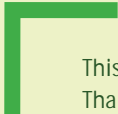# Internet

Diffusion in South East Asia

ITU

International Telecommunication Union

This report summarizes the workshop on Internet diffusion in South East Asia, held in Bangkok, Thailand, from 21 to 23 November 2001. The accompanying CD-ROM contains the background materials and input to the workshop which was organized by ITU's Telecommunication Data and Statistics (TDS) Unit of BDT, Strategy and Policy Unit (SPU), and the Asia-Pacific Regional Office in Bangkok. It was hosted by the Post and Telegraph Department (PTD) of Thailand and supported by the Communications Authority of Thailand (CAT), the Telephone Organization of Thailand (TOT) and the National Electronics and Computer Technology Center (NECTEC).

The purpose of the workshop was to present the results of the ITU Internet Case Studies undertaken for the region during 2001. The case studies were carried out in: Cambodia, Indonesia, Lao PDR, Malaysia, Philippines, Thailand and Viet Nam. In addition, presentations were given by national and international experts and a special session was held on the Internet in Thailand. The case studies project is carried out by the BDT Telecommunication Data and Statistics (TDS) Unit, headed by Michael Minges, in collaboration with SPU, headed by Tim Kelly. The present report is based on the summary of the workshop prepared by Somkiat Tangkitvanich, Research Director for Information Economy at the Thailand Development Research Institute (TDRI), and on the workshop background materials and presentations, and was edited by Joanna Goodrick. The views expressed in this report are those of the authors and do not necessarily represent the opinions of ITU or its membership.

Internet diffusion in South East Asia

Introduction

South East Asia is rich in interest for the study of telecommunications and the Internet. The ten countries that make up the Association of South East Asian Nations (ASEAN) – Brunei Darussalam, Cambodia, Indonesia, Lao PDR (Laos), Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam – are home to some 523 million inhabitants, 8.6 per cent of the world's population. ASEAN members range from some of the world's wealthiest nations to least developed countries (LDC). In terms of telecommunication development, the region is one of the major investment destinations due to its high rate of adoption of new technology. Although the Asian financial crisis, which erupted in 1997, brought about a slowdown in the pace of economic expansion and investment in telecommunications, the region has managed to bounce back within just a few years. For instance, the growth rate of investment in mobile phone infrastructure in the region has once again overtaken the global average growth rate. The growth rate of Internet users, which remained above the global average growth rate even during the period of economic crisis, continues to remain above global average levels (see Figure 1).

Figure 1 – ASEAN's Internet growth rate (per cent)
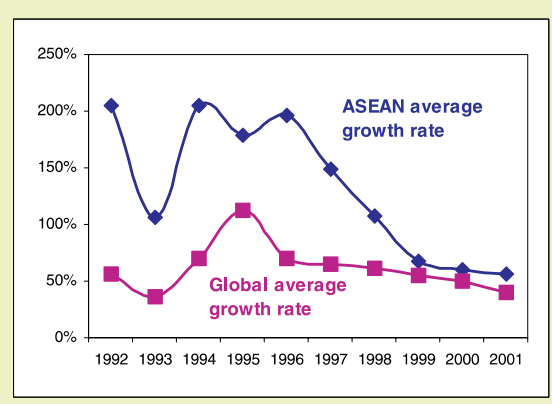
Source: ITU World Telecommunication Indicators Database.

In terms of regulatory structure, the region provides both positive and negative examples. While some countries have not yet separated telecommunication service provision from sector regulation, others have set up an independent telecommunication regulatory body. In some countries, the telecommunication and broadcasting regulators have been merged to form a 'converged regulator'. In terms of market strategies, the region also provides rich examples of successful Internet policies that might be adopted in other countries and regions of the world. Among the strategies that have proved successful are prepaid Internet cards, Internet cafés and nationwide dialling codes.

The region also has its sights set on becoming one of the world's centres of innovation. The success of the software development industry in India has sparked interest in the region, and many governments, notably those of Malaysia, Philippines, Thailand and Viet Nam, are endeavouring to foster their own software production centres. The region has successfully exploited its relatively low labour costs to drive manufacturing-based export growth in the past, and now wants to use this advantage for software development.

In November 2001, the International Telecommunication Union (ITU) convened a workshop to present the results of the ITU Internet Case Studies carried out for South East Asia during the year and to uncover and discuss the key issues affecting Internet developments in the region. One of the aims of the workshop was to shed light on the factors that help to accelerate, or retard, the development of the Internet in countries at different stages of economic and social development.

The case studies were carried out for Cambodia, Indonesia, Laos, Malaysia, Philippines, Singapore (carried out in 2000), Thailand and Viet Nam and provide a detailed overview of the telecommunication and Internet sectors in those countries. This includes profiles of the sectors, regulatory and policy frameworks, information on market players (government and private, national and foreign investors, development agencies, etc.) and telecommunication infrastructure. The case studies also show how ICTs are being used in the commercial (e-commerce), government, and health and education sectors. They provide a methodological framework for analysing the status of Internet developments and make recommenda-tions that may be useful to policy-makers and regulatory agencies. These case studies are included on the CD-ROM which accompanies this brochure. Also included are presentations and documents by speakers from across the region, covering, *inter alia*, commercial aspects of the Internet, Internet indicators and e-readiness assessments, applications of the Internet in the region, and economic and social influences on Internet use.

Among the major topics raised and discussed during the workshop were: Internet policy, public access and awareness, software parks, international charging, telecom operators and markets, regional cooperation and the role of market research. Finally, the role of ITU and other international organizations was also discussed.

One of the key points to emerge from the workshop was that, contrary to the widely perceived notion that the Internet market is (or should be) unregulated, policy-makers need to apply Internet policies which provide for balanced regulation and licensing arrangements of the sector. This is particularly valid in the current era of convergence, if countries are to benefit fully from the opening

up of the market to competition and the potential for operators to expand into new activities. A coherent and well-balanced Internet policy will ensure maximum social benefits for all segments of the population (e.g. promoting Internet projects in schools, promoting the development of local content, etc.), and at the same time provide for the economic benefits of a growing market. This could also lead to higher Internet penetration rates in the less wealthy countries of the region and help to bridge the regional 'digital divide' that currently exists.

Regulatory and policy aspects of the Internet in South East Asia

Since the commercialization of the Internet in the mid-1990s, the myth has been rife that, free from government intervention and left to its own forces, the free market will deliver the desired outcomes in terms of investment, consumer welfare and innovation. It is argued that, unlike the traditional telecommunication service markets, the Internet market should remain unregulated and be left entirely to the private sector. In reality however, almost all governments, including all countries in South East Asia, intervene in the Internet market in one way or another.

There are many reasons why governments need to intervene in this way. Key among these is the concern that, left to market forces alone, a gulf may appear between higher- and lower-income segments of the population in terms of Internet access, i.e. the so-called 'digital divide' problem. To promote more equitable access to the Internet, and to reduce access prices, competition needs to be introduced. At the same time promotional measures need to be implemented to target the underprivileged segments of the population. Moreover, consumer concerns, such as security, privacy and content, need to be addressed by specific policy measures.

Market access

More providers, *ergo* improved access?

Questions frequently arise relating to the number of Internet service providers (ISPs). Is there such a thing as an optimal number of ISPs? Which criteria should determine a government's decision on how many licences to issue? The number of licensed ISPs in each country in the region varies widely, ranging from two in Laos to about 150 in Indonesia and the Philippines (see Table 1). This disparity reflects the differences in market access policies applied by each government.

Table 1 – Internet Service Providers (ISPs) in South East Asia

Country	Number of ISPs*	Registry	ISP association
Cambodia	3/3		No
Indonesia	150/60	www.iix.net.id/iix.html	APJII
Lao PDR	2		No
Malaysia	18/?	www.cmc.gov.my	No
Philippines	150/50	www.piso.org.ph	PISO
Singapore	44/?	www.ida.gov.sg	No
Thailand	18/18	www.thnic.net	ISP Club
Viet Nam	5/4		No

* Number of licensed ISPs/number of ISPs in operation.
Source: Presentation by Michael Minges, Workshop on Internet diffusion in South East Asia.

In Cambodia, Laos and Viet Nam, no new ISPs have been licensed for several years. In Thailand, there is no limit on the number of licensed ISPs but, as at December 2001, the licensing process was frozen pending the establishment of the new telecommunication regulator. In some countries, there is also a significant gap between the number of licensed ISPs and the number of ISPs in operation. In Indonesia, for example, there were some 150 licensed ISPs at the beginning of 2001, but only around 60 were actually providing services.

Several policy-makers have expressed their concern that unrestricted market entry in smaller markets could discourage serious investors from making a long-term commitment to developing Internet infrastructure in the country. This would eventually lead to higher access prices. An in-depth look at South East Asian countries suggests that the contrary is true: the more ISPs there are, the lower the prices **(see Figure 2)**.

As elsewhere, incumbent telecommunication operators in South

Figure 2 – Competition among ISPs drives down prices
Internet access cost (USD/30 hours) and number of ISPs in selected ASEAN countries
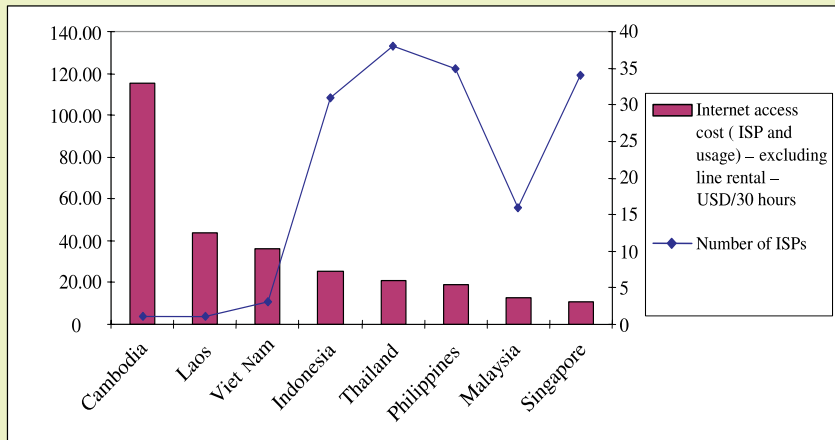
Source: OECD; ITU; Netcraft.

East Asia are highly active in providing Internet access services. In most of these countries, the incumbent telecommunication operator is the largest ISP, as well as the main provider of infrastructure such as international bandwidth and leased lines **(see Table 2)**. However, there are some signs of a

downturn in regional markets, partially caused by the regional economic crisis and partially by ill-judged investment decisions. To remain competitive and profitable, telecom operators will have to develop more practical business models based on successful examples from other countries.

Table 2 – Incumbent operators and the Internet
In selected ASEAN countries

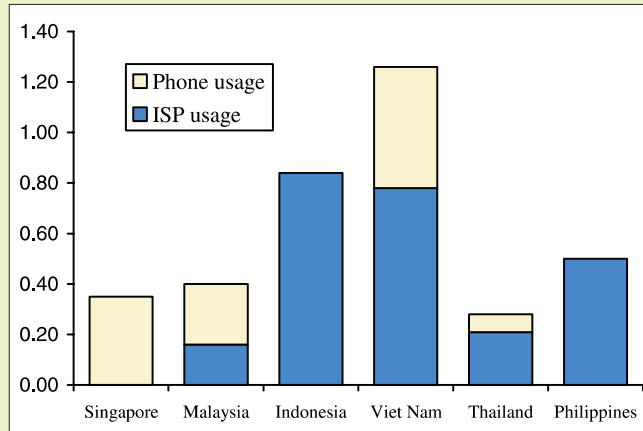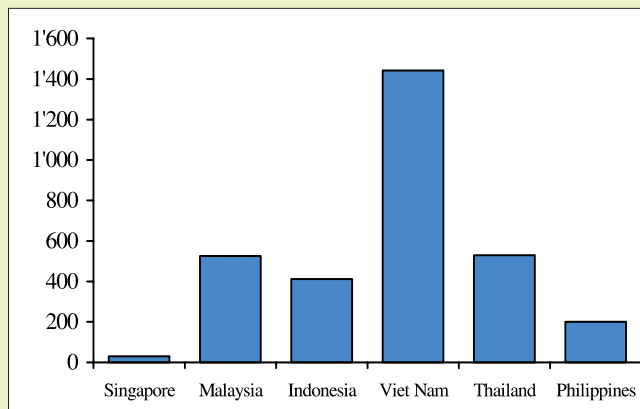| Incumbent	ISP	Remarks
Telkom (Indonesia)	TelekomNet	Market leader with 10% of post-paid users.
Telecom Malaysia (Malaysia)	TMNet	Market leader with around 65% of users.
PLDT (Philippines)	Infocom	Acquired by PLDT in 1998, joint-ventured in 1996. One of the top three ISPs.
CAT (Thailand)	CAT has about one-third of each of the total 18 ISPs.	Internet Thailand initial public offering (IPO). (Sold in November 2001.)
Singtel (Singapore)	SingNet	First ISP to launch, now market leader.
VNPT (Viet Nam)	VDC	Monopoly Internet access provider and Internet exchange provider. Retail market leader with 60% of users.

Source: ITU ASEAN Internet Case Studies.

Regulation of content

South East Asian countries have adopted a variety of approaches towards regulating the content of the Internet. Some countries, such as Indonesia, Thailand and the Philippines, have no explicit regulations on Internet content. But this does not mean that content is not regulated. In Thailand, for example, Internet pornography is considered illegal, just as is printed pornography. Other countries, including Laos, Singapore and Viet Nam, have explicitly introduced content control mechanisms, either in the form of firewalls to block pornographic sites, or by requiring the mandatory registration of content providers.

Pricing

Pricing and price structures also vary across the region. Dial-up access to the Internet is composed of two parts: the access charge levied by the ISP, and telephone usage charge (see Figure 3a). Various methods are used to calculate the telephone usage charge, with some countries, such as Cambodia, Laos, Singapore and Viet Nam, charging on a time-metered basis, and others, like Thailand and the Philippines imposing a flat rate for local calls. Indonesia and Malaysia grant a discount rate for telephone usage to access the Internet, while Singapore charges for telephone calls but offers free Internet access bundled with the calls.

Figure 3a – Internet access price per hour (USD)
In selected ASEAN countries

Phone usage
ISP usage

| | 1.40 | 1.20 | 1.00 | 0.80 | 0.60 | 0.40 | 0.20 | 0.00 |

Singapore   Malaysia   Indonesia   Viet Nam   Thailand   Philippines

Figure 3b – Internet 64 kbit/s leased-line price comparison (USD per month)
In selected ASEAN countries

| 1'600 | 1'400 | 1'200 | 1'000 | 800 | 600 | 400 | 200 | 0 |

Singapore   Malaysia   Indonesia   Viet Nam   Thailand   Philippines

Source: ITU ASEAN Internet diffusion case studies.

As regards access charges, dial-up services are increasingly becoming commodities. The case of Thailand clearly demonstrates this phenomenon. In 1995, when competition was still limited, most ISPs in the country offered the service based on a monthly subscription fee. In 1998, prepaid access cards became a widely available payment method, enabling customers to avoid the monthly subscription charge. Also around this time, a pricing scheme was introduced that was gauged according to the time of day. In general, users accessing the Internet during off-peak hours benefit from discounts. In 2001, some ISPs started to offer flat-rate Internet access services. Furthermore, the Telephone Organization of Thailand (TOT) started to offer its telephone customers free

Internet access to domestic websites. Due to the commodification of access services, ISPs in Thailand have been forced to find alternative sources of revenue, and to move away from being 'pure' access providers to being, in most cases, providers of content, applications and e-commerce.

Leased-line prices also vary considerably across the region. For instance, while a 64 kbit/s leased-line costs as little as USD 30 a month in Singapore, the price is more than USD 1,400 in Viet Nam (see Figure 3b). In order to achieve lower leased-line prices, more competition needs to be introduced in infrastructure provision.

From an ISP's perspective, it is important to distinguish between the various cost components of international connectivity, which is made up of two elements: the cost of international leased circuit and the cost of a connection to the Internet hub. The first component, connection to the Internet backbone through satellites or submarine cables, is traditionally controlled by relatively few companies and is therefore potentially subject to market dominance. The second component, international Internet connectivity, tends to have lower prices compared to the first component owing to the relatively low barriers to switching between suppliers. However, the prices of these two components cannot always be separated, as there is widespread bundling of connectivity with international circuits.

Size matters when it comes to international Internet connectivity, and economies of scale are important in determining the price paid for international bandwidth. Countries with small markets and those that are landlocked (and therefore do not have access to undersea cables) pay more for Internet connectivity than others and are often among the least developed countries. Special initiatives should be designed to provide affordable international bandwidth for this group of countries. For instance, countries could pool their bandwidth requirements and develop regional backbones. Infrastructure costs could also be reduced by liberalizing international gateways.

International bandwidth charges

Historically, the full costs of international links have been imposed on Asian ISPs wishing to connect to North America. Despite the fact that traffic has become more symmetrical between North America and Asia, this model is still being used. This means that North America-based ISPs are getting a free ride on trans-Pacific links, even though the links may carry a significant amount of traffic initiated by North American customers wanting to access Asian sites. This increases operating costs for non-North America ISPs, effectively widening the digital divide.

One point to emerge from the workshop was that the issue of international bandwidth charging should be placed at the top of the agenda and be discussed at appropriate forums, such as ITU (through the ITU study groups, for example) and other relevant international and regional forums.

It is also important for governments and industries in the region to continue to work together in seeking a solution. A balance needs to be struck between ensuring that the private sector continues to lead the way, and fulfilling the public objective of providing equitable access. To that end, possible solutions include information exchange and dialogue through international and regional organizations and the promotion of regional industry-to-industry discussions,

an example of which is the ASEAN ISP dialogue. The goal of this dialogue, which was set up by ASEAN to discuss areas of cooperation among the various ISPs in the region, is to improve the conditions under which ASEAN ISPs operate for the benefit of the development of the regional, and global information infrastructure.

Internet telephony

South East Asian countries have adopted different policies towards the operation of Internet telephony or Voice over Internet Protocol (VoIP). Most countries in the region approve the use of the technology but allow only licensed telecommunication operators to provide the service. Some countries, like Malaysia and Singapore, have granted licences for VoIP providers. Others, like Thailand, have so far limited service provision to State-owned telecommunication operators. There is also a general tendency for less developed countries, such as Cambodia and Laos, to prohibit the provision of VoIP for fear that the service might erode State revenues from telecommunication services. In practice, however, the VoIP service is widely available and has become popular in these countries. In Viet Nam, for example, IP telephony now accounts for more than 40 per cent of the market for calls between Hanoi and Ho Chi Minh City. It is important for regulators to recognize that bans against IP telephony are hard to enforce, and that it might be better to adopt more realistic approaches. One such approach might be to license IP telephony providers and require that they contribute to universal access goals, just like traditional telecommunication operators.

Broadband

Compared to East Asian countries such as the Republic of Korea and Japan,

South East Asian countries' broadband services are still in their infancy stages, with the exception of Singapore, where there are more than 200 broadband applications. In the Philippines, a competitive cross-media competition framework has been established to allow competition between cable modems, digital subscriber lines (DSL), local multipoint distribution services (LMDS) and fixed wireless, which has pushed prices down to about USD 50 per month for residential users. Despite this, however, market demand seems to be rather low and saturated at around 10,000 subscribers. This is due to low-quality cable television (CATV) networks that need major upgrading, and to the low speed of DSL. In addition, foreign investment restrictions and economic uncertainty limit scope for expansion. In Thailand, some providers have started to provide DSL, cable modems and satellite broadband, but incumbent telecommunication operators are still not actively involved in the market and user numbers lie in the few hundreds. In Viet Nam, although DSL has been piloted, the number of users is still marginal.

Quality of Service

Few countries in the region have introduced regulated or provider-guaranteed quality of Internet services. Only Singapore publishes clear quality of service (QoS) assessments. Examples of QoS are *system accessibility*, which measures the ease with which subscribers are able to access the network; *service activation*, which refers to the elapsed time between the receipt of the customer application and the activation of the service, and *number of complaints*, which refers to the total number of complaints received from subscribers per 1,000 subscribers in a given month. The Philippines' regulator requires operators to guarantee QoS,
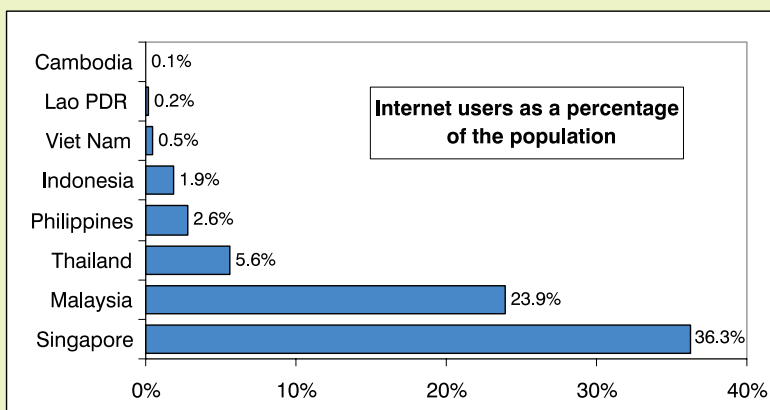
but does not enforce this requirement. In Thailand, system accessibility cannot be ensured because few alternative telecommunication links are available. This is due to the monopoly that exists in many market segments.

Universal access

Internet penetration, defined as the ratio of Internet users to the population, varies among South East Asian countries. Although the penetration rate is quite high in upper-middle income countries like Singapore (29.9 per cent) and Malaysia (15.9 per cent), it is less than one per cent in lower-income countries like Cambodia, Laos and Viet Nam (see Figure 4). This demonstrates the region's 'digital divide' in terms of access to the Internet.

Figure 4 – Internet penetration (year 2001) *In selected ASEAN countries*

Country	Internet users as a percentage of the population
Cambodia	0.1%
Lao PDR	0.2%
Viet Nam	0.5%
Indonesia	1.9%
Philippines	2.6%
Thailand	5.6%
Malaysia	23.9%
Singapore	36.3%

Source: ITU, World Telecommunication Indicators Database.

Survey data shows that the vast majority of the population in South East Asia cannot afford individual Internet access. This is due in part to sheer costs, but is also due to the lack of access to telephone lines and personal computers. This is illustrated in Thailand for example, where, of the 2.27 million households with Internet users, only about 21.5 per cent of households accessed the Internet from at home, while the remaining 78.5 per cent made use of Internet cafés, schools and workplaces. If Internet access is to be boosted, it will have to be through public locations such as schools, universities and Internet cafés. In the region, Indonesia has been a trendsetter with its proliferation of Internet cafés, termed '*Warung Internet*', or '*Warnets*'.

Despite the low levels of Internet penetration, universal access policies geared towards improving the situation are still lacking in most South East Asian countries. Universal access policies are either non-existent, insufficient or unclear. Thailand is among the few countries that are endeavouring to enact laws to ensure universal access to the Internet. More positively, many non-governmental organizations (NGOs) are active in parts of the region, playing a useful, and crucial, role in providing Internet access in rural areas.

Promotion

Governments also have a key role to play in promoting the Internet and boosting the growth of the Internet industry. This may include the introduction of industry incentives for training and content development, as well as projects to provide Internet access in public locations such

as schools and libraries. The National Electronics and Computer Technology Center (NECTEC) in Thailand, for example, has spearheaded numerous government initiatives for ICTs. The Center has been instrumental in guiding the SchoolNet project that, by March 2002, had provided free Internet access for over 4,300 schools.

Promotional measures may be necessary in those areas where market forces alone will not lead to an optimal level of Internet service provision. Broadband Internet, content development and industrial collaboration are among those areas where promotional efforts can be beneficial. Another major barrier to reaping the full benefits of using the Internet for development is the shortage of relevant applications. Governments should play a pivotal role in promoting national 'killer applications' through e-government initiatives. Singapore is a clear leader in this area, and Malaysia is also implementing many e-government flagship projects in the context of the 'Multimedia Super Corridor', a major software park project devoted to IT growth in the country.

Socio-cultural factors

Although it often seems that the level of Internet penetration largely depends on national income and other economic factors, it needs to be recognized that the digital divide within the region is not purely an economic problem, but also a social and cultural one. Research shows that education levels are a key determinant of the level of Internet penetration. This is illustrated by the fact that countries where the population only has primary education tend to have low levels of Internet penetration. Conversely, countries where enrolments in tertiary education reach into double figures are likely to have high levels of Internet penetration (see Table 3). This may be partly due to the fact that many Internet users in South East Asian countries are students who access the Internet from universities. Another key point is that accessing the Internet requires a level of literacy that goes beyond basic reading and writing skills.

Furthermore, a significant proportion of Internet content is in English – a foreign language for most South East Asians. This barrier can be partially overcome by the provision of foreign language teaching and training, but also by the development of content in local languages.

Table 3 – Education and Internet penetration *In selected ASEAN countries*

Country	Gross primary school enrolment (1996)	Gross secondary school enrolment (1996)	Gross tertiary school enrolment (1996)	Internet penetration (2001)
Singapore	94	74	38.5	29.9
Malaysia	100	64	11.7	15.9
Thailand	87	56	22.0	3.8
Philippines	100	77	29.0	2.6
Indonesia	100	51	11.3	0.9
Viet Nam	100	47	6.9	0.25
Cambodia	100	24	1.2	0.05
Lao PDR	100	28	2.8	0.1

Source: UNESCO (education) and ITU (Internet penetration).

The digital divide therefore needs to be addressed not only from an economic perspective, but also from a socio-cultural one. Education levels need to be raised and Internet access and training should be provided to all students at the tertiary level. It would also be beneficial to develop content in local languages. In this regard, many South East Asian countries have developed fonts to display Internet content in their local languages. For example, Cambodia has developed *Tuek Trey*, a font converter for Windows.
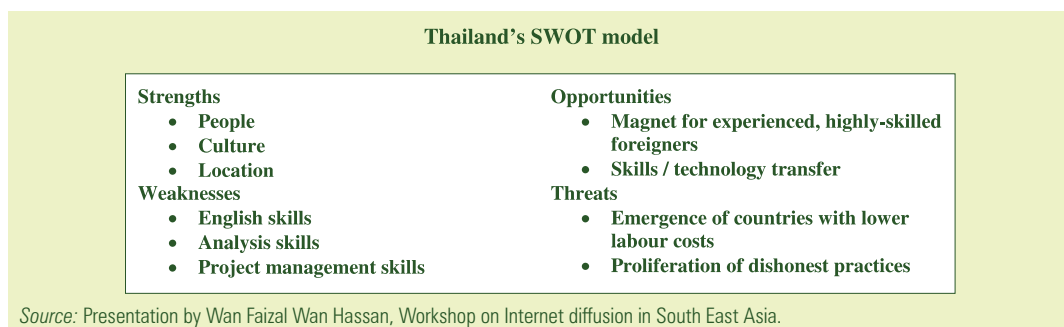
Software parks

The enormous success of the United States' Silicon Valley and the software development industry in India has excited interest around the globe. Many governments, including in South East Asia, are trying to foster their own software havens. The basic resource needed for computer programming is brainpower, so relatively little investment is required. Software park projects that have already been established in the region include Malaysia's Multimedia Super Corridor, the Saigon Software Park, Software Park Thailand, Bali Camp, and the Philippines' IT Parks. Potentially, such software park projects promise to generate foreign exchange and investment, reduce the brain-drain problem by providing skilled manpower with attractive jobs, and generate local IT expertise.

Telecommunication infrastructure is a key component of most software development centres. In India, the government's decision to let software parks have their own Internet connectivity has contributed to growth. Viet Nam, which offers discounted Internet access for software parks, is also thinking of moving in this direction. Thailand's Software Park, located on the outskirts of Bangkok, is fully occupied with some 40 companies. Its goals include attracting foreign investment and developing high-quality and competitive software, especially for mobile Internet applications.

It is still too early to tell how software centres will fare in the region. One danger is that software centres may become islands of IT expertise while the remainder of the country falls behind. Also, with so many IT parks, the market is getting increasingly competitive. Countries need to determine their advantages, distinguish themselves from others and find niche markets. A crucial issue will also be the ability to attract, keep and train skilled labour, particularly when almost all countries around the world have a shortage of IT personnel. Thailand has developed a 'SWOT' analysis model that analyses the country's particular strengths, weaknesses, opportunities and threats (see Figure 5) in a way that could serve as a model for others.

Figure 5 – Assessing strengths, weaknesses, opportunities and threats: Thailand's SWOT model

The success of software centres may be determined by countries' ability to attract and keep skilled labour, to assess their assets and disadvantages, and to find niche markets.

Thailand's SWOT model

Strengths	Opportunities
• People	• Magnet for experienced, highly-skilled foreigners
• Culture	• Skills / technology transfer
• Location	
Weaknesses	**Threats**
• English skills	• Emergence of countries with lower labour costs
• Analysis skills	• Proliferation of dishonest practices
• Project management skills	

Source: Presentation by Wan Faizal Wan Hassan, Workshop on Internet diffusion in South East Asia.
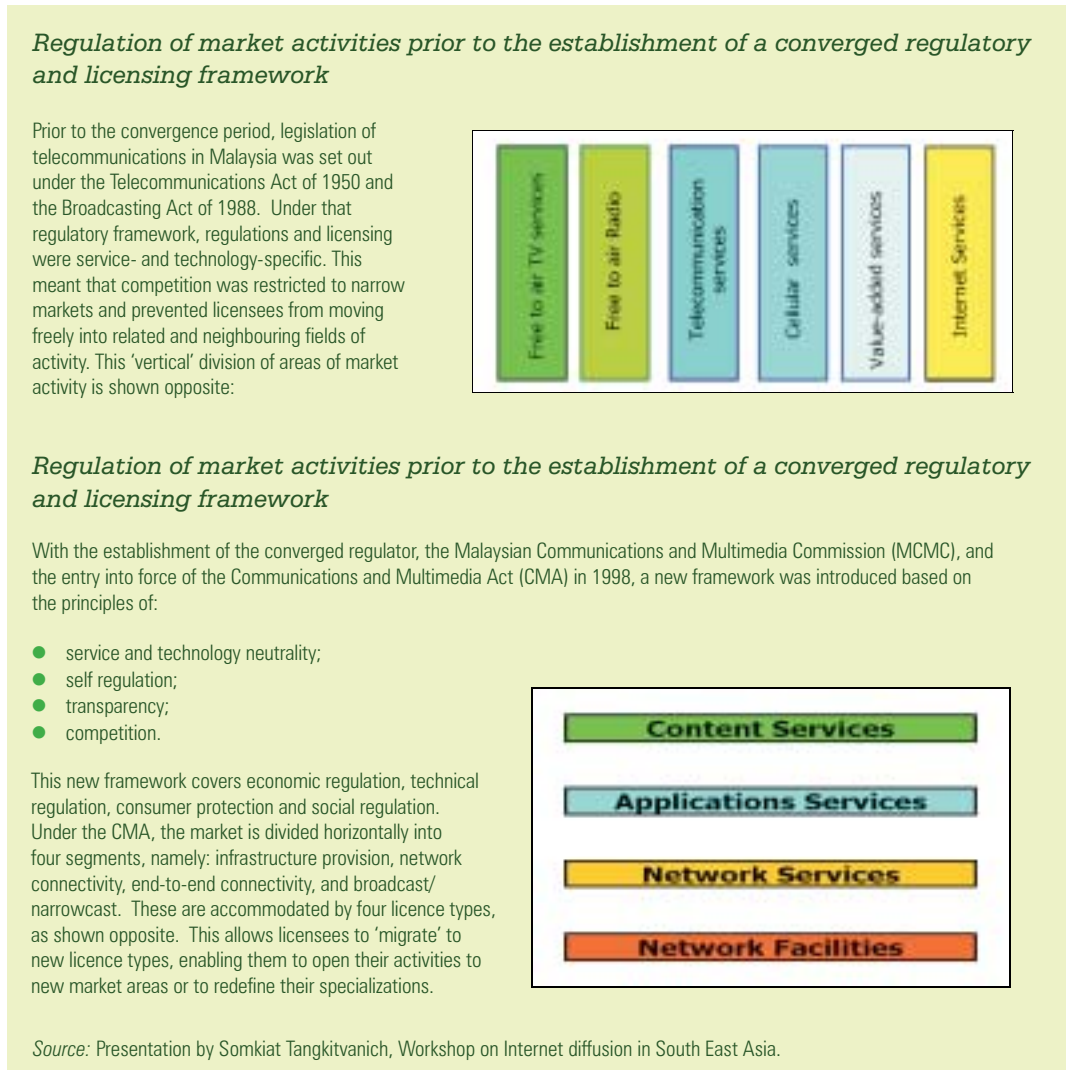
Regulatory implications of convergence

The convergence of telecommunications, information technology and broadcasting also has important regulatory implications. With digitization, the same information can now be transported over diverse types of networks that have traditionally been regulated by different government authorities. While a few countries, like Malaysia and Singapore, have taken into account the impact of technological convergence by merging their telecommunication, information technology and broadcasting regulators into a single agency, most countries still rely on the pre-convergence regulatory regime, and some have not yet even separated regulatory functions from operational functions.

Figure 6 – Regulation in Malaysia: The pre-convergence and post-convergence periods

Regulation of market activities prior to the establishment of a converged regulatory and licensing framework

Prior to the convergence period, legislation of telecommunications in Malaysia was set out under the Telecommunications Act of 1950 and the Broadcasting Act of 1988. Under that regulatory framework, regulations and licensing were service- and technology-specific. This meant that competition was restricted to narrow markets and prevented licensees from moving freely into related and neighbouring fields of activity. This 'vertical' division of areas of market activity is shown opposite:

Regulation of market activities prior to the establishment of a converged regulatory and licensing framework

With the establishment of the converged regulator, the Malaysian Communications and Multimedia Commission (MCMC), and the entry into force of the Communications and Multimedia Act (CMA) in 1998, a new framework was introduced based on the principles of:

- service and technology neutrality;
- self regulation;
- transparency;
- competition.

This new framework covers economic regulation, technical regulation, consumer protection and social regulation. Under the CMA, the market is divided horizontally into four segments, namely: infrastructure provision, network connectivity, end-to-end connectivity, and broadcast/ narrowcast. These are accommodated by four licence types, as shown opposite. This allows licensees to 'migrate' to new licence types, enabling them to open their activities to new market areas or to redefine their specializations.

Source: Presentation by Somkiat Tangkitvanich, Workshop on Internet diffusion in South East Asia.
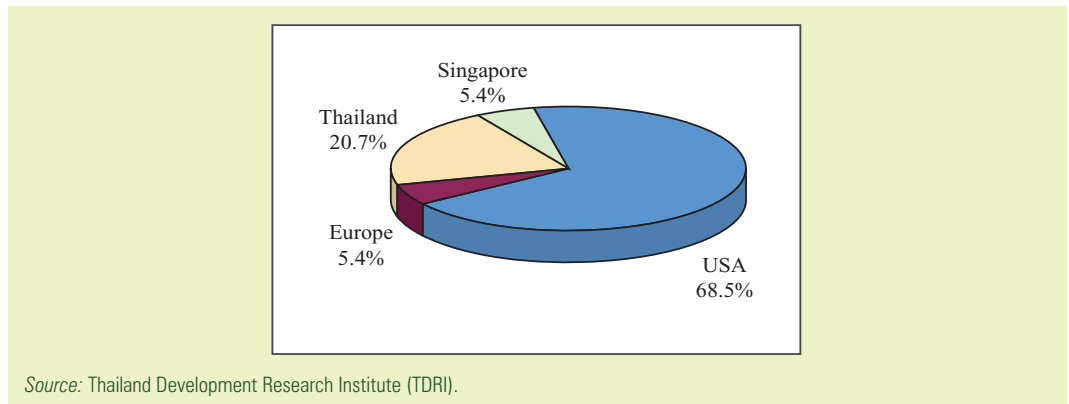
Adverse effects of State intervention

Although the Internet market needs to be managed and regulated, some types of government intervention can be detrimental to Internet development. The case study on Internet regulation in Thailand shows that a State monopoly in the Internet market results in high leased-line prices, low penetration of Internet use and mass migration of web hosting business to foreign countries. For example, 68.5 per cent of Thai language web portals are located in the United States, 5.4 per cent in Europe and 5.4 per cent in Singapore. Only 20.7 per cent of the sites are located in Thailand, even though most of their targeted customers are in Thailand (see Figure 7). This generates unnecessary international traffic and drives up domestic ISPs' bandwidth costs. It is estimated that the annual loss due to the prevalence of a State monopoly in the international gateway market amounts to THB 230 million (USD 5.25 million).

Figure 7 – Locations of Thai web portals

Source: Thailand Development Research Institute (TDRI).

Other forms of government intervention in the Internet market may also have adverse effects on the market. In particular, the Thai case study shows that, by requiring ISPs to transfer one-third of their shares to the state agency without any actual capital payment as part of the concession, government intervention distorts the market. Most ISPs tend to under-report their net profits to avoid sharing them with the State agency. This makes it more difficult to obtain reliable market information, which is necessary for the establishment of appropriate policies.

Role of private operators

The private sector in South East Asian countries employs an array of marketing strategies for the provision of Internet access. Those that have proved the most successful are:

● Prepaid Internet cards: In the Philippines, more than 40 per cent of Internet use is through prepaid and the service is growing fast. In Thailand, prepaid Internet access service is also highly popular, with more than 70 per cent of the accounts being prepaid. Prepaid packages (see Figure 8) offer a convenient way of subscribing through a variety of retail outlets, including bookstores and convenience stores. Users can also easily recharge the prepaid cards online, via their mobile phone or at automatic teller machines (ATMs). Moreover, prepaid offers a

cheap and flexible pricing scheme with no long-term commitment to an ISP and it allows users that might not qualify for a long-term subscription to use the service. From the ISP perspective, prepaid cards provide positive cash flow and reduce the risk of consumer default on payments.

- Internet cafés and public access: In many South East Asian countries, only a small fraction of users access the Internet from home. The current penetration rate is sustained by access from Internet cafés and other public access points. In Indonesia, for example, there are more than 2,500 *WarNets*, or Internet cafés, providing public Internet access. In the wake of the 1997 Asian crisis, many big conglomerates in Indonesia went bankrupt. At the same time however, small-scale small and medium enterprise (SME) ventures offering Internet access to the public started to spring up in major cities throughout the archipelago. At the end of the year 2000, the number of *WarNets* in Indonesia reached 2,500, providing about 20,000 PC-based access points to the Internet.

- Nationwide dialling codes: In Viet Nam, around 40 per cent of users dial up via 1268 and 1269 numbers, without any pre-registration.

In addition to each individual provider, a group of ISPs can collectively play a vital role in developing the Internet market. Consider the case of the Association of Indonesian Internet Service Providers, a non-profit organization founded in 1996 with a membership composed of all 27 ISPs. Some early achievements of the association include the creation of a national Internet registry, the establishment of a network information centre (NIC) and the promotion of Internet use in schools. The Association has also operated an Internet exchange called 'IIX' since June 1997, without any government funding. The exchange helps to keep traffic within the country, thereby reducing the demand for international bandwidth and contributing to the growth of national websites.

Figure 8 – Prepaid Internet packages in Thailand
Examples of packages currently on the market

Source: Presentation by Morragot Kulatumyontin, Workshop on Internet diffusion in South East Asia.

Role of non-governmental organizations (NGOs)

NGOs can also play a crucial role in the development of the Internet in less developed countries, where government and private sector involvement may be limited. For example, in Cambodia, where the level of Internet penetration is one of the lowest in South East Asia, one NGO, the Open Forum of Cambodia, has contributed to providing Internet access to schools by providing technical assistance. It has also developed *Tuek Trey*, a font conversion program for Windows, and it runs a mailing list, promotes the use of newsgroups and provides technical training. Ideally, such initiatives should be fostered through collaboration with governments and international organizations, which should consider partnering with NGOs to provide Internet access in developing countries.

Market information

Accurate and timely information is critical for the formulation of Internet policy. However, few countries in the region have developed an adequate or effective system to collect market data. This is partly because many Internet parameters are more difficult to measure than might be expected. In the first place, an appropriate and workable definition is required: in order to measure Internet penetration, for example, a definition needs to be established for 'Internet users'. The number of users is not necessarily identical to the number of subscribers, as many users may be sharing the same Internet account. It is also unclear whether the definition of a 'user' includes only those who access the Internet frequently, or whether occasional users are also included. Access-on-demand and prepaid cards further complicate the sums.

Even where an appropriate definition exists, regular household surveys need to be conducted to monitor changes in the number of users. In South East Asia however, with the exception of Singapore, such surveys are few and far between. Although Thailand has recently begun to conduct its first household survey of ICT application, in other countries of the region only ad hoc surveys are available. It is hardly surprising, then, that there are considerable disparities in estimates of numbers of users. There is therefore a clear need for governmental organizations in charge of promoting the Internet to collaborate with national statistical research agencies to design questionnaires on ICT-related matters, and to collect the required data on a regular basis.

Role of international and regional organizations

e-ASEAN

First mooted at the ASEAN Summit in Hanoi in December 1998, the Working Group for ASEAN Information Infrastructure (WGAII) was formed to develop the plan for the Asian Information Infrastructure (AII). The objective is to establish high-speed direct connections between national information infrastructures. This plan later grew to become the e-ASEAN initiative. Under this initiative, the Working Group has also produced an e-readiness study aimed at developing an understanding of the level of e-readiness in ASEAN countries and to provide recommendations for positioning ASEAN in the digital economy.

The e-ASEAN Task Force, an advisory body to ASEAN composed of representatives from the public and the private sectors from ASEAN member countries, was created by ASEAN in late 1999 to develop a broad and comprehensive action plan for an ASEAN e-space and to develop regional competencies to compete in the global information economy. In developing the

action plan, the Task Force has been asked to examine the physical, legal, logistical, social and economic infrastructure needed to create the basis for ASEAN's competitiveness in the twenty-first century. In addition to the above initiatives, the activities of e-ASEAN include the promotion of electronic commerce, liberalization and facilitation of trade in ICT products and services, capacity building and e-society and e-government (see the e-ASEAN Task Force website at: www.e-aseantf.org).

Also in progress is the ASEAN ISP Forum, which aims to facilitate and promote the enhanced integration and interoperability of regional ISP services and the optimization of Internet traffic within the region.

Role of ITU

The workshop concluded with a discussion of the role of ITU and other international organizations. The current involvement of ITU in Internet diffusion research projects dates from 2000, when the ITU Internet Case Studies project was initiated. This project has the objectives of improving market information, examining and analysing the factors that influence Internet diffusion, and offering policy recommendations. Each case study consists of a country overview; a review of the telecommunication and media sector; a review of the Internet market; a survey of Internet use in the government, health, education and business sectors; and finally a comparative analysis and practical policy recommendations. ITU also provides a forum for the discussion of policy issues that are of interest to its Member States – of which the workshop on Internet diffusion in South East Asia is an example.

At the workshop on Internet diffusion in South East Asia, useful cross-country comparisons were made – and conclusions drawn – from the case studies. It was suggested that possible future roles for ITU might include the organization of theme-specific workshops on important issues such as IP telephony, national backbones and international Internet charging. ITU might also help countries improve their collection of ICT data and raise awareness among policy-makers as to the challenges and opportunities of ICTs. Further collaboration between ITU and other inter-governmental organizations involved in ICT projects was also encouraged.

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