The Telecommunication Markets of Asia, Africa, and the Middle East

Paul Budde
Principal Analyst
Paul Budde Communication Pty Ltd.

1. Market Overview

1.1 Asian Still Booming Despite Financial Struggles

Notwithstanding continuing economic woes in many parts, Asia continues to show strong growth throughout the region and across market segments. Mobile, Internet, and even fixed phone line services have all continued to grow, although the growth has been patchy in some areas. The strong growth recorded in 2001 is continuing in 2002, with some notable developments:

- China has become the biggest mobile market in the world, overtaking the United States early in 2001.
- South Korea continues to set the pace in broadband growth and development.
- Japan is the world leader in mobile applications.
- Asia is the fastest growing region for Internet, and, in sheer numbers, Asia is the dominant region for fixed-line subscribers.

Despite these developments, the global economic downturn and the worldwide information technology and telecommunications (IT&T) recession hit Asia hard in 2001, and the ramifications continued in 2002. The impact has been particularly evident in dramatically falling profit margins for Asian operators, which in turn has impacted share values. At the same time, a significant number of operators have continued to struggle with their heavy debt burdens carried over from the Asian economic crisis of the late 1990s. Financially stretched companies will continue to be the target of the ongoing mergers and acquisitions in 2002, as the Asian market goes through its necessary post-crisis rationalisation process. The preparedness of companies to confront the need to restructure is one reason why the region has proven resilient.

Overall resilience has not staved off a slowdown in infrastructure investment in Asia, most notably in submarine cables and satellites. By 2001, it had become obvious that there was an oversupply of capacity, especially in the regional undersea cables. After five years of heavy investing, suppliers and operators alike were reviewing their strategies, and 2002 was turning out to be a quiet year for submarine cable installation as a result.

Look out for India, however, as it appears to have finally turned the bureaucratic corner and considerable growth is expected to soon follow. In virtually all segments of the country's telecom industry, pent-up demand amongst its middle class is larger than the total telecom market of many European countries, and India will soon follow China in a period of unprecedented growth in this sector.

It should be remembered many Asian countries are still in the early stages of their IT&T development. With a strong propensity for telecommunications and information being demonstrated across the region, the growth potential in this market remains

considerable. Apart from the obvious commercial opportunities in telecommunications, other sectors, such as finance, education, and community services, are seeing strong interrelated growth as the application of information technology spreads.

Turning to technology, Western-based companies still dominate the supply lines in Asia. Most of these fail to adequately address the community-based culture and needs in Asia, generally taking an individual approach. However, companies that are capable of changing their business models to incorporate products and services that allow sharing of networks, devices, and services can expect to do very well.

Market analyst IDC also separates the region's telecommunications and IT sectors. It expects that Asia's telecommunications services market will continue to outpace its IT sector in 2002, with respective growth rates of 20.6% and 13.5% as economic recovery starts to impact some time during the second half of the year. Altogether, the region (excluding Japan) will see the telecom services market grow to US$161 billion in 2002, while the IT market will grow at a slower pace to around US$76 billion. IDC nominated China as a hot spot for IT in Asia, forecasting 25% growth to US$25.6 billion in 2002. China's IT sector will continue to grow to be worth more than US$50 billion by 2005 at a compound annual growth rate (CAGR) of 27%.

IDC also expects telecom services to maintain a CAGR of around 19% up to 2005. By then, the Asian market will be worth around US$269 billion. This will be largely driven by the proliferation of broadband and Internet protocol (IP) services in 2003 and 2004, as well as growth in wireless services, particularly as next-generation services become available.

IDC noted that the Asian telecommunications market is about the same size as the IT market. The fact that Asia's telecom market is twice the size of the IT market suggests a large latent demand for IT in the region.

1.2 Africa's Unmet Demand

Like Asia, Africa presents an enormous market, but it is still a long way from matching the levels of the industrialized world in terms of telecommunications. With huge pent-up demand—the African Telecommunications Union (ATU) estimates that there is demand to support an additional 60 million lines on the continent—Africans typically wait anywhere from two to 10 years for a telephone. However, the last few years have seen remarkable changes in many African nations, as governments begin to realize the benefits of a well-developed telecom infrastructure to overall economic growth.

Many countries are undergoing sectoral reform, and foreign investment is now being actively encouraged across the continent as privatization and liberalization are being introduced. Approximately one-third of all state telcos have already privatized, and several more are set to undergo privatization in the near future.

According to BMI-TechKnowledge, the African telecom market can expect to grow in 2002 at a similar pace as in the past couple of years, with mobile markets growing more than 35%, while fixed lines were forecast to grow by 25%. The CAGR over the period 2000–2005 was projected to be 33% for the mobile market and 25% for fixed line. Multi-national companies such as MTN, Econet Wireless, MSI, and Telkom SA have invested more than US$4 billion in Africa. The majority of this investment has been in the areas of telecommunications infrastructure and networking.

1.3 The Middle East's Slow Change Led by Israel and the UAE

Change is coming slowly to most of the Middle East, and the penetration rates of fixed lines, the Internet, and mobile telephones are low in many countries. Two countries are exceptions: Israel and the United Arab Emirates (UAE) have wireless penetration levels at, or above, Western European levels. The UAE also has European levels of Internet use. Bahrain and, to a lesser extent, Turkey are also becoming more wired. Turkey, the UAE, and Bahrain are also the Arab countries with the greatest openness to trade and social and economic liberalness.

Most countries have yet to establish a legal framework to encourage competition and have little separation between policy making, regulation, and operation. Only Jordan, Turkey, and Saudi Arabia have established independent regulators, and that of Saudi Arabia is at a very early stage. While the UAE and Bahrain are among the countries with the most developed telecommunications, they are also among those with the least competition and liberalization in their markets.

In general terms, fixed-line penetration is low throughout the region, and only Israel has fixed-line competition and penetration levels approaching those of Europe or Australia. However, the quality of the infrastructure is comparatively high, and digital lines are widespread, with many countries having 100% digitalization. Even so, Internet use is low in the region, with the usual exceptions of the UAE and Israel, and is frequently subject to restrictions and censorship. Internet cafes are popular in several countries, particularly Iran.

Competition exists in mobile communications in Israel, Jordan, Kuwait, Lebanon, Saudi Arabia, Syria, Turkey, and Yemen. Mobile telephone usage varies in the region from the high levels in Israel, which is one of the highest penetration rates in the world, and the UAE, with levels similar to those in Western Europe, to Iraq, where mobile telephony is not available at all to the general public, and Syria, Yemen, and Iran, with penetration rates of less than 3%. Turkey is one of the fastest growing mobile markets in the world.

Country	Fixed Line	Internet	Mobile
Bahrain	24.66%	19.88%	42.49%
Iran	15.50%	0.62%	2.30%
Iraq	*2.94%	N/A	N/A
Israel	47.63%	23.05%	80.82%
Jordan	12.74%	4.09%	14.39%
Kuwait	23.97%	10.15%	24.82%
Lebanon	*19.49%	*8.58%	21.25%
Oman	8.97%	4.57%	12.37%
Qatar	27.45%	6.56%	29.31%
Saudi Arabia	14.48%	1.34%	11.33%
Syria	10.88%	0.36%	1.20%
Turkey	28.52%	3.77%	30.18%
United Arab Emirates	39.69%	33.92%	71.97%
Yemen	2.21%	0.09%	0.80%

(Note: * indicates 2000)
(Source: ITU reports)

Table 1: *Fixed-Line, Internet, and Mobile Penetration*

2. Regulatory Environment

2.1 Asia's Gradual Deregulation, China, and the WTO

Deregulation of the telecom sector in Asia made difficult progress in 2001. There remains much work to be done into 2002 and beyond. While many markets have had competitive mobile carriers for years—for example, Hong Kong since 1984—full competition is a relatively new concept. Markets are being successfully opened up to competition and to foreign investment as entrenched local resistance is steadily overcome. However, the situation in Asia is characterized by the continuing significant role of the incumbents. Many governments in the region are reluctant to make the final move to cede control of their telecom assets. And, paradoxically, the era of sector liberalization has resulted in more, not less, political interference in the industry. Governments still have large stakes in incumbents (see *Table 2*), and the international portfolios of these incumbents are so complex that there is considerable potential for conflicts of interest in regional dealings.

Market	Carrier	Government Shareholding	Structure
China	China Telecom	100%	Government corporation
	China Mobile	100%*	Partially listed
	China Unicom	100%*	Partially listed
Hong Kong	PCCW	0%	Listed corporation
Japan	NTT	45%	Listed government corporation
Malaysia	Telekom Malaysia	75%	Listed government corporation
Singapore	SingTel	74%	Listed government corporation
Philippines	PLDT	0%	Listed corporation
Thailand	CAT	100%	Government department
	TOT	100%	Government department
South Korea	Korea Telecom	58.99%	Listed government corporation
Taiwan	Chunghwa	100%	Government corporation

(Source: Paul Budde Communication based on industry sources)
* Government retains 100% of voting rights.

Table 2: *Status of Incumbent Telcos in Selected Markets*

Singapore Telecom (SingTel) typifies the politicized nature of the market. After failing in its effort to buy equity in a number of operators in the region, SingTel finally succeeded in 2001 in its takeover of Australian-based Optus. Optus operates Australia's three national satellites that are used by the Australian Department of Defense for military communications. An acquisition by 74% Singapore government-owned SingTel could have meant Australia's military communications being placed under the control of a foreign government. While the deal was eventually approved, the situation is indicative of the highly political market.

All eyes are on China following the decision in November 2001 to admit the country to full membership of the World Trade Organization (WTO). The incredible growth and concentration of economic activities and population in China has created an overwhelming need for new debt and equity capital, particularly in the telecom industry. Privatization, public infrastructure, and concession-based telecommunications projects are the driving force behind many new potential project-finance transactions. China's entry into the WTO should guarantee that its telecommunications regulatory environment improves significantly. The country has specifically committed to a schedule for opening up its telecom sector to foreign investment between 2002 and 2007.

While there is no denying that much work and further reform lies ahead, there is an air of optimism about the opportunities in China. In the meantime, the United States and other countries are strengthening their representative teams in China to handle WTO–related issues.

2.2 Africa Increasingly Deregulated

Recent reforms in the telecom sector have for the first time in many years led to optimism across the whole of Africa. For while the sector remains heavily dominated by single state-run telco monopolies, an increasing number of countries in the region have moved toward deregulation. By 2000, 35 African countries had liberalized or were in the process of liberalizing their telecom sectors. Many countries, including Uganda, Ghana, and the Seychelles, have contracted second or even third fixed-line operators, although not all of these networks were immediately operational. Meanwhile, many other nations have begun the liberalization process, including Botswana, Burkina Faso, Cameroon, Egypt, Ghana, Kenya, Lesotho, Malawi, Mauritius, Morocco, Mozambique, Nigeria, South Africa, Tanzania, Uganda, and Zambia.

Highlights of developments since the mid-1990s include the following:

- During 1996–1997, 12 African countries established independent regulatory bodies, and there are now 33 African nations with independent regulatory bodies.
- Between 1996 and 1998, there were nine privatizations of African public telecom operators (PTOs), compared with only one in the five years to 1995. By early 1998, more than 20 incumbent operators in the region had some degree of private and/or foreign ownership.
- By mid-2001, there were around 100 mobile networks in operation, compared with 33 in 1995.
- Most African capitals now have more than one Internet service provider (ISP), and in 2001, there were about 575 public ISPs across the region.

2.3 Middle East Deregulation Has Long Way to Go

Liberalization and privatization are still at an early stage in most Middle Eastern countries. Only Jordan, Turkey, and Saudi Arabia have independent regulators, and while Saudi Arabia has established the Saudi Communications Commission (SCC), it is “still at an early stage,” although work is “in progress to develop it into an effective operating organization.”

The incumbent fixed-line operator has been transformed into a corporate entity, more or less independent from the relevant government department, in several countries. Bahrain, Iran, Israel, Jordan, Oman, Qatar, Saudi Arabia, and Yemen fall into this category. Qatar has privatized a 45% share of its incumbent fixed-line operator, Bahrain a 60% share, Jordan a 40% share, and UAE a 40% share. Israel is the only country to have introduced competition into fixed lines. Two of the fixed-line operators are independently owned, and 45% of incumbent Bezeq has been privatized with a further share in process.

Most countries have competition in mobile telephones: Israel, Jordan, Kuwait, Lebanon, Saudi Arabia, Syria, Turkey, and Yemen.

3. Infrastructure

3.1 Asia's Foreign Investment and Fiber Cabling

The latent demand for fixed-line services provided the impetus for the Asian telecom sector during what was a difficult period immediately following the Asian financial meltdown in the late 1990s. Growth in fixed telephone lines during this period slowed only slightly and remained at 10%, which was twice the world average. Telcos in some of Asia's developing economies (China, India, Indonesia, Malaysia, the Philippines, Thailand, and Vietnam) serviced 90% of total demand for telephones lines (150 million), an indicator of Asia's appetite for telecommunications.

At the same time, however, revenues from the fixed-line market have not been so robust. After suffering a decline of 4.5% in 2001, fixed-line service revenues are expected to increase marginally to US$112 billion in 2002, up 1.8% from 2001. In May 2002, market researcher Gartner Dataquest forecast that the total market for fixed-line services in Asia would be worth US$137 billion by 2006, with modest rates of growth expected up until then.

India is expected to see double-digit growth in the next few years, with its telecom services market reaching US$14 billion in 2006, up 14% from 2001. The more developed markets—Japan, Korea, Hong Kong, and Singapore—will experience slowing growth rates. Japan, which accounted for 44% of the market in 2001, will experience a CAGR of just 1.4% from 2001 through 2006. By 2006, Japan's revenue from fixed-line services is expected to total US$50 billion.

At the regional level, Asian operators have been rewriting their business plans as a consequence of changing telecom markets throughout the world. The projected demand for telecommunications services in Asia that indicated a need for investments in new infrastructure totaling at least US$1 trillion over the current decade remains in place. Just how the strategy for this level of investment will play out is the big question.

Country	Year That Mobile Passed Fixed	Subscribers (millions)		Penetration	
		Mobile	Fixed	Mobile	Fixed
South Korea	1999	29.1	22.7	61%	47%
Hong Kong SAR	1999	5.7	3.9	79%	58%
Taiwan	2000	21.6	12.8	97%	57%
Singapore	2000	2.8	1.9	66%	47%
Philippines	2000	10.6	3.1	13%	4%
Malaysia	2001	7.6	4.7	31%	19%
Japan	2001	67.1	53.6	53%	42%
Thailand	2001	7.9	7.7	13%	12%

(Source: Paul Budde Communication, Asia Telecommunications Reports 2002/2003)

Table 3: *Fixed and Mobile Phone Subscribers (selected countries)*

Even before the Asian economic crisis of the late 1990s, it was recognized by governments in Asia that, firstly, they needed to encourage private sector investment to help meet the shortfall in investment capital and, secondly, that this strategy would inevitably mean a substantial level of foreign investment. The involvement by the private sector is now even more vital in 2002, as those operators in Asia that were saddled with massive foreign debt as a result of the economic crisis probably have

their last chance to restructure and refinance. In many instances, taking on a foreign partner is looming as the best available option, subject of course to the local regulatory regime.

It is clear that optical fiber submarine cabling will continue to be the focus for much of the international telecom infrastructure development in the region. This focus is needed to support intra-regional connectivity, given the very geography of the region. But it is also necessary to meet the predicted huge future demand for bandwidth between Asia and the rest of the world. Asia receives about one third of the worldwide investment in submarine cabling.

A general perception of an oversupply of bandwidth capacity on Asia-Pacific routes leading into 2002 has been causing some confusion in the market. It is well recognized that investment in submarine cables is no longer bringing the returns achieved in the past. As a consequence, companies have been finding it increasingly difficult to raise capital for undersea cable ventures. A closer look at the existing infrastructure reveals that the over-provision of submarine capacity in the region has been in the intra-regional networks, rather than in the large regional and trans-Pacific cables. In fact, the pressure to lay new trans-Pacific cables is expected to mount during 2002 and beyond.

Although infrastructure development has generally slowed, demand for wholesale services has continued to rise, driven in the short term by voice services but in the longer term by data services and the Internet. Planned fiber network buildouts in the region should boost bandwidth twenty-fold. By 2005, it is expected that close to 90% of all new connections will be made through optical fiber to the home (FTTH) or curb (FTTC). By the middle of this decade it is forecast that Asia will lead the FTTH market, as the operators of legacy networks in other parts of the world will try to protect their vested interests in copper-based networks.

3.2 Africa Already Digitalized

While fiber-optic cabling is regarded as the future of infrastructure and used for international networks, a growing number of African countries already have sophisticated national networks with 100% digital main lines. Surprisingly, the proportion of digital lines on the continent in 2000 was close to 94%. Many African countries have already made modernization and expansion of their infrastructures a priority. The introduction of foreign strategic investors through privatization of national fixed-line operators has created ambitious network expansion targets. In some cases, development plans call for growth rates of more than 20% per year.

At the other end of the scale, large parts of the network in countries such as Camoros, Liberia, and Zimbabwe are old analog systems with poor national links between urban centers. This disparity between countries is one reason for Africa's immature Internet market and nonexistent broadband landscape. With such a large land mass, fixed networks across Africa are not economically attractive. However, at least five satellite operators are extending their footprint over Africa, and the WASC/SAT3/SAFE submarine cable should link SA to Europe and the Far East by the first quarter of 2003. It will provide transmission capacity of 80 Gbps.

3.3 The Middle East Also Highly Digitalized

A feature of the region is the high state of technical development. All countries except Iraq, Iran, and Turkey have 100% digitalization of the network or very near it—a much higher rates than for Eastern Europe, for example. However, teledensity levels are comparatively low. Only Israel and the UAE approach European levels of teledensity, and Iraq and Yemen have levels amongst the lowest in the world. In

contrast, only Cambodia, Bangladesh, and Myanmar have a lower teledensity in Asia. In most countries, the fixed-line teledensity is growing slowly or not at all. Rural services tend to be very poor. Iraq's telecommunications are particularly bad, caused by a combination of the devastation resulting from the Gulf War of 1991, the United Nations (UN) sanctions prohibiting the import of telecommunications equipment, and the restrictions imposed by Iraq's government.

All countries are dominated by the incumbent fixed-line operator, which is, in all cases but Israel, still a monopoly operator. In addition, there has been very little foreign investment in the region, and no foreign telco or investment company owns a majority share in any Middle Eastern fixed-line operator. Foreign investment in some countries is still prohibited by law. Elsewhere, Cable & Wireless owns a 20% share of Bahrain's Batelco, and France Telecom owns an 88% share of the joint venture that owns a 40% stake in Jordan Telecom and is also responsible for management and operations. Private investors own the non-government shares of Qatar's Q-Tel and the UAE's Etisalat. In Israel, Sprint (25%), Deutsche Telekom, and France Telecom (10.5% each) own shares of alternative fixed-line operator Baraq, while Telecom Italia owns a share of Golden Lines. The non-government owned shares of Bereq are once again owned by local investors. In all other countries, the fixed-line operator is 100% government-owned.

Many countries have invested in satellites and submarine cables for international connections. Batelco is a joint owner of the Fibre Optic Gulf (FOG) submarine cable together with Etisalat of the UAE, the Kuwaiti Communication Ministry, and Qatar's Q-Tel. FOG provides connectivity at high bandwidths to other global cable systems such as Fibre Link Around the Globe (FLAG) and SE-ME-WE 3. All three of Israel's international fixed-line operators have invested in the MedNautilus submarine optical fiber cable. And Saudi Arabia is home to the Arab Satellite Communications Organization (Arabsat), which carries traffic around the region and North Africa.

4. Internet

4.1 Asia Well Advanced

Building on the substantial progress made in satisfying its huge appetite for the Internet in 2000/2001, Asia began 2002 not far behind North America and Europe in terms of total number of Internet users. More generally, the market for data services, including the Internet and public IP services, is growing strongly. It already accounts for 24% of the total market and is expected to increase to 35.6% by 2006. Total data revenue is forecast to reach US$49 billion in 2006. Despite this strong growth in data, the profit margin remains very low, and operators need to work through a rebalancing process.

Internet growth continues to be led by the developed economies of the region: Japan, Hong Kong, South Korea, Singapore, and Taiwan. The total number of Internet users in Asia is forecast to reach more than 250 million by end-2003, up from 155 million in February 2002. The forecast annual growth rate for China is 63% and for India 44%. By 2005, China should become the largest Internet-using nation in Asia. India should have 21.3 million subscribers by then, making it the fourth-largest Internet market in this region after China, Japan, and South Korea.

In many of the region's developing economies, Internet penetration is still low due to the high cost of access, poor telecom infrastructure, and the slow rate of deregulation. At the same time, there is almost universal recognition of promising economic and social benefits of the Internet, and this will certainly push the market forward on a broad front.

Country	Users (millions)	Penetration Rate
South Korea	26.1	55%
Singapore	1.9	51%
Hong Kong SAR	3.1	46%
Japan	57.9	46%
Taiwan	10.0	45%
Malaysia	5.7	24%
Thailand	3.5	6%
China	42.5	3%

(Source: Paul Budde Communication, Asia Telecommunications Reports 2002/2003)

Table 4: *Top Asian Countries Ranked by Internet Penetration*

According to market analyst NetValue, Asian markets are among the fastest growing in the world in terms of number of households connected to the Internet. By early 2002, there were an estimated 110 million people in Asia who access the Internet from home. The number is growing at about 25% per year. In terms of which country's Internet users seem most interested in buying goods and services over the Internet, NetValue reported that Korea had the highest proportion of visitors to e-commerce Web sites.

In terms of revenue generated from the Internet, Asia has yet to build momentum and is not expected to get close to the United States until at least 2005, by which time the Asian Internet access market is forecast to be worth US$17.2 billion, whereas the United States would still have a distinct lead with US$21.2 billion. Market analyst eMarketer expects that the region's business-to-business (B2B) e-commerce sector will grow at a CAGR of 109% in the period up to 2005. As the region increasingly adopts broadband, Internet-based revenues and e-commerce are expected to surge.

4.2 Africa Needs Infrastructure and Bandwidth

Like other developing regions around the world, Africa's data traffic is growing considerably, up 300% in South Africa during the last year alone. However, most nations lack sufficient international bandwidth to reliably deliver Internet content in any real volume. This is despite many nations' deployments of digital infrastructure.

According to Pyramid Research, Africa's international bandwidth is set to rise tenfold to more than 6 Gbps over the five years to 2006, possibly leading to a bandwidth glut. This huge growth is mostly driven by demand for data services, an explosion in North African traffic, and the deployment of the SAT-3 and Africa One submarine fiber-optic cabling projects. These networks will be active by 2002–2003 and can save the continent almost US$300 million in call charges, as most calls between African countries are currently routed via Europe and the United States. In markets such as Algeria and Nigeria, international backbone traffic is forecast to double annually over the five years.

Turning to the Internet, access has greatly improved since the mid-1990s. The private sector, lower communication costs, and digital infrastructure have increased Internet connectivity from just 11 countries in 1996 to all 54 countries and territories having permanent connectivity in 2001. The first local full-service dial-up ISP connection was established in South Africa in 1991, and almost all capital cities in Africa now have more than one ISP. By mid-2001 there were nearly 600 public ISPs across the region, excluding South Africa, where the market has consolidated into

four major players with 90% market-share. Africa's largest ISP, Africa Online, is operating in nine countries, with plans to have a presence in 18 African countries by end-2002.

The private sector has also led to various forms of public Internet access becoming increasingly available across the continent. These include kiosks, cyber cafes, and other types of public Internet access, such as adding PCs to community phone-shops, schools, police stations, and clinics, where the cost of equipment and access can be shared between a larger number of users.

The rapid growth of Internet access has been mostly confined to the capital cities, with a growing number of countries establishing points of presence (PoPs) in some secondary towns. Standing in the way of rapid Internet growth is the lack of telecommunication infrastructure. Rural areas, where up to 80% of the population lives, are largely uncovered by telephone services. Great variations exist between regions and countries, and other key barriers to growth include the high cost and lack of leased lines, insufficient skilled labor, low computer penetration, unreliable electrical services, high illiteracy rates, and limited awareness. A major inhibiting factor is the high price of personal computers and Internet connection.

With these impediments, Internet use in Africa remains comparatively miniscule. User numbers have grown from less than 500,000 in 1995 to around 5 million in mid-2001, though growth is slower than world averages and is less than half the growth rate of mobile services on the continent. In early 2001, overall Internet penetration stood at just 0.5%, and in Sub-Saharan Africa, penetration was only 0.2%. This compares with more than 50% penetration in developed countries.

4.3 The Middle East's Governmental Influence

Not unlike Africa, the Middle East suffers from a lack of infrastructure and a bandwidth shortage across the region. A report from the Arab Advisers Group, published in early 2001, stated that the combined bandwidth of Egypt, Saudi Arabia, Lebanon, Jordan, Morocco, Oman, Syria, and the UAE was only 777 Mbps, equivalent only to the combined bandwidth of 518 U.S. cable-modem subscribers. There is a lack of peering arrangements with international backbone operators leading to high bandwidth costs, and low levels of competition in the industry have kept prices high. In addition, the conservative and negative attitudes of many governments have led to restrictions, censorship, and a general lack of on-line Arabic content.

Some nations are well ahead of others. Data communications have been liberalized in Kuwait and Lebanon, for example, while in Jordan, 23 companies had data communications licenses at end-2001, offering services on the Jordan Telecom network. While integrated services digital network (ISDN) is available in most countries, only Israel and the UAE have large numbers of subscribers. ISDN is also available in Bahrain, Jordan, Qatar, Syria, Turkey, and Yemen and was introduced during 2001 in Oman.

A digital divide for Internet use in the Middle East is also clear. With the exception of the UAE and, to a lesser extent Israel, Internet use in the Middle East is very low. While the UAE and Israel are among the richer countries of the region, wealth and gross domestic product (GDP) are not the only determining factors in levels of Internet use. Government support, or lack of it, is a major factor. The UAE's West European levels of Internet penetration is partly due to the many expatriates in the population, but much more due to the government's support, illustrated by the flourishing Dubai Internet City, a high-tech free trade zone.

In contrast, Saudi Arabia has an Internet penetration rate of less than 2%, despite its oil wealth. Internet connections have only been publicly available since 1999, and the government has banned a total of 400,000 Web sites since then. Similarly, in Iraq, Internet use remains restricted to government establishments. The only exceptions are four government-run Internet centers that opened in mid-2000, giving the public Internet access but at high prices.

With home access so costly, Internet cafes have become popular in several countries because they allow high access costs to be distributed among multiple users. They are particularly widespread in Iran, where there are more than 1,500 in Tehran and many more in other large metropolitan areas. The cafes have been widely used to make low-cost overseas phone calls via voice over Internet protocol (VoIP) services, resulting in falls in Iranian incumbent operator TCI's international long-distance revenue during 2001.

5. Broadband

5.1 Asia's Broadband Brilliance

While Asia's attraction to the Internet continued unabated in 2002, more significantly, Asia has started to eagerly embrace broadband as a means of efficiently delivering such next-generation Internet services as interactive television and streaming media. South Korea, with 8.5 million broadband subscribers by April 2002, had more broadband Internet subscribers than the United States, a country with five times its population. One forecast for broadband subscriber growth in Asia expects to see the market expand to about 35 million by 2003, up from less than 500,000 in 1999. Also, in January 2002, the Intermarket Group forecast that 79 million people in Asia would subscribe to wireless access to Internet by 2005, up from 30 million in 2000.

So far, however, broadband has only managed to make an impact in the region's developed economies. Everywhere else in the region, dial-up narrowband access predominates, at best achieving 56 Kbps. The potential of broadband as the premier Internet delivery technology is still being held in check by its high cost. Though in countries with strong broadband demand such as South Korea, the issue is not so much cost as the shortage of suitable local language content.

Market	2001 (million)	2002 (million)	2004 (million)
Korea	8.3	9.4	13.2
Japan	2.5	5.8	3.4
Taiwan	1.0	1.8	3.4
Total	**12.3**	**17.0**	**20.0**

(Source: Paul Budde Communication, Asia Telecommunications Reports 2002/2003)

Table 5: *Broadband Subscriber Forecasts in Asia's Leading Markets: 2001, 2002, 2004*

Hong Kong, one of the world's most advanced countries in terms of sophisticated telecom infrastructure, surprisingly has experienced relatively slow growth in broadband Internet. By early 2002, only about 15% of Internet subscribers had broadband access.

In Singapore, broadband Internet has finally taken off, utilizing the remarkable infrastructure, which sees almost 100% of the island's homes and businesses

passed by broadband infrastructure. The number of broadband subscribers in Singapore is expected to reach 1.3 million by 2005, a significantly high broadband penetration for a country of 4.1 million people.

China had an estimated 175,000 broadband subscribers at end-2000 and 880,000 narrowband subscribers. Although 2001 was expected to be China's "broadband year," the sector has yet to show signs of maturity. The average subscriber take-up rate in the country's broadband zones was less than 5% at end-2001, with content remaining a major stumbling block to rising subscription levels.

Taiwan aims to be on a par with the United States in terms of broadband access by 2010. The government is aiming for three million broadband users by end-2003. By December 2000, there were around 100,000 broadband subscribers, representing an estimated penetration rate of only 3% of all Internet connections. However, asymmetric digital subscriber line (ADSL) has shown positive signs of taking off. The total broadband subscriber base had passed the one million mark in early 2002.

Broadband has finally started to take off in Japan. The year 2001 saw a remarkable burst of growth, with ADSL subscribers rising from just 10,000 at end-2000 to 1.53 million in December 2001 and 1.3 million cable subscribers. The government's e-Japan Priority Policy Program has set the goal of having five million broadband subscriptions by end-2002 and 30 million broadband households by 2005. At the end of 2001, just 8% of Japanese households could connect to the Internet via broadband. If the target is achieved, this figure will reach 66% by 2005.

5.2 Middle East Broadband Just Starting

While Asia's broadband landscape is the envy of the world, Africa has none, and it is only just beginning in the Middle East. Total digital subscriber line (DSL) numbers, as published by Point Topic Ltd., were only 47,900 for the Middle East region at end-2001, higher than for Eastern Europe but lower than the 5 million in North America, more than 5 million in Western Europe, and more than 400,000 in South America. ADSL services are available in Israel (since December 2000), Kuwait, Saudi Arabia (since November 2001), Turkey, and the UAE (since mid-2000) and are under development in Oman. Israel's three cable-television companies have invested large sums in infrastructure to prepare themselves to provide broadband Internet access. They received licenses to provide Internet connections in March 2002.

Broadband is hoped to stimulate e-commerce activity, but with the low rates of Internet penetration in most countries and particularly low rates of home usage, consumer e-services of all types have yet to develop. The exception is Internet banking, which is available in several countries but with low usage rates. Israel, and particularly the UAE, lead the region's e-commerce activity.

In Israel, with the region's second highest Internet penetration, business-to-consumer (B2C) e-commerce sales reached US$60 million at end-2000. On-line shoppers represented 6% of the population and 16% of Internet users. By mid-2000, there were 310,000 bank customers using on-line banking and around 8,000 companies using electronic on-line payment systems.

The UAE is paving the way for other Middle East countries to undertake e-commerce initiatives. It is marketing itself as the ideal location for foreign and domestic companies to undertake e-commerce ventures, including B2B, B2C, government-to-business, and government-to-consumer. The Dubai government established a central e-government office in October 2001 at Dubai Internet City and launched a government portal offering business and personal services including bill paying,

queries, license renewals, and company registration via the Internet. However, development is being hindered by the lack of competition in Internet service provision.

Oman is planning something similar to the Dubai Internet City with a long-term e-government program called Digital Oman to facilitate on-line payment of bills, downloading and submission of applications and forms, and other routine services. Meanwhile, in Qatar, a B2B marketplace—C1QT Ltd.—was launched in April 2001 as a joint project by C1ME Ltd., the incumbent telco Q-Tel, The International Investor (TII), and private investors.

6. Mobile

6.1 Asia Miles Ahead

Just as it leads in other areas, Asia's mobile industry remains one of the fastest-growing and largest markets in the world. The region had more than 330 million mobile phones by end-2001, annual revenues of more than US$130 billion (compared with US$10 million in 1994), with expected revenues nearing US$170 billion in 2003. Investment in mobile infrastructure during 1999–2004 is forecast to be around US$300 billion to US$600 billion. According to the ITU, the Asia-Pacific is poised to become the world's mobile powerhouse, with more than 50% of the world's mobile phone users by 2010. It had a 35% share in 2000. Asia is also home to the two largest mobile companies in the world: China Mobile and Japan's NTT DoCoMo. In mid-2001, China overtook the United States to become the biggest market in the world.

Country	Subscribers (millions)	Penetration	Annual Growth
China	145	11%	62%
Japan	67	53%	16%
South Korea	29	61%	9%
Taiwan	21	97%	21%
Philippines	10	13%	68%

(Source: Paul Budde Communication, Asia Telecommunications Reports 2002/2003)

Table 6: *Top Five Asian Mobile Markets Ranked by Number of Subscribers*

Looking back on Asia's 1997–1998 economic crisis, the mobile market handled the aftermath of that crisis exceptionally well. The region experienced annual growth rates of 50% in both 1999 and 2000, falling to around 37% in 2001, still well ahead of the United States and Europe. Indonesia, a country seriously affected by the economic crisis, saw its mobile market grow by only 16% in 199, but soar by more than 100% in 1999, then by more than 62% in 2000 and 74% in 2001.

Growth in mobile has been influenced by different drivers across the region. In markets such as Indonesia and the Philippines, growth has been mainly driven by prepaid services, with this trend continuing strongly into 2002. In Japan and Korea, new Internet services have been the catalyst for mobile growth, whereas in Singapore and China, increased competition has been the prime mover.

This growth has led to mobile phones outstripping fixed-line subscribers across the region. In 1993, Cambodia was the first country in the world to boast more mobile than fixed subscribers, and there are now more mobile than fixed-line subscribers in a number of other Asian countries, including Bangladesh, Malaysia, Japan, Mongolia,

the Philippines, Singapore, South Korea, Hong Kong SAR, Taiwan, and Thailand, with several more very close to crossing the line.

Operator	Country	Subscribers
China Mobile	China	105,000,000
NTT DoCoMo	Japan	39,600,000
KDDI Group	Japan	15,800,000
China Unicom	China	13,000,000
SK Telecom	South Korea	11,900,000

(Source: Paul Budde Communication, Asia Telecommunications Reports 2002/2003)

Table 7: *Top Five Asian Mobile Operators by Number of Subscribers*

While analysts' views on the size and nature of the growth in the Asian mobile market differ, there is general consensus on the market's direction. With anticipated total investment in the range of US$300 billion to US$600 billion in the five years up to 2005, Asia is expected to account for 40% of the global wireless infrastructure spending over that period. Analyst EMC forecasts that there will be 518 million mobile subscribers in Asia by 2004 and that Asia will have taken over from Europe as the world's largest mobile market by that time. It is expected that there will be more than 30 mobile services per 100 people by then. Analysts see Thailand and the Philippines as particularly ripe opportunities for wireless equipment vendors in the 2002-to-2004 period.

Wireless technology holds much promise for promoting communication access in the region. The rollout of 3G mobile services in the world began in Asia when Japan's NTT DoCoMo launched its FOMA service in 2001. Korea is also set to embrace 3G. Outside of Japan and South Korea, however, operators and governments alike are approaching 3G very cautiously. There is a feeling that user acceptance level is likely to be relatively low due to limited handset availability, the high price of 3G handsets, limited content and applications, and the initial performance of 3G–related services failing to meet expectations.

Despite the market's caution in its approach to 3G, analyst IDC has forecast 142 million wireless Internet users in the region (excluding Japan) by 2004. A number of analysts have predicted that mobile Internet access will become more important in the Asia region than fixed-line Internet, setting it apart from the rest of the world.

6.2 Africa's Mobile Overtakes Fixed Networks

In contrast to Asia's relative wealth, Africa may be the world's poorest continent, but the African mobile market is growing in leaps and bounds. New local companies and foreign multinationals have been scrambling to tap the pent-up demand for cheaper and more efficient communication technologies. In addition to new mobile networks, Global System for Mobile Communications (GSM) community phone shops are opening in even the most remote areas. In South Africa alone, these shops are generating more than 35 million phone calls a month. Despite this, and the resulting steady decline in tariffs, owning a mobile phone remains a luxury afforded by few in Africa.

African networks are growing at the extraordinary rate of twice the international average. This is primarily due to the small number and high cost of fixed-line connections and the liberalization of the mobile phone market. In 1993, there were only a handful of African countries with a cellular system. In the 18 months to June 2001, about 36 operators launched new mobile services bringing the total to around

100 networks in 48 countries across the continent and leaving only six countries without access to mobile phone services. As of 2001, 56% of African countries allow competition in the mobile networks, compared with 7% in 1995.

In late-2001, prepaid services in Africa accounted for 90% of all mobile users, excluding South Africa where the figure was around 75%. Prepaid services have fueled growth in cellular subscribers to now outnumber fixed-line subscribers in a growing number of African nations. These include some of the continent's strongest economies: Botswana, Cote d'Ivoire, Morocco, South Africa, Tanzania, and Uganda. The trend toward fixed-line substitution started in Uganda in July 1999 and has continued in other countries through 2001.

Country	Subscribers	Penetration
South Africa	9,805,000	22.58%
Morocco	4,001,000	13.28%
Egypt	3,001,000	4.39%
Cote d'Ivoire	591,000	3.70%
Zimbabwe	361,000	2.89%
Reunion	357,400	49.54%
Senegal	350,000	3.50%
Tunisia	303,500	3.16%
Kenya	300,000	0.99%
Uganda	270,000	1.16%

(Source: Paul Budde Communication, Telecommunications in Africa Report 2002/2003)

Table 8: *Top 10 African Mobile Markets*

With such rapid growth across the continent, some major operators are worth noting. Chief among them are Econoet Wireless International (EWI), MIC Africa, Mobile Telephone Networks (MTN), MSI Cellular, Orascom, and Vodacom.

EWI now has operations in Botswana, Lesotho, Morocco, Nigeria, South Africa, and Zimbabwe. In addition, it runs Econet Satellite Services in the UK, as well as ISP Ecoweb Malta, and is preparing to establish mobile networks in Lesotho and New Zealand.

MIC Africa has cellular operations in Ghana, Senegal, and Tanzania and licenses in Sierra Leone and the Democratic Republic of Congo, with a population under license of more than 115 million.

Besides its cellular operations in South Africa, MTN provides both mobile and fixed-line telecom services in Uganda, Swaziland, Rwanda, Cameroon, and Nigeria. Investments outside South Africa are held through Mobile Telephone Networks Africa (MTN Africa) and Mobile Telephone Networks International (MTN International).

Netherlands-based MSI Cellular (MSI) has operational networks in Egypt, Uganda, Zambia, Malawi, Congo Brazzaville, Gabon, Sierra Leone, Chad, Congo Kinshasa and Burkina Faso and has acquired a controlling stake in the cellular operator in Sudan. It also has networks under construction in Guinea, and Niger. The company is also a strategic investor in the Tanzania Telecommunications Company.

Orascom Telecom is the largest telecommunications player in the Middle East and Africa. Countries served during 2001 include Benin, Burkino Faso, Burundi, Central African Republic, Chad, Congo, Egypt, Gabon, Cote d'Ivoire, Jordan, Niger,

Pakistan, Syria, Togo, Uganda, Yemen, Zambia, and Zimbabwe. The company also won Algeria's second GSM license in July 2001. Orascom owns 80% of South Africa–based Telecel International.

The largest GSM network operator in South Africa, Vodacom, also operates a GSM network in Lesotho and has a controlling stake in Vodacom Tanzania.

6.3 Middle East Very Divided

The contrast in developments between the different countries of the Middle East is even starker than it is in the areas of fixed lines and the Internet. Israel has one of the highest penetration rates in the world, at more than 80% according to the ITU at end-2001, and the rate in the UAE, at more than 70%, is similar to that of Denmark, Belgium, or the Netherlands. The rates in Bahrain (42.5%) and Turkey (30%) are similar to those of some of the more developed countries of Eastern Europe. Turkey was one of the fastest growing markets in the world to mid-2001, according to Global Mobile, ranking eighth in terms of net adds and eleventh in percentage growth. In contrast, mobile telephones are not available to the general public at all in Iraq, and in Syria, Iran, and Yemen, the penetration rates are less than 3%.

As is the case in most developing countries, wireless communications is the area that has been most open to privatization, liberalization, and foreign investment. Most Middle Eastern countries have introduced competition in the market, but Bahrain, Iran, Oman, Qatar, and the UAE have yet to do so—not that it seems to have hindered growth in the UAE or Bahrain. In all these five countries, the wireless operator is also the monopoly fixed-line operator.

One of the larger investors from outside the region is Orascom Telecom of Egypt, which has stakes in operators in Jordan, Syria, and Yemen. In Israel, Hutchison Whampoa has a 35% share of Partner; Shamrock Holdings of the United States has a 50% share of Pelephone; BellSouth International (34.75%) and Safra Group of Brazil (34.75%) have shares in Cellcom; and Motorola has a share of the fourth operator, MIRS. In Jordan, MobileCom is a subsidiary of Jordan Telecom, which itself has France Telecom as a major shareholder, manager, and operator. France Telecom also has share in Syria's second operator and has a 67% share of Lebanese operator FTML. Lebanon's other operator, LibanCell, is partly owned (14%) by Finland's Sonera, which also has 37.3% share of Turkish operator Turkcell. Telecom Italia has a major share of another of Turkey's four operators, Aria.

Seven of the countries have started trials of general packet radio service (GPRS) or are already providing commercial services. Wireless application protocol (WAP) services were available in nine countries as at mid-2001. Israel completed a tender for three 3G licenses in December 2001. The licenses went to the three largest incumbent mobile operators.

Mobile satellite operator Thuraya Satellite Telecommunications Co. is based in the UAE. It is backed by Etisalat (the largest shareholder, with a 34.525% share), Abu Dhabi Investment Co., Arab Satellite Communications Organization (with 21 member countries), Bahrain Telecommunications (Batelco), Qatar Telecommunications (Q-Tel), and Kuwait's Mobile Telecommunication Co. Launched in October 2000, Thuraya-1 has a 12-year lifespan, the capacity for 13,750 simultaneous calls and an initial capacity for 1.8 million subscribers. Dual-mode terminals extend the reach of mobile users, enabling free roaming between urban areas served by GSM providers and outlying areas that can only be accessed using advanced satellite technology. Thuraya provides services across the Middle East, North and Central Africa, Europe, and parts of Asia.

7. Broadcasting

7.1 Asian Affected by Global Advertising Downturn

The Asian mobile market remained resilient in the face of the region's financial woes, but the same could not be said about the region's broadcasting sector. In addition, the global economic downturn impacted growth rates in the Asian market during 2001. Operators had to contend with a drop in advertising revenues amid ongoing currency weakness and declining consumer demand in the region. While this is the overall trend across the region, there have been some exceptions, notably China, India, and Korea, where distributors and platform providers have experienced growth markets.

Even with these problems, the region continues to have the highest rate of television penetration in the world. The entire Asia-Pacific region is expected to exceed 660 million television households by 2010, of which 45% will subscribe to cable, 9% to digital direct-to-home (DTH) packages, and 23% will receive digital terrestrial transmission (DTT) signals. About one-third of television households will be taking only analog terrestrial signals by then. With the expected national adoption of DTT by China, the country could have around 59 million DTT homes by 2010.

Asia supports terrestrial television services, as well as cable services, and a flourishing (and sometimes illegal) satellite DTH industry. Interest in the Internet means that many cable operators are increasingly upgrading to offer television, telephony, and Internet services.

Between 1996 and 2000, the cable and satellite sectors in Asia saw vigorous growth. By 2000, the entire region boasted around 470 million households connected to cable and satellite television networks, more than those in either the United States or Europe. By end-2001, as growth slowed, the number of connected households had risen to 480 million.

7.2 African Skies Suited to Satellite

The liberalization of broadcasting regulations and the increasing penetration of low cost DTH technology have led to significant growth in Africa's television market. While the vast geography of Africa and the sparse communications infrastructure make a perfect combination for satellite-delivered telephony, there is also an emerging market for audio and video broadcasting services. The broadcast potential is attracting commercial ventures with expertise in DTH and other satellite broadcast technologies. In Africa, where the overall cable penetration rate is very low, DTH service provides an efficient means of delivering television broadcasts to the expanding middle class. Huge growth is expected in this market in the coming years, particularly in South Africa where the MIH group dominates the market.

The television industry in Africa is largely free-to-air. Most television stations are state-owned and do not depend on advertising revenue. There is also a growing number of private television stations, most of which are owned by large foreign multinational corporations. Established in Nairobi in 1990, Kenya Television Network (KTN) was the first non-pay privately African-owned television station on the continent. The African Union's largest free-to-air TV network is TVAfrica. The other large broadcaster is M-Net in South Africa. Most of the local state broadcasters are affiliated with large media outlets, including CNN, M-Net, and TVAfrica.

Pay-TV services have been available in South Africa since the early 1990s, when Electronic Media Network Ltd (M-Net) won the rights for the tender to become the only competitive television service to the public broadcaster South African

Broadcasting Corporation (SABC). Its encrypted terrestrial channel was the first true multichannel television package offered in Africa. M-Net is now Africa's premier pay-TV service, with 1.25 million subscribers in 49 countries across the continent as of mid-2001.

7.3 The Middle East's Government Control and Pay TV

As might be expected, broadcasting in some Middle Eastern countries is highly controlled. Several countries ban home satellite television receivers, but the bans are not always strictly enforced. Most countries have their own national broadcaster, but the Arab region has several competing pay-TV stations, including digital TV, which have regional audiences.

Pay-TV stations in the region include LBC and Future TV, based in Lebanon, and Saudi-owned MBC, based in London. There are also four competing digital TV platforms: ART, Orbit, Star Select, and Gulf DTH/Showtime. Orbit is backed by the Saudi Al Mawared Group, and ART is funded by two billionaire Saudis. Gulf DTH is a joint venture between Viacom and Kuwait Projects Company (KIPCO). During 2001, Showtime started offering interactive television services under the brand name SmartTV, supported by OpenTV's EN2 technology.

The Qatar-based Al Jazeera Satellite Channel commenced broadcasting in 1996. The broadcaster is the first 24-hour satellite news network in the Arab world and also the first independent and uncensored Arab news organization. It broadcasts sports, news, cultural programs, and lively talk shows on sensitive political, social, and even sexual issues, as well as government corruption and Islamic fundamentalism. Al Jazeera has more than 50 correspondents in 31 countries worldwide. It is financed by an annual government subsidy of US$30 million sanctioned by the emir of Qatar.

In Israel, there are three national free-to-air channels, three cable-television operators (Tevel Digital, Golden Channels, and Matav Digital), and one satellite television broadcaster (YES TV). The three cable-television companies have invested large sums in infrastructure to prepare themselves for the provision of advanced digital television services as well as broadband Internet access. Tevel and Matav also "rebranded" themselves, adding "digital" to their names. In early 2001, the Israeli Cables and Satellite Broadcasting Council, after a long regulatory debate and process, authorized the three cable-television operators to operate partial digital broadcasts. They also received licenses to provide broadband Internet services in March 2002.

In Turkey, an ordinance, issued by regulator RTUK in 2001, effectively lays down the terms and conditions for operating digital DTH services for new and existing providers of satellite-delivered channels. There are three digital broadcasters operating: Cine Digital+, DigiTurk, and Star Digital.

See also:

- *Telecommunications and Information Highways in Africa* (http://www.budde.com.au/africa.html)
- *2003 Middle East Telecommunications and Information Highways* (http://www.budde.com.au/midEast.html)
- *2003 Information Highways and Telecommunications in Asia* (http://www.budde.com.au/asia.html)