INTERNET, E-COMMERCE, AND TELECOMMUNICATIONS MARKET OPPORTUNITIES FOR U.S. SMALL- AND MEDIUM- SIZED BUSINESSES

EXPORTIT ASIA:

PRELIMINARY REPORT

U.S. DEPARTMENT OF COMMERCE
International Trade Administration
Trade Development
Information Technology Industries
Office of Information Technologies / Office of Telecommunications Technologies

December 2000

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Information on the Office of Information Technologies can be found at http://exportIT.ita.doc.gov.

Information on the Office of Telecommunications Technologies can be found at http://telecom.ita.doc.gov.

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FOREWORD

This report describes and analyzes the trends, key issues and events in information technology (IT), telecommunications, Internet and e-commerce adoption in Asia, highlighting Hong Kong, Taiwan and South Korea, in order to create a framework from which U.S. small- and medium-sized enterprises (SMEs) can make educated business decisions about entering these markets. The report analyzes the status of telecommunications liberalization, competition in telecommunications services, and the deployment of new telecommunications technologies, and how these changes are affecting the adoption of the Internet and e-commerce. It also analyzes economic, cultural, historical, and political factors influencing the adoption of information technology, the Internet and e-commerce applications. The report highlights information and market opportunities relevant to U.S. SMEs in the information technology (IT) and telecommunications industries. The report suggests market entry strategies for smaller firms, and provides a listing of resources from the U.S. Department of Commerce and other resources to assist U.S. firms in their market entry.

This report is based on market research and analysis by international trade specialists from the U.S. Department of Commerce's Office of Information Technologies and Office of Telecommunications Technologies within the International Trade Administration. The work was supported by the International Trade Administration's U.S. and Foreign Commercial Service (US&FCS) market specialists in Asia. Much of the information in the reports on Hong Kong, Taiwan, and South Korea was gathered during on-site interviews with IT company representatives, IT users, IT trade association representatives and government officials in those countries. Information gathered from on-site interviews is supplemented with data from market research firms and an extensive review of available literature, including press reports.

Data provided in these reports were collected from a variety of sources, and are not necessarily consistent. This report endeavors to provide the most recent data available for each country, however, tables listing multiple countries often must rely on older data sets. Therefore, data provided in the Asia overview may be older than the data provided in any individual country overview.

This effort was carried out as part of the U.S. Department of Commerce Market Development Cooperator Program (MDCP), under a grant awarded to the Software and Information Industry Association (SIIA). The MDCP is a competitive matching grants program that builds public/private partnerships by providing federal assistance to nonprofit export multipliers such as states, trade associations, and chambers of commerce that are particularly effective in reaching SMEs.

EXECUTIVE SUMMARY

Asia is potentially the most important regional information technology (IT) and telecommunications market in the world. It includes the two most populous countries, China and India, and the world's second largest economy, Japan. Japan is also the second largest IT market in the world after the United States. China, alone, is currently the fastest growing telecommunications market in the world and is projected to surpass the United States as the world's largest telecommunications market within a few years.

Demand for IT and telecom equipment in Asia is estimated at over $100 billion in 2000, representing about 25 percent of the world total. The use of the Internet is also growing quickly in Asia. Active adult Internet users there will reach about 38 million by 2001, and the user base in this region should more than double to 96 million, or 26 percent of the world total by 2003. Key factors driving Internet usage and electronic commerce (e-commerce) growth include telecommunications deregulation and the build-out of the telecommunications and Internet infrastructure which are resulting in lower user fees; declining prices in information technology and telecommunications equipment; a growing array of e-commerce software applications; and a recognition that e-commerce can lower costs and raise operational efficiencies. By 2004, the Asia-Pacific region is expected to represent 20 percent of worldwide online spending, with e-commerce revenues reaching $1.6 trillion.

There are numerous opportunities for U.S. suppliers, and U.S. IT companies have forged critical sourcing relationships with Asian companies in the areas of motherboards (Taiwan), disk storage (Singapore), and software programming (India).

Asia markets are very diverse, in terms of size, population, levels of economic development and cultures. Potential exporters to Asia need to examine each country individually to determine its market potential. This report provides in-depth analyses of the IT markets Hong Kong, Taiwan and South Korea, as well as brief overviews of nine other countries.

Hong Kong, Taiwan and South Korea present an interesting study in commonalities and contrast. While there are many similarities between the IT markets in each country, there are also important differences that may influence a potential exporter's decision as to where to focus attention.

The governments of Hong Kong, Taiwan and Korea recognize the importance of information technology to overall economic development, and each has enacted a program to help bring their economies into the information age. But the government approach and degree of direct involvement is different in each market.

Hong Kong takes the most laissez-faire approach to promoting IT development. Its "Digital 21 - Information Technology Strategy" sees the government's role as creating the proper

environment for IT to flourish. Key elements of this plan include a liberalized regulatory environment designed to promote the development of an advanced information infrastructure, educational incentives, and government leading the public by example in the adoption and application of IT solutions. Hong Kong provides relatively little in the way of direct government grants or explicit directions to its private sector.

The government of South Korea takes a more hands-on approach to promoting IT development. Its "Cyber Korea 21" initiative is a government-directed five-year development plan that evolved from the Master Plan for Information Promotion (1996-2000). The Korean government invests directly in building nationwide high-speed fiber-optic networks, providing satellite communications links and personal computers to schools, and establishing online knowledge databases. The government also exerts a strong influence over the direction of academic research and the development and business activities of Korea's IT companies.

Taiwan's approach to promoting IT development appears to fall somewhere in between the Hong Kong and the Korean approaches. Taiwan's "National Information Infrastructure (NII) Development Plan" is overseen by the NII Steering Committee under the Executive Yuan. The NII Steering Committee coordinates the activities of other government agencies that are given responsibility for implementing a wide range of NII projects. Projects range from infrastructure build-out to legal reform to promoting IT education. While Taiwan's government takes a direct and active role in promoting IT development in Taiwan, industry appears to be given broad discretion in determining the best strategies for achieving its objectives.

The IT equipment markets in Hong Kong, Taiwan and South Korea also offer interesting contrasts. Hong Kong is primarily a service-based economy and does very little IT equipment manufacturing. The Hong Kong market is wide open to foreign equipment suppliers, and users make their equipment purchasing decisions on the basis of price and performance.

Taiwan is a world-class manufacturing center for IT equipment, ranging from chips to components to complete products, such as personal computers. Many leading IT equipment manufacturers have set up manufacturing subsidiaries in Taiwan, or rely on independent Taiwanese factories to supply their original equipment manufacturing (OEM) needs. Taiwan is relatively open to foreign investment in the IT manufacturing sector, and joint venture manufacturing operations are fairly common. Many foreign firms are able to develop "win-win" partnerships with Taiwanese companies.

Korea is also an important manufacturing center for IT equipment. However, the Korean industry developed in an environment characterized by government programs designed to restrict imports and discourage foreign investment while developing local IT manufacturing capabilities. As a result, potential foreign investors found it difficult to develop "win-win" deals in Korea. This situation has changed in recent years, partly as a result of reforms brought about in Korea by the Asian financial crisis. Korea's government planners have apparently also realized that the

transition to an information society can be made much more quickly by taking advantage of the best technologies that the world has to offer rather than trying to develop everything domestically.

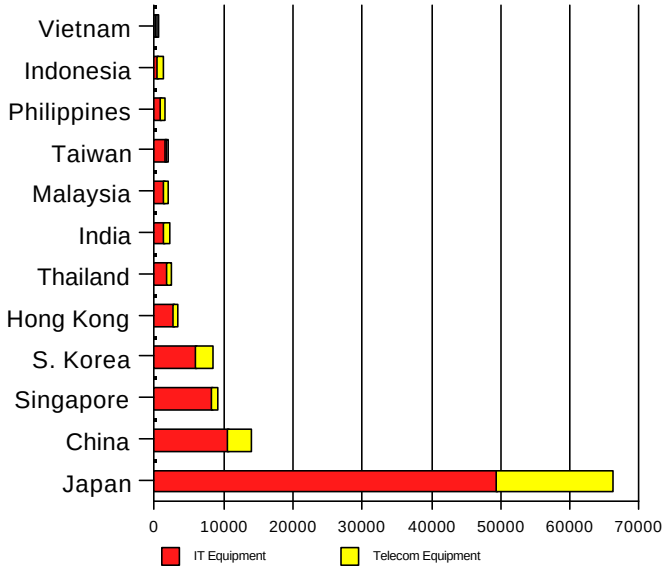
Hong Kong, Taiwan and South Korea are all intent on moving to the forefront of the Information Age. Each of them is actively promoting the development of an advanced information infrastructure. Wireless communications technologies are extremely advanced and widely deployed in all of these markets. The Internet is developing rapidly, and there is a strong demand for networking technologies and applications. Localized versions of specialized software applications are also in great demand. In short, these markets offer tremendous market opportunities for the world-class products and services from U.S. information technology firms.

While they offer opportunities, these markets also pose challenges, especially for small-to medium-sized enterprises (SMEs). Understanding local customs and business practices may require partnerships with local firms, or relationships with larger multinational firms. In some cases, local agents or distributors may be sufficient. Interested companies should contact the U.S. Department of Commerce for information on local markets and suggestions on developing market entry strategies.

CHAPTER 1: OVERVIEW OF THE ASIAN IT & TELECOMMUNICATIONS MARKETS

Asian IT and Telecommunications Equipment Markets in 2000 (Millions of Current U.S. Dollars)

Country	IT Equipment	Telecom Equipment	Total
Japan	$49,376	$16,498	$65,874
China	$10,567	$3,148	$13,715
Singapore	$8,316	$606	$8,922
South Korea	$5893	$2,340	$8,233
Hong Kong	$2,698	$371	$3,069
Thailand	$1,738	$588	$2,326
India	$1,425	$563	$1,988
Malaysia	$1,271	$563	$1,834
Taiwan	$1,453	$327	$1,780
Philippines	$758	$659	$1,417
Indonesia	$426	$676	$1,102
Vietnam	$246	$116	$362
Total Asia	**$84,167**	**$26,455**	**$110,622**



Source: Copyright 2000, Cahners Business Information, Electronics Industry Year Book 2000 Edition.

Asia has become a significant information technology (IT) and telecommunications market as well as an important production base for IT products. Regional demand is expected to reach nearly $111 billion by the end of 2000, with IT equipment representing 76 percent of this total. Japan is by far the largest country market, accounting for nearly 60 percent of the total Asia market, followed distantly by China, Singapore and South Korea. U.S. high tech exports, including semiconductors, consumer electronics, and other electronic components and equipment, to this area doubled from 1993 to $63.5 billion in 1999. Japan, South Korea, and Singapore continued to be the top three export markets for these products in 1999. [1]

Despite the financial crisis that affected Asia in 1997 and budget cutbacks in many sectors, all Asian governments have continued to invest in the development of a more sophisticated information technology infrastructure which will generate substantial business opportunities for IT suppliers. These governments consider the sector a significant driver to economic growth and crucial for the international competitiveness of their industries. This commitment is underscored

[1] Cybernation 2.0, American Electronics Association

in their development of their national IT plans, such as Korea's Cyber21 and Malaysia's Vision 2020 strategies, and the continuation of initiatives such as SingaporeONE and the Multimedia Supercorridor project in Malaysia. In most of these economies, legislation has been either drafted or approved to create a legal environment conducive to conducting electronic commerce. Many Asian governments' active participation in multilateral fora such as the Asia-Pacific Economic Cooperation (APEC) indicate continued government prioritization in this sector.

IT Spending by Country as a Proportion of Gross Domestic Product, 1998

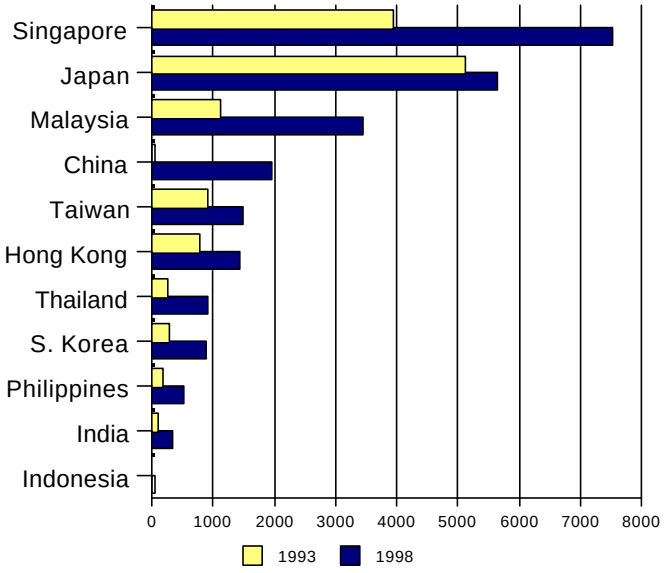
Country	GDP (millions of U.S. dollars)	IT Spending (millions of U.S. dollars)	IT/GDP (%)	IT Spending per Capita (U.S. Dollars)
Singapore	99,269	2,394.1	2.4	686
Japan	5,278,738.6	85,871.2	1.7	681.9
Hong Kong	151,203.1	2,046.5	1.4	314.9
Malaysia	96,422.7	1,230.6	1.3	58.8
China	917,993.6	9,011.6	1	7.4
South Korea	505,812	4,925.9	1	106.1
Taiwan	317,598.9	3046.7	1	139.1
Vietnam	22,404.6	205.8	0.9	2.7
Philippines	88,457.5	515.9	0.6	6.6
India	423.007.5	2,267.3	0.5	2.3
Thailand	173,263.1	746.2	0.4	12.4
Indonesia	207,257.6	274.3	0.1	1.3

Source: IDC

Lured by government investment incentives and the availability of skilled, low cost labor in these countries, many leading U.S. IT suppliers established assembly operations in the region from the 1980s onwards. As a result, cumulative U.S. technology manufacturing investment reached almost $24 billion in 1998, a 92 percent increase from 1993. Most of this spending was in Singapore, Japan, and Malaysia. Government IT spending and U.S. direct investment in Asia continue to grow, but the business dynamics are changing to keep up with the pace of the Internet and electronic commerce.

Cumulative U.S. Direct Tech Manufacturing Investment in Asia (Millions of Current U.S. Dollars)

Country	1993	1998	Change (%)
Singapore	$3,922	$7,510	91
Japan	$5,106	$5,631	10
Malaysia*	$1,090	$3,412	N/A
China*	$15	$1,935	N/A
Taiwan	$882	$1,471	67
Hong Kong	$740	$1,397	89
Thailand*	$219	$891	N/A
South Korea	$263	$846	222
Philippines	$148	$499	237
India	$69	$305	342
Indonesia	(D)	$18	N/A
Total U.S. Tech Mfg. Investment in Asia	**$12,454**	**$23,915**	**92**



(D) Suppressed to avoid disclosure of individual companies
* Some data are not released. This typically under represents the true amount of U.S. direct investment abroad and makes yearly comparisons difficult.

Source: U.S. Bureau of Economic Analysis

The Internet and E-business Readiness

A study measuring the relative preparedness for the Internet era of 60 nations around the world published in May 2000 by the Economic Intelligence Unit's (E.I.U.) e-business forum showed that the e-business readiness ratings of Asian countries vary widely. Singapore and Hong Kong ranked in the top ten while many of the remaining Asian nations were situated in the middle of this list. India, China, and Vietnam were among the least prepared. The number of computers in use in this region has nearly quadrupled from 1993 to 2000 and is projected to grow in excess of 120 percent through 2005 in several of these nations and as much as 291 percent in India and 228 percent in China.[1] Computer penetration in the region ranges from 44 percent in Singapore down to around 1 percent in China and India.[1] Internet use is expanding rapidly as well. Based on a recent study by the Philips Group, the number of Internet users in Asia is expected to grow 422 percent over the next five years. Currently, the region has approximately 43.6 million Internet users. This number is expected to increase to 228 million in 2005 and 370 million in 2006. The Philips Group also predicts that Japan will continue to have the largest number of Internet users until 2004, but China will surpass Japan in 2005.

E-Business Readiness Ratings of Major Asian Nations*

Rank	Country	Business Environment (1)	Connectivity (2)	E-business Readiness (3)
8	Singapore	8.55	8	8.3
9	Hong Kong	8.52	8	8.3
21	Japan	7.43	8	7.7
24	South Korea	7.30	7	7.2
27	Taiwan	8.13	5	6.6
28	Thailand	7.27	5	6.1
32	Malaysia	6.91	5	6.0
38	Indonesia	6.16	5	5.6
46	Philippines	6.72	3	4.9
50	India	5.97	3	4.5
51	China	5.88	3	4.4
54	Vietnam	5.30	3	4.2

* Rank out of 60 nations

Source: The E.I.U. ebusiness forum, http://www.ebusinessforum.com, May 4, 2000

(1) Measures the expected attractiveness of the general business environment over the next five years, taking into consideration 70 different indicators such as strength of the economy, outlook for political stability, the regulatory climate, taxation policies, and openness to trade and investment.
(2) Takes into account the state of the existing telephone network and other factors that affect Internet access such as dial-up costs and literacy rates.
(3) A proxy for judging a country's relative preparedness for the Internet era. It is the country's average score across the two previous measures.

Electronic Commerce and the Business-to-Business Segment

According to the market research firm, Gartner Group, the volume of Asian e-commerce transactions will reach $340 billion by 2003, with business-to-business (B2B) e-commerce transactions accounting for 80 percent ($272 billion) of this total value. Worldwide B2B e-commerce is predicted to reach $7.3 trillion by 2004. Nearly $1 trillion of this amount is expected to generate from the Asian region (excluding Japan).

A key factor that will drive this explosive growth is improved, cheaper telecommunications services as more governments move to liberalize their telecommunications sector. Many industry analysts believe that Singapore's complete liberalization of its telecom sector ahead of schedule this April will influence other Asian governments to follow suit. As Internet access becomes more affordable, the consumer and business community's Internet usage and adoption of appropriate Internet technologies will become more widespread. The availability of low-cost personal computers (PCs) is also driving higher PC penetration rates throughout the region.

Eight Asian telecommunications carriers in the Asia-Pacific region will create an Asian Internet network to provide more efficient (faster and more affordable) Internet traffic within the region that will eliminate the need to route intra-regional traffic through the United States. The eight companies include Japan's KDD, Korea Telecom, Singapore Telecom and the Philippine Long Distance Telephone Company (PLDT). According to PDLT, Internet traffic in the Asia/Pacific region is growing by an average of 50 percent a year. Over the next few years, Internet traffic is expected to overtake voice traffic within the region.

Trends and the vertical markets engaged in B2B e-commerce

Most of the major and successful players in the B2B marketplace already have a strong regional presence. The leaders include the information technology (IT) suppliers themselves, many of whom are original equipment manufacturers (OEMs). OEMs are requiring shorter delivery times from their suppliers and have been driving the adoption of e-commerce technologies along their supply chains to save time and costs. Since many OEMs source their components from Taiwan, China, Malaysia, and the Philippines, OEMs such as IBM, Compaq, and Acer have all required their suppliers to adopt supply chain management technologies. Some large IT component suppliers, such as Taiwan Semiconductor Manufacturing Company and United Microelectronics Corporation have multi-purpose portals in place to meet the demands of their customers. In the Enterprise Resource Planning software market, SAP and Oracle are the market leaders in the Asia/Pacific region.

Other vertical industries that are active in the B2B marketplace include automotive, shipping, chemicals, steel/metals, and healthcare. More and more trading companies are forming online marketplaces to support traditional vertical industries such as manufacturing and shipping. Vertical portals or "vortals" are now popping up everywhere challenging the traditional horizontal business models. Vortals provide customers with complete services including procurement,

insurance, logistics, shipping, and delivery. The emergence of vortals in the B2B marketplace has led to an increasing number of strategic alliances among infrastructure providers, suppliers, trading companies, content providers, and insurance carriers.

The major players involved in propelling B2B transactions in the region and the portals that have emerged reflect industries that are economically significant to either individual economies or to the Asia as a whole. For example, Asia's steel industry accounts for 45 percent of overall world consumption. The four biggest consumers, China, Japan, South Korea and Taiwan, account for about 250 million metric tons a year worth $100 billion. South Korea is the third-largest steel producer in Asia, following China and Japan, and accounts for seven percent of world production. As a result, both Hyundai (SteelnMetal.com) and Samsung (tradesteel.com) have created portals for the steel and metals industry. Similar trends are taking place in the healthcare industry as well, where Forrester Research expects the sale of medical supplies and pharmaceutical drugs to be the fastest-growing segment of B2B e-commerce over the next few years, rising to $44 billion in 2003 from $1 billion in 1999.

Market Opening Trade Agreements

The Information Technology Agreement

The Information Technology Agreement (ITA) is a World Trade Organization (WTO) trade agreement that requires participants to eliminate their tariffs by January1, 2000 on a wide range of information technology products. These products include computer hardware and peripherals, telecommunications equipment, computer software, semiconductor manufacturing equipment, analytical instruments, and semiconductors and other electronic components. As of December 2000, the ITA had 36 participants (with the 15 members of the European Union participating as one bloc) that represent approximately 95 percent of world trade in information technology products. Countries covered in this report that are signatories to the ITA include Hong Kong, India, Philippines, Indonesia, Japan, Singapore, Korea, Taiwan, Thailand, and Malaysia. Once China accedes to the WTO, it will sign onto the ITA, committing to an elimination of tariffs on two-thirds of the products covered under the ITA by January 1, 2003, and elimination on tariffs for all the remaining products by January 1, 2005.

Basic Telecommunications Services Agreement

Sixty-nine countries, accounting for more than 90 percent of the world’s estimated $900 billion annual telecommunications revenues, concluded a telecommunications services agreement on February 15, 1997, under the auspices of the WTO. The Basic Telecommunications Services Agreement consists of three parts: market access, national treatment, and pro-competitive regulatory principles. The Agreement entered into force on February 5, 1998. Asian signatories include: Bangladesh, Brunei, Hong Kong, India, Indonesia, Japan, Korea, Malaysia, Pakistan, Papua New Guinea, the Philippines, Singapore, Sri Lanka, and Thailand. It is expected that once China enters the WTO, it will also sign onto the Agreement, allowing for further opportunities for foreign participation in the market.

Opportunities for U.S. companies in the Asian IT market include:

- Security-related technologies
- Electronic commerce solutions for vertical markets such as government, banking and manufacturing
- Business applications software
- Internet-related technologies and services
- Internet Content Providers (ICPs)
- Supply chain management
- Networking equipment
- Wireless applications, devices, and services
- Value-added telecommunications services

CHAPTER 2: SELECTED ASIAN MARKET SNAPSHOTS

CHINA

Information Technology (IT)
According to International Data Corporation (IDC), China is expected to surpass Australia by 2001 to become the Asia-Pacific region's largest IT market, excluding Japan. China's purchases of IT hardware, software, and services should reach nearly $14 billion in 2000 and triple by 2004, accounting for nearly a third of the Asia-Pacific region, excluding Japan.

Approximately 88 percent of China's IT spending went to hardware in 1999. However, this share will decline to 77.7 percent in 2004, while those for software and IT services spending will increase to 11.7 percent and 10.7 percent, respectively. China is also the second largest personal computer (PC) market after Japan in Asia. According to the Ministry of Information Industry (MII), sales of these systems have risen at a 67 percent average annual rate since 1993 to more than 4 million units annually. Domestic manufacturers have captured more than 70 percent of these sales while U.S. firms have held much of the remainder. Imports represent about 70 percent of China's demand for packaged software. U.S. firms have been the dominant suppliers, particularly to the transportation, telecommunications, banking, and education sectors. China is the sixth fastest growing large U.S. IT export market in the world, with computer equipment as the leading export market segment. The level of these exports has more than doubled from $1.5 billion in 1993 to $3.3 billion in 1999, according to data compiled by the American Electronics Association.

Internet use in China is becoming more widespread for people of lower income and educational levels and will grow faster there than in any other nation in the Asia-Pacific region in the near future. The number of Chinese Internet users is expected to increase at a 63 percent average annual rate from 4.5 million in 1999 to 51.2 million in 2004, according to a recent IDC study. The Chinese government is also very supportive of developing China's information industry. The government's 10th Five-Year Plan (2001-05) will address the development of the country's information industry for the first time.

Electronic Commerce
E-businesses in China are multiplying almost as rapidly as Internet users. MII estimates that there are now at least 1,100 e-commerce firms in operation. Of these, more than 600 are online stores, compared to less than 100 at the beginning of 1999. On average, two new e-commerce firms are set up each day. According to MII's Computer & Microelectronics Development Research Centre and Ccidnet.com, the volume of online shopping is expected to reach $42 million by the end of 2000.

There are a number of reasons why Chinese consumers are not shopping online in larger numbers. Most online purchases are currently paid for in cash, deliveries are slow and unreliable, consumers mistrust online merchants, and concerns exist over secure electronic payment. China currently lacks a nationwide electronic payment system capable of handling online purchases. Debit cards are currently the best option for developing an online payment scheme. However, the lack of

cooperation among banks and central supervision means that cross-bank transactions originating on the Internet are impossible.

Companies engaging in business-to-business (B2B) electronic commere also face similar challenges, including insufficient transport and communications networks, banks that cannot process transactions from one branch to another, and restrictions on services such as insurance and distribution.

Telecommunications
China is currently the world's second largest telecommunications market and is expected to surpass the United States as the largest market over the next few years. U.S. exports of telecommunications equipment to China amounted to $547 million in 1999, while imports of telecommunications equipment from China amounted to $2,485 million. Exports tend to be more advanced technology products, such as networking equipment, while imports tend to be commodity products, such as telephones and answering machines.

Mobile phones are one of the fastest growing sectors in China's telecommunications market. China had 40 million mobile subscribers at year-end 1999. It is expected to have 60 million by the end of this year and projected to have 150 million by 2005.

In addition to its 40 million mobile subscribers, China had over 130 million wireline subscribers at year-end 1999. These equate to per-capita penetration ratios of just 13.5 percent for wireline and 3.5 percent for mobile, illustrating the tremendous opportunity for further growth. Foreign participation in China's telecommunications market has primarily been limited to equipment sales since it is illegal for foreign companies to own or operate communications networks in China. However, this situation will change after China joins the World Trade Organization (WTO), when China's telecommunications services markets will be gradually opened to foreign investment.

INDIA

Information Technology (IT)
According to International Data Corporation (IDC), the IT market (computer systems, packaged software, and computer services) in India totaled $3 billion in 1999, is expected to increase 27 percent to $3.8 billion in 2000, and is forecast to grow to $7 billion by 2002. Both the government and the private sector have increased their use of computers and a surge of interest in the Internet and electronic commerce is fueling market growth.

Factors contributing to accelerated growth in IT include: 1) continued economic improvement; 2) low IT penetration, particularly in the consumer segment; 3) hardware price erosion (many home personal computers, PCs, now cost $800 or less) ; 4) the rapid increase expected in the number of Internet users; 5) substantial investment in IT for national competitiveness (currently less than 1 percent of its GDP, but expected to reach 2.5 percent by 2003); 6) import tariffs and taxes that are likely to drop over the next five years; and 7) local expertise in software development. Factors inhibiting accelerated growth include: 1) an underdeveloped telecommunications infrastructure (although there are approximately 1 billion people in India, only 18 million have access to telephone lines); and 2) a lack of local language software and content.

Statistics for the number of Internet subscribers and users vary by analysts, with most estimates

indicating that a small minority of the population has access to the Internet in India. All estimates, however, indicate that India has less than one percent Internet penetration rate. Internet use is more than three times the subscriber rate, with estimates between 1.4 million and 2.6 million, due to the commonplace sharing of subscriber accounts. Approximately 85 percent of Internet users live in eight cities, with about 40 percent concentrated in New Delhi and Mumbai. Hyderabad and Bangalore also have high Internet penetration rates. Internet sharing is commonplace in Pune, Calcutta and Bangalore where a high proportion of people access the Internet from educational institutions. Cyber cafes and kiosks also offer opportunities to access the Internet. According to a Gartner Group survey, 60 percent of Indian users surf from cyber cafes. Rural India is virtually disconnected from the World Wide Web. The cost of Internet access, reported to be approximately $42 for 20 hours/month, equals 8 percent of the average gross domestic product (GDP) per capita income. On a regional basis, India is currently the fifth largest Internet user market in the Asia Pacific region, after China, Korea, Australia and Taiwan.

Electronic Commerce

Although India faces many obstacles before e-commerce can become an important economic engine, both the government and private sector are developing solutions to address some of these limitations. One significant step was the May 2000 approval of the IT Bill which should establish the legal and regulatory framework for e-commerce. The bill paves the way for a system of electronic records, electronic/digital signatures, payment gateways and certifying authority. The Indian government also eased restrictions on foreign direct investments (FDI) in the e-commerce sector by raising the limit from 49 percent to100 percent.

The opportunity for e-commerce should expand with the growth of Internet use. According to a 1999 report by IDC, e-commerce in India is emerging and has registered transactions worth $30 million, with projections for $575 million by financial year 2002-3. Nasscom reports more optimistic figures estimating e-commerce transactions worth $800 million in 2000-01, up from about $100 million in 1999, and projects growth to $2.5 billion by 2002.

B2B transactions constitute the majority of e-commerce transactions in India, although widespread use is slow in developing. According to a recent study by Netmonitor, only 7 percent of India's Internet-using businessmen have done any kind of e-commerce transaction for their business, and only 15 percent have posted web sites. However, the number of business users is growing rapidly, with more than one dozen B2B portals currently in operation and about 6,000 companies listing goods through these sites. Nasscom estimates B2B transactions will be around $700 million for 2000-01.

Challenges still exist in the area of business-to-consumer (B2C) e-marketing. A survey conducted by the Indian Market Research Bureau revealed that only 26 percent of the respondents were aware of the shopping possibilities available on the Internet. The Gartner Group also notes that only 2 percent of Indian Internet users have engaged in B2C e-commerce, or paid on-line. Another limiting factor in India's B2C e-commerce sector is the relatively small number of credit card holders among the country's total population. One industry estimate has placed the percentage of Internet users with credit cards in the 40

percent range. Meanwhile, the distribution of on-line purchases could be further complicated by India's complex postal system.

Telecommunications

India's 27 million line telephone network is among the top 10 largest networks in the world and third largest among the emerging economies. It has been growing at an average of more than 20 percent annually for the last few years. Currently, India has a relatively low teledensity of 2.7, with plans for eliminating waiting lists for telephones by 2002 and achieving a teledensity of 7 by 2005 and 15 by 2010. This will require 75 million telephone connections by 2005 and 175 million by 2010. At current prices, this translates into additional investments of approximately $36 billion by 2005 and $69 billion in the following five years. The investment potential is not limited to basic telephony, but is spread across a wide range of services and technologies, including cellular, Internet, radio trunking, Global Mobile Personal Communications System (GMPCS), and other value added services. Growth in various services is expected to facilitate a tremendous growth in the market for telecommunications equipment. India's cellular network, based entirely on 900 Mhz GSM (Global System for Mobile Communications), is growing fast, with 2.2 million current subscribers and an additional one million expected to be added by the end of 2000.

The Indian government issued a New Telecommunications Policy in 1999 and made several announcements during the summer of 2000 to further liberalize the market. The Indian domestic long distance market was opened to private sector participation on August 15. The new state-owned service provider (formerly the Department of Telecommunications, now called Bharat Sanchar Nigam Ltd., or BSNL) was established as a separate commercial entity ("corporatized") on October 1, 2000 and is no longer a part of the Ministry of Communications. The government has also announced that the state monopoly on international telecommunications services (held by Videsh Sanchar Nigam Ltd., or VSNL) will end by April 1, 2002. India's international telecommunications traffic is growing at nearly 20 percent per year, and the United States is India's second largest market for outbound minutes after Saudi Arabia.

There is a cap of 49 percent foreign ownership investment in companies providing basic and cellular telephony; 51 percent is allowed for value added services. There have been recent reports that these caps may be lifted to encourage a greater amount of foreign investment in India's telecommunications sector. There is no limit on foreign equity in infrastructure providers, such as those who supply passive infrastructure (e.g., dark fiber) and those who provide end to end bandwidth to service providers. Plans are underway for issuing licenses for basic telephony in the 14 regions of the country which as yet have no competitive fixed service provider. There are also reports that the current duopoly for cellular services may be abolished and the sector deregulated.

INDONESIA

Information Technology (IT)

The market for IT products and services in Indonesia totaled $638 million in 1999 and is expected to reach $1.95 billion in 2004, representing a compound annual growth of 25 percent between 1999 and 2004 according to International Data Corporation (IDC).

Although the personal computer (PC) penetration rate remains relatively low at 1.7, and Internet usage is still in its infancy (estimated to be nearly 900,000), the potential growth in the IT market is promising given that Indonesia houses the fourth largest population in the world. The number of Internet users is expected to exceed 4 million in 2003 and the number of active Internet Service Providers (ISPs) is expected to grow from 35 in 1999 to over 60 over the next few years, according to the Indonesian Internet Service Providers Association.

In the past, the Indonesian government has not placed a great deal of emphasis on the development of its information and communications industry. For this reason, most of the IT businesses in Indonesia serve as agents and distributors for IT multinationals. The government is now viewing IT development as a way to boost its economy. The government has invested $70 million into their national infrastructure plan, Nusantara 21 (N-21), to build an information superhighway that will connect 11 major cities by 2001.

Electronic Commerce

The financial crisis that plagued Asia in 1997 served as a catalyst to stimulate the development of electronic commerce in Indonesia. According to IDC, e-commerce transactions are expected to be $250 million by year-end 2000 and reach $3.2 billion by 2003. The most promising vertical markets include retail, banking and finance, transportation, and manufacturing. The Gartner Group ranks Indonesia among the top nations in Asia for e-procurement services. Indonesia is expected to grow 195 percent and 215 percent in the direct and indirect e-procurement segment respectively. Although the business-to-business (B2B) market in Indonesia is projected to grow rapidly, growth in the business-to-consumer (B2C) segment remains relatively low given that Indonesia is still a cash-based society. According to industry estimates, approximately 90 percent of consumer purchases are made in cash. To further encourage the development of e-commerce in Indonesia, a draft of cyber regulations is currently under review by the Law and Judicial Ministry.

Telecommunications

Indonesia's telecommunications market is on the path to liberalization, which will occur in stages over the next few years. At this point, there are two major players in the market: PT Telekomunikasi Indonesia (Telkom) which has a monopoly on domestic call services, and PT Indonesia Satellite Corporation (Indosat) which has control over international call services. The Indonesian government has proposed that Telkom will maintain its monopoly on long distance and domestic calls, until 2005 and 2010, respectively. According to press reports, the government's plan allows foreign telecommunications companies to enter the domestic call services market with the stipulation that they must enter into an agreement with Telkom and pay it a compensation fee. The Indonesian government recognizes that new entrants into the telecommunications market would accelerate market liberalization efforts, however they want Telkom to have control over which companies are able to enter the market until the dates specified in their liberalization plan.

In 1996, the Indonesian government proposed an initiative to install five million new telephone lines by the end of 1999. Working in cooperation with private consortia, the government planned to install three million new lines, while the remaining two million were to be installed by the private consortia, consisting of 5 companies covering a specified

region in Indonesia. The economic crisis slowed the installation of these lines, and the government (PT. Telkom) still plans to install 3 million lines. However, they have requested that the private companies now install 1.26 million lines.

Compared with other Asian countries, the mobile phone penetration in Indonesia is quite low at one in 100 people in 1999. However, according to Telkom, during the first quarter of 1999, the cellular phone market experienced nearly a 30 percent growth in new subscribers. It appears that the government is committed to developing the cellular telecommunications market, especially with a proposed target of installing 3 million cellular lines by 2000.

Indonesia currently employs three different cellular technologies: Global System for Mobile Communications (GSM); Nordic Mobile Telecommunications (NMT)-450I, and Advanced Mobile Phone Service (AMPS). Industry insiders predict that the demand for cellular phones will significantly increase in the next few years due to the popularity of prepaid cellular calling cards. These prepaid cards continue to attract new cellular subscribers, both corporate and personal, because the cards are relatively easy to secure.

JAPAN

Information Technology (IT)

Japan's computer market is growing rapidly. U.S. Department of Commerce market specialists in Tokyo report that the market's revenues reached $50 billion in 2000. Demand had fallen in recent years due to the country's prolonged recession, but is increasing again because of the improving Japanese economy, significant price competition, expansion of the consumer market, purchases for Y2K remediation, increased Internet use, and deployment of e-business strategies. In addition, a growing number of Japanese firms are investing in and upgrading computers and related infrastructures, such as local area networks (LANs) and extranets, to increase efficiency and productivity and to improve competitiveness. In 1999, 90 percent of mid- and large-sized Japanese firms had LANs installed.

As hardware sales surge along with increasing Internet use, new and sophisticated software is in demand. Japan's software market reached revenues of $12.4 billion in 1999, a 10 percent increase from 1998. Business process re-engineering is gaining the attention of Japanese businesses, spurring strong demand for software to improve efficiency, namely database management systems (DBMS), customer relationship management (CRM), and groupware software. Many Japanese firms are starting to implement e-commerce strategies, and demand for Internet and e-commerce software is predicted to be very high in the coming years. In addition to sophisticated software, the rise in the personal computer (PC) penetration rate is in turn spurring demand for various types of applications, such as word processing, Internet/web software, e-mail translation software, pre-installed suite software packages, and security and network software.

Some industry experts suggest that Japan is a few years behind the United States in Internet use. Japan's Ministry of Posts and Telecommunications (MPT) recently reported that 27 million Japanese currently use the Internet - more than one third of those via mobile phones - for an Internet penetration rate of approximately 21 percent. The number of users is expected to rise steadily as PCs

increasingly penetrate homes and businesses and as Internet-enabled handheld devices continue to gain popularity. By 2003, the number of Internet users in Japan is projected to reach 76 million, or 60 percent of the country's population.

Electronic Commerce

Total e-commerce revenues in Japan reached approximately $4.2 billion in 1999. They are expected to more than double in 2000 to $7.4 billion and to amount to $693 billion in 2003, according to the Ministry of International Trade and Industry (MITI) and Anderson Consulting. Rapid growth is due to a number of factors, including more Japanese language content; increased security; increased availability of inexpensive, high-quality PCs; and recent telecommunications liberalization. Nonetheless, Japan's e-commerce market lags several years behind that of the United States.

Most e-commerce growth will be in business-to-business (B2B) revenues, which grew 420 percent from $610 million in 1998 to $3.2 billion in 1999. The market is predicted to expand to $651 billion in revenues by 2003. The penetration rate of B2B purchases as a percentage of all business transactions in 1998 was approximately 8 percent, and could reach around 40 percent by 2003. Firms in all industries reportedly are realizing B2B's potential to increase efficiency and cut costs, and are interested in investing in these technologies. The distribution industry is one of the largest users of B2B technologies and, along with the auto parts, electronic information, and construction industries, is predicted to have significant growth in B2B e-commerce use, according to Anderson Consulting and MITI.

Telecommunications

Japanese demand for telecommunications equipment, excluding fiber optic cable, was estimated at $29.7 billion in 1999, making it the second largest telecommunications market in the world after the United States. Japan's local telecommunications service market has been long dominated by the monopoly supplier, Nippon Telegraph and Telephone (NTT), which has a 64 percent share of the total domestic services market and a 98 percent share of the local services market. In mid-1999, NTT was restructured into one long distance/international communications company and two regional communications companies, under a single holding company which is not involved in communications business operations.

One of the highest growth sectors has been wireless communications. There are over 60 million wireless users in Japan (50 percent penetration), and wireless access to the Internet is driving growth. NTT DoCoMo continues to be the market leader, with 55 percent of total subscribers. The long-anticipated merger creating KDDI, a viable competitor to NTT, was just completed in October 2000. The merger unites DDI, KDD and IDO, companies that serve as long distance, overseas and wireless carriers, respectively.

Historically, Japan's telecommunications market has been relatively highly regulated. Over the past several years, the Japanese government has recognized that the economic benefits of a dynamic telecommunications sector require vigorous competition and broad market participation. Through independent deregulation initiatives (U.S.-Japan Framework and the Enhanced Initiative on Deregulation) and through implementing its WTO commitments, Japan has taken several

significant measures to foster a more pro-competitive regulatory regime in the telecommunications sector, including a significant reduction in NTT's interconnection charges. Bilateral discussions on further deregulation are ongoing. In addition, in August 2000, Japan's trade ministry proposed a series of sweeping telecommunications reforms designed to open the telecommunications market to competition so that Japan does not slip behind the rest of the world in telecommunications market innovation.

MALAYSIA

Information Technology (IT)

The Malaysian government has taken an active role in integrating IT and telecommunications into the community. The Multimedia SuperCorridor (MSC) project is an ambitious initiative that began in 1996 to build Asia's version of the Silicon Valley, which would incorporate flagship applications such as electronic government, smart schools, and telemedicine. The MSC is part of the Malaysian government's Vision 2020, their national IT development plan. U.S. companies that have invested in MSC include Microsoft, Sun Microsystems, Oracle, and IBM.

In 1999, Malaysia ranked fifth in the Asia-Pacific region for high-tech U.S. exports. High-tech exports to Malaysia totaled $6.2 billion, representing a 118 percent growth rate between 1993 and 1999. Due to lower production costs and attractive investment incentives, Malaysia was the third largest market in Asia-Pacific and seventh in the world for U.S. electronics manufacturing investment in 1998, which totaled $3.4 billion. Motorola, Texas Instruments, and Intel have significant investments in Malaysia.

Until very recently, there were only two Internet service providers (ISPs) operating in Malaysia. The new ISP, Maxis Net, offers one year free access to existing fixed and cellular subscribers, which should encourage increased Internet usage and put pressure on the other two ISPs to offer more competitive services. The number of Internet dial-up accounts was 523,000 in 1999, and is expected to reach 1.4 million in 2004. According to International Data Corporation (IDC), the number of domain names registered through the Malaysian Network Information Center increased from 2,312 in 1998 to 5,231 in 1999.

Electronic Commerce

The Malaysian government has also passed legislation that supports the development of the Internet and electronic commerce. The Communications and Multimedia Commission Act of 1998 establishes the Malaysian Communications and Multimedia Commission (CMC), the regulatory body overseeing the communications and multimedia industry. The Multimedia Convergence Bill, passed in 1998, recognizes the convergence of telecommunications, computing, and broadcasting technologies. The Digital Signature Act, effective October 1998, recognizes the legal status of digital signatures. To date, electronic commerce transactions are not taxed in Malaysia.

The electronic commerce market is rapidly taking off in Malaysia. The business-to-consumer (B2C) market is currently growing faster than the business-to-business (B2B) market due to the media attention placed on the B2C segment. E-commerce in Malaysia has burgeoned in the past year largely because of the rush to cash in on the euphoria generated by the phenomenal rise in Internet-related stocks. As in the United States, some of the most high

profile e-commerce investments have been in the B2C area.

Telecommunications
Malaysia is rapidly upgrading its telecommunications infrastructure to meet the growing demand for services and to enable value-added services such as electronic commerce, interactive distance learning, video-on-demand and interactive multimedia content. The country is looking for and purchasing state-of-the-art equipment and technology. Unlike many countries in the region, the telecommunications sector in Malaysia has been privatized, making it a highly competitive market. Despite the recent economic crisis, demand for basic and value-added telecommunications services has remained strong. The Ministry of Telecommunications has issued 36 licenses for the provision of value-added services, and five international gateway licenses.

Most of the cellular networks are available in Malaysia, including Nordic Mobile Telecommunications (NMT) 450, ART 900 (Celcom's analog system), Advanced Mobile Phone System (AMPS) 800, Global System for Mobile Communications (GSM), and Personal Communications Network (PCN). According to the CMC, there were approximately 2.1 million cellular telephone subscribers. Industry analysts suggest that cellular subscribers may be a good market segment to tap for value-added on-line services, especially since the mobile phone penetration rate is much higher than the personal computer (PC) penetration rate.

PHILIPPINES

Information Technology (IT)
The Philippines was the fastest growing market in Asia-Pacific for U.S. high-tech exports between 1993 and 1999, quadrupling to $4.9 billion, with semiconductors accounting for $4.1 billion of this trade. Between 1993 and 1998, U.S. technology manufacturing investment in the Philippines increased 237 percent, making it the 8th largest market for U.S. high-tech investment. The strength of the electronics assembly industry in the Philippines has prompted many leading U.S. information technology companies, such as Intel, Motorola, and Texas Instruments to expand their assembly operations there. As a result, between 1993 and 1999, U.S. imports of computers from the Philippines increased 1600 percent. The Philippines ranked tenth in high-tech merchandise exports to the United States from 1993 to 1999, growing 347 percent. During this same period, the Philippines was ranked our tenth largest trading partner in high-tech trade (with the European Union considered as one single trading partner).

The Philippines is also becoming a major IT hub for multinationals. An increasing number of U.S. firms are locating engineering design, manufacturing design, call centers, back office operations, outsourcing centers and software development there. These companies include America On-Line (AOL), Barnes and Noble, Fluor Daniel, Bechtel, Sealand, and Citibank among others.

The number of websites increased by over 200 percent annually from a handful in 1994 to 500 by 1998. According to the Philippine Internet Service Organization, there are currently 600,000 Internet users nationwide. By 2004, the number of users is expected to reach 1.3

million. According to Pyramid Research, the number of Internet dial-up accounts will increase from 330,000 in 1999 to 2.9 million by 2004. A highly-educated middle-class population and a well-developed consumer culture are contributing factors that have spurred this growth. Other factors contributing to the growth of Internet usage include a high literacy rate, willingness to embrace the Internet and electronic commerce, and expected growth in gross domestic product (GDP) per capita from $3,582 in 1999 to $3,692 in 2000.

Although Internet usage is increasing rapidly, several obstacles still remain that may slow down this growth. The monthly cost of accessing the Internet is relatively expensive at $22 for 80 hours in a country with a per capita income of $988. For this reason, the number of Internet users is substantially higher than subscribers. Of the 180 Internet service providers (ISPs), only twenty have international connections. The high cost of bandwidth results in the majority of ISPs choosing to lease cheaper and smaller bandwidth alternatives. To lease an E1 line from the Philippines to the United States, an ISP would pay approximately $40,000 per month versus $6,000 to $7,000 to lease a 64K line. The cheaper option results in slower and less reliable dial-up access for the users. According to a recent survey, 75 percent of users log off the Internet due to frustration with the slow Internet connection. The leading ISPs are Infocom, which was bought in 1998 by the Philippine Long Distance Telephone Company (PLDT) and has a direct fiber optic link installed in its Network Operations Centre, and SkyInternet, which also offers high-speed cable Internet access.

Currently, there are three "IT zones" in Metro Manila - Eastwood City, Fort Bonifacio, and Filinvest - which are actively promoting investments by IT firms. An increasing number of U.S. firms are locating engineering design, manufacturing design, call centers, back office operations, outsourcing centers, and software development.

Electronic Commerce

Despite the limited Internet penetration rate and telecommunications infrastructure, electronic commerce is starting to develop in the Philippines, particularly with the recent passage of the Electronic Commerce Act. Passage of the Act by President Estrada signaled the full support of the Philippine government in the development of electronic commerce in the country. The Act addresses critical issues such as the admissibility of digital signatures and electronic documents in courts, authentication, and infrastructure security. The latter is critical, given the recent global effects of the "I Love You" virus that originated in the Philippines. The new law features stiff penalties to deter cyber crimes. Fines range from $2500 for hacking to $250,000 for electronic commerce-related crimes. Imprisonment can range from six months to three years. Although electronic commerce is still in its infancy in the Philippines, the passage of this law and the increase in Internet users will spur its development. Industry experts believe that a minimum of 500,000 Internet users are needed to make electronic commerce viable in the Philippines.

President Estrada recently mandated the Electronic Commerce Promotion Council, headed by Secretary Mar Roxas of the Department of Trade and Industry, to update investment policies and formulate promotional activities related to the promotion of electronic commerce in the Philippines. Roxas has been negotiating with international companies to

invest in and partner with Philippine IT companies and service providers.

The business-to-business (B2B) electronic commerce market represents one of the fastest growing sectors in the Philippines. Many multinationals and other large companies are already engaged in e-commerce activities and smaller companies are moving toward e-commerce readiness. More and more ISPs are expanding their services to include not only access but also content provision and electronic commerce and payment gateways.

Business-to-consumer (B2C) websites have also started emerging in the Philippine marketplace. Most of these sites only accept cash payment. Credit card payments are entertained by some sites, but the manual process of signing the credit card slip upon delivery is still being used. Moreover, a large majority of firms do not rely on a web presence to conduct business. According to the latest International Data Corporation (IDC) research, in 1999, about 100,000 Internet users shopped online. As Filipinos become more assured of the security of data and the efficacy of online transactions, IDC predicts the numbers to increase to 1.3 million online shoppers by 2004.

Telecommunications

The Philippine government passed three significant laws (Executive Order 59, Executive Order 109, and the Republic Act 7925) which opened the market to competition in 1993. As a result of the deregulation, ten new companies entered the market to challenge the former incumbent, PLDT, and fixed line costs lowered for the population. Nationwide telephone density increased from 1.4 per 100 in 1993 to 10 by the end of 1999. In Manila, there are almost 20 phones per 100 people. PDLT still remains the nation's principal domestic and international fixed line provider and continues to operate the most extensive nationwide domestic fiber optic network and microwave long distance network. The cellular telephone system showed the greatest growth over the past three years. Cellular subscribers more than tripled from 500,000 in 1995 to 1.8 million by the end of 1999. Cable TV is also one of the fastest growing industries in the Philippines. By the end of 1999, there were approximately 1 million cable TV subscribers with an annual growth rate of 20 percent.

Although the IT equipment and investment markets are relatively open, there are still some concerns that persist with regard to the telecommunications market. Despite the numerous deregulation measures, the lack of competition has prevented the improvement of telecommunications infrastructure quality. Interconnection issues between PLDT and smaller regional networks continue to present problems, and the National Telecommunications Commission has shown itself to be unwilling or unable to enforce existing regulations that require reasonable interconnection terms. In addition, the Philippines has signed but not ratified the Basic Telecommunications Agreement, indicating a lack of commitment to enforce concessions agreed upon within the World Trade Organization (WTO) framework.

The Philippine Constitution limits foreign investment in telecommunications networks to 40 percent of equity and bans foreign investment in cable television networks. A convergence bill is pending in the Philippines Congress that would permit up to 40 percent foreign equity ownership in cable networks. This proposal, and proposals to increase overall foreign investment limits are very

controversial and opposed by entrenched interest groups.

SINGAPORE

Information Technology (IT)
Singapore is a very significant market for U.S. IT interests. In 1998, Singapore was the largest market in the Asia-Pacific region and the second largest in the world for U.S. high-tech manufacturing investment according to the Bureau of Economic Analysis. In 1999, the United States exported $7.4 billion in high-tech equipment, which had increased 52 percent from 1994. According to the American Electronics Association, Singapore currently manufactures close to half of the world's supply of computer disk drives.

The market for information technology products and services in Singapore totaled $2.74 billion in 1999, and is expected to reach $4.46 billion by year-end 2004 according to International Data Corporation (IDC). Despite a small population of 3.2 million, Singapore's regulatory, commercial, and economic environment, makes it one of the leading markets for U.S. IT and electronic commerce opportunities in the Asia-Pacific region. According to a Dataquest survey, Singapore will be among the top three nations in the Asia Pacific region in e-commerce implementation. Singapore has the second highest Internet penetration rate in the region after Australia, and the ninth highest in the world. According to Pyramid Research, there were 620,000 Internet dial-up accounts in 1999. This number is expected to increase five-fold to 3.2 million by 2004. In early 2000, 42 percent of households had Internet connection.

According to IDC, the volume of electronic commerce transactions is expected to grow from $118 million in 1999 to $6.3 billion by 2004. Factors that contribute to e-commerce and IT growth in Singapore include a high literacy rate, a high Internet penetration rate, a high gross domestic product (GDP) per capita, a well-developed telecommunications infrastructure, a strong technical labor force, and active government support. Singapore had the highest GDP per capita in the Asia-Pacific region at $26,300 in 1999 and second highest in the world after the United States.

The rate of IT adoption varies among businesses in Singapore. According to the Singaporean government, approximately 96 percent of large enterprises have Internet access compared to 86 percent for small- and medium-sized enterprises (SMEs). Local area network (LAN) usage is nearly 100 percent among larger businesses. Sixty-one percent of large firms have websites, compared to 32 percent among SMEs. IT spending is highest among the government, IT, telecommunications, and banking/finance sectors. Businesses are expected to increase their IT spending by an average of five percent between 2000 and 2001. According to another survey conducted by the Singapore Information Technology Federation, of the 188 organizations polled, 15 percent have engaged in electronic commerce and 42 percent planned to within the next 12 months. Among the highest percentage of users were the government and companies with sales over $100 million.

Electronic Commerce
The Singaporean government has taken an active role in creating a sound legal environment that encourages the uptake and development of electronic commerce. Last year, the government developed an e-commerce master plan that addresses security and electronic payments concerns. In 1998,

Singapore passed the Electronic Transactions Act, which gave digital signatures legal status. The government currently does not tax electronic commerce transactions. In addition, the Copyright Act was amended in 1999 to extend IPR protection for copyright owners in the digital arena. Singapore has been working with its major trading partners to harmonize e-commerce laws. The Singaporean government's policies include encouraging Internet use, or "Dot.Coming," within the Government, private, and personal use sectors of Singaporean society.

By liberalizing telecommunications, building a nationwide broadband network, creating public IT investment funds, and providing easier work visa processing to IT professionals, Singapore has laid the groundwork for a vibrant regional and global e-commerce hub. The country is committed to promoting itself as a trusted global hub for e-commerce. Singapore now plans to recruit top U.S., European, and Asian high-tech companies to base their Asian operations in Singapore.

Telecommunications

Singapore is considered to have one of the best regulatory and competitive telecommunications environments in the world. In April 2000, the Ministry of Communication and Information Technology fully liberalized the telecommunications sector two years ahead of schedule. In preparation, the government issued five facilities-based and 29 service-based licenses in March. With the opening of the market, the incumbents, SingTel and Starhub, will face stiff competition and be forced to lower prices and provide more services in order to remain competitive. The government has also lifted all restrictions on direct and indirect foreign ownership of the telecommunications sector. The announcement of complete liberalization is expected to generate $3 billion in foreign investments in Singapore.

Singapore places great emphasis on developing and maintaining a sophisticated and advanced telecommunications infrastructure. In 1999, the telecommunications market in Singapore was valued at $1.3 billion. According to the International Telecommunications Union (ITU), Singapore's 1999 teledensity was 57.70. The country also has 2.16 million mobile phone subscribers.

The government's efforts to liberalize and deregulate the telecommunications industry, in particular the full implementation of its World Trade Organization (WTO) commitments in April of this year, should fuel demand and create opportunities for U.S. firms to sell and invest. In 1999, U.S. telecommunications equipment exports to Singapore reached nearly $290 million. Foreign firms dominate the telecommunications equipment market in Singapore because domestic firms cannot meet the demand created by the government's infrastructure plans and the island's sophisticated consumer base.

THAILAND

Information Technology (IT)

The Thai government announced an IT2000 plan in 1995, which incorporates initiatives to build up their telecommunications infrastructure and to train communities to become more IT-literate. To encourage the uptake of Internet usage, the Ministry of Interior's Local Administration Department has recently launched its own web portal that will allow the public to access a wide range of government services. The project was a joint

effort between the Communications Authority of Thailand, Informix Software, Sun Microsystems, and Control Data (now Syntegra).

Thailand houses one of the largest manufacturing bases for electronics in the Asia-Pacific region, and imports a significant amount of electronic components for final assembly. In 1999, U.S. high-tech exports amounted to $2 billion, of which semiconductors accounted for $1.3 billion. The number of Internet users had increased from 800,000 to approximately 1 million in 2000. The personal computer (PC) penetration rate is 3.3 percent, and approximately 70 percent of businesses own a PC.

Electronic Commerce

Because of the importance of electronic commerce, the Ministry of Commerce has set up a pilot project to provide some knowledge and understanding with regard to how e-commerce can be made use of, and how the Internet these days can be a vehicle for expanding trade. E-commerce is so important to the Thai Government that they have intended to put this in their development plan, the 9th and the 10th National Economic and Social Development Plan.

E-government is now taking shape through the various initiatives of the National Information Committees, one of which is the Government Information Network. The GINet is the government intranet and it is linked to 20 provinces. It is used for the purpose of government information exchange and is solely for the government.

Telecommunications

The Thai market for telecommunications services is still regulated, but is on a slow path to liberalization. The Telephone Organization of Thailand (TOT), a state enterprise, is the major player in the market. However, in recent years, two private telecommunications service providers, Telecom Asia (TA) and Thai Telephone & Telegraph (TT&T) were granted operating licenses to provide basic telecommunications services (local and long distance) in certain parts of Thailand.

Currently, there are several on-going projects that will result in a major expansion of Thailand's telecommunications infrastructure. These projects include: the installation of rural public long distance telephone lines; the installation of submarine fiber optic cables; the planned installation of six million additional fixed telephone lines; the possible licensing of new cellular phone service providers; and the construction of satellite earth stations. The implementation of these projects is setting the stage for the development of e-commerce, which industry insiders believe will flourish within the next two to three years.

As with many emerging economies, the wireless market is growing quite rapidly in Thailand, and the government has placed significant investment in developing Thailand’s mobile infrastructure. Investment is expected to increase from $50 million in 1999 to more than $400 million in 2000. There are six analog and digital mobile telephone and two satellite-based mobile phone operators in Thailand. Currently, there are approximately 2.1 million Thai mobile phone subscribers, with an expected annual growth rate of 10 percent. Opportunities exist to provide Internet products and services with the use of the mobile phone, particularly due to growth in mobile phone penetration.

Privatization of Thailand's state enterprises has been a government priority over the past decade and is currently seen by the authorities

as one of the keys to restoring economic vitality. Part of the privatization program is encountering fierce opposition from various labor unions. This opposition has led to delays in the passage of legislation through Parliament. At the same time, new competition legislation has been introduced to ensure that the privatization process does not result in the creation of private monopolies. These reforms, once implemented, should lead to enhanced opportunities for trade and investment.

VIETNAM

Information Technology (IT)

Although Vietnam is a relatively small market for IT products and services, totaling $234 million in 1999 according to International Data Corporation (IDC), the market is expected to grow steadily at a compound annual growth rate of 23 percent between 1999 and 2004. Vietnam's underdeveloped telecommunications infrastructure and tight regulation of the market have resulted in low Internet usage. By the end of 2000, merely 0.1 percent of population were Internet users. To encourage increased Internet and IT usage within the country, the Vietnamese government has attempted to instill policies that will allow for greater widespread adoption among a population of $370 gross domestic product (GDP) per capita. State-owned Vietnam Posts and Telecommunications Corporation (VNPT) has reduced its charge per minute in order to make Internet access more affordable. Recently, Vietnam Datacommunication Company (VDC), a VNPT subsidiary, has been permitted to provide indirect Internet services on a trial basis which will allow users to surf on the Internet without paying installation and subscription fees. Internet connection rates remain relatively slow due to the firewall system that is monitored by VDC. Some experts allege that this system has reduced Internet access speeds from 30 to 300 percent.

Electronic Commerce

While public access to the Internet was introduced to Vietnam in 1997, electronic commerce is still slowly catching on although many cultural impediments remain in place. In the business sector, most companies use the Internet to send e-mail rather than to conduct business transactions. On the consumer side, most transactions are done in cash and credit cards are seldom used. In addition, there is no legal framework governing e-commerce transactions, and no laws that deal specifically with the protection of intellectual property protection over the Internet. Software piracy is a serious concern among foreign businesses in the Vietnam market. The Business Software Alliance estimates that nearly 97 percent of software used in Vietnam has been pirated.

The Vietnamese Government acknowledges that electronic commerce and the widespread adoption of IT will be drivers in Vietnam's economic competitiveness in Asia, and are taking steps to address concerns that may hinder this development. In January 2000, an e-commerce development strategy for Vietnam was submitted to the government for approval. The Ministry of Trade will select forty enterprises to participate in e-commerce promotion throughout the country. Vietnam has also recently joined the Association of Southeast AsianNations (ASEAN) Coordination Board on E-commerce.

Telecommunications

The development of the telecommunications infrastructure in Vietnam is a national priority. The key players, the Directorate General Post & Telecommunications (DGPT), and the Vietnamese operating and purchasing authority,

VNPT, decided that the telecommunications system must consist of cutting edge products and services.

The buildup of Vietnam's telecommunications network is one of the fastest in the world. At the end of 1998, there were approximately 2 million telephone lines installed compared to 127,000 lines in 1991. By year-end 2000, there will be 3 million telephone lines installed, and in Ho Chi Minh City and Hanoi, there will be between 20 and 25 telephone lines per 100 people. In addition, multiple Global System for Mobile Communications (GSM) cellular networks, multiple pager networks, and a parallel fiber optic/digital microwave backbone system is now in place. Once these installations are completed, 90 to 95 percent of the provinces and cities in Vietnam will have the fiber optic cable backbone.

The telecommunications services market is highly regulated by the DGPT. Currently, foreign companies are only allowed to participate in developing the telecommunications network through Business Cooperation Contracts (BCCs). However, while the foreign company is expected to provide equipment and training it could only share the revenue with the local partner at a negotiated rate for a specified period of time. In other words, they are prohibited from owning or managing telecommunications systems.

The mobile phone market is growing rapidly, with a customer base predicted to exceed 600,000 by the end of 2000. Currently, there are two nationwide systems, and one local system in Ho Chi Minh City. It is expected that there would be a CDMA (Code Division Multiple Access) mobile phone network in 2001 as a result of the recent $230 million deal between the local joint stock company, Saigon Postel, and SLD Telecom, a Korean consortium comprising of SK Telecom, LG Electronics and Dongah Elecomm. According to industry insiders, there are opportunities to provide value-added services for the mobile phone, such as Internet connection and e-mail capabilities.

Despite this relative growth, the Vietnam telecommunications sector is still far behind that of other regional countries in many areas. In terms of phone density, the country currently has roughly 4 phones per 100 people. According to its business plans, VNPT is expected to invest $500-$700 million annually in the next five years on the telecommunications infrastructure. However, the government's goal to develop the telecommunications industry may be adversely damaged by its pricing policy. Currently, costs of telecommunications services in Vietnam, including Internet service, are ranked among the most expensive in the world. It is expected that the DGPT will officially allow local telecom operators to provide both domestic long-distance and international telecom services using VoIP (Voice over Internet Protocol) technology in the first quarter of 2001. If this plan is realized, telecom costs will be reduced dramatically.

CHAPTER 3: HONG KONG

Economic and Information Technology Indicators

Economic Indicators	
Total Population	6.721 million[2]
Total GDP	1,268 billion HKD = U.S. $163.6 billion[1]
Total per capita GDP, purchasing power parity (1998 est.)	$25,100[3]
Real GDP growth	3 percent (1999), 8.5 percent (2000)
Information Technology and Telecommunications Indicators	
Computers per 1,000 people	413[4]
Total phone lines	3.869 million[1]
Teledensity (phones per 100 people)	58[1]
Wireless subscribers	4.3 million[5]
Wireless Teledensity	63[1]
Total Internet users	2 million[6]
Internet users as a percentage of population	30 %[5]

INTRODUCTION: THE OVERALL IT MARKET AND INDUSTRY

The market for information technology (IT) products and services in Hong Kong totaled $2.29 billion in 1999, and is expected to reach $2.98 billion by year-end 2004 according to the market research company, IDC. Personal computers (PCs), workstations, and low-end servers make up nearly half of this market. The hardware market is still driven by low-end products due to high demand from the home and small office markets. Hong Kong has the fourth highest PC penetration rate in the Asia-Pacific region and the fourteenth highest in the world. IDC predicts that the largest growth sector will be in packaged software,

[2]Telecommunications Indicators in Hong Kong, submitted to ITU for the fiscal year ending 31 March 2000, OFTA

[3]Lycos, infoplease.com, World Almanac

[4]Cybernation 2.0, American Electronics Association

[5]June 19,2000 edition of *Wireless Week*

[6]South China Mornig Post, May 1, 2000, "Net users in Hong Kong likely to have passed the 2m mark"

with a compound annual growth rate of 9.4 percent between 1999 and 2004, followed by IT services at 8.5 percent, and hardware at 3.6 percent. Although Hong Kong is a relatively small market for U.S. high-tech exports, ranking sixth in the Asia-Pacific region and ninth in the world (with the European Union considered as one trading partner), U.S. high-tech companies have a strong presence there through local branch operations and distributors. Many companies consider Hong Kong a gateway into the mainland Chinese market, which according to IDC is expected to surpass Australia by 2001 as the largest IT market in the Asia-Pacific region, excluding Japan.

Hong Kong is the United States' eleventh largest high-tech trading partner. According to the U.S. Bureau of the Census, in 1999 the U.S. exported $5.7 billion in high-tech equipment to this city. Because Hong Kong sources key components for final assembly in mainland China, semiconductors represented nearly 42 percent of this export value.

A small IT industry

There is a very small IT equipment manufacturing base in Hong Kong. According to the Hong Kong Trade Development Council, there were 211 IT equipment and 39 telecommunications equipment establishments registered there as of September 1999. In the 1980's, when real estate prices were rising significantly, many Hong Kong companies began to move their IT manufacturing base to Guangdong Province in mainland China, where land, labor and production costs were significantly lower. Today Hong Kong serves as the financial, marketing, and distribution center for the more labor-intensive IT manufacturing base in mainland China.

The local software industry is quite small, but Hong Kong has a strong custom software development capability. Corporate mainframe users, particularly in the banking, financial, and insurance sectors, multinationals, and government departments develop most of their software solutions in-house. Systems integrators are in high demand, particularly for more complex systems, but the local systems integration industry is still in its infancy and the companies are small with less experienced staff than their international counterparts.

According to a Hong Kong Productivity Council survey, there are more than 700 independent software vendors operating in Hong Kong. The majority (55 percent) are small with a staff of less than 20 employees. In 1998, one-quarter of the 1,789 software packages available in Hong Kong was sold through local independent software vendors. The small business and home markets are the largest consumers of packaged software. Most of the computer usage among the small business community is for word processing and accounting/financial applications. In the home market, most of the software purchases are for games, education, and word processing. There is a tendency within the small business community to purchase local software packages because of the perception that Hong Kong firms have a better understanding of local needs. This preference underscores the importance of localization and customization in this market.

The Hong Kong Industrial Technology Centre Corporation (HKITCC) was established in 1993 to facilitate IT development in Hong Kong. To support the HKITCC, the Hong Kong government provided a $32 million[7]

[7] Amount based on exchange rate of $1 = 7.8 HK$.

(HK$250 million) grant, a 5700 square meter land grant, and $24.1 million (HK$188 million) in low-interest loans. The HKITCC manages an incubation program that assists high technology start-ups through a combination of lowered operating costs, marketing support, management training, and technical assistance. Their technology transfer program helps commercialize research findings through a business matchmaking program. The four technology focus areas are multimedia, telecommunications, software and systems, and microelectronics. To date, there have been 80 incubating firms, and 25 have graduated. Over 85 percent of the incubating companies now focus on software and e-commerce-related technologies.

but a potential gateway to China

Although Hong Kong is a relatively small market for IT products and services, many companies approach the city as a gateway into the significantly larger market of mainland China. In 1999, the overall IT market in China reached $11 billion, an increase of 21.1% over 1998. IDC projects the compound annual growth rate (CAGR) between 1999-2004 for this market to be 23.1 percent. In 1999, China represented 20.8 percent of the IT market in the Asia/Pacific region (excluding Japan), ranking second in the region to Australia. IDC expects that by 2001, China will surpass Australia to become the largest IT market in the region. By 2004, China will represent nearly one-third (28.7 percent) of this regional demand.

Hong Kong is an international city, and most local companies are accustomed to dealing with overseas businesses. Many successful foreign firms have partnered with a local Hong Kong company that serves as their mediator with mainland China. According to a Hong Kong Productivity Council survey, approximately 22 percent of the independent software vendors in this city surveyed now have a branch office in China, compared to only 9 percent in 1994. The local Hong Kong company can also serve as a distribution channel and software support service center there for foreign companies.

Having a local partner may also be beneficial for protection against piracy in the Hong Kong market. Software piracy, particularly with packaged software, is a serious issue in Hong Kong, and the government has recently enacted amendments to strengthen its anti-piracy legal framework. Copyright piracy and trademark counterfeiting violations are now addressed within the Organized and Serious Crimes Ordinance, and offenders are now charged with stiffer penalties.

There are many features of the Hong Kong market that make it attractive to U.S. businesses. The market for information technology products is relatively open. Hong Kong is a free port, and the movement of goods into and out of this city is relatively seamless. Customs procedures are straightforward and fast. Even though Hong Kong is a signatory to the Information Technology Agreement, the city phased out tariffs on information technology and telecommunications products to zero well before the January 1, 2000 deadline. In addition, English is commonly spoken and serves as the international business language in Hong Kong.

Hong Kong is not a technological innovator

Hong Kong does not have strong capabilities in basic R&D or information technology innovation. Until very recently, it did not have a ready supply of venture capital, and entrepreneurs were typically forced to borrow from friends or family in order to finance their business plans. This situation has improved somewhat with the advent of the dot-com worldwide economic phenomenon and the explosive growth in the information technology industry.

but will rapidly adopt proven technologies

The international nature of many businesses in Hong Kong, and the role of this city as a regional headquarters for numerous multinational firms, exposes this market to many new products and services. Hong Kong businessmen are renowned for their stock trading acumen, and the business culture is heavily influenced by the market dynamics of the stock exchange. The ability to react and adapt to oscillations in the stock market has resulted in a business culture characterized by a willingness to quickly adopt new trends, particularly those that are perceived as offering positive cost/benefit ratios.

Hong Kong was an early adopter of paging technologies, for example, and currently has one of the highest market penetration rates for cellular phones in the world. It was also among the first countries to fully digitize its fixed telecommunications network that now supports 3.9 million exchange lines. There reportedly are more phones than there are people there.

The "Old Economy"

Traditionally, the Hong Kong economy has been dominated by large, privately-held, multi-industry conglomerates with large holdings of real estate. Many of these conglomerates are principally owned and controlled by wealthy individuals, who are locally referred to as "tycoons". Most conglomerates also hold licenses to provide IT services.

helps foster the "New Economy"

The entrepreneurial spirit in Hong Kong is very strong and business decisions are very market-dependent. As information technology companies began to appear prominently on the world's stock markets, conglomerates which traditionally focused on real estate development began to invest more in IT industries to preserve their positions on the Hang Seng Index. As a result, they tend to also be the biggest IT investors there.

As the IT market in Hong Kong began to flourish in the latter part of the 1990's, a stronger venture capital mentality emerged as investors recognized the potential for large profits. By mid-1999, the amount of venture capital managed through Hong Kong amounted to over $16.7 billion (HK$130 billion). The city now ranks second in the Asia-Pacific region and eighth in the world for its availability of venture capital.[8] However, in Hong Kong, as in many other markets around the world, much of the new venture capital has been generated from investors trying to capitalize on the dot-com craze, without regard to the actual merits of

[8] Cybernation 2.0, American Electronics Association

the business investment (what Alan Greenspan referred to in the United States as "irrational exuberance").

The public listing of Tom.com, a multilingual, China-oriented infotainment portal owned by Li Ka Shing's Hutchinson Whampoa and Cheung Kong (Holdings), one of the largest property developers in Hong Kong, was oversubscribed 669 times during its initial offering. This interest was a reflection of public confidence in Mr. Li and his well-established track record for creating wealth. When Tom.com's IPO closed on February 23, 2000, the Hong Kong police had to be called to control the crowd of 300,000 investors who had lined up outside banks to take part in the offering.

An important development in Hong Kong's effort to facilitate investment in IT development was the creation of a second stock market there. Modeled after the U.S. NASDAQ exchange, the Growth Enterprise Market (GEM) was launched by the Hong Kong Securities and Futures commission in November 1999. The GEM is intended as a listing service for fast-growing, high-tech companies in Hong Kong, Taiwan and China. It features less stringent listing standards, but stricter disclosure rules than the Hang Seng. The GEM's original listing requirements were further eased in March 2000 to make it easier for new ventures to obtain financing.

Knowledge worker shortfall

One factor contributing to Hong Kong's limited capacity for technological innovation is a lack of workers with the necessary training. Hong Kong's economic strengths have traditionally been in trade and finance, and some observers of Hong Kong's economy note, only half jokingly, that its best and brightest students pursue careers in real estate or finance, rather than engineering and high technology.

Hong Kong University does have a well-regarded information technology program and graduates many IT professionals. There are currently 19,000 full-time students studying in an IT-related field there. Like many other nations, however, Hong Kong is experiencing a shortage of skilled high-tech workers. The May 4, 2000 edition of the *Far Eastern Economic Review* reports that Hong Kong produces 4,000 IT graduates a year and conservatively requires 5,000.

To address this shortage in high-tech workers, the government recently announced an *Admission of Talents Scheme* that provides local Hong Kong companies with more flexibility to hire IT professionals from mainland China and overseas to work there. Hong Kong's Internet entrepreneurs are mostly young, foreign educated, and have good foreign connections (often in the United States). According to a 2000 Manpower survey of the IT industry, about 1.7 percent of the working population (61,000 employees) work in the IT sector.

A stratified IT market....

The willingness to adopt new technologies varies widely between large and small firms in Hong Kong. The large banks and multinational companies are most likely to adopt new technologies, although many of the newer and younger firms are also willing to make that investment. Nevertheless, many Hong Kong companies have barely begun to use IT applications to improve productivity.

makes SMEs the majority in the economy but the minority in adopting IT

There are more than 290,000 small- to medium-sized enterprises[9] (SMEs) in Hong Kong, which account for more than 98 percent of business establishments. The import/export sector accounts for the majority of these SMEs. Many of these are family-owned enterprises that tend to favor traditional ways of doing business.

Although SMEs are the majority of businesses in Hong Kong, their adoption of, and investments in, IT significantly lag larger corporations. According to a survey conducted by the Hong Kong Productivity Council, average IT spending among large businesses was nearly 14 times more than small-sized businesses and nearly 7 times more than medium-sized businesses in 1999. One of the largest obstacles is that top-down management exists among many SMEs, and there is a lack of IT buy-in among management. The large multinationals operating in Hong Kong are faster to recognize the benefits of investing in IT to remain competitive globally. They are also in a better position to finance the implementation of these technologies than are smaller companies.

Average IT Spending Among Businesses in Hong Kong, 1999

Size of company	Average IT spending in 1999	Relative Spending
Small	$ 4,103 (HK$32,000)	1.0
Medium	$ 8,333 (HK$65,000)	2.0
Large	$ 56,153 (HK$438,000)	13.7

Source: Hong Kong Productivity Council

The level of IT deployment varies widely even among large establishments in Hong Kong, and some companies have taken an entirely different approach to incorporating IT into their business plans. Although there is a lot of capital being funneled into the IT industry in Hong Kong, the internal use of IT within some of these large conglomerates is still relatively low. Some of the companies that claim to be adopting IT are not using IT internally to improve their business operations and lack an understanding of how IT can be used to improve business processes. Instead, their business models focus on investing in IT stocks and IT companies that have promising potential for large capital gains.

Early adopters of advanced IT applications in Hong Kong are considered to be the financial sector, such as stockbrokers and bankers, shippers and freight forwarders, and IT companies themselves. Other early adopters include entertainment and content providers.

Manufacturing Sector

The manufacturing sector is generally viewed as a relatively slow adopter of IT in Hong

[9] The Hong Kong government defines SMEs as manufacturing enterprises with fewer than 100 employees and non-manufacturing enterprises with fewer than 50 employees.

Kong. Most of the manufacturers that have integrated IT into their operations have done so due to pressure from their foreign partners who are automating their supply chains. Their partners are driving the supply chain by requiring shorter lead times to delivery and just-in-time inventory. Smaller companies, in particular, are afraid of making the initial capital investment to set up a supply chain management system and lack the skills needed to maintain and manage it. For these reasons, the Hong Kong Government established a $640 million (HK$5 billion) Innovation and Technology Fund to provide funding for projects in the manufacturing and services industries that use IT to improve efficiency. The fund is intended to stimulate technology adoption in Hong Kong's economy.

Banking and Finance Industries

According to the Hong Kong Trade Development Council, Hong Kong ranks ninth in the world based on the volume of external banking transactions, eleventh in the world's securities market, and is the second largest banking center in the Asia/Pacific region, after Japan. There are more than 320 financial institutions currently operating in Hong Kong, 77 of which are among the world's 100 largest banks. The banking and finance sectors account for the majority of larger installations, and are the leading users of back-office applications.

Banks that previously outsourced many of their data operations, such as account management and fund transfers, are increasingly turning to in-house systems development because of concerns about releasing inside information to contractors. In addition, because of the complexity and specialized nature of many financial transactions, customized solutions are often required. All the major Hong Kong banks now have large IT departments. One of Hong Kong's larger banks currently employees 1800 people in its IT department, 900 of them programmers.

Shipping and Freight Forwarding Industries

Hong Kong is home to one of the world's busiest container ports. According to the U.S. Department of Transportation's Maritime Administration, Hong Kong ranked first in the world in 1998, and second to Singapore in 1999, in cargo volume.[10] Hong Kong's total container throughput is projected to reach 24 million Twenty Foot Equivalent Units (TEUs) in 2006 and 33 million TEUs in 2016 according to the Hong Kong Trade Development Council, and Hong Kong's ports handle over 250 million documents annually.

Hong Kong shipping and freight forwarding companies have made large IT investments to automate their documentation processing in order to manage the tremendous volume of cargo shipments that are processed daily through the Hong Kong harbor. For example, Hong Kong has computerized its ship registration procedures and utilizes applications tailored for warehousing and container management to control and track transactions. Many shipping and freight-forwarding companies use electronic data interchange (EDI) to transmit documents among themselves and with importers and exporters.

[10] Based on container throughput in millions of Twenty Foot Equivalent Units.

CargoNet, which is a consortium of major shipping companies and Hong Kong's leading supplier of electronic documentation for trade and transportation transactions, entered into an alliance with Electronic Data Systems (EDS) in 1998 to develop web-based EDI services to process shipping documentation. Previously, the consortium relied on a Lotus Notes-based system for messaging transactions. In 1997, Hong Kong traders spent $9.87 billion (HK$77 billion), or five percent of the value of Hong Kong's total trade, to process paperwork for 8.5 million shipments into and out of the Hong Kong Harbor. In an effort to more efficiently process these transactions and reduce costs, the CargoNet - EDS team developed an extranet that can handle 250 messages per second and can connect more than 230,000 trading companies.

An alliance between *BALtrans*, one of Hong Kong's largest forwarders and logistics handlers, *Arena*, an e-commerce service provider, and *portsnportals.com*, the container handler subsidiary of Hutchison International Ports Holdings, has been formed that allows shippers to file orders and exchange documents electronically. Modern Terminals Ltd. (MTL), Hong Kong's second-largest container handler, is joining forces with U.S.-based venture capital firm E.M. Warburg, Pincus and Company, and other shareholders to create an online logistics company called V- Logic. V-Logic will hold inventory at MTL, which will then fulfill orders placed by individual consumers via the Internet.

Import/Export Sector

The movement of goods into and out of Hong Kong is relatively easy and has contributed to making the import/export sector one of the most significant contributors to Hong Kong's overall economy. While E-mail communication is common, EDI adoption is relatively slow compared to other nations with large trading economies. According to a survey conducted by IBM and the Hong Kong Productivity Council in September 1999, the import/export sector is supposed to be the most willing sector in Hong Kong to adopt e-business technologies. Some initiatives, such as Tradelink and EZ*Trade have been launched by the government and associations to facilitate IT integration into this sector, but since the majority of the companies involved in international trade are SMEs, widespread adoption is still slow.

All shipments in or out of Hong Kong require some degree of government documentation. Tradelink was formed in 1992 under an agreement signed between the Hong Kong government and eleven private sector shareholders[11]. Tradelink provides an electronic platform to facilitate documentation transactions such as certificate of origin and trade declaration applications. As of July 2000, there were over 57,000 registered customers, and nearly 48,000 transactions per day. Tradelink's message security system supports over 152,000 individual security key holders. Beginning in April 2000, the Customs and Excise Department closed its Hong Kong collections office and mandated that all import and export declarations must be in electronic form. Importers and exporters have the option of directly submitting their

[11] The eleven shareholders are Pacific Century CyberWorks, China Resources (Holdings) Ltd., the Federation of Hong Kong Industries, Hong Kong Air Cargo Terminals Ltd. , the Hong Kong Association of Freight Forwarding Agents, the Hong Kong General Chamber of Commerce, the Hongkong International Terminals Ltd., the Hongkong and Shanghai Banking Corporation Ltd., Modern Terminals Ltd., Standard Chartered Bank, and Swire Pacific Ltd.

declarations online via Tradelink's *tradelink-ebiz.com* website or can go to one of Tradelink's twenty-seven service centers throughout Hong Kong. The service centers charge a US$3.20 (HK$25) data processing surcharge to convert paper submissions into electronic form for submission.

The Hong Kong Article Numbering Association's (HKANA) EZ*Trade also offers EDI solutions that conform to EANCOM/EDIFACT international standards. EZ*Trade automates the flow of paper between trading partners. The web-based EDI service was developed to meet the needs of small- and medium-sized businesses that could not afford large investments in systems that support EDI transactions. To access EZ*Trade services, businesses only need a PC, modem, and an Internet browser. The service is open to all HKANA members. For non-members, HKANA charges a $385 (HK$3,000) entry fee and a $385 (HK$3,000) annual fee. The service handles transactions such as purchase orders, purchase order responses, changes to purchase orders, and invoices. Eventually EZ*Trade will have online payment settlement capability.

Wholesale and Retailing

Many larger retail shops have installed bar-coding and electronic point-of-sale (POS) systems to manage their inventory. Some retail chains have connected their POS systems with their suppliers, exchanging purchase orders and invoices. Data mining applications are also used to analyze the information collected by the POS systems. The textiles, toys, and construction industries have B2B portals. Most small shops, however, make limited use of IT applications.

THE GOVERNMENT'S ROLE

The Hong Kong Government recognizes the importance of IT

The Government of Hong Kong has clearly recognized the contribution that IT applications can offer to the overall economic health and well being of the city. It realizes a highly developed IT sector supports other business and commercial services and enhances Hong Kong's overall international competitiveness.

In his 1997 Policy Address, Hong Kong's Chief Executive, Tung Chee-hwa, stated his vision to make the city a leader, rather than a follower, in the information age. In his 1998 Policy Address, he reiterated the importance of utilizing IT to drive Hong Kong's economic expansion and help it to retain its competitive edge.

The Information Technology and Broadcasting Bureau (ITBB) was set up in April 1998 to coordinate the Hong Kong Government's activities in information technology, broadcasting and telecommunications. An Information Infrastructure Advisory Committee (IIAC) was also created in August 1998 to assist ITBB in its efforts.

and is committed to leading Hong Kong into "the information world of tomorrow"

In order to enhance and maintain Hong Kong's IT development, the ITBB formulated the "Digital 21" IT strategy, which was announced in November 1998. According to the ITBB, the goal of Digital 21 is to "Enhance and promote Hong Kong's information infrastructure and service so as to make Hong Kong a leading digital city in

the globally connected world of the 21st century."

The "Digital 21" strategy

Digital 21 includes policy initiatives designed to strengthen what were identified as four enabling factors:

- High capacity communications systems
- Common software interface for secure electronic transactions
- People who know how to use IT
- A cultural environment that stimulates creativity and welcomes advances in using IT

Leading by example...

In general, the government of Hong Kong acts as a facilitator for the development and application of information technology. The government believes it should create the proper legal and regulatory environment to encourage industry to provide the necessary investment in infrastructure, and set an example in applying new technologies.

The Hong Kong government is computerizing many of its activities and has very ambitious plans to offer public services via Electronic Service Delivery (ESD). The ESD will provide an open and common information infrastructure for the public to obtain government services online. The government will launch the first phase of the ESD project in October 2000. Through the Internet and public information kiosks installed at convenient public locations, the local community can obtain government services 24 hours a day and 7 days a week. The ESD scheme will also serve as a catalyst to encourage electronic commerce development in the private sector by eventually allowing commercial services to be provided via the same information infrastructure electronically.

Promoting high capacity communications systems

The Hong Kong government has deregulated Hong Kong's telecommunications market with the intention of promoting competition and increased investment in new infrastructure. To further stimulate infrastructure development, the ITBB is also promoting two major communications development projects in Hong Kong: Cyberport and Teleport.

Cyberport

The Cyberport project, announced in March 1999, is intended to be an intelligent community of high technology companies and industry professionals in the IT and information services sectors from both Hong Kong and overseas. The goal of the Cyberport project is to foster IT development in Hong Kong. The Cyberport is expected to accommodate over 30 medium- to large-sized and 100 small-sized companies and is scheduled to be completed in three phases beginning in 2003 and finishing in 2004. The site will be developed in a partnership between the Hong Kong government and the Pacific Century Cyberworks Group (PCCW). The Hong Kong government will donate the land for the site (in the Southern District on Hong Kong Island) and PCCW will make a capital contribution of about $897 million (HK$7 billion) to the project. As of mid-

2000, 15 companies[12] have signed letters of intent to become anchor tenants and an additional 142 companies have expressed interest in becoming tenants. Additional information about the Cyberport project can

be obtained on the ITBB website at: www.info.gov.hk/itbb

Teleport

The Teleport project, announced in June 1999, is intended to serve as a facilities site for Hong Kong's external (international) communications links, particularly satellite earth stations and undersea cables. The government has set aside 11 hectares of land in Chung Hom Kok specifically for the operation of external telecom facilities. The teleport site is expected to be developed in phases, through invitations for open tenders. Details on the Teleport project are available on the ITBB website at: www.info.gov.hk/itbb

Common software interface for secure electronic transactions

The ITBB has also worked to create the legal and technical environment necessary for the widespread acceptance of IT applications by helping to develop a public key infrastructure and certification authorities, introducing a legislative framework for electronic commerce, and promoting a common interface for the use of Chinese characters in electronic communications.

The passage of the Electronic Transactions Ordinance by the Hong Kong Legislative Council on January 7, 2000 provides the framework whereby electronic documents and signatures are given the same legal status as their paper-based counterparts. The law also provides for a voluntary certification authority recognition scheme under which certification authorities may apply to the Hong Kong government for recognition on a voluntary basis in order to protect consumer interests and to enhance users' confidence in conducting electronic transactions. On January 31, Hongkong Post began to act as the first public Certification Authority whose operations conform with international security standards. This agency will provide certification services via a local Public Key Infrastructure (PKI).

The Electronic Tendering System of the Government Supplies Department, which was launched in April 2000, was one of the first applications to use Hongkong Post's certification services. The Electronic Tendering System notifies potential suppliers about government tenders. Since its introduction, the number of small tenders issues has increased 73 percent. By the end of August 2000, 429 tenders each valued under $1.3 million (HK$10 million) were issued to suppliers, representing approximately $74 million (HK$577) million in government-to-business (G2B) e-commerce.

With regard to addressing computer-related crimes, the Computer Security Unit under the Crime Prevention Bureau of the Hong Kong Police Force was set up as early as 1995 in response to the increasing use of computer systems and the associated security threats. The unit aims to educate the public to use the computer and the Internet properly. In

[12] The anchor tenants are Cisco Systems, CMGI, Hewlett-Packard, Hikari Tsushin, Hua Wei, IBM, Legend, Microsoft, Oracle, Pacific Convergence Corporation, Portal, Silicon Graphics, Softbank, Sybase and Yahoo!.

addition, an interdepartmental working group was set up under the Security Bureau in March 2000, which focuses on strengthening the framework or environment within which law enforcement against computer crime may be carried out. This includes identifying problems and recommending solutions, legislative or otherwise, regarding crime prevention, evidence gathering, investigation and prosecution arising from computer crime.

Bringing IT to the public

As noted previously, the Hong Kong government has initiated the Electronic Service Delivery program to enable Hong Kong's business community and the general public to conduct as many transactions with the government as possible on-line in English and Chinese. Over time, the government will require that most of these transactions be performed online in an effort to force the public to become familiar with new technologies.

In an effort to facilitate this process, the government has installed a number of Cyber Points, which are Internet-ready PCs that allow the public to access Hong Kong government homepages, the Universal Free Electronic Mail Service, and other websites free-of-charge. The purpose of the initiative is to encourage community uptake of IT and Internet usage by placing these stations in locations such as community halls, district office, public libraries, and post offices for easy and convenient access. By the end of 2000, there should be more than 300 Cyber Points installed throughout the territory.

Human Resource Development

In the area of human resources, the ITBB is attempting to address Hong Kong's manpower and training needs for IT professionals. It is promoting the increased incorporation of IT elements in schools and is developing recommendations for immigration allowances to address Hong Kong's shortage of IT professionals.

The government launched a five-year strategy, *IT for Learning in a New Era*, in November 1998, to integrate the use of information technology into the public school curriculum. The government will spend $410 million (HK$3.2 billion) to implement this initiative, with an additional capital expenditure of over $70 million (HK$546) million each year. The government's target by the 2002/2003 school year is to have 25 percent of the school curriculum taught through the use of IT. All secondary schools and approximately 300 primary schools currently have Internet connections, and the average numbers of computers is 80 per secondary school and 42 per primary school. Over 85,000 teachers are to receive four levels of training on how to integrate IT into the school curriculum. All teachers were expected to pass the basic level by the 2000/2001 school year. They were also given free e-mail accounts. However, many are reportedly not using their accounts.

To encourage and facilitate young people to use IT, the government last year granted approximately $20 million (HK$156 million) for free computer facilities and Internet services at 125 children and youth centers and agencies. AC Nielson's New GenerAsians survey indicates that Hong Kong children have the second highest level of Internet access at home, and the highest

level of mobile phone ownership in the Asia/Pacific region. The majority of Hong Kong children surveyed use the Internet for general surfing, compared to their contemporaries in Japan and China who use the Internet mainly for playing games.

The ITBB also organizes and participates in seminars and conferences aimed at encouraging SMEs to engage in electronic commerce, prepares information kits for distribution to the business community, and provides public service broadcasts of IT-related announcements on television and radio.

A cultural environment that stimulates creativity and welcomes advances in using IT

The ITBB promotes the development of Chinese language standards and applications, encourages the development of innovative local websites, tries to cultivate an IT entrepreneurial spirit, and fosters the training of IT professionals. It outsources many IT applications for government use in an effort to encourage the development of the local industry.

First Regional E-commerce Alliance in Asia

In July 2000, three government-backed e-commerce networks from Hong Kong, Taiwan, and Singapore signed a memorandum of understanding with the goal of stimulating e-commerce transactions and cooperation among the three countries. Hong Kong's Tradelink, Singapore Network Services, and Trade-Van Information Services Taiwan have agreed to a mutual recognition of digital certificates issued by their respective certification authorities, the creation of a pan-Asia portal, and an exchange program to share experiences relating to e-commerce.

Assessment

The Digital 21 initiative has been generally well received by Hong Kong's business community. There is general agreement that the Hong Kong Government is acting appropriately and is doing a good job in promoting the development and application of new information technologies in Hong Kong.

Observers state that the Hong Kong government is gradually applying IT solutions to its own internal operations, having reached the stage of building websites and making information available online. They further state that, despite the progressive initiatives of the Hong Kong government to stimulate the adoption of e-commerce and IT in the economy, its laissez-faire attitude may not lead to a fast uptake of IT. They feel that a strong IT user education and training program targeted at all segments of the community is essential to making these initiatives successful.

The Digital 21 initiative is trying to avoid some of the mistakes made in previous government efforts to introduce IT applications, such as "Tradelink". Tradelink, discussed earlier in this paper, is an online system for filing customs documents that was initiated several years ago. Many industry observers note that when introduced, it required users to purchase special programs and equipment, used proprietary standards, and lacked certain capabilities (e.g., it was reportedly launched in an "English only" version.)

The Electronic Service Delivery initiative, by contrast, utilizes open market-based standards, is accessible through a variety of terminals such as personal computers and public kiosks, and uses bilingual interfaces.

Some high-tech companies in Hong Kong believe that the Cyberport project is not being built quickly enough. The global information technology industry is growing at a significantly faster rate than the Hong Kong real estate development industry can accommodate it. High-tech companies are in need of rental space and fiber-optic cabling now, and the first stage of project completion is not until 2002. The changes that occur for most industries within one calendar year occur in the high-tech industry within a month's time. IT companies are renting space elsewhere on Hong Kong island. Li Ka Shing's The Center has rented 70 percent of its new space to 40 IT companies that can have fiber-optic cabling installed and a 24-hour air-conditioned climate to host temperature-sensitive computers. Smart buildings are popping up throughout Hong Kong that will offer alternatives.

TELECOMMUNICATIONS

Hong Kong's telecommunications market is extremely well developed. The Hong Kong government estimates that telecommunications contributed $5.4 billion (HK$42 billion), or 3.6 percent of the total, to Hong Kong's GDP in 1998, including private sector infrastructure investment of $1.8 billion (HK$13.95 billion).

Policy and regulatory environment

Policy development and regulatory oversight for the telecommunications and IT sectors in Hong Kong rests principally with two agencies, the Information Technology and Broadcasting Bureau (ITBB) and the Office of the Telecommunications Authority (OFTA).

The Information and Technology Broadcasting Bureau was established in April 1998 to lead and coordinate the activities of the Hong Kong Government in the development of IT, broadcasting and telecommunications policies. The creation of the ITBB resulted from a recognition by the Hong Kong government that the application of information technologies was of growing importance to overall economic development and maintaining Hong Kong's position as a leading international business and financial center. Telecommunications policy functions had previously been carried out by the Secretary for Economic Services in the Government Secretariat while broadcasting policy was handled by the Secretary for Recreation and Culture.

The ITBB has published separate policy objectives in broadcasting and film services, information technology, and telecommunications. In the broadcasting and film services area, ITBB's objective is to promote the development of the broadcasting and film industries and enhance Hong Kong's position as a broadcasting and film productions center. In the information technology area, its objective is to enhance and promote Hong Kong's information infrastructure and services to make Hong Kong a leading digital city. In the telecommunications area, ITBB's objective is to facilitate the development of the telecommunications industry and to enhance Hong Kong's position as a telecommunications hub.

The Office of the Telecommunications Authority (OFTA) was established as a separate government department on July 1, 1993 from what was formerly the Telecommunications Branch of the Post Office. OFTA serves as the executive arm of the Telecommunications Authority (TA), which is appointed under the Telecommunication Ordinance (Chapter 106 of the Laws of Hong Kong) as the statutory body to oversee the regulation of the telecommunications sector in Hong Kong.

OFTA is responsible for the regulation of the telecommunications services and equipment industry, spectrum management, and advising the public sector on telecommunications matters. Under its regulatory responsibilities, OFTA is in charge of promoting the development of a fair and competitive operating environment for the telecommunications industry in Hong Kong, issuing and administering licences for public telecommunications services, administering the telecommunications numbering plan, resolving interconnection disputes between operators of competitive networks and services, type approval and certification of radiocommunication equipment, setting standards for telecommunications services and equipment, and regulating and coordinating satellite activities. Under its spectrum management responsibilities, OFTA is in charge of the managing and assigning of radio frequencies, issuing and administering radio licences and equipment, the investigation of interference complaints, and prosecuting the illegal use of telecommunications equipment.

Hong Kong's telecommunications market is almost completely open*....*

Hong Kong's telecommunications market is almost completely open and competitive. There are no tariffs on equipment, and since Hong Kong does not have an indigenous telecommunications equipment manufacturing industry that it might wish to protect, there are no non-tariff barriers to telecommunications equipment imports.

Telecommunications services and facilities are not subject to foreign ownership restrictions, and the Hong Kong Government has "progressively liberalized" its telecommunications sector to the extent that there are no longer any monopoly service sectors.

Healthy competition exists in paging, cellular services, ISPs, and value-added and facilities-based international services. In each of these sectors, the government has attempted to open the market to as many competitors as possible.

...with the exception of fixed wireline services

The notable exception to Hong Kong's wide-open telecommunications services markets is in the area of domestic wireline services. Since licensing three new fixed wireline carriers in 1995, the Hong Kong Government has instituted a moratorium on issuing any new licenses for fixed wireline services through year-end 2002, effectively limiting competition in this area.

Wireless Services

Hong Kong's mobile telecommunications market has always been unrestricted, subject only to spectrum availability. There are currently 6 companies in 11 distinct networks competing in the mobile cellular services market and mobile penetration stands at 55 percent of the population. Hong Kong implemented mobile phone number portability on March 1, 1999, thus enabling mobile phone customers to retain their phone numbers when changing service providers. This effectively removed one of the last obstacles to customer convenience and created even more effective competition in Hong Kong's mobile phone market.

Mobile Operators in Hong Kong
Cable & Wireless HKT CSL Limited
Hutchinson Telephone Company Limited
SmarTone Mobile Communications Limited
Peoples Telephone Company Limited
New World PCS Limited
Mandarin Communications Limited

Source: OFTA

Paging

Hong Kong's paging market is similarly open to competition and restricted only by spectrum availability. Although the popularity of paging has declined as mobile telephone service has increased, there are still 28 paging companies in Hong Kong, and market penetration stands at 5 percent of the population.

International Services

Competition in international telephone service was authorized for services-based competitors (resale operators) as of January 1, 1999 and for facilities-based (satellite and undersea cable) competitors as of January 1, 2000.

Internet Service Providers

Hong Kong also offers unlimited licensing opportunities to Internet Service Providers (ISPs). As of July 2000, OFTA reported that 202 companies held ISP licenses. A complete list of ISP license holders is available on the OFTA website at: http://www.ofta.gov.hk/index_facts_eng.html

Domestic Wireline

The local wireline monopoly formerly held by Cable and Wireless Hong Kong Telecom (C&W HKT) was ended in 1995 when three new wireline service providers were licensed. The existing cable television licensee has also recently been granted permission to offer telecommunications services over its hybrid fiber/coaxial cable network. The overall ratio of exchange lines to population is 55 percent, and the ratio of residential exchange lines to households is 110 percent.

The decision to limit fixed line licenses has been somewhat controversial, and a number of critics have charged that the three carriers licensed in 1995 have not made the necessary investments in infrastructure to enable them to compete effectively with C&W HKT. OFTA initiated a review of the fixed line market in 1999 to determine whether or not to

issue additional fixed licenses. It issued a determination in this matter in May 1999 which concluded that the most effective way to promote competition in the fixed line market was to obtain further commitments from the three new fixed line license holders (Hutchison, New T&T, and New World Telephone) in exchange for a continuation of the moratorium on the issuance of new licenses until the end of 2002. To further promote local competition, OFTA also decided to permit Hong Kong Cable Television Limited to offer telecommunications services using cable modem technology and to issue new licenses for fixed wireless service providers.

Wireline-based Fixed Telecom Network Services Licensees
Cable and Wireless Hong Kong Telecom (former monopoly service provider)
Hutchison Communications Ltd.
New T&T Hong Kong Ltd.
New World Telephone Ltd.

Source: OFTA

By allowing operators to pursue their own interconnection agreements, critics charge that OFTA has enabled C&W HKT to disadvantage its potential competitors by delaying their interconnection with the Hong Kong Telecom network. The critics argue that the appeals process and potential penalties are apparently not sufficient to encourage cooperation, and that dominant carriers practicing anti-competitive behavior do not have any incentive to cooperate when the fines are low compared with the advantages of maintaining their market share.

Competition has brought benefits to most sectors

Competition in Hong Kong's wireless sector is intense, and many industry analysts believe that operators may actually be pricing services below cost in an their efforts to establish market share. OFTA moved quickly to address an apparent attempt at price fixing by wireless operators in January 2000. Evidence of price fixing by wireless carriers emerged on January 2, 2000, when all six carriers simultaneously adjusted their prices. OFTA initiated an investigation the very next day, and concluded it within two weeks, resulting in a finding that all of the operators were party to an arrangement which prevented or restricted competition in the wireless sector. All of the carriers subsequently agreed to rescind their price adjustments and revert back to their previous prices . Price adjustments have since been initiated by individual wireless carriers.

Competition in international service has been very effective, and Hong Kong's rates for international calls are now among the lowest in the world. OFTA estimates that competition in international telephone service saved Hong Kong consumers $320.5 million (HK$2.5 billion) in 1999.

but there is still room for improvement

Hong Kong's rates for leased lines are considered high by most users. This is usually attributed to a lack of effective competition in the local wireline market, resulting principally from a lack of infrastructure build-out by the wireline carriers other than C&W HKT. Because of the lack of effective competition in the market, many industry observers believe that

broadband deployment will be limited and relatively expensive. ADSL is still in the early stages of deployment, and prices for broadband services are relatively high - one industry representative said that bandwidth is 12 times more expensive in Hong Kong than it is in the United States.

The real estate connection

There are strong connections between some of Hong Kong's leading real estate tycoons and fixed wireline network operators.

Hong Kong hosts the largest listed property sector of any market in the world in absolute dollar terms, and the property sector accounts for 20 percent of the market capitalization. The property developers that have dominated Hong Kong's Hang Seng Index for the past 20 years have diversified their holdings by buying into Hong Kong's telecommunications infrastructure. Residential apartments that are wired to provide cable TV and Internet access represent the critical last mile in the control of these property developers. While Hong Kong law reportedly guarantees that all fixed network operators have right of access to buildings, observers state that the law is not necessarily effective and would be difficult to enforce. There are no guarantees of access for wireless service providers.

The acquisition of C&W HKT by Pacific Century CyberWorks (PCCW) effectively placed control of two of the four Hong Kong wireline networks in one family. The principal shareholder in PCCW is Richard Li, the son of Li Ka-shing. Li Ka-shing is the largest property owner in Hong Kong (his companies comprise 16 percent of the total capitalization of the Hang Seng Index) and the chairman of the Cheung Kong group, the conglomerate that includes Hutchison Telecom and Tom.com. Pacific Century CyberWorks' bid to acquire Hong Kong Telecom from HKT's parent company, Cable and Wireless, beat out Singapore Telecom.

Relationship Between Property Developers and Information Technology Infrastructure

Property Group	Partner/Company under Property Group	Description of Service Owned
Cheung Kong Group	Hutchinson Telecom HK	Satellite FNTS license granted 2/25/2000 Wireless telecom provider PMRS, PCS Operator
	Tom.com	Multilingual entertainment portal (ranked among the top 5 in popularity)
	Ibusiness Corporation	Funds Internet ventures and joint ventures; Cheung Kong Ltd. and Hutchison Whampoa Ltd. are the majority participants with a combined stake of 75 percent; portals focusing on retail, real estate, insurance and procurement sectors
Sun Hung Kai Properties Limited	SmarTone	LMDS license granted 1/18/2000 Wireless telecom provider PMRS, PCS Operator
	Sun eVision	Technology arm
	Intellinet Management Limited	Facilities management via the Internet
	E-Supply Chain Management	Targeting the SME sector to build a vertical virtual supply chain
Henderson Land Development Company Limited	Henderson Land	LMDS license granted 1/18/2000
	Henderson Cyber	Cabling networks, data centers, broadband Internet installation, applications services, portal services
New World Development Company Limited	New World Cyberbase New World Telephone	Internet and technology flagship Provides FTNS, PCS, IDD services Wireline-based FNTS license granted 6/20/1995
Sino Land Company Limited	Sino Technology Corporation Limited	Broadband Internet installation, establishment of data centers, portals
The Wharf (Holdings) Limited	I-Cable Communications	Wireline cable network-- covers 1 million homes FNTS license graned 1/18/2000
	Hong Kong Cable Television Limited	FNTS license granted 1/18/2000
	New T&T Hong Kong Limited	Wireline-based FNTS license granted 6/27/1995

THE INTERNET

Hong Kong's Internet market is relatively advanced, although estimates of its exact size vary. The Telecommunications Research Project (TRP) at Hong Kong University estimated in April 2000 that 58 percent of Hong Kong households had personal computers as of year-end 1999 and that most of those were online. The TRP predicts that penetration will rise to 92 percent by year-end 2002.

Hong Kong's Internet Market is growing rapidly

According to figures provided by OFTA, Hong Kong had 1,876,734 registered customer Internet accounts in February 2000, up from 683,193 in March 1999. Preliminary estimates for March 2000 put the number of Internet accounts at 2 million, and traffic volume consistently exceeds 1 billion minutes per month.

There are currently over 200 ISPs in Hong Kong, although market share is concentrated in a few of the largest companies. C&W HKT, currently Hong Kong's largest telecom service provider and largest ISP, is the market leader, with about one-third of the market share. OFTA has not limited the issuance of ISP licenses, and the advent of more broadband networks and low market entry barriers has led to increased competition among ISPs. Some competitors have offered free Internet service and other giveaways.

According to the American Electronics Association's *Cybernation 2.0* report, Hong Kong ranks fourth in the Asia/Pacific region in both Internet usage per capita and computers in use per capita for the year 2000. Approximately 91 percent of Hong Kong's Internet users accessed the Internet from home in the month of August 2000 according to a survey conducted by NetValue.

Broadband networks are reportedly accessible to 100 percent of commercial buildings and over 80 percent of households in Hong Kong. The city's external Internet capacity currently stands at 44 Gbps and is expected to increase ten-fold over the next three years. The Hong Kong government is expecting $1.7 billion (HK$ 13 billion) in private investment to build out the telecom infrastructure over the next few years.

Leased line accounts (accounts with more than one log-in ID are counted as single accounts) increased from 5,291 in March 1999 to 8,658 in February 2000. OFTA reported 51,494 broadband Internet access customer accounts (defined as accounts with downloading speed of 1 Mbps or more using cable modem, asynchronous transfer mode, asymmetric digital subscriber line, digital subscriber line, or other technologies) in Hong Kong in February 2000, the only time period for which these data are available.

Wireless Application Protocol (WAP) penetration still low

The penetration of WAP is not very high in Hong Kong due to a limited supply of WAP-enabled devices, limited applications, and slow download speeds. Most of the current applications are text-based and simple black and white graphics. Examples of WAP services available in Hong Kong include the ability to send and receive e-mail, local and international news

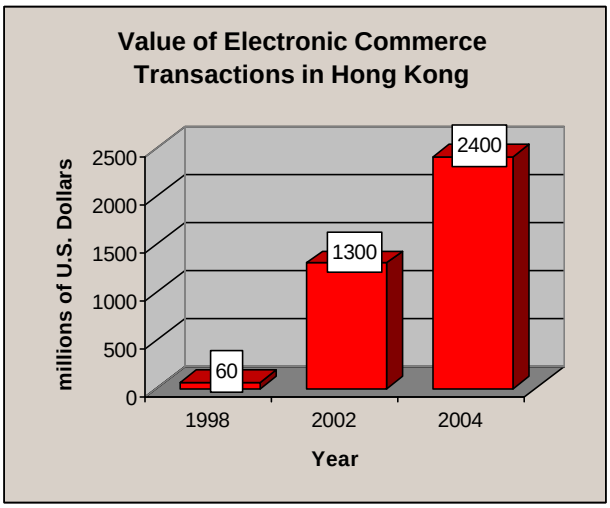
highlights, latest real estate information, real-time Hong Kong stock quotes, and entertainment information.

Many of Hong Kong's mobile service operators are beginning to shift their business focus from voice communications to data communications and mobile commerce services. All six cellular operators have launched WAP services, and some offer over 100 channels with WAP content, but subscriptions still remain relatively low considering the number of mobile service subscribers in Hong Kong. Many of the cellular operators plan to implement general packet radio services (GPRS) technology, which will increase network speeds. Initially, many of the cellular operators followed AOL's model and offered WAP services only to their subscriber base. This model may not be sustainable in Hong Kong, and some operators have begun to open their WAP portals to all users.

SmarTone recently launched a WAP portal offering, which is targeted mainly at young subscribers. The new portal, called "Republic of Funland", includes such channels as games, online comic strips, fortune telling, and horoscopes. These channels are accessible to all WAP users even if they subscribe to other mobile operators. Since SmarTone launched its WAP services in early 2000, it has a subscribership base of 20,000 WAP users. The monthly subscription cost for WAP services is $6.40 (HK$50), and WAP users are spending an average of 30 percent more on their mobile phone bill than regular subscribers.

Although WAP services have not been overwhelmingly embraced by consumers, Hong Kong mobile operators are cooperating to facilitate the adoption of mobile commerce. These mobile operators are collectively adopting a mobile certificate standard that allows client and server authentication capability to mobile networks, so that customers and vendors can verify their respective identities.

ELECTRONIC COMMERCE



Source: The Economist Intelligence Unit 2000

The sophisticated financial sector in Hong Kong contributes to fueling electronic commerce growth there. There are no foreign exchange controls or restrictions on capital flows into or out of Hong Kong. Hong Kong is the fifth largest market in foreign exchange transactions and the fourth largest market for external banking transactions. Low tariff and non-tariff barriers are also accelerating online trade. It is estimated that the value of electronic commerce transactions will increase from $60 million in 1998 to $1.3 billion by 2002 and $2.4 billion in 2003.

Business-to-consumer e-commerce (B2C EC) is still in its infancy

A report issued in 1999 by the market research firm AC Nielsen reported that B2C e-commerce transactions amounted to $9.8 million (HK$76 million) in 1998 from 110,000 electronic purchasers, which was double the volume from the year before. Another analyst, Boston Consulting Group, released a report in February 2000 that estimated Hong Kong's online retail revenues at $40 million in 1999. This represents less than 0.2 percent of total retail revenues in Hong Kong, as compared to a level of 1.2 percent in the United States. It appears that B2C transactions in Hong Kong are following the same growth curve that was experienced in the United States, but that Hong Kong is still a few years behind the United States. According to an AC Nielson survey, nearly 300,000 people in Hong Kong have shopped online. The Internet shopping population in Hong Kong has increased 2.5 times since March 1999. Books and magazines are the most commonly purchased items, followed by groceries, food/beverages, and clothing/shoes. The average value of transactions has increased $385 (HK$3000) per shopper.

Dr. John Ure, Director of the Telecommunications Research Project, Centre of Asian Studies, University of Hong Kong, released a Working Paper in March 2000 entitled, "Modelling Critical Mass for E-Commerce: the Case of Hong Kong" in which he estimates that a critical mass for retail e-commerce in Hong Kong (defined in his paper as more than 1,000,000 transactions annually) could be reached in 2004 or 2005, assuming an annual doubling of online transactions between now and then. According to a recent survey, only approximately 10 percent of organizations have adopted e-commerce in their business operations. Many are reluctant because of security concerns about conducting transactions over the Internet.

Another hindrance to the quick uptake in electronic commerce is the lack of an electronic communications interface standard that incorporates all Chinese character sets commonly used in Hong Kong. Many businesses, particularly local SMEs, prefer to communicate in Chinese. However, the written Chinese language itself introduces a challenge to IT suppliers and underscores the importance of software localization. There is a double-byte requirement for both the Traditional and Simplified Chinese character sets, whereas Western alphabets only require single-byte programming.

To address this issue, the Hong Kong government published the Hong Kong Supplementary Character Set in 1999, and is in discussions with the International Organization for Standardization (ISO) on the development of the ISO 10646 standard, which will include all of the world's written scripts, including the characters commonly used in Hong Kong.

Drivers that will accelerate the growth in B2C EC include the ability to instantly place orders over the Internet and the increased usage of mobile phones and handheld devices that are web-enabled.

There are some retailers in Hong Kong that have embraced new technologies to offer expanded services to their customers. Dairy Farm International's 7-Eleven stores plan to install cyber active transaction stations called CATs, which will enable shoppers to

perform transactions such as purchasing movie tickets, accessing the Bank of East Asia's banking services, and settling of Standard Chartered credit card bills. The initial rollout of these stations will be limited to a few business districts but if successful, these cyberstations will be installed throughout the 387 stores located in Hong Kong.

Business-to-business e-commerce (B2B EC)

The outlook for business-to-business electronic commerce in Hong Kong is much more optimistic. Most analysts estimate that the value of B2B transactions in Hong Kong is 2 to 3 times the value of B2C transactions. While many small family-owned firms are unlikely to adopt electronic commerce measures in the near future, other companies are being forced to adopt it because of the international nature of their businesses and pressures from foreign suppliers or customers.

A spokesman for C&W HKT told a press conference in March 2000 that revenue from business-to-business e-commerce applications would account for 20 percent of the company's revenues over the next three years. C&W HKT has entered into an agreement with Oracle Corporation to launch a web-based Electronic Marketplace for the China region. This marketplace is intended to serve as an online meeting place for buyers and sellers to interact and conduct business. C&W HKT also said that it intended to become one of Asia's leading providers of Internet protocol solutions for business customers.

Internet banking is just taking off

Internet banking is not widespread in Hong Kong. As of April 2000, only 4 banks in Hong Kong were offering full-scale Internet banking services (versus an estimated 5,000 in the United States), although other banks were planning to enter the market in the near future. For example, the *Far Eastern Economic Review* reported in its May 4, 2000 edition that Hong Kong's largest bank, HSBC Holdings, is teaming up with Merrill Lynch to create a $1 billion on-line banking and brokerage company.

Many local banks are unprepared to handle payments from overseas Internet shoppers and many businesses have complained about the reluctance of local banks to assist them in setting up their business online. Chekiang Bank was the first Hong Kong-based bank to offer banking services over the Internet in December 1997, followed by Citibank in November 1998, and the Wing Lung Bank in December. In 1999, the Bank of East Asia and Dao Heng Bank Group announced plans to deliver online services by October of 1999, and HSBC by mid-2000. HSBC announced that it will invest $320.5 million (HK$2.5 billion) in 2000 to support a wide range of Internet banking products and services.

According to a Goldman Sachs survey, the Bank of East Asia is currently the leader in Internet banking among Hong Kong banks. They offer cyberbanking services such as mortgage and personal loan applications, stock trading, and the ability to transfer funds. Currently, over 100,000 of their customers have opened online accounts.

Some other large banks, such as Hang Seng Bank, Dah Sing Bank, and Standard Charter,

have also announced plans to launch Web-based services, recognizing the potential reductions in operating expenses that are inherent in Internet banking versus physical branch offices. Nevertheless, there is a general consensus that a critical mass does not yet exist in Hong Kong to make Internet banking economically feasible. Most analysts estimate that it will be two to five years before the savings will outweigh the costs of installing and maintaining Internet banking systems in Hong Kong banks.

Many local banks are reluctant to offer full-scale Internet banking services because the PC penetration rate in Hong Kong is still lower than the mobile phone penetration rate. Local banks prefer to develop their telephone banking services (even though the transactions are not as secure as Internet-based transactions) because the Hong Kong community is more accustomed to accessing information over their mobile phones than over the computer or other Internet-enabled devices. KPMG consulting found that Hong Kong banks lagged their international counterparts by approximately 12 months in delivering banking services to their customers via the Internet. According to an AC Nielson survey, approximately 650,000 people in Hong Kong are predicted to settle their banking needs over the Internet, while close to 1 million people will be using their mobile phones for banking services this year.

Virtual Banks

The Hong Kong Monetary Authority requires Internet-based virtual banks to maintain a physical presence in Hong Kong to conduct business. In addition, local banks must be 50 percent owned by a well-established bank, have deposits of at least $385 million (HK$3 billion), and $513 million (HK$4 billion) in total assets. Overseas institutions are restricted to no more than three branches there.

Barriers to IT and e-commerce implementation

The pace of IT and e-commerce adoption in Hong Kong is considerably slower than it is in the United States. Although Hong Kong has a well-developed telecommunications infrastructure and access to virtually all of the latest technology, there are a variety of mostly cultural impediments that tend to slow the uptake of IT applications there.

According to a survey conducted by IBM and the Hong Kong Productivity Council in September 1999, only 378 business establishments of the 207,274 surveyed (less than 0.2 percent) had adopted e-business technologies and approximately 24 percent were using e-mail for internal and external communications. The majority of the early adopters were in the import/export sector. Many of the companies that have a web presence did not have a way of analyzing their webpage visitor's usage patterns. Of the companies that plan to adopt some e-business solutions in 2000, service and wholesale establishments represented the majority, while companies in the import/export sector represented the majority of the firms that planned to enhance their current e-business systems.

Electronic commerce is beginning to catch on in Hong Kong, but a variety of problems have limited its acceptance by the general public. The city is still very much a cash-based society, the use of credit cards for normal retail transactions is not widespread, and the

use of credit itself, with attendant interest payments, is often considered foolish. Although both the Mondex International Smart-Card System and Visa Cash have been introduced in Hong Kong, cash is still the preferred method of payment among Hong Kong shoppers, and the usual limit for automatic teller machine withdrawals in Hong Kong is $1282 (HK$10,000). Consumers not paying cash are more likely to use debit cards rather than credit cards.

Shopping is still considered a leisure activity in Hong Kong, and this has tended to slow the acceptance of B2C EC there. Hong Kong is densely populated, and the shopping districts are easy to access and full of people who like to touch and feel the products they purchase, rather than ordering online. According to a 2000 Taylor Nelson Sofres survey, most residents use the Internet to gather information on consumer products, resulting in a 19 percent online shopping dropout rates, one of the highest in the world.

Another barrier to the adoption of e-commerce in Hong Kong is the fact that many firms there are small, family-owned businesses. These companies are accustomed to conducting business in traditional ways and are reluctant to embrace new technologies unless they offer immediately favorable cost-benefit ratios. Many analysts predict that most retailers will eventually have to establish a web presence, but that they will wait until a successful on-line retail model emerges from the current confusion in the industry. Even the large retailers are not all moving to sell their products online. They are waiting to see a successful model first emerge in the United States. The "bricks and clicks" model still holds strongly in Hong Kong, and there are very few virtual storefronts that exist in the market.

Outlook - Broadband Infrastructure Development

Hong Kong's broadband infrastructure must develop quickly to spur the widespread adoption of advanced information technologies. Many in the general business community feel that the rate of infrastructure spending by Hong Kong's licensed wireline operators must increase and the prices charged for broadband services and leased lines must be reduced. Some industry players point to Singapore's decision in early 2000 to completely open its market to fixed wireline service providers as evidence that Hong Kong should also bring to an early end its moratorium on new fixed line licenses.

The ITBB appears to be aware of this issue, and has taken steps to address it. The ITBB conducted a review of the regulatory framework for fixed line communications in 1998 and announced its policy decisions over the period October 1998 to May 1999. The ITBB concluded that the best way to achieve effective competition within the shortest period of time would be to obtain further commitments from the existing new fixed telephone network service licensees in return for a moratorium on issuing any new licenses prior to year-end 2002. The Hong Kong government also decided to issue licenses for the provision of fixed wireless local networks to spur the development and deployment of innovative wireless technologies.

ITBB's performance assessment measures for local fixed telecommunications networks service licensees differs from its performance assessment measures for the

number of external telecommunications services licensees, external fixed telecommunications networks service licensees, mobile phone licensees, paging services licensees and Internet service providers. The performance target for fixed telecommunications networks service licensees is "To maintain the existing number of local FTNS licensees until end-2002," while the performance target for all of the other service providers is "To maintain a level playing field so as to ensure that the market determines the optimal number of licensees, (subject to any physical or spectrum constraints)."

The effect of these differing measures is reflected in Hong Kong's rate of adoption of broadband services. According to the ITBB, about 80 percent of Hong Kong households were expected to have access to broadband service by year-end 1999, and practically all commercial buildings currently have access to broadband telecommunications networks. Yet, according to the statistics of OFTA, Hong Kong had only an estimated 51,000 registered broadband Internet access customer accounts, and about 8,700 leased line accounts.

Many people in the Hong Kong IT community, both consumers and providers, claim that broadband access rates are too high due to a lack of competition at the wholesale level. One industry contact said that bandwidth rates in Hong Kong are 12 times the price of U.S. rates. According to one industry representative, a 155 Mbps leased fiber connection between Japan and Hong Kong costs an average of $1 million per month, compared to $882,000 between Japan and the United States and $142,000 between the United States and Europe. On average, a 155 Mbps connection between Taiwan and San Francisco costs 11 times as much as one between New York and London. Other industry representatives complain that some current wireline license holders have shown little interest in spending money on infrastructure build out, preferring to view their licenses as investments that will appreciate in value.

SUMMARY OBSERVATIONS

Hong Kong is one of the most open and competitive information technology (IT) and telecommunications markets in Asia. Its IT and telecommunications equipment market is completely open and competitive. Its telecom services markets are also very open and competitive, except in the area of domestic fixed wireline services.

Hong Kong's Internet and e-Commerce markets generally lag the U.S. market by 1 to 5 years, depending on the particular technology and application. While B2B e-commerce is catching on, B2C take-up is limited by a cultural preference for in-store shopping and cash-based transactions.

Hong Kong is primarily a service-based economy. Most manufacturing operations have been moved across the border to China's Guangdong Province.

Business as usual after the handover

On July 1, 1997, the British Crown Colony of Hong Kong reverted to Chinese sovereignty, and is now considered a Special Administrative Region (SAR) under the People's Republic of China. Hong Kong's relationship with mainland China is characterized by two principles: (1) *One*

Country, Two Systems and (2) *Hong Kong People Governing Hong Kong*. Under the first principle, mainland China will not impose its economic, legal, or planning system onto Hong Kong, SAR. China has agreed to uphold this principle for fifty years. Under the second principle, Hong Kong People Governing Hong Kong, only Hong Kong citizens will hold the offices of the Chief Executive, Executive Council, and Legislative Council. The only exceptions to Chinese intervention are in the areas of foreign affairs and national defense.

Hong Kong remains one of the most open markets in Asia to foreign investment. In addition, there is generally less government intervention in the Hong Kong market than in other Asian markets.

Although Hong Kong is a small market in and of itself, it can serve as a gateway to the much larger China market. For Western firms with limited resources and/or limited experience in China, it may be easier to partner with a Hong Kong firm to enter the China market than to attempt to enter the China market directly. Hong Kong firms generally are familiar with both Chinese and Western business practices, and can help Western firms avoid some of the problems likely to be encountered in the less transparent mainland China market.

MARKET OPPORTUNITIES

Hong Kong firms have no desire to "reinvent the wheel"; they are willing to purchase foreign-developed hardware and software applications that meet their needs, and the Hong Kong government has no industrial policy designed to keep out foreign products while fostering local IT development. Many Hong Kong IT companies are interested in finding partners who have the technology, but need assistance in localization or in-country marketing.

The Hong Kong market offers promising opportunities for firms offering the following products and services:

- Internet equipment and services (web hosting, security) - Hong Kong offers a favorable environment for the development of software relating to web-based applications, Intranet solutions, multimedia, EDI, e-commerce, video-on-demand, and training.
- Integrated e-commerce solutions for SMEs - In particular, the import/export sector SMEs are in need of applications that will enable them to take advantage of the global trend to achieve quick response in their supply chains.
- IT applications related to finance, sales and service businesses
- Localized software packages
- Wireless applications - Hong Kong's mobile service operators will partner with content providers to build their WAP services. There is a particular

interest in WAP services targeted to a population under the age of 18.

- Systems integrators - Potential opportunities exist to provide computer equipment and systems integration services for the Hong Kong government's ambitious IT development plans, and to large companies seeking to automate processes and systems. Hong Kong companies also seek new telecommunications and information technologies to integrate into their manufacturing plants, which in most cases have been relocated to South China.

- Software products - Promising prospects appear in: applications software, particularly for Chinese language systems; Internet; e-commerce; graphics and desktop publishing; CAD/CAM; networking and communications; engineering and production control; and fourth generation language (4 GL) applications.

According to Secretary Kwong of the Information Technology and Broadcasting Bureau, the HK Government's target is to outsource two-thirds of all new IT projects in government by 2001. Since April 1999, outsourcing has been the preferred option in the government to develop the local IT industry. Government IT spending in 1999 was estimated to be $331 million (HK$2 billion).

CHAPTER 3: THE ROLE OF THE U.S. DEPARTMENT OF COMMERCE

INTERNATIONAL TRADE ADMINISTRATION (www.trade.gov)

The mission of the U.S. Department of Commerce's International Trade Administration (ITA) is to assist U.S. companies export products and services and compete in foreign markets. Two ITA units responsible for export promotion are Trade Development (TD) and the U.S. and Foreign Commercial Service (US&FCS).

TRADE DEVELOPMENT[13]

ITA's Trade Development unit is the Commerce Department's link to U.S. industry. TD provides industry and market analyses, export promotion services, advocacy for U.S. companies bidding on foreign government contracts, and support for trade negotiations. This unit offers an array of services to help small businesses increase their export potential.

Industry Expertise. TD's industry expertise encompasses nearly all U.S. business sectors.[14] Industry sector specialists provide U.S. firms with information and analyses on domestic and foreign industry trends; foreign market conditions and opportunities for specific products or services; general exporting advice; information on foreign market tariffs and non-tariff barriers, and regulations; business and cultural practices; and advocacy assistance.

TD's industry expertise is also the primary source used by the President and the Office of the U.S. Trade Representative (USTR) in trade negotiations. TD's industry analyses, close work with industry representatives, understanding of issues such as restrictions on market access and product standards and testing, and knowledge of trade data help negotiators understand business priorities and problems and develop trade agreements that provide maximum benefit for U.S. firms. TD industry experts also help monitor and enforce foreign governments' compliance with trade commitments, working with other ITA units, including the US&FCS and Market Access and Compliance (MAC), and USTR.

TD's IT and telecommunications industry-focused offices are the Office of Information Technologies (OIT), the Office of Telecommunications Technologies (OTT), and the Office of Microelectronics, Medical Equipment, and Instrumentation (OMMI).

Office of Information Technologies

OIT focuses on the following IT industry segments: computers and peripherals, software, networking equipment, Internet technologies, and e-commerce technologies.

OIT actively supports U.S. IT firms' efforts to

[13]More information on Trade Development, including information on its services and industry specialist contact information, can be found at http://www.ita.doc.gov/td. Selected IT and telecommunications TD contacts are listed in the Appendix.

[14]Except agriculture, which is the responsibility of the U.S. Department of Agriculture.

expand their business overseas. OIT industry specialists track the growth and competitiveness of domestic and foreign IT industries; counsel U.S. businesses on overseas market conditions and the practical aspects of exporting their products; identify market barriers as they affect IT exports; and work closely with USTR to negotiate the removal of these barriers.

OIT export promotion activities include trade missions, trade fairs, catalog shows, and technical seminars that introduce U.S. businesses to potential partners and IT end-users overseas.

OIT staff compile and disseminate detailed information and analyses on their IT industry sectors. Each year, industry specialists profile these industries in the Department of Commerce/McGraw Hill publication *U.S. Industry and Trade Outlook*, describing current and future IT industry and market trends on a domestic and global basis. These specialists also continually expand and update the OIT web site with information on foreign markets and regulations, U.S. and foreign policies that affect IT exports, trade events, and additional government and private-sector resources. OIT distributes a free electronic newsletter highlighting trade leads, partnering opportunities, and trade events.

In 2000, OIT will be involved in a number of activities including work on a Market Development Cooperator Program (MDCP) grant to assist IT SMEs (see discussion of MDCP program below); focused market research on Latin American and Africa; disseminating information on partnering opportunities in Europe; distributing its IT Management Planning Tool, which helps small enterprises assess their IT usage and e-business readiness; developing an internationally focused web site to connect buyers and sellers of U.S. IT products and services; continued monitoring of computer-related trade agreements; and continued emphasis on a strong overall e-commerce focus in its trade promotion activities.

To obtain more information, including a list of upcoming OIT-supported trade events, or to locate OIT trade specialists, contact:

Office of Information Technologies (OIT)
U.S. Department of Commerce, Room 2806
14th Street & Constitution Avenue, N.W.
Washington, D.C. 20230
Tel: (202) 482-0572
Fax: (202) 482-0952
http://exportIT.ita.doc.gov

Office of Telecommunications Technologies

OTT's mission is to support the growth and competitiveness of the U.S. telecommunications equipment and services industries in foreign markets.

OTT provides business counseling to U.S. telecommunications firms seeking to enter specific markets by developing and disseminating information on the telecommunications market conditions in foreign countries based on information from US&FCS (see fuller description of US&FCS services on the following pages) and a wide range of other industry resources.

OTT promotes international trade and investment opportunities for the U.S. telecommunications industry by sponsoring events that offer direct contact with foreign government and industry officials. In conjunction with other parts of ITA and other

U.S. government agencies, OTT also acts as an intermediary between U.S. firms and foreign government officials to provide advocacy support for U.S. bidders on foreign public projects and to reduce or remove barriers that limit U.S. telecommunications firms' access to foreign markets. The office works closely with USTR on trade negotiations and other efforts to open foreign markets to U.S. telecommunications equipment and services exports, as well as on monitoring bilateral and multilateral telecommunications agreements.

OTT conducts market research and statistical analysis of the domestic and international telecommunications industry, publish a variety of trade and industry reports, including telecommunication trade statistics and foreign market guides. The office distributes a series of free electronic newsletters delivering up-to-date information on foreign market opportunities and industry information to U.S. subscribers. OTT also prepares the telecommunications chapters of the U.S. Industry and Trade Outlook.

To obtain more information, including a list of upcoming OTT-supported telecom events, or to locate OTT trade specialists, contact:

Office of Telecommunications Technologies (OTT)
U.S. Department of Commerce, Room 4324
14th Street & Constitution Avenue, N.W.
Washington, D.C. 20230
Tel: (202) 482-4466
Fax: (202) 482-5834
http://telecom.ita.doc.gov

Office of Electronic Commerce (OEC)
The Office of Electronic Commerce (OEC) provides information, business counseling, and export assistance services to U.S. firms seeking to enter specific foreign e-commerce markets by developing and disseminating information on the electronic commerce market conditions in foreign countries. OEC also conducts general trade and policy analysis and research, including analyzing foreign countries' e-commerce laws and initiatives and comparing them to US policy requirements.

OEC provides support for ITA's ongoing e-commerce export promotion initiative. This initiative seeks to expand U.S. exports, bring small business exporters into the global economy, and engage our trading partners in e-commerce issues. The focus is to connect U.S. businesses to the new digital economy. OEC participates in fostering the right policy environment by focusing on keeping both the Internet and foreign markets open to private sector driven global growth. This is accomplished by participating in various fora, such as the USG's Interagency Working Group on Electronic Commerce, the Organization for Economic Cooperation and Development (OECD), the World Trade Organization (WTO), European Union, Asia Pacific Economic Cooperation (APEC) and Free Trade Area of the Americas (FTAA). This effort also includes overseeing the Administration's E-Commerce Joint Statements with other governments, managing the Industry Functional Advisory Committee on Electronic Commerce (IFAC-4), as well as participating in formal as well as informal policy dialogues with other nations. OEC tries to determine how to cope with the changes taking place and ensure that the policy infrastructure is in place to enable business, trade and investment to take place as efficiently as possible in the digital economy. We also provide various technical services, such as video conferences, to bring

together government policy and industry experts on various e-commerce issues.

To obtain more information, or to speak with an E-Commerce Trade Specialist, contact:

Office of Electronic Commerce (OEC)
U.S. Department of Commerce, Room 4324
14th Street & Constitution Avenue, N.W.
Washington, D.C. 20230
Tel: (202) 482-2959
Fax: (202) 482-5834
http://www.ecommerce.gov

Office of Microelectronics, Medical Equipment, and Instrumentation

OMMI covers electronic components (such as electron tubes, printed circuit boards, semiconductors, capacitors, resistors, transformers, and connectors) and semiconductor manufacturing equipment. OMMI also covers several industry sectors with high IT content, including medical and dental equipment and electromedical apparatus, process control instruments, laboratory analytical instruments, optical instruments, and instruments to measure electricity and electrical signals.

OMMI's primary mission is to promote exports and increase the international competitiveness of these U.S. industry sectors. OMMI counsels U.S. firms on foreign market conditions and the specifics of exporting, using information from US&FCS posts abroad and a wide range of other industry resources. OMMI staff also work with private sector and DOC colleagues to develop trade missions, trade fairs, catalog shows, seminars and other trade events that offer direct contact with foreign government officials, industry representatives, and end-users. In cooperation with other parts of ITA and other U.S. government agencies, OMMI participates in and supports trade negotiations to reduce or eliminate regulatory and other barriers to trade and international investment in these industries.

OMMI staff gather and disseminate market research and statistical analyses of the domestic and international microelectronics, medical equipment and instrumentation industries. Trade and industry reports, trade statistics, information on foreign markets and regulations, U.S. and foreign policies that affect exports, trade events, and links to additional government and private sector resources are available on the OMMI website. OMMI industry specialists also profile current and future industry and market trends on a domestic and global basis in the U.S. Industry and Trade Outlook.

To obtain more information, including a list of upcoming OMMI-supported trade events, or to locate OMMI trade specialists, contact:

Office of Microelectronics, Medical Equipment, and Instrumentation (OMMI)
U.S. Department of Commerce, Room 1015
14th Street & Constitution Avenue, N.W.
Washington, D.C. 20230
Tel: (202) 482-2470
Fax: (202) 482-0975
http://www.ita.doc.gov/td/ommi/

Trade Information Center. TD's Trade Information Center (TIC) is an excellent first stop for new-to-export companies seeking export assistance from the federal government. TIC trade specialists 1) advise exporters on how to find and use government programs; 2) guide businesses through the export process; 3) provide country and regional business counseling on standards

and trade regulations, distribution channels, trade opportunities and best prospects for U.S. companies, foreign import tariffs/taxes and customs procedures, and common commercial difficulties; 4) provide information on overseas and domestic trade events and activities; and 5) provide sources of public and private export financing. TIC trade specialists also advise exporters how to access reports and statistics from the computerized National Trade Data Bank (NTDB) and direct them to state and local trade organizations that provide additional assistance. To contact the TIC, call 1-800-USA-TRAD(E); fax (202) 482-4473; e-mail tic@ita.doc.gov; or visit its website: http://tradeinfo.doc.gov.

Trade missions and events. Working together with the private sector and the US&FCS, TD industry experts help plan, organize, and recruit for trade events, including high-level executive missions with the Secretary and the Under Secretary of Commerce. Industry-specific trade missions and events are listed on individual offices' web sites.

Advocacy Center. The Advocacy Center supports U.S. businesses of all sizes as they compete for projects overseas. Whether a company is small, medium, or large, the Center aims to ensure that when these companies participate in international tenders they are treated fairly and that their proposals are evaluated on technical and commercial merits. The Advocacy Center marshals the resources of 19 U.S. Government agencies in the Trade Promotion Coordinating Committee and U.S. officials stationed at our embassies and consulates around the world. Advocacy assistance can include a meeting between a key foreign official and a U.S. government official, a phone call to a high-level foreign official, a timely letter to a foreign government decision-maker, or a Cabinet or sub-cabinet level trade mission to a foreign country. Advocacy support is a means to promote our country's economic well-being by leveling the playing field. Since 1993, the Advocacy Center has helped 110 SMEs win foreign government contracts valued at more than $2.4 billion. In addition, as suppliers or subcontractors to larger U.S. companies' overseas projects, thousands of U.S. SMEs benefit indirectly from the Advocacy Center's services. For more information, visit the Center's website at http://www.ita.doc.gov/td/advocacy.

Small Business Program. The Small Business Program is ITA's focal point for trade policy issues concerning SMEs. The Program brings the small business point of view to international trade policy discussions, primarily through the Industry Sector Advisory Committee on Small and Minority Business for Trade Policy Matters (ISAC-14, see Industry Consultations Program discussion below), the only advisory committee to the U.S. government on small and minority business export concerns. The Small Business Program also provides outreach to and plans events for small, women-owned, and minority-owned firms.

Industry Consultations Program. Industry has a voice in U.S. trade policy formulation through the Industry Consultation Program (ICP). The ICP is comprised of 17 Industry Sector Advisory Committees on Trade Policy Matters (ISACs), representing 17 industry sectors of the U.S. economy, including IT, and small and minority businesses. It also has four Industry Functional Advisory Committees on Trade Policy Matters (IFACs), that address cross-

cutting issues affecting all industry sectors–customs, standards, intellectual property rights, and e-commerce. Advisors on these committees have direct access to trade policymakers at the U.S. Department of Commerce and USTR, and develop their industry's positions on U.S. trade policy and negotiation objectives.

The committees address market access problems; tariff and non-tariff barriers to trade; discriminatory foreign procurement practices; the information, marketing, and advocacy needs of their sector; and other trade issues. Committee members are executives and managers of U.S. manufacturing or service companies involved in international trade or are trade association executives. For more information, see http://www.ita.doc.gov/td/icp.

Export Trading Companies and Trade Intermediaries. The Office of Export Trading Company Affairs (OETCA) promotes the formation and use of export trade intermediaries and the development of long term joint export ventures by U.S. firms. OETCA administers two programs available to all U.S. exporters or potential exporters. The Export Trade Certificate of Review program provides antitrust protection to U.S. firms for collaborative export activities. The U.S. Exporters' Yellow Pages™ publication is designed to assist U.S. trade intermediaries to link up with U.S. producers of exportable goods and services. For more information, see http://www.ita.doc.gov/td/oetca.

Market Development Cooperator Program. The Market Development Cooperator Program (MDCP) is a competitive matching grant program. It builds public-private partnerships by providing federal assistance to nonprofit export multipliers, such as states, trade associations, and chambers of commerce, which are particularly effective in reaching and assisting SMEs. MDCP awards help fund the start-up costs of new export marketing ventures which these groups would not undertake without federal government support. For more information, see http://www.ita.doc.gov/td/mdcp.

THE U.S. AND FOREIGN COMMERCIAL SERVICE (US&FCS)[15]

Also part of the International Trade Administration, the U.S. and Foreign Commercial Service (US&FCS) aims to assist U.S. firms in realizing their export potential by providing expert counseling and advice, information on markets abroad, assistance in locating international contacts, matchmaking services, support of trade events, and advocacy services. US&FCS trade experts are located in more than 70 countries around the world and in major cities throughout the United States.

International Operations. US&FCS offices are located primarily in U.S. embassies and consulates and are valuable connections to overseas markets. US&FCS staff in these countries are industry focused and can offer expert advice on the business practices, cultures, and languages of their specific country or region. They offer numerous products and services to help U.S. firms enter the market or assist companies

[15]More information on US&FCS, including information on its services and industry specialist contact information, can be found at http://www.usatrade.gov/. Selected US&FCS contacts are listed in the Appendix.

already established in that country expand their sales. The main activities of these overseas offices are establishing key industry and foreign government contacts, helping match U.S. suppliers with overseas buyers, and organizing or facilitating trade events. Contact information for US&FCS IT and telecommunications market specialists in Asia is in the appendix. In addition, the US&FCS web site, www.usatrade.gov, has contact information for all Asia-based US&FCS trade specialists.

Domestic Operations. These offices provide export counseling and marketing assistance to the U.S. business community through 1,800 trade experts located in 100 U.S. Export Assistance Centers (USEACs). The USEACs work closely with the Office of International Operation's overseas posts to facilitate transactions by linking U.S. suppliers with international buyers or partners. USEACs provide counseling to U.S. firms seeking to expand into international markets. USEACs help firms enter new markets and increase market share by identifying the best markets for their products; developing an effective market entry strategy aided by information generated from overseas offices; advising clients on practical exporting matters such as distribution channels, programs and services, and relevant trade shows and missions; and assisting with trade finance programs available through federal, state and local sectors.

US&FCS Services

Market Research

- **National Trade Data Bank (NTDB)**. A "one-stop" source of international trade data collected by federal agencies, the NTDB contains over 190,000 trade-related documents, including market research reports, trade leads, trade contacts, statistical information, country reports, and more. It is available at federal depository libraries, can be purchased on CD-ROM, or can be accessed through the Internet at www.stat-usa.gov. Call 1(800) STAT-USA to order or for more information.

- **Industry Sector Analysis (ISA)**. ISAs are structured market research reports produced on location in leading overseas markets. Reports cover market size and outlook, characteristics, and competitive and end-user analysis for a selected industry sector in a particular country. ISAs are available on the National Trade Data Bank and on www.usatrade.gov.

- **International Market Insights (IMI)**. IMIs are short profiles of specific foreign market conditions or opportunities prepared in overseas markets and at multilateral development banks. These non-formatted reports include information on dynamic sectors of a particular country. IMIs are available on the National Trade Data Bank and on www.usatrade.gov.

- **Country Commercial Guides (CCG)**. CCGs, put out annually by US&FCS market specialists, contain country-specific information on marketing U.S. products and services; leading sectors for U.S. exports and investment; trade regulations, customs, and standards; investment climate; trade and project financing; business travel; and economic and trade statistics. CCGs are available on the National Trade Data Bank and on www.usatrade.gov.

Pinpoint Export Prospects

- **Customized Market Analysis (CMA)**. A CMA report assesses the market for a specific product or service in a foreign market. The research provides information on sales potential, competitors, distribution channels, pricing of comparable products, potential buyers, marketing venues, quotas, duties and regulations, and licensing or joint venture interest.
- **Trade Opportunity Program (TOP)**. These are sales leads from international firms seeking to buy or represent U.S. products or services. TOP leads are printed daily in leading commercial newspapers and distributed electronically via STAT-USA.
- **Agent/Distributor Service (ADS)**. ADS is a customized overseas search for qualified agents, distributors, and representatives for U.S. firms. Commercial officers abroad identify up to six foreign prospects that have examined the U.S. firm's product literature and expressed interest in representing the U.S. firm's products.

Promote U.S. Firms' Products and Services Abroad

- **Commercial News USA**. This export marketing magazine promotes U.S. products and services worldwide. Disseminated in print to screened agents, distributors, buyers, and end-users and on-line to electronic bulletin board subscribers. Selected portions of Commercial News USA are reprinted in business newsletters in several countries.
- **Gold Key Service**. This custom-tailored service in foreign markets combines orientation briefings, market research, appointments with potential partners, interpreter service for meetings, and assistance in developing follow-up strategies.
- **Matchmaker Trade Delegations**. These "match" U.S. firms with prospective agents, distributors, and joint venture or licensing partners abroad. US&FCS staff evaluate U.S. firms' products and services marketing potential, find and screen contacts, and handle all event logistics. U.S. firms visit the designated countries with the delegation and, in each country, receive a schedule of business meetings and in-depth market and finance briefings.
- **International Buyer Program (IBP)**. This supports selected leading U.S. trade shows in industries with high export potential. US&FCS offices abroad recruit foreign buyers and distributors to attend the U.S. shows while program staff helps exhibiting firms make contact with international visitors at the show. The IBP achieves direct export sales and international representation for interested U.S. exhibitors.
- **Multi-State Catalog Exhibitions**. These showcase U.S. company product literature in fast growing markets within a geographic region. U.S. Department of Commerce staff and representatives from state development agencies present product literature to hundreds of interested business prospects abroad and send the trade leads directly to participants.
- **Trade Fair Certification**. This supports

major international industry trade shows providing high-profile promotion of U.S. products. Certification encourages private organizers to recruit new-to-market, new-to-export U.S. exhibitors; to maintain Commerce Department standards for event; and to provide services ranging from advance promotion to on-site assistance for U.S. exhibitors.

The U.S. Department of Commerce's Information & Communications Technology (ICT) Team[16]

The U.S. Department of Commerce's Information and Communications Technology (ICT) Team comprises IT market and industry specialists, from both US&FCS and TD, who work together to share information and provide comprehensive services to support U.S. IT firms' exporting efforts. ICT team members are located in US&FCS Export Assistance Centers in key geographic areas throughout the United States, in US&FCS offices abroad, and in TD IT- and telecommunications-focused offices in Washington, DC.

Members offer all U.S. Department of Commerce export promotion services mentioned above; in addition, the Team's structure and programs aim to meet the specific needs of firms in the IT industry. Team members' regional presence allows them to be accessible and responsive to the many small- and medium-sized IT firms and firm clusters around the United States. The formal network of IT-focused trade specialists located in the United States and abroad adds value to U.S. IT SMEs, as domestic team members can easily access foreign-based colleagues for the most updated information for U.S. firms on trade leads and quickly changing foreign market opportunities; in addition, domestic team members can provide input to foreign-based colleagues on market research topics of use to U.S. IT firms. Finally, the ICT Team constantly develops new export promotion programs specifically to meet the needs of firms in the rapidly changing IT industry.

ICT Team services currently include the following:

- Reports specific to IT firms' exporting needs, such as a forthcoming report on distribution channels and contacts in selected markets.
- Technology-based services for U.S. firms to reach potential buyers and partners, including international video-conferencing services and virtual trade shows on the US&FCS web site and at large IT trade shows.
- The Show Time program, which allows U.S. IT firms to meet with ICT Team industry specialists at domestic and international trade shows to learn about international sales and marketing opportunities for high-tech products and services, receive country and industry briefings, matchmaking services, and other networking opportunities.
- Coordinated trade promotion activities in partnership with state and local governments, trade associations, and trade show organizers.

[16]For more information on the ICT team, see http://www.usatrade.gov/US/annarbor/ICT_USA.htm, or see the Appendix for contact information.

- A website with an estimated 2,000 links relating to the information technology industry, expected to increase to 4,000-5,000 links.