

Thailand Telecom Brief

By Ken Zita



Thailand has ambitions to challenge its Southeast Asian neighbors as a regional Internet and new media services hub. The economy rebounded strongly from the Asian financial crisis and the resulting consumer affluence is driving fast expansion of mobile services. The mobile penetration rate leapt spectacularly to about 42.5 percent in 2004, up from only 6 percent in 2000 and forms the basis for a range of new data and content services likely to spur innovation in the years to come. Network operators are posting record financial performance even as retail prices for services continue to fall. The government is meanwhile forging ahead with a new high-profile tsunami warning system and ambitious e-government initiatives.

Political and Economic Brief 2

Economy 3

Telecom Policy Environment 4

ICT Promotion 8

Telecom Market Environment 11

Mobile Market 12

Other Technologies 15

Internet 15

Despite justly deserved optimism, Thailand faces a number of keen challenges. It has one of the most complex markets environments in the world, characterized by a maze of interlocking investment structures, lease-based infrastructure concessions and government intervention in the commercial marketplace. To circumvent a constitutional mandate requiring state ownership of “strategic” sectors such as telecom, Thailand introduced build-transfer-operate arrangements, or concessions, in the early 1990s with the two licensed monopolies, TOT and CAT. The concessions were negotiated at different times and with different terms, and some companies enjoy considerable advantages over their competitors. Thailand’s commitments to the WTO and to a bilateral trade agreement with the U.S. require that the concessions be converted to equity joint ventures by 2006. The politically charged process could receive a boost from the new National Telecommunications Commission, but it is not yet clear whether the new agency has the political gravitas to arbitrate among powerful vested interests.

The communications market continues to be influenced by externalities. In early 2005 a contract between TOT and Siemens was cancelled in favor of an electronic auction designed to achieve a lower price, a direct preference of the Prime Minister. The telecom sector in Thailand is undergoing great change and issues of concession conversion, establishment of a transparent interconnection regime, and the forthcoming public

Ken Zita is President of Network Dynamics Associates (www.ndaventures.com), a technology consulting firm active in nearly 40 countries. Dr. John Ure, an NDA senior consultant, contributed to this brief.

listings of CAT and TOT all have the potential

Key Indicators

Thailand	
Population	64.9 million
GDP	\$477 billion
GDP real growth*	6.7 percent
GDP per capita	\$7400 (2003)
Literacy	92.6 percent
Phone lines	6.41 million
Telephone density	13.57 percent
Mobile phones	26.7 million
Mobile density	42.5 percent

Sources: CIA Factbook, US Department of State, Network Dynamics Associates



to be impacted by the broader political process. Broadband penetration remains low and greater regulatory clarity is required before service providers are prepared to make necessary infrastructure investments.

Political and Economic Brief

Following a 400 year royalist history, Thailand was transformed to a constitutional monarchy in 1932. Since then the country has been ruled by a series of military governments interspersed with brief periods of democracy, and the military has played a prominent role in political and economic life. A new Constitution was adopted in 1991 and elections in 1992 ushered in the current era of Thai democracy. The king has little direct power under the constitution but is a symbol of national identity and unity. King Bhumibol, who has been on the throne since 1946, commands enormous popular respect and moral authority, which he has used on occasion to resolve political crises that have threatened national stability, such as during student riots in Bangkok in 1992.¹

In the 1992 elections, the political parties that had opposed the military won by a narrow majority, and Chuan Leekpai, a leader of the Democratic Party, became Prime Minister. The Thai Nation Party came to power in 1995 but it, too, was displaced, in 1996. The government changed hands once again after the Asian financial crisis, with Chuan Leekpai becoming prime minister in November 1997. Chuan formed a coalition government promising prudent economic management and institution of political reforms mandated by a new constitution, the second after only six years, which was adopted in 1997. In January 2001, the telecommunications multimillionaire and current prime minister, Thaksin Shinawatra and his Thai Rak Thai (TRT) party, won a decisive victory on a populist platform of economic growth and development. In the February 2005 elections, Thaksin was re-elected by an even greater majority, sweeping 377 out of 500 parliamentary seats. Thaksin's second administration took office March 9, 2005. The election process was viewed as generally free and fair though with some irregularities.² The Prime Minister has quipped publicly that Thailand is now a "one party government" and observers are watching the direction of the government's next policy steps as the opposition's political position has been greatly weakened.

In February 2003, the Prime Minister initiated a 3-month "War on drugs" campaign intended to eliminate narcotics from the country. The Minister of Interior instructed local authorities to update "blacklists" of individuals suspected of being involved in illegal drug trafficking, sale, or use. The Prime



¹ Excerpted from State Department Background Note: <http://www.state.gov/r/pa/ei/bgn/2814.htm>

² Country Reports on Human Rights Practices - 2004 <<http://www.state.gov/g/drl/rls/hrrpt/2004/>



Minister told governors and provincial police that those who failed to eliminate a prescribed percentage of the names from their "blacklists" would be fired.³ According to official figures, there were 1,386 narcotics-related deaths between February 1 and April 30, 2003. No arrests were made in 1,195 of these cases which led many observers to believe police were responsible for most of these deaths. According to press reports, more than 2,200 alleged drug criminals were killed during the year, while more than 90,000 suspects were arrested.⁴

A strict social conservatism is growing from policies endorsed by Thaksin, evidenced by new regulations defining specific areas in Bangkok as 'entertainment zones' where establishments can remain open until 1:00 a.m. Those outside of those zones close at midnight.

The main challenge and struggle politically for the current Administration is violence in the southern part of the country, attributed to Muslim separatist insurgents. The Government has employed various attempts to solve the problem but recent incidents, including a bombing at Hat Yai airport, have heightened the impression that the situation is not under control. Incidents of violence against government authorities and civilians are ongoing. More than 630 people have been killed since an Islamic separatist movement broke out in January 2004. In October 2004, 87 protestors were killed, including 78 who died in custody. The government's hard-hitting response has strained relations with several Muslim countries, including Thailand's predominantly Muslim neighbor, Malaysia. The government has invited diplomats from the Organization of the Islamic Conference (OIC), the 57-nation Muslim assembly, to assess the incident.

Economy

While in some ways the epicenter of the 1997 financial crisis, Thailand responded and recovered well from the steep fiscal shock, especially since 2001. In 2003 GDP growth in Southeast Asia's second largest economy was 6.7 percent. Much of the growth was fueled by private consumption, rising farm incomes, expansion of consumer credit, low interest rates and increasing trade. The Thai economy is export-dependent, with exports accounting for 60% of GDP. Supportive government policies aimed at stimulating the economy in an election year also played a key part of the performance. The government pushed a comprehensive stimulus package aimed at a range of politically important consistencies, especially in rural areas; 60 percent of the population is employed in agriculture. Some of these programs include farm debt restructuring; grants for villages including micro-finance loans; and support for small and medium sized businesses which the Thaksin government views to be "the heart" of the Thai economy. The administration is especially focused on reducing regional income differentials, which have been exacerbated by rapid economic growth in and around Bangkok. The Thai Asset Management Corporation was also established to manage nearly \$30 billion in non-performing debt.

According to preliminary estimates, growth in 2004 slowed to about 6.2 percent. Initial forecasts for the year anticipated faster expansion (some economists believed in the 7-8 percent range) but external events dampened expectations. A persistent, three-year drought has hit the agricultural

³ If I find provincial governors who can't meet the government target, I will send someone else to replace them," reported in Legal News Watch: http://www.legalnewswatch.com/news_144.html

⁴Near verbatim citation from <http://www.state.gov/g/drl/rls/hrrpt/2003/27790.htm>



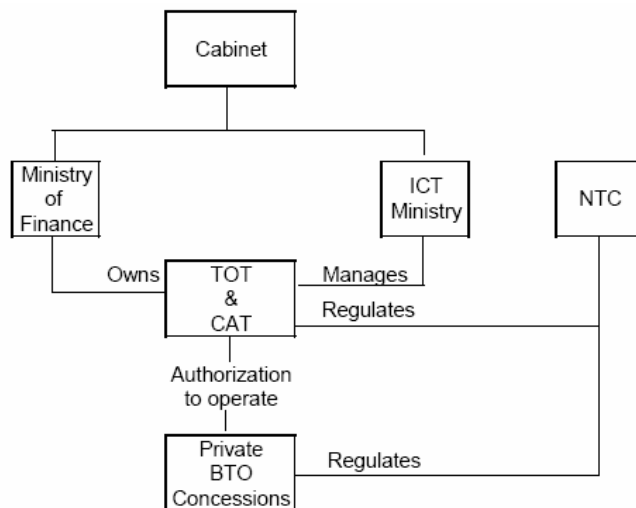
sector hard. Thailand is the world's biggest exporter of rice, rubber and tapioca and water shortages have damaged plantations in 62 of the country's 76 provinces. The December 2004 tsunami also hurt the important shrimp farming and tourist sectors. Additionally, higher oil prices (Thailand imports 65 percent of its oil needs), the bird flu scare and political unrest in the Southern provinces have pushed economists' consensus estimates down. Real growth is projected to slow to about 5.5 percent for 2005. By contrast, the Thai economy grew 9.4 percent per year for the decade up to 1996.

Japan is far and away the largest investor, and largest source of imports, with US a distant second. Due to the surge of exports from Thailand to the US, however, US is Thailand's largest trading partner, at around 20 percent of exports. Thailand is 23rd largest US trading partner, with almost \$21 billion in two-way trade. On a percentage basis, Thailand's trade is growing faster with its other Asian trade partners and with China. The government welcomes foreign investment and investors who are willing to meet certain requirements can apply for special investment privileges through the Board of Investment. To attract additional foreign investment, the government has modified its investment regulations. Foreign direct investment has slowed in recent years, falling to \$3.8 billion in 2002 and \$1.5 billion in 2003.

Telecom Policy Environment

Telecoms was traditionally the corporate province of the Thai military. The domestic incumbent, the Telephone Organization of Thailand (TOT), was led and staffed by serving and retired army officers, while the international services incumbent, the Communications Authority of Thailand (CAT), was dominated by the rival air force. Democracy was restored in Thailand in 1992, leading to the removal of overt military influence on both companies. Successive governments and parliaments from that time forward have wrangled over the role of the state in the sector. It was not until 12 years later, in 2004, that an independent regulator was appointed with the creation of the National Telecommunications Commission (NTC). In the intervening years, a variety of complex regulatory policies – arguably the most complex in the world – helped establish the market context that remains in place today.

The Constitution of 1997 stipulated the establishment of two independent regulating bodies to supervise the telecom and broadcasting sectors. Legislation promulgated in March 2000 specified that the National Telecommunications Commission (NTC) and National Broadcasting Commission (NBC) be in operation by 2001. It was not until December 2004 that the seven commissioners to the NTC were actually appointed. NBC is not in operation as of early 2005. Thailand also passed a new telecommunications law, the



Source: Macquerie Securities

Telecommunication Business Operation Act (TBOA) of 2001, which repealed the Telephone and Telegraph Acts of 1934 and 1974. Under the TBOA, foreign nationals are not allowed to hold more than 25 percent equity in a facilities-based Thai telecommunications operator, and three-fourths of the board of a Thai telecommunications operator are required to be Thai nationals.⁵ The legislation also stipulated the creation of the Ministry of Information and Communications Technology (MICT), which assumed its role 2002. The MICT is responsible for policy planning, whereas NTC is nominally in charge of day-to-day sector regulation and dispute management.

The chief constraint on telecom reform and liberalization has been a constitutional mandate that national infrastructure providers be owned by the state. To circumvent this problem short of amending the constitution, Thailand introduced a Build-Transfer-Operate (BTO) model to entice foreign investment without actually taking the plunge to

true market ownership reform. In 1990 two mobile cellular operators were licensed under BTO structured lease arrangements: Advanced Info Services (AIS) and UCOM/TACS (later renamed DTAC). AIS formed a cooperative alliance with TOT, UCOM/TACS with CAT.

Basic Services Concessions

Basic Telephone Services (Fixed Phone)

Operator	Truc (Telecom Asia)	TT&T
Service	Installation of 2.6 million numbers in Bangkok and the vicinity	Installation of 1.5 million numbers in the provincial areas
Concession granted by	TOT	TOT
Concession period	25 years (Oct 1992 – 2017)	25 years (Oct 1993 – 2018)
Revenue sharing	16% (2 million numbers) 21% (600,000 numbers)	43.1% (1 million numbers) 44.5% (500,000 numbers)

Even today private telecom companies operating in Thailand cannot own physical network assets. Every services provider is instead required to operate under a BTO concession arrangement with the government, sharing its revenue with the state-owned telecom companies. TOT collects revenue from 11 such concessions, which produced about \$105 million in profit in 2000 (Bt 4 billion). CAT holds 10 similar concession contracts. “Concession management” has actually become a core competency and standalone profit center at each of the companies.

In 1993, Nynex, now Verizon, partnered with the powerful Charoen Pokphand (CP) Group, owned by the Sino-Thai Chearavanont family, to establish TelecomAsia (TA), a fixed network service provider in Bangkok. In the same year, NTT West teamed up with Thailand Telephone & Telecom (TT&T) to serve the fixed line needs of rural Thailand. TA holds a 25-year concession for a network of 2.6 million lines in Bangkok and pays TOT an average of 16 per cent of its annual revenues under its BTO agreement. TT&T built a 1.5-million-line network in the provinces under a 25-year BTO agreement, under which it pays 43.1 per cent of its revenue to TOT. As a result of these large-scale, partially private investment structures, fixed lines in operation in Thailand rose rapidly. Thailand had 1.4 million lines before liberalization, compared to 4.7 million lines once the BTOs were commercialized.

In addition to the fixed line concessions, BTOs have been concluded with four mobile networks: AIS with Singapore Telecom; TA Orange (until 2003 with France Telecom); DTAC with

⁵ Briefing paper In relation to the proposed Free Trade Agreement between the United States of America and the Kingdom of Thailand, FTA Taskforce, American Chamber of Commerce in Thailand, October 2004



Telenor; Hutchison with CAT; and DPC. Additionally, Thai Mobile is a joint venture between TOT and CAT. The BTO model produced important success. With the contributions made by the ventures, effective teledensity (both fixed and mobile combined) has been raised from 3.13% in 1992 to 26.04% by 2002.

The BTOs have improved consumer services, but the playing field is anything but level. Firms pay widely different percentages of revenues to the government for their franchises. Each has a different duration and expiry date, and unique schedule of payments

of “concession” and “access” fees. Cellular mobile operators DTAC and TA Orange, both CAT concessions, have been paying Baht 200 a month per mobile subscriber to TOT, while AIS, a TOT concession, enjoyed a lower interconnection charge. In 2001, DTAC refused to pay the access charges for a period, but later relented. As important, the concession holders are paying licensing fees directly to TOT and CAT, which have become fierce competitors in the market.

The timing and process of converting the concessions has been mooted for years, and has been a popular subject for the opposition in Parliament. With the effective dominance of Thai Rak Thai in the 2005 election, and the dampening of strong opposition, the legislative terms of the debate are likely to change. The government has long maintained

that the commercial parties had to sort out the concession issue for themselves. Not surprisingly, nothing happened. TOT and CAT had no incentive to unilaterally reduce revenue expectations, nor breach the advantageous contractual rights established in the BTOs. TOT earns an estimated \$520 million annually from its BTO arrangements (Bt20 billion). In 2002, TOT had total assets of \$7.1 billion (Bt273 billion), of which \$2.8 billion (Bt110 billion) consisted of networks and equipment transferred by private companies under BTO assets. The CAT had \$2.2 billion (Bt 87.2 billion) in assets, half of which were tied to BTOs. Concession payments to the government by the two telcos top \$500 million per year -- and this, after a 40 percent top line excise tax is paid to the government by the concessionaires. With about \$400 million flowing in to state coffers annually, the government has not exactly jumped to resolve the concession issue. The

Mobile Concessions

Mobile Phone Service				
Operator	Network	Concession granted by	Concession period	Revenue sharing
AIS	900 GSM	TOT	25 years (start 1990)	Year 1-5: 15% Year 6-10: 20% Year 11-15: 25% Year 16-25: 30%
DTAC	1800 GSM	CAT	27 years (start 1990)	Year 1-4: 12% Year 5: 25% Year 6-15: 20% Year 16-20: 25% Year 21-27: 30% Plus network (TOT) connecting fee of Bt200/number/month
ORANGE	1800 GSM	CAT	16 years (start 1999)	Year 1: 25% Year 2-9: 20% Year 10-14: 25% Year 15-16: 30% Plus network (TOT) connecting fee of Bt200/number/month
DPC	1800 GSM	CAT	16 years (start 1999)	Year 1: 25% Year 2-9: 20% Year 10-14: 25% Year 15-16: 30%

AIS and DTAC Government Burden Compared

	1999	2000	2001	2002	2003	1Q04
TOT, CAT and excise tax						
ADVANC	29.6%	27.1%	26.4%	25.0%	24.0%	23.6%
TAC	24.9%	26.2%	30.6%	28.9%	29.9%	32.5%
TRUE	14.4%	16.0%	16.0%	17.7%	20.2%	19.5%
Income taxes						
ADVANC	8.7%	14.5%	12.8%	12.8%	10.2%	14.5%
TAC	1.7%	2.7%	3.9%	3.9%	3.8%	6.3%
TRUE	-0.8%	0.4%	0.3%	0.6%	0.4%	0.8%
Government burden						
ADVANC	38.3%	41.5%	39.1%	37.9%	34.2%	38.2%
TAC	26.6%	28.9%	34.5%	32.8%	33.7%	38.8%
TRUE	13.6%	16.4%	16.4%	18.3%	20.6%	20.3%

Source: Company data, MRE estimates



concession holders, for their part, simply have not had the political power to engineer meaningful change. The National Telecommunications Commission initially maintained neutrality in the dispute at the time of its launch but, by early 2005, indicated that it would help broker a truce.

For the most part the concessions are considered to be a “Thai problem”, at least from the perspective of the Thai government, TOT and CAT. There are however important obligations made to the global community to put its house in order. The government’s Telecommunications Master Plan agreed in November 1997 commits Thailand to deregulating its telecommunications industry by 2006, in accordance with World Trade Organization (WTO) directives. The WTO requires the replacement of BTOs with independent licensed operators as well as privatization of the state owned operators. The 2006 milestones have set a clock running. A more pressing trade crucible, however, may be the Free Trade Agreement with the U.S. being negotiated in 2005.

It seems a foregone conclusion that material offers will be tendered for each of the concessions. Various options include shortening the concession periods and altering the timing and terms of buyout terms to TOT and CAT. It bears noting that, under Article 80 of the Constitution, the NTC cannot force TOT and CAT to convert concessions to licenses. By law, the change will have to be voluntary.

An important consideration going forward is the influence that may be exerted by other political forces, notably the prime minister’s office, which has lately shown a willingness to intervene in market behavior. An \$170 million fixed line TOT contract with Siemens was scrapped in early 2005. TOT’s board terminated the deal in favor of an electronic auction following public comments to do so by the prime minister, a brazen maneuver to achieve a lower price. Such political influence is troublesome to foreign investment.

The NTC’s first regulatory move is expected on interconnection. Imposing a cost-based interconnection standard applicable to all operators would require that operators pay for outgoing traffic over the networks of other operators, and remove some of the in-built subsidies of captive license holders. Interconnection obviously has a direct impact on the concession structure, but it is a regulatory move that addresses a bigger strategic issue – one might say in an indirect, Thai way. TOT would be a big loser in any normalization of interconnection agreements. It is estimated to earn approximately \$200 million per year in payments, and such a hit on revenues would impact its valuation in a run up to an IPO. An early step toward ridding the industry of revenue-sharing schemes was introduced in a controversial 2003 telecoms excise tax. Under the excise tax regime, telecoms firms pay part of their revenue to the Ministry of Finance instead of to CAT and TOT Corp. Fixed-line operators will pay 2 percent of their revenue to the ministry, and mobile operators 10 percent.

In addition to specific action items such as concessions and interconnection, the NTC needs to address the overall issue of transparency and consistency in policy making. Confusion and uncertainty arose when the Thai Telecommunications Act in 2001 was passed reducing the foreign ownership ceiling from 49 per cent to 25 per cent. Under intense pressure from industry the Government reversed the decision. Creation of the NTC should be a step toward more open policy making and dispute arbitration, if NTC is allowed to do its job. The danger is that the NTC

could simply replicate the clash of interests that exists within the industry, and that the government will not be able to resist exerting influence.

Until the NTC was established TOT was the *de facto* regulator. It controlled access to network resources such as numbering and interconnection, and even required its BTO partners to seek prior approval of their engineering plans and marketing campaigns. The TOT remains the most powerful incumbent, and restricting it from abusing its market power will be a test of the independence of the NTC. Licensing should pass over entirely to the NTC, including Internet Service Provider (ISP) licenses that have previously been issued by the CAT, as well as assignments of future radio frequency licenses. NTC appointed a consortium of Ericsson Thailand-Baker and McKenzie in early 2005 as its consultant to draw up guidelines for writing new telecom licensing rules. The powers of radio spectrum allocation lie with the National Frequency Management Board of the Post & Telecom Department (PTD), which passed to the ICT Ministry in 2002, and are to be assumed by the new NTC along with licensing assignments.

Another element of liberalization was introduced in 2004 when TOT broke the embargo on offering international direct dial calling in direct competition with the CAT. In July 2004, TOT introduced IDD to key countries at nine Baht per minute. A month later, CAT responded by introducing free, unlimited Internet-based domestic long-distance telephone calling to all household and corporate customers of its Internet access services.

The final step towards full market liberalization will be the privatization of TOT and CAT, first proposed in 1992. CAT is expected to be the first to reach a public listing in late 2005, even though it is the less valuable property of the two. Like the formation of an independent regulator, privatization is an issue steeped in murky political interests. CAT has limited physical assets (primarily last mile data networking) and a significant portion of its cash flow comes from concession agreements. Until the concession issue is resolved its future cash flow becomes questionable, especially as the traditional IDD revenue mainstay continues to erode.

Both TOT and CAT are labor-intensive employers compared with their BTO partners. Labor union opposition to privatization has been strong. To give an indication of just how labor-intensive TOT and CAT are, TelecomAsia employs 4,000 people on the fixed network side for 2 million subscribers, in contrast to TOT's 20,000 employees for a fixed network with 3.5 million subscribers.

The industry is abuzz over speculation about whether TOT and CAT would merge before or after a privatization. Or, alternatively, if AIS would seek to consolidate TOT's fixed network into its own operations.

ICT Promotion

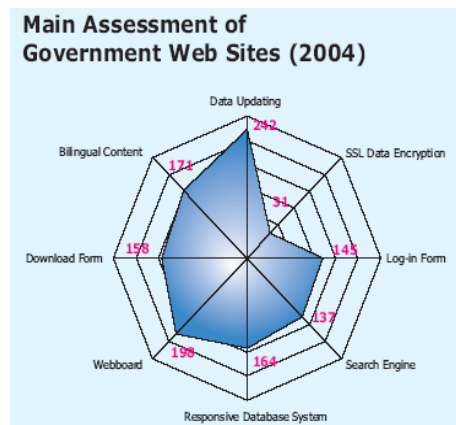
Thailand sees itself as the information technology leader for Southeast Asia. Improving the network infrastructure – especially the extremely low broadband penetration rate – is essential to Thailand's establishing an enabling environment for applications and services. The government is also pursuing an ambitious agenda of "e-society" initiatives. A variety of high-level bodies have been involved with the setting of ICT policy and charting a *National ICT Master Plan 2002-2006* that was endorsed in September 2002. Among them are:

- Ministry of Information and Communications Technology (ICT)
- National Electronics and Computer Technology Centre (NECTEC)
- National Economic and Social Development Board (NESDB),
- Finance Ministry,
- Office of the State Audit Commission,
- State Enterprise Policy Committee, and
- Transport and Communications Ministry (MOTC), Office of the Auditor General.

Additionally, a number of independent think tanks and associations are involved, among them:

- Thai Telecommunications Management Academy,
- Telecommunications Association of Thailand,
- Software Industry Promotion Agency (SIPA),
- Association of Thai Computer Industry (ATCI), Office of the Consumer Protection Board (OCPB)
- Kasikorn Research Center (KRC),
- Thailand Development and Research Institute (TDRI),
- Chulalongkorn University's Intellectual Property Institute (CUIPI),
- National Institute of Development Administration,
- Foundation for Consumers, and others

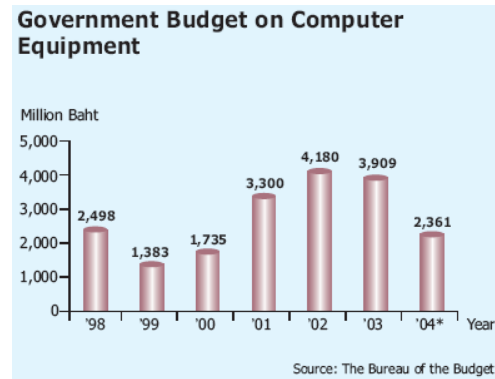
The government has adopted a seven-point strategy plan aimed at promoting ICT adoption in Thailand: 1) enhancing the quality of life toward a knowledge-based society; 2) promoting equal opportunity for access to ICTs; 3) support communications networks that enable Thailand to become a premier Southeast Asia Internet hub; 4) promote and develop the ICT industry, especially through supply chain management and e-commerce; 5) enact the right legal environment to facilitate ICT in support of greater efficiency and competitiveness; 6) promote human resources; 7) R&D; 8) turn the Ministry of Information and Communications Technology into a model showcasing the use of ICTs in government and public administration; and, 9) accelerate the integration of government databases to facilitate government service delivery and governance.



Deploying an information management system for government agencies has taken concrete form in the PMOC, or the Prime Minister Operating Center project. In this effort, led by a comprehensive technical study by Booz Allen Hamilton and funded by USTDA in 2004, the Thai government is introducing an integrated, inter-agency data networking architecture for all government ministries. Each key government ministry and administrative body is creating a harmonized data structure and retrieval strategy, as well as an Agency Operations Center, directly linked with the prime minister's office. The goals are to collect, analyze and present real-time data for executive review; improve decision making at crisis response; improve efficiency and transparency of government operations; integrate data for multiple ministries; and assemble data for strategic planning. The PMOC system combines both the logical level application management systems in addition to a secure fiber optic transmission network. Target completion for the project is expected by mid 2006.

Other important e-society initiatives underway include Thailand's Smart Card, in which some 64 million citizens are expected to enroll by 2006, and the e-Citizen project, to introduce electronic voting through information kiosks at post offices around the country. Computer animation is viewed as an ICT sector where Thailand can achieve global competitive advantage and a number of programs have started to stimulate this industry.

The grandest regional ambition, perhaps, is Thailand's interest in becoming a regional operational center for the proposed, multinational tsunami early warning effort for the Indian Ocean, following the December 2004 disaster. The government is already focusing on improving the domestic communications infrastructure that would be the foundation for their tsunami early warning system, and are evaluating options for alerting municipalities, resorts and others from a central location in Bangkok.



At the *Phuket International ICT Conference for Disaster Recovery Management and Global Warning: Learning from Tsunami* in February 2005 the MICT proposed a web services software architecture for sharing information between agencies to manage disaster recovery, locate survivors, warn of possible natural disasters, help with business continuity and to apply a logistics system for the distribution of aid. A first step is the establishment of a data center. A single database and workflow management framework will then be introduced. A public warning system is also planned and the MICT has requested allocation of emerging frequencies from the new NTC. Hewlett Packard donated emergency notification and GIS systems to assist with the disaster warning system. Additionally, True Corporation plans to upgrade 400 of its mobile base stations to enable cell broadcasting for streaming text messages to between 100,000 and a million users a minute. Other carriers are expected to follow.

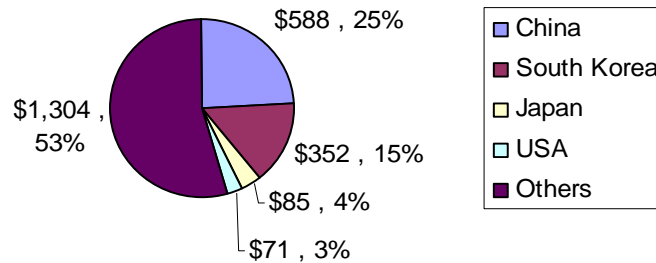
Other state supported ICT projects in the IT 2010 plan include:

- ICT Budget PC ("People's PC") project,
- National Science and Technology Park in Chiang Mai

- "One Temple, One Computer Centre" project to help 100 temples serve as community knowledge centers
- "Budget Wireless Project"
- One Baht Per Hour Internet Connection Project, and an
- e-Cities project.

Telecom Market Environment

In 2004 the overall size of the market for telecommunications equipment and services is about \$5.1 billion. Roughly half, or \$2.4 billion, went to spending on imported equipment. The market leaders are China (23 percent, or \$588 million), South Korea (15 percent, \$352 million) and Japan (3.5 percent, \$85 million). US companies captured only 2.9 percent of the market, for a share valued at \$71 million. Locally assembled products accounted for \$93 million. The market is projected to grow on 7-11 percent average until 2007.



The total number of fixed line telephones in service is 6.41 million, for a penetration rate of 13.57 per 100 people serving Thailand's of 63 million people. The network is roughly split between urban (3.31 million lines) and rural areas (3.1 million lines). Strictly speaking, TOT owns the entire PSTN infrastructure. It directly manages and markets about half of all access lines while the balance are handled by concessions. TOT is completing a 565,500 fixed-line expansion project in 2005 and is scheduled to add 577,500 more lines in 2006. Wireless Local Loop (WLL) systems are being deployed increasingly in rural areas. In 2004, TOT had 90,000 subscribers to the WLL service from rural areas, a figure that can be expected to grow dramatically as equipment prices fall.

The other principal carriers are True Corporation Public Co., Ltd, which has 3.4 million fixed line customers in greater Bangkok, making it the largest PSTN operator. TT&T Public Co., Ltd. operates a 1.5 million fixed-line contract in the provinces. TOT has given seven firms the right to terminate VoIP traffic, but not to handle outgoing traffic.

In the early 1990s when True, first called CP Telecom and then Telecom Asia, designed its fixed line network to serve Bangkok with British Telecom, it built with foresight. The network is based on a distributed optical fiber-based architecture that takes the edge of the core network close to customers' premises. True claims to supply over 90 per cent of the ADSL broadband market in Bangkok and is capable of delivering up to 6 Mbps service to high-rise buildings in and around the city center. It is planning a migration to a next generation network (NGN) platform. True's existing telephony concession with TOT only covers Bangkok where it operates 2.6 million lines.

True is lobbying for spectrum and a nationwide license to provide broadband fixed wireless high-speed data circuits and services, principally fast Internet services.

Broadband adoption has been sluggish. Thailand has 320,000 broadband connections (included leased lines) at the end of 2004, a low penetration rate (0.52) given the overall sophistication of the economy. Officials proudly point to a 700 percent increase over 2003 which can be viewed as tremendous progress – or as a really, really late start. True dominates the broadband sector with 100,000 subscribers, and 20,000 customers supported by TT&T Public PLC and TOT Corporation PLC, respectively.

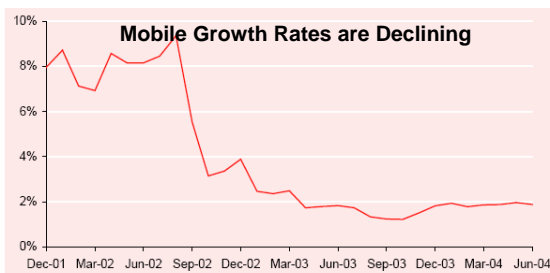
No formal universal service obligations have existed in Thailand. With sector reforms to come it is anticipated that a universal service fund will be established to build the telecom infrastructure with contributions coming from a mix of government, NTC, and industry sources. ICT projects that rely upon that infrastructure are steered mainly through the National Electronics and Computer Technology Centre (NECTEC). These include SchoolNet Thailand, Community Telecentre, and Wireless Local Loop (WLL) for Rural Telephone projects.⁶

Despite the collapse of the Thai Baht in 1997, the telecom sector has proved resilient. For example, CAT kept its level of investment, as measured in local currency, on a steadily rising path after 1997. Thai telecom companies also benefited from International Finance Corporation support when in 2002 the IFC partially underwrote TelecomAsia's (TA) bond issue of over \$400 million and further supported TA's share issue in 2004 for close to \$40 million, helping stabilize investor sentiment in the sector. But there were casualties among foreign investment partners. France Telecom withdrew from TA Orange, writing off \$500 million, and Verizon divested its stake in TelecomAsia in 2003. Singapore Telecom and Telenor, neither having very large home markets, elected to stay.

Mobile Market

Mobile phone subscribers overtook fixed line subscribers in 2001 and account for an estimated 48 per cent of all Thai telecom revenues (2002). Total subscribers at the end of 2004 were 26.7 million people, or a mobile penetration rate of about 42.5, up from only 6 percent in 2000.⁷ The surge in penetration has been particularly remarkable, as Macquerie Securities notes, because the current levels of penetration are sustained with a per capita income of \$2,330.

Cellular subscriber growth in 2001 and 2002 was approximately 120 percent per annum but slowed to ~20 percent in 2003 and the first half of 2004. A further slowdown is expected as urban areas are approaching saturation. For Thailand to reach 50 percent penetration by 2006, which the industry hopes, prices will need to fall further as the discrepancy between



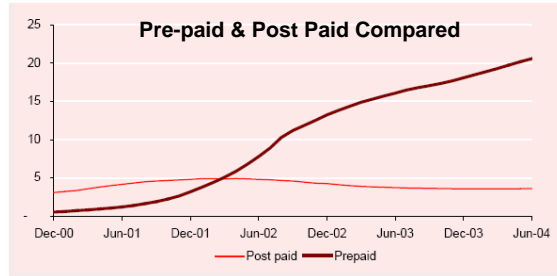
Source: Company data, MRE estimates

⁶ For nine case studies see NECTEC (2003) *IT for Poverty Reduction*.

⁷ According to Macquerie, the net penetration is probably exaggerated by multiple SIMs and long periods of validity for prepaid subs, with a real mobile density closer to 35 percent.

urban and rural income is huge. Macquerie Securities estimates that the marginal capital cost for adding a new GSM subscriber has fallen to about \$30. Monthly subscriber growth has slowed from the roughly 8% per month growth rates in 2001 and early 2002 to a bit less than 2% per month in 2004.

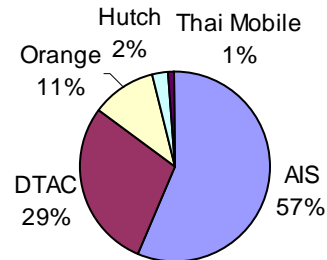
Especially important has been the introduction of pre-paid mobile calling cards as a way to reduce bad debt and address those markets made up of lower-income groups on the outskirts of cities, and in rural areas. By 2004, pre-paid users accounted for about 80 per cent of the entire subscriber base and nearly all the industry’s growth, with ARPU, or Average Revenues Per User, standing at around \$7 (Bt 250-300) per month for pre-paid subscribers, or one-fourth the revenues from post-paid.



Source: Company data, MRE estimates

The attractiveness of pre-paid cellular and the exigencies of competition have pushed wireless operators out into Thailand’s hinterlands, in a sense addressing the universal service principle by default. According to Macquerie, AIS may have an engineering competitive advantage in rural areas as it is the only operator using the 900 MHz frequency, which has greater cell coverage than 1800 MHz systems, and therefore lower capital costs. DTAC has estimated that 10 million rural residents are potential mobile customers.

Total sector revenue is estimated at \$5.7 billion in 2004, up an estimated 7 percent over 2003. Voice services constitute \$2.69 billion, or 47 percent of the market. Data services such as SMS constitute a tiny portion of sector revenues. The non-voice market is expected to grow to \$357 million (14 billion baht) in 2005, up about 27 percent over 2004, on a customer base now estimated at 4 million. SMS tariffs are about three times higher than neighboring Philippines, and there is a language barrier to sending Thai messages using Roman characters. Handsets earned the lion’s share of market value, with \$2.88 billion in sales.



Five licensed operators network operators compete for this pie:

- Advanced Info Services Public Co., Ltd (AIS)*, the Shin Group affiliate, is the market leader, with 57 percent share. At year-end 2004 it had 14.9 million subscribers, of which 2 million were postpaid (GSM Advanced and GSM 1800) and 12.9 million prepaid service (One-2-Call). It operates an all-GSM network at GSM 900, 1800 and holds frequency at 1900 MHz. AIS plans to spend as much as \$400 million in 2005 (about 16 billion baht), of which \$240 million is for capacity expansion, \$50 million on quality management and \$110 million on value-added services. Spending could reach \$500 million to \$550 million annually after 2006. A 3G trial with W-CDMA is expected to begin in May 2005, with Huawei as vendor. AIS has 2.4 million data



- users, representing 70 percent of its 3.3 million customers who have handsets that support multimedia. Non-voice revenue in 2004 is estimated at more than \$260 million (Bt 10 billion). It should be noted that AIS, a company built by the tycoon prime minister, has a significant interest in the timing and terms of converting its concession. In 2000, AIS made the highest concession payments to the government of any lease holder, about \$148 million (5,656 million Baht).
- *Total Access Communications Public Co., Ltd (DTAC)*, owned jointly by the UCOM group and 40 percent by Telenor, has 29 percent of the market, with 7.73 million subscribers. The company was established in 1989 and changed brand identity to "DTAC" in 2001. It operates an AMPS 800 mobile service and a GSM 1800 service. GPRS was launched in 2002. Data revenue accounted for 15 percent of total earnings in 2004. About 84 percent of its subscribers are prepaid. Profits jumped 73 percent in 2004 to \$116.7 million. The company paid about \$35 million in concession charges last year.
 - *TA Orange*, led by True Corporation Public Co., Ltd., entered the market as the third GSM operator in early 2003 and earned 1.5 million subscribers in the first year. It doubled its user base in 2004 to 3 million, leading the market in new adds on a percentage basis (52 percent growth vs. 34 percent for AIS and 14 percent for DTAC). It has earned about 11 percent of the market. TA Orange non-voice revenue hit about \$26 million in 2004, a 43 percent jump over 2003. Following a restructuring period in 2003-2004 – when France Telecom sold its shares for 1 Baht and wrote off an estimated \$500 million – the company has set out on a new expansion strategy with a clean balance sheet. Among other initiatives, True is driving an effort to integrate postpaid billing systems for both fixed (True) and mobile (Orange) services. Mobile accounting for 37 percent of True's revenues in 2004.
 - *Hutchison CAT Wireless Multi Media*, Thailand's only CDMA operator, currently has 700,000 subscribers, serving Bangkok and 25 central provinces. In January 2005 it concluded a \$187 million contract to build a nationwide CDMA2000 1x and EV-DO network for 51 of the 76 provinces in Thailand. The extended network, with 1600 base stations, will provide high-speed data services and have the capacity to handle 3.3 million subscribers. Arguably the network is a core component of CAT's efforts to boost its valuation prior to a public listing in 2005.
 - *Thai Mobile* is the oddest corporate partnership: a joint venture directly between TOT and CAT. Apparently the partnership has not worked. To date it has focused its efforts, described as "feeble" by some, on 2G. It is estimated to have between 250,000 to 300,000 subscribers or approximately 1 percent market share. It is the first and, as of early 2005, the only operator with a 3G spectrum allocation but has yet to commission or deploy a network. TOT is reportedly set to take full control of the CDMA 1900MHz operation, buying the 42 percent stake held by CAT for about \$11 million (Bt420 million).

One of the first issues for the NTC is to review the adequacy of allocations of frequency bands for 3G and whether this will require a re-allocation of spectrum. It is possible the NTC could issue 3G licenses in 2006 but no fixed schedule is set.



Thai private fixed-line operators have expressed a desire to raise the monthly charge and lower the per call charge to tilt the balance away from the mobile operators. But a change in fees has proven difficult to implement because rate structures must be approved by the concession granter – TOT – which has been unwilling to do so. The BTO arrangements restrict the commercial ability of TA and TT&T to experiment with different pricing strategies, and suggests the fixed operators will have difficulty competing.

Thai telecom firms have renewed an interest in expanding abroad. CP Group won a 3G license in Indonesia in 2003 through its subsidiary PT Cyber Access. Shinawatra Group committed \$30 million in 2004 to its joint venture Lao Telecom Co., and Samart spent \$17 million in 2003 to expand the network coverage of its Cambodian cellular JV, Cambodia Samart Communication Co. (Casacom).

Other Technologies

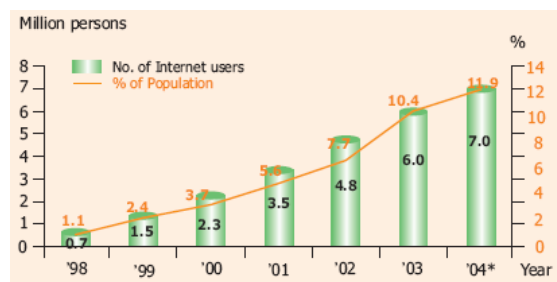
True is exploring with UBC the option of leasing its fiber network to provide IP TV. Rival media group, Advanced Data Corp, part of the Shin Corporation group of companies plans to launch an IP TV service in competition with UBC's cable TV services. UBC offers cable TV in Bangkok over an HFC network and by DTH satellite nationwide. True and UBC are being advised by Cascade, the consulting arm of PCCW (Hong Kong) who successfully launched their own IP TV service in Hong Kong branded NOW Broadband. One of the problems True and UBC face in going ahead with their own IP TV service is the danger of cannibalizing their cable TV business, an issue being closely examined. But IP TV, fast Internet access and a next-generation IP network in Bangkok would give True a "triple play" option, a direction True wishes to follow.

Shinawatra Satellite has pioneered an innovative broadband satellite service and launched Thailand's first 24-hour Internet television service, the IPTV Channel, in September 2004. It also launched the IPStar direct broadband satellite network in 2004. In a broadband push, the ICT Ministry has offered assistance to the TOT and CAT to negotiate for usage of the fiber optic backbone infrastructure of the Electricity Generating Authority of Thailand (Egat), Metropolitan Electricity Authority (MEA), and the Provincial Electricity Authority (PEA).

Internet

Internet access is predominantly dial-up, as broadband last mile facilities are so scarce. There were only an estimated 320,000 broadband users in 2004. With the launch of Shin Corp's IPStar satellite service, broadband access will be easier to deploy in remote areas.

Given the importance of boosting the information economy, the government needs a comprehensive strategy for the Internet. NTC began public hearing in March 2005 to begin drafting a new policy. CAT maintains a mandatory 32 per cent stake in most of the country's ISPs which are run as 10-year concessions. The private sector holds 65 per cent of an ISP and 3 per cent belongs to company



Source: NECTEC



staff. In 2002, two of the country's largest ISPs, CS Communications, a subsidiary of Shin Satellite that runs the CS Internet service, and Point Asia Dot Com, parent company of ISP Loxley Information Service (LoxInfo), merged, creating the country's largest ISP, with approximately 40 per cent of the market by revenue.

ISPs are also partnering with mobile operators to provide WiFi services, for example, Asia Infonet and Orange, Pacific Internet and TOT, M-Web and DTAC. Foreign ownership is currently capped at 49 percent.

