.iash.org.il/ E-mail: software@industry.org.il
Italy	Associazione Nazionale Aziende Servizi Informatica e Telematica URL: http://www.anasin.it/ E-mail: Anasin@anasin.it
Japan	Japan Information Service Industry Association (JISA) URL: http://www.jisa.or.jp/ E-mail: info@jisa.or.jp
Lithuania	Association of the information technology, telecommunications and office equipment companies of Lithuania (INFOBALT) URL: www.infobalt.lt E-mail: office@infobalt.lt

WITSA MEMBERS

Malaysia	Association of the Computer Industry (PIKOM) URL: http://www.pikom.org.my E-mail: info@pikom.org.my
Mexico	Asociación Mexicana de la Industria de Tecnologías de Información (AMITI) AMITI: http://www.amiti.org.mx/ E-mail: amiti@spin.com.mx
Mongolia	Mongolian National Information Technology Association /E-mail: enkhbold@mtu.edu.mn
Morocco	L'Association des Professionnels de L'Informatique de la Bureautique et de la Telematique (APEBI) / http://www.apebi.org.ma/ E-mail: apebi@apebi.org.ma
Netherlands	Federation of Dutch Branch Associations in Information Technology (Federatie Nederlandse IT - FENIT) URL: http://www.fenit.nl/ E-mail: bureau@fenit.nl
New Zealand	Information Technology Association of New Zealand (ITANZ) URL: http://www.itanz.org.nz/ E-mail: info@itanz.org.nz
Northern Ireland	Software Industry Federation in Northern Ireland (SIF) URL: http://www.sif.co.uk E-mail: billy@sif.co.uk
Norway	ICT Norway (IKT Norge) / http://www.ikt-norge.no/ E-mail: bt@ikt-norge.no
Poland	Polish Chamber of Information Technology and Telecommunications (Polska Izba Informatyki i Telekomunikacji - PIIT) / http://www.piit.org.pl/ Email: piit@ikp.atm.com.pl
Portugal	Associação Portuguesa das Empresas de Tecnologias de Informação e Comunicações (APESI) E-mail: apesi@treal.pt
Republic of Korea	Federation of Korean Information Industries (FKII) URL: http://www.fkii.or.kr/english/index.html E-mail: FKII@chollian.net
Romania	Association for Information Technology and Communications of Romania (ATIC) URL: http://www.atic.org.ro E-mail: Vlad.Tepelea@algorithm.ro & atic@softnet.ro
Singapore	Singapore Information Technology Federation (SITF) URL: www.sitf.org.sg E-mail: sitf@sitf.org.sg
South Africa	Information Industry South Africa (IISA) URL: http://www.ita.org.za E-mail: ita@ita.org.za
Spain	Asociación Española de Empresas de Tecnologías de la Información (SEDISI) URL: http://www.sedisi.es E-mail: info@sedisi.es
Sweden	Swedish IT-companies' Organisation AB (Svenska IT-Företagens Organisation AB) URL: http://www.sito.se/ E-mail: info@sito.se
Thailand	The Association of Thai Computer Industry (ATCI) URL: http://www.bdg.co.th/atci/atcihome.htm E-mail: Info@ATCI.or.th
United Kingdom	Computing Services & Software Association (CSSA) URL: http://www.cssa.co.uk/cssa/ E-mail: cssa@cssa.co.uk
United States	Information Technology Association of America (ITAA) URL: http://www.ita.org/index.htm E-mail: jmcwilliams@itaa.org
Venezuela	CAVEDATOS - Venezuelan Association of Software Houses URL: www.cavedatos.org E-mail: cavedato@telcel.net.ve
Zimbabwe	Computer Suppliers' Association of Zimbabwe (COMSA) / comsa@csz.icon.co.zw

ON WITSA

The World Information Technology and Services Alliance (WITSA) is a consortium of 41 information technology (IT) industry associations from economies around the world. As the global voice of the IT industry, WITSA is dedicated to:

- advocating policies that advance the industry's growth and development;
- facilitating international trade and investment in IT products and services;
- strengthening WITSA's national industry associations through the sharing of knowledge, experience, and critical information;
- providing members with a vast network of contacts in nearly every geographic region of the world; and
- hosting the World Congress on IT, the only industry sponsored global IT event.

Founded in 1978 and originally known as the World Computing Services Industry Association, WITSA has increasingly assumed an active advocacy role in international public policy issues affecting the creation of a robust global information infrastructure, including:

- increasing competition through open markets and regulatory reform;
- protecting intellectual property;
- reducing tariff and non-tariff trade barriers to IT goods and services; and safeguarding the viability and continued growth of the Internet and electronic commerce.

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