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Bridging the Digital and Regulatory Divide in ASEAN

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1. Introduction

It is now widely recognized that the digital revolution presents both a threat and an opportunity to global development. On the one hand, it forms the basis of a new social divide – the so-called digital divide between those connected and unconnected to the global information network. It raises the specter of a wider income divide within and among nations, as the benefits of the new information and communication technology (ICT) accrue disproportionately to the rich, while the poor neither have the resources to access nor to use them effectively. On the other hand, ICT could be an effective instrument to achieve social, economic and political objectives. For one, it could improve the delivery of public education and health services by allowing access to marginalized and geographically isolated groups. It could also empower the poor politically by making policies and political processes more transparent, and improving communication between the state and its citizens. The United Nations (UN), in the Millennium Declaration, emphasized these potentials when it admonished member nations “to make available the benefits of new technologies, especially information and communications”¹ as they work towards eradicating global poverty.

Heeding to the UN call, the 10 countries comprising the Association of Southeast Asian Nations (ASEAN) forged the e-ASEAN Framework Agreement in November 2000, which aims, among others, to reduce the digital divide within and among its members. To achieve this vision of equality of access and use of ICT, the members agreed to develop and strengthen regional information infrastructure; facilitate the growth of e-commerce; liberalize trade and investment in ICT products and services; build the capacity of low income members, collectively referred to as CLMV

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(Cambodia, Lao PDR, Myanmar and Vietnam); and promote the use of ICT in the delivery of government services, i.e., e-government.

Since the Agreement, a number of regional initiatives have been launched. The first activity was an assessment of the ICT sector in each member state by means of a regional e-Readiness study conducted in 2001. This was followed by the adoption of a common legal framework for e-commerce and negotiations on Mutual Recognition Arrangement on telecommunications equipment. Since 2003, tariffs on ICT products have been eliminated in the six original members (namely, Brunei Darussalam, Indonesia, Malaysia, the Philippines, Thailand, and Singapore); the four newer members, CLMV, are committed to follow this lead in 2008. Under the Initiative for ASEAN Integration, at least eight ICT projects providing technical assistance to CLMV have been initiated. A regional database on ICT sector is being developed to monitor progress and impact of regional and national initiatives; a regional research network on ICT called ASEAN Science and Technology Net (ASTNET) was recently formed.

Despite these initiatives, however, the digital divide in ASEAN remains real and palpable. Signs that the gap is being bridged exist but are hardly noticeable. Perhaps four years of regional cooperation is too short to expect significant outcomes, especially since the digital divide is proving to be resilient like the income divide, not only in ASEAN but also globally.

The crux of the matter is that little is understood about the phenomenon of digital divide other than it exists. There is yet no consensus on fundamental questions such as what it is and how it is measured. Does it refer to the huge disparity in access to computers, as initially perceived, or to the whole gamut of ICT infrastructure? A deeper issue is what it represents – whether digital divide is simply a manifestation of income divide or a distinct form of inequality. Hitherto, its causes have been cursorily treated in the literature. Nonetheless, recent quantitative analyses suggest that while income is a major determinant, investment in human resource, infrastructure and regulatory quality are also contributing to the gap.²

A phenomenon as complex and dynamic as global digital divide may well be best understood as it applies on a smaller scale, like in a regional level. And ASEAN presents an interesting case to explore the various dimensions of global digital divide.

This is because the heterogeneity of ASEAN membership, both in economic and political spheres, mirrors much of the divisions existing in the global community that engender and reinforce the digital divide.

Using ASEAN as a case, two dimensions of the digital divide are examined in this paper, namely: the nature and extent of the divide, and the link between digital divide and regulatory environment. On the first issue, since it is almost taken for granted that digital divide exists, the metrics used to establish its existence have been hardly subjected to rigorous analysis. It is shown that conventional measure fails to distinguish between digital divide and income inequality, and that an alternative measure may be able to highlight digital divide as a distinct phenomenon. Having established that digital divide exists not only because of disparities in incomes, the second task is to relate the divide to the disparities in regulatory environment. The argument put forward is that countries that have deftly combined market reforms and intervention to ensure broad-based take-up of ICT are on the favored side of the divide, while those with flawed regulatory environment belong to the other side.

The succeeding sections are organized as follows. Section 2 describes and measures the huge disparities in access and use of ICT among ASEAN economies, as well as their relative positions in the global digital divide. While income is a major factor explaining a country's position in the divide, it is shown that some economies have achieved higher ICT penetration than is normally supported by their incomes, while ICT penetration in others falls short of the trend. Such differences in ICT performance are traced in Section 3 to diverse regulatory environment prevailing in these economies, where in some, the environment is conducive, in others, stifling, to the growth of ICT sector. Three aspects of regulatory environment are deemed relevant in explaining ICT performance: institutional arrangement, management of competition and implementation of universal service principle. Section 4 relates the findings of the preceding two sections and explores measures to close the gaps.

2. Digital Divide

The ASEAN Community is an interesting mix of frontrunners and laggards in the digital race. On one side is Singapore that often emerges in the lead in any ICT benchmarking exercise. Among 102 economies evaluated by the World Economic

Forum (2004), Singapore ranks second in network-readiness, i.e., on preparedness to participate in and benefit from ICT developments. Similarly, Singapore outranks some OECD economies, such as Japan and Australia, in the Digital Access Index developed by the International Telecommunications Union (ITU) where it places 14th among 178 economies. The Accenture (2004) also ranks Singapore as next only to Canada, and at par with the United States, in terms of eGovernment maturity. At the other end is Myanmar, the only country in Asia and one of only seven countries in the world whose effective teledensity remains less than 1 percent.³

The stark contrast in ICT penetration among ASEAN economies is apparent from Table 1, where ICT penetration is measured by the number of fixed line and cellular phone subscriptions, internet users and personal computers per 100 individuals. In terms of cellular phone penetration, for example, while there are 85 subscribers in every 100 persons in Singapore, the corresponding ratio in Myanmar is 12 in every 10,000 persons.

Table 1. ICT Penetration in ASEAN and Other Economies, 2003

Countries	Population (million)	GDP per capita (US\$), 2002	Fixed lines per 100 persons	Cellular per 100 persons	Internet users per 100 persons	Computers per 100 persons
Brunei	0.36	12,447	25.57	40.06	10.23	7.67
Cambodia	14.14	254	0.26	3.52	0.25	0.20
Indonesia	215.09	860	3.94	8.74	3.76	1.19
Lao PDR	5.68	328	1.12	1.00	0.27	0.33
Malaysia	25.17	3,870	18.16	44.20	34.53	14.68
Myanmar	53.22	122	0.68	0.12	0.05	0.56
Philippines	81.10	980	4.12	26.95	4.40	2.77
Singapore	4.20	20,894	45.03	85.25	50.88	62.20
Thailand	63.08	2,044	10.55	26.04	9.65	3.98
Vietnam	81.38	432	5.41	3.37	4.30	0.98
ASEAN	543.42	1,157	5.50	13.84	5.91	2.72
Asia	3,624.28	2,328	13.40	55.44	6.86	4.52
Africa	825.45	663	3.01	6.18	1.50	1.38
Americas	855.53	15,633	34.53	34.37	26.20	28.95
Europe	795.13	12,822	40.97	55.60	23.88	21.44
World	6,221.54	5,359	18.48	22.00	11.09	9.91

Source: International Telecommunications Union (ITU).

As a group, ASEAN appears to lag behind in ICT adoption by global standards, as its performance is only relatively better than Africa's. Clearly, the exemplary

performance of Singapore is being dragged by the lackluster performance of lower income members.

Generally, the ranking of countries in terms of penetration of the four ICT technologies follows their income ranking, but there are few exceptions. Most notable is Malaysia's higher ICT penetration rates in all except fixed lines compared to Brunei, even as the former's per capita is less than one-third of the latter. Vietnam's fixed line intensity has also overtaken the Philippines whose per capita income is more than twice as much.

The huge disparities in ICT penetration rates do not however establish the existence of digital divide. Rather, the digital divide is perceived to separate countries whose shares of world's ICT infrastructure exceed their corresponding shares in world population from those countries where the opposite condition applies. Thus, Table 2 presents the picture of the global digital divide.

Table 2. Shares of Income Groups in World's Population, Income and ICT Infrastructure, 2003 (percent)

Income Group	Population	Income	Fixed lines	Cellular subscription	Internet Users	Computers
Low income	40.4	3.4	6.9	5.3	5.5	3.0
Lower middle income	38.6	10.9	39.4	35.4	21.3	15.2
Upper middle income	5.4	6.2	6.0	8.8	7.0	5.7
High income	15.6	79.5	47.7	50.5	65.5	76.1

Source: Author's calculation based on ITU's data.

By comparing an income group's population share with its shares of ICT technologies, one is able to determine where the group lies in relation to the global digital divide. Low-income countries are below the divide of fixed line infrastructure because while they account for 40 percent of the world's population, they own less than 7 percent of the lines. By contrast, high-income countries are above the divide since they lay claim to about 48 percent of fixed line supply, while comprising less than 16 percent of the world's population. In all four ICT technologies, low-income

countries are below the divide, while upper middle income and high-income countries are above it. The lower middle-income group is below the divide in all except fixed line technology.

The foregoing interpretation of digital divide is analogous to the determination of inequality in income distribution. The basis for judging whether income distribution is skewed in favor of any group is by comparing a group's population share with its income share. On surface, the analogy is useful for consistency. But it raises the issue if the coincidence of the two divides implies that they are one and the same phenomenon. Or is digital divide distinct and a relevant phenomenon in itself?

Kenny et al. (2003) raise a more informed objection to the analogy. They argue that lower income economies having less access to ICT is almost a tautology; to expect otherwise is illogical. That is, one could not expect low income economies to have as many mobile phones or computers as high income ones for this would mean that the former would have to spend a much larger proportion of their income on ICT, leaving them with little (or none at all) to spend on their basic needs such as food. It is more sensible to expect one's ICT access to be proportional to one's income.

Applying the conventional criterion for determining a country's position in relation to the global digital divide, Table 3 defines which of the ASEAN economies are above the divide, and which ones are below it. Take Indonesia as an example. Its share of world's population is much larger than its shares in world's ICT infrastructure, thus, it is ranked below the divide.

Table 3. Shares of ASEAN Economies in World's Population, Income and ICT Infrastructure (percent)

	Population	Income	Fixed lines	Cellular subscription	Internet Users	Computers
Brunei	0.006	0.013	0.008	0.010	0.005	0.005
Cambodia	0.227	0.010	0.003	0.036	0.005	0.005
Indonesia	3.457	0.554	0.738	1.375	1.175	0.426
Lao PDR	0.091	0.005	0.005	0.004	0.002	0.003
Malaysia	0.405	0.288	0.398	0.813	1.264	0.608
Myanmar	0.855	0.018	0.032	0.005	0.004	0.051
Philippines	1.304	0.237	0.291	1.599	0.509	0.372
Singapore	0.068	0.264	0.164	0.262	0.311	0.438
Thailand	1.005	0.384	0.575	1.179	0.877	0.416
Vietnam	1.308	0.107	0.383	0.201	0.509	0.135
ASEAN	8.726	1.880	2.597	5.484	4.661	2.459

Source: Author's calculation based on ITU database.

A closer scrutiny of the positions of the ASEAN economies in relation to the global digital divide reveals however that these are not always predetermined by their income class. CLMV economies and Indonesia – all belonging to the low-income group – are positioned below the divide in all four technologies, while Singapore, belonging to the high-income group, is consistently above the divide. But Brunei, Malaysia, the Philippines and Thailand – belonging to different income clusters – are above the divide in some technologies, and below it in others.

Such observation underscores the importance of distinguishing the impact of income from other factors affecting ICT adoption, hence, of changing the basis of reckoning the digital divide. If one adheres to the more reasonable expectation of economies adopting ICT at the rate determined by their incomes, as suggested by Kenny et al. (2003), then an alternative approach to understanding the digital divide follows. That is, economies whose ICT penetration rates are above the trend defined by income are ranked above the digital divide, while those with penetration rates below the trend are ranked below the divide. In this manner, the trend line represents the digital divide.

Using cross-country data on about 211 economies in the ITU database, trend lines between income and penetration rates for each year from 1998 to 2003 and for each of the four ICT infrastructures are fitted. The regression results, presented in Table 4, reveal a nonlinear relationship between the two variables. Generally, the fitted curves suggest that ICT diffusion is slow at low-income levels, but accelerates after some income threshold.

Based on the foregoing regressions, the predicted ICT penetration rates are estimated. For each economy, ratios of actual to predicted penetration rates are calculated and an average is taken for the six-year period. A ratio greater than 1 indicates above-average performance, while a ratio less than 1 signals below-average performance.

Table 4. Regression Results Estimating Income-ICT Penetration Trend Lines

$$y = \beta_0 + \beta_1 x + \beta_2 x^2 + \beta_3 x^3$$

	β_0	β_1	β_2	β_3	R^2	d.f.
Fixed lines						
1998	2.1449	.0046	-2.E-07	2.E-12	.835	181
1999	2.5108	.0045	-1.E-07	1.5E-12	.837	180
2000	2.4484	.0048	-2.E-07	2.0E-12	.810	176
2001	2.6365	.0047	-1.E-07	1.9E-12	.812	161
2002	3.2381	.0050	-2.E-07	2.3E-12	.822	117
2003	4.2437	.0041	-1.E-07	1.1E-12	.773	190
Mobile phones						
1998	-.1467	.0011	1.3E-08	-5.E-13	.761	181
1999	-.7488	.0025	-3.E-08	6.7E-14	.781	180
2000	-1.0452	.0043	-1.E-07	7.4E-13	.764	176
2001	-1.1621	.0067	-2.E-07	2.5E-12	.789	161
2002	-.1125	.0094	-4.E-07	4.8E-12	.815	117
2003	2.6817	.0086	-3.E-07	4.5E-12	.710	188
Internet users						
1998	.4164	9.6E-05	4.4E-08	-9.E-13	.680	174
1999	.5131	.0003	5.1E-08	-1.E-12	.736	179
2000	.4909	.0010	3.4E-08	-9.E-13	.742	175
2001	-.0216	.0020	-1.E-08	-2.E-13	.769	160
2002	.5575	.0031	-7.E-08	5.4E-13	.777	114
2003	1.5934	.0027	-4.E-08	-8.E-14	.764	189
Computers						
1998	.4845	.0011	9.9E-09	-3.E-13	.871	146
1999	.6088	.0012	1.3E-08	-4.E-13	.857	153
2000	.7341	.0014	1.2E-08	-5.E-13	.820	155
2001	.5662	.0018	-5.E-09	-2.E-13	.813	143
2002	.8684	.0020	-2.E-08	5.4E-14	.790	107
2003	1.1514	.0019	-1.E-08	-4.E-14	.809	163

Table 5. Average Ratio of Actual to Predicted ICT Penetration in ASEAN Economies, 1998-2003

	Fixed lines	Cellular phones	Internet use	Computers
Brunei	0.60	0.74	0.54	0.34
Cambodia	0.06	3.89	0.10	0.13
Indonesia	0.55	0.99	0.91	0.59
Lao PDR	0.20	0.44	0.12	0.19
Malaysia	1.09	1.70	4.23	1.65
Myanmar	0.18	0.01	0.03	0.25
Philippines	0.56	2.92	1.47	0.96
Singapore	0.88	1.14	1.25	1.57
Thailand	0.83	1.22	1.38	0.80
Vietnam	0.77	1.32	0.77	0.59
ASEAN	0.57	1.43	1.08	0.71

The results, presented in Table 5, reveal some interesting patterns, to wit:

- Brunei, Indonesia, Lao PDR and Myanmar have consistently underperformed in terms of the four ICT infrastructures. In contrast, Malaysia has been a consistent

overperformer.

- Cambodia and Vietnam have generally underperformed except in cellular phones.
- The Philippines and Thailand have mixed performance.
- Surprisingly, Singapore's fixed line penetration is below the trend, but it overperformed in other ICT infrastructures.
- Except in fixed line technology, the ASEAN as a group has above-average penetration rates relative to its income.

The next section attempts to explain the wide variation in ICT performance of ASEAN economies by probing into their regulatory environment.

3. Regulatory Divide

There is a fair amount of studies that have suggested that the quality of regulation is an important determinant of ICT adoption. For example, Caselli and Coleman (2001) found protection of property rights a significant variable in the regression equation explaining personal computer adoption in OECD economies. Dasgupta et al (2001) included an index of competition policy to explain the growth of internet intensity in a broad sample of countries in Asia, Africa and Latin America. Wallsten (2003) related internet usage and supply of internet hosts to regulatory independence, transparency and discretion. Chinn and Fairlie (2004) showed the significance of the quality of regulatory regime in explaining internet and personal computer penetration. Estache et al. (2002) asserted that price (internet access cost), as an explanatory variable in the internet penetration equation, is a product of regulation. Concretely, regulatory action can lower price, directly through Universal Service Obligations in rural areas and indirectly by promoting competition and implementing interconnection rules to ensure connectivity of new service providers to incumbent's network.

The accepted wisdom is that the ICT sector thrives best in an environment of healthy market competition and effective regulation. This section describes qualitatively the impact of regulation on the diffusion of ICT in ASEAN economies. Three key aspects of the regulatory regime are discussed: institutional arrangement, competition policy, and universal service.

3.1 Institutional Set-up

A regulatory regime that can best promote the growth of ICT sector is autonomous, accountable and competent. These qualities are unevenly observed in ASEAN economies.

Table 6. Regulatory Arrangements in ASEAN Economies

	Separation of policymaking and regulation	Separation of regulation and operation	Main source of regulator's financing	Key reform law for telecoms
Brunei	Yes	Yes	Regulatory fees	2001
Cambodia	No	No	State budget	-
Indonesia	Yes	Yes	State budget	1999
Lao PDR	No	No	State budget	2001
Malaysia	Yes	Yes	Regulatory fees	1998
Myanmar	Yes	No	State budget	-
Philippines	Yes	Yes	Regulatory fees	1995
Singapore	Yes	Yes	Regulatory fees	1999
Thailand	Yes	Yes	Regulatory fees	2001
Vietnam	No	Yes	State budget	2002

The fact is that half of the ASEAN economies is still struggling to break free from the old paradigm of state-owned monopoly service supplier, with only a semblance of independence from the regulator and policy-maker, whereas the other half has been able to establish an independent regulatory body. In Cambodia, the Ministry of Posts and Telecommunications remains the policymaker and regulator, as well as provider of domestic and international telephone services. A similar structure prevails in Lao PDR where the Ministry of Communications, Transport, Posts and Construction is the regulator, policy-maker and owner of the Enterprise of Telecommunication Lao that provides fixed line services.

If the regulator were to effectively safeguard consumer interest, then it should be able to maintain independence from the policymaker on one hand, and from the service provider on another. Some countries are able to achieve independence at one level, but not in another. In Myanmar, for example, policymaking and regulation are separately performed by the Ministry of Communications, Posts and Telegraphs (MCPT) and the Posts and Telecommunications Department (PTD), respectively. But the incumbent supplier, the Myanmar Posts and Telecommunications, as well as the PTD, are both under the MCPT, hence the separation in policymaking, regulation

and operation is only structural and does not constitute true independence of functions. Vietnam separated regulation from commercial operation as early as 1990 when the incumbent operator, Viet Nam Posts and Telecommunications Corporation (VNPT), spun off from the Department of General Posts and Telecommunications (DGPT). In 2002, however, the DGPT became the Ministry of Post and Telematics (MPT) and assumed both policymaking and regulatory functions.

The only ASEAN economy to have always maintained separate structures for policymaking and regulation is the Philippines as it is the only country that did not have the tradition of state-owned monopoly supplier in telecommunication services. The previous monopolist, the Philippine Long Distance Telephone Co. (PLDT), remains a private company. Regulation is exercised by the National Telecommunications Commission (NTC), while policymaking by the Department of Transportation and Communications (DOTC). But despite its autonomy and relatively long existence, NTC's efficacy as regulator is being undermined by lack of resources and skills to handle complex and emerging issues, particularly those related to curbing market dominance.

Most ASEAN economies are gearing to follow Singapore's or Malaysia's model in launching an effective regulatory regime. In the case of Singapore, the first major reform was to separate regulation from service operations by creating a new government corporation called Singapore Telecommunications (SingTel) out of the Telecommunications Authority of Singapore (TAS), previously the sole provider and regulator of telecommunications services. Once an independent regulatory body had been formed, later known as Info-Communications Development Authority (IDA), it proceeded to remove the impediments to introducing market competition, such as exclusivity privileges of and state equity in the incumbent supplier. On the other hand, Malaysia first corporatized Jabatan Telekom Malaysia (now Telekom Malaysia), then issued new service licenses to stimulate market competition. JTM however retained regulatory functions until 1998 when the Malaysian Communications and Multimedia Commission (MCMC) was established to serve as the industry's regulator. MCMC currently reports to the Ministry of Energy, Water and Communications, the industry's policymaking body.

It took several years before Singapore and Malaysia could establish the appropriate

governance structure for the industry. Elsewhere, the regulatory reform was also protracted. Indonesia corporatized the government agencies designated to provide domestic telephony and international services in the early 1990s, ended their exclusive market privileges in providing services in 1999, and subsequently firmed up the structure of regulation and policymaking in the industry in 2003. Beginning 2004, a new autonomous body called Badan Regulasi Telekomunikasi Indonesia (BRTI) serves as regulator, while policymaking resides in the Ministry of Communications.

Through a series of legislations in 2001, Brunei Darussalam aims to follow the examples of Malaysia and Singapore when it transferred the regulatory powers of the sole fixed services provider, Jabatan Telekom Brunei (JTB), to a new regulatory body called Authority for Info-communications Technology Industry (AiTi). The next step in Brunei's regulatory reform agenda is to corporatize the state-owned provider JTB to subject it to commercial discipline. However, Brunei is not keen in opening the market to new service providers, at least not until 2010, on grounds that its small market may not be able to support new providers.

The most recent regulatory body to be formed is Thailand's National Telecommunications Commission, which began its work only in 1 November 2004. Previously, the two state-owned enterprises that have the sole authority to provide telecommunication services in Thailand, the Telephone Organization of Thailand (TOT) and the Communication Authority of Thailand (CAT), were effectively the industry's regulators, with the Department of Post and Telegraph (DPT), the precursor of TOT and CAT, relegated to frequency management.

In sum, the governance structure for ICT services remains weak in CLMV economies where independent and effective regulation does not yet exist. Brunei, Indonesia and Thailand have only recently established their respective regulatory bodies; it would require some more years before these bodies could attain the maturity required of a regulator in a market environment as dynamic as ICT. The Philippine NTC has yet to attain regulatory sophistication, albeit its independent structure gives it a considerable head start relative to other ASEAN regulators. By contrast, Singapore's IDA and Malaysia's MCMC are setting examples of regulatory policies for the region in fostering market competition and promoting growth in their respective industries.

3.2 Market Competition

Creating the right structure is only an initial, albeit an important step to establishing an effective regulatory regime. The litmus test of efficacy is the ability to transform a monopoly into a competitive market. Indeed, this remains a major challenge to most regulators as former monopolists often continue to wield overwhelming advantage over new market entrants. Table 7 presents some indicators on the state of market competition in fixed line, mobile and internet services in ASEAN.

Table 7. Market Competition in ASEAN ICT

	Number of market suppliers			Allowed foreign investment (%)	Status of main fixed line operator	Market share (%)
	Fixed lines	Mobile	Internet		Ownership	
Brunei	1	1	2	0	state	100
Cambodia	3	4	3	unclear	state	64.5
Indonesia	2	2	112	non-ASEAN, 35; ASEAN, 40	state, 51.2%; private, 48.8%	98
Lao PDR	3	4	6	unclear	state, 51%; private, 49%	80
Malaysia	4	3	*	61 for first 5 yrs.; 49 thereafter	state, 67%; private, 33%	97.3
Myanmar	2	1	2	0	state	n.a.
Philippines	73	7	*	40	private	63.6
Singapore	2	5	*	100	state, 67.2; private, 32.8	99.7
Thailand	3	3	18	0	state	44 (Bangkok); 59 (outside Bangkok)
Vietnam	5	6	13	0	state	98.5

*Large number.

It should be recognized that all telecommunications industries around the world were previous monopolies as it was not until the mid-eighties that technological changes transformed the natural monopoly character of the industry and rendered it viable to market competition. ASEAN economies opened their markets to competition at different times. The modalities of allowing entry to new service providers likewise vary, often dictated by national circumstances.

The Philippines was the first in ASEAN to end the monopoly of its service provider; its market reform was also unique. In 1995, it introduced a scheme of dividing the country into 11 service or franchise areas and assigning them to nine new carriers. Market entrants are to compete against the incumbent, PLDT, which is the only carrier with a nationwide franchise. Previous to reform, PLDT competed against small operators with franchises limited to specific provincial areas. The scheme raised the number of fixed line operators to 73 that includes PLDT, the new carriers and small provincial operators. It was hailed a success for the dramatic improvement in teledensity from 2% to 9% only after three years since its introduction.

Critics of the Philippine reform argue that while the scheme accelerated infrastructure development and ensured deployment of services to previously unserved and underserved areas, it fragmented the market, which in turn undermined the challenge posed by new entrants against the incumbent since the former have limited coverage area, whereas only the latter has ubiquitous presence in the country. The incumbent, as a result, remains dominant and is able to limit competition by exercising its market power. Yet it is not easy to blame regulation. The market outcome may well reflect a flaw in the design of the reform or weakness in regulatory capacity, or both. Those designing the reform are confronted with the predicament of whether or not to limit the number of new suppliers, and if so by how many, so as to avoid market fragmentation.

Most policymakers are cautious not to open their markets too wide to encourage cream-skimming and threaten the viability of the incumbent as it may, in the long run, stifle infrastructure development. When Malaysia opened its fixed line service market, for example, it granted new licenses to only five, but subsequent market developments pruned the number of providers to four. Vietnam limited new licenses for fixed line services to only four and granted them only to state-owned enterprises.⁴ In contrast, Singapore first opted for a duopoly structure when it terminated the exclusive rights of SingTel to provide basic telephony and granted license to a new operator, Starhub Communications, but subsequently decided to open the market fully to competition. This means that the Singapore regulator, IDA, could issue new licenses to those qualified without being bound to a predetermined number of suppliers.

Apart from concerns of fragmenting the market, introducing market competition in

some economies could be constrained by legal impediments to provision of private telecommunications services. This is the case in Thailand and Indonesia that have nonetheless found ways to work around the constraint. However the ad hoc measures are proving inadequate to establish effective market competition. In Thailand, the Telephone Organization of Thailand (TOT), state enterprise that has legal monopoly over fixed line services, created its own “competition” by entering into concession arrangements with private enterprises – one with Telecom Asia (TA) to put up fixed lines in Metropolitan Bangkok, and another with Thai Telephone Telegraph (TT&T) to serve areas outside Bangkok. The rationale for such arrangements is for TOT to “compete” against its own concessionaires and be compelled to improve its services. Whether such arrangement is able to mimic the outcome of real market competition is unclear, but the fact that the concessionaires (TA and TT&T) are restricted by their contracts from making any price adjustments without approval of TOT clearly diminishes the competitive threat that the concessionaires can pose on the incumbent. However, the concession arrangements are seen responsible for the rapid growth of infrastructure, especially in rural Thailand.

Under an almost similar arrangement, Indonesia’s fixed line monopoly provider, P.T. Telekomunikasi Indonesia (Telkom), invited the entry of new service providers to expand its network to the regions. A scheme known by the Indonesian acronym KSO (Kerjasama Operasi) is a Build-Operate-Transfer (BOT) agreement⁵ between Telkom and its KSO partner where the latter is given a 15-year exclusive right to deploy and operate lines in a designated area. Telkom entered into five such agreements since 1995, whereby it assigned five of seven regions of Indonesia to its KSO partners. The scheme however was less successful than Thailand’s. Only one of the five KSO partners remains viable; the other partners have to be bought out by Telkom because of financial difficulties.

Where domestic capital is limited, restrictions on foreign investments in ICT pose yet another barrier to introducing market competition. This flows from the fact that the ICT business is capital-intensive, hence considerable investment is needed to enter the market. It would be difficult for a capital-constrained new entrant to challenge an incumbent that has already established its network. Thus local providers often require foreign capital to boost their market positions. Yet four ASEAN economies,

namely, Brunei, Myanmar, Thailand and Vietnam, are prevented by their national laws to accept any foreign equity in telecommunication services. On the other hand, varying degrees of limitations (shown in Table 7) apply to foreign capital in Indonesia, Malaysia and the Philippines. In Cambodia and Lao PDR, there are no statutes that spell out the restrictions that apply to foreign capital; the absence of transparent rules render these economies as much (if not more) restrictive towards foreign capital as other economies where explicit prohibition is known. Only Singapore, among ASEAN economies, holds no legal restriction on foreign equity in ICT.

Ironically, it is also in Singapore where the incumbent has been most successful in defending its market share against potential competitors. As can be gleaned from Table 7, Singtel managed to hold on to its near-monopoly status in fixed line business despite liberal licensing and foreign investment policies. This does not mean however that Singapore's fixed line market is any less competitive than other ASEAN markets where the number of operators is greater and the incumbents' market shares are less but still substantial. Instead this observation underscores two realities that regulators confront. First, the incumbent's first-mover advantage could be overwhelming that liberalizing entry into the market is not sufficient to ensure market competition. However, it is easier for new entrants to penetrate the market with newer technologies. A case in point is the mobile phone market where competition tends to be more intense than in fixed line services. Therefore, while incumbents may remain dominant in older technologies, new suppliers could be dominant in newer technologies. The regulator should ensure that incumbents are not able to use their dominance in one market to frustrate competition in another market, as when, for example, an incumbent fixed line operator refuses interconnection to a service provider of mobile phone or internet.

Nor should the regulator prevent the flow of new and superior technologies that tend to undermine the market positions of those clinging to older technologies. This point is particularly relevant to regulatory treatment of callback, international simple resale (ISR) and voice over internet protocol (VoIP) that have successfully brought down the costs of international telecommunication services in economies where application of these technologies has been unfettered. Although it is difficult to curb

the use of these newer technologies, some regulators have nonetheless maintained policy restrictions against their use out of concerns that they could lead to cutthroat price competition that eventually might drain the resources of operators and compromise future infrastructure investments. Hence the regulator is caught in a bind whether to maintain technological neutrality and allow market competition to drive down prices and benefit consumers, or to discriminate new technology in order to keep prices afloat and allow operators to have resources that could be invested in network expansion.

Only Singapore and recently, Malaysia and the Philippines have sided with technological neutrality and adopted liberal policy towards IP telephony. Indonesia and Vietnam permit the use of IP telephony but only by limited number of service providers. Cambodia allows only one operator to offer VoIP, but it is by the same operator that has monopoly of international gateway facility, thereby preventing VoIP from offering an alternative to traditional infrastructure, i.e., Public Switched Telephone Network (PSTN). Brunei and Lao PDR have not defined their policies on VoIP, although restrictions are believed to apply, whereas Myanmar and Thailand have expressed prohibition of the service.

Second, in light of the incumbent's market advantage over new suppliers, asymmetric regulation in favor of the latter may be warranted. Singapore and Malaysia have used asymmetric regulation effectively to jumpstart competition. This has taken the form of imposing more regulatory burden on the incumbent with respect to provision of interconnection. Recently, Singapore increased the incumbent's burden by obliging it to lease local loops to competitors. Local loop unbundling has been identified as the policy responsible for the rapid deployment of broadband infrastructure in Japan and Korea. However, Singapore's policy is less bold than Japan's and Korea's to the extent that the latter did not only mandate unbundling but also prescribe the charges for the lease of local loops.

Thus, despite Singtel's near monopoly of the fixed line market, the regulator IDA prevents it from abusing its market power through pro-competitive policies. The policies that the Malaysian regulator MCMC are keenly following have also kept in check the market behavior of the incumbent Telekom Malaysia. A characteristic of Singapore's and Malaysia's markets that set them apart from other ASEAN economies

is a well-functioning regulatory regime that ensures market contestability despite continued dominance of incumbents. This is not an easy feat as the regulator would have to be careful not to be too intrusive as to stifle growth of the sector, yet perceptive to foreclose opportunities of anti-competitive behavior.

One area where regulators could intervene to promote competition is in interconnection of networks of competing service providers. The incumbent, given its relatively more extensive network, could put its competitors at a disadvantage by refusing interconnection. To date, however, only three ASEAN economies have a fully developed interconnection policy, namely, Singapore, Malaysia and the Philippines. Brunei's regulator, AiTi, is still drafting the first interconnection policy for the country in anticipation of the corporatisation of the incumbent JTB. The new Indonesian regulator, BRTI, is currently implementing the provisions on interconnection contained in the 1999 Telecommunication Act, following the change in market structure from monopoly to duopoly, but it is also drafting a new set of more detailed interconnection rules. The entry of private sector operators in Cambodia's telecommunications market since the early 1990s prompted the drafting of a new law where some provisions are pertinent to interconnection. The draft law was completed in 2000, but has not been passed until now.

In other ASEAN economies, the interconnection rules, even if they exist, are ineffective in promoting competition because the interconnecting parties are non-competitors. In Thailand, for example, the interconnection is between the incumbent TOT and its private concessionaires, and between TOT and CAT – both are state-owned enterprises. In Vietnam, all operators are state enterprises, and the dominant operator, Viet Nam Post and Telecommunications (VNPT), owns major stake in its competitors. The regulators of Lao PDR and Myanmar have yet to draw up interconnection policies, but the compulsion to have one is weak since the parties to be affected are not effectively competing with each other. .

A set of transparent rules on interconnection and a regulator to enforce these rules are however not always sufficient for new entrants to make a dent on the incumbent's market share given that consumers may find it costly to switch carriers. The cost of switching carriers pertains to changing telephone numbers. Thus, some regulators have mandated number portability whereby a customer can retain his number even

when he transfers subscription to another carrier. None of the ASEAN economies has mandated number portability. This may partly explain why it is difficult for competitors to win over Singtel's customers.

Moreover, where governance is weak, there is risk that even as the operators are ostensibly competing fiercely over subscribers, they can still use interconnection price as an instrument of tacit collusion. When this happens, diffusion of ICT services could be stunted by high prices. This appears to be the case in the Philippines where the regulator opts to intervene in interconnection negotiations between service providers only when no agreement could be reached, but otherwise leaves the terms of the agreements to the contracting parties. The *laissez-faire* policy is seen responsible for keeping market prices buoyant and limiting the arena of competition to non-price areas.

Indeed, one observes from Table 8 that where market competition is weak, prices of services are generally high relative to average incomes, and consequently, ICT penetration rates are relatively low. This is evident in CLMV economies where ICT tariffs clearly exceed reasonable proportions of average incomes that could be allotted to communications. By contrast, ICT tariffs are more affordable (relative to average income levels) in Singapore and Malaysia where market competition is stronger.

Perhaps the only exception to this general association between prices and competition is Thailand's tariffs that are lower compared to the Philippines' despite the latter more competitive market. However, the lower prices are not a consequence of competitive pressure but by state intervention in price-setting.

Table 8. ICT Tariffs in ASEAN
(values in US\$)

	Fixed lines		Mobile phones		Internet	
	Price of local 3-minute call	Annual subscription as % of GDP per capita ¹	Average of peak and off-peak per minute call	Annual subscription as % of GDP per capita ²	Price of 20 hours of use	Annual subscription as % of GDP per capita ³
Brunei	-	0.9	0.17	4.8	16.39	1.6
Cambodia	0.03	27.9	0.06	85.0	57.36	271.0
Indonesia	0.03	9.8	0.15	60.7	22.26	31.1
Lao PDR	0.10	39.9	0.07	76.8	31.87	116.6
Malaysia	0.02	2.4	0.12	11.2	8.42	2.6
Myanmar	0.06	60.0	0.00	0.0	42.50	418.0
Philippines	-	13.6	0.12	42.2	17.05	20.9
Singapore	0.02	0.4	0.16	2.8	11.04	0.6
Thailand	0.07	5.5	0.12	21.1	6.98	4.1
Vietnam	0.02	10.3	0.19	154.2	19.85	55.1

¹Computed based on residential monthly subscription plus 300-minute local call per month.

²Computed based on 300-minute call per month.

³Computed based on 20-hour use per month.

Source: Author's calculation based on ITU database.

3.3 Universal Service

No matter how vigorous the market competition, there may still be some sectors that would fall out of the ICT network and could only be brought into the digital fold through so-called universal service programs (USPs). These subsidy programs are intended to provide ICT access to marginal income groups and geographically isolated areas. If the market were functioning efficiently, then only the commercially unviable sectors would require subsidized access; other groups should be able to obtain access at market-determined rates. But some regulators make up for the difficulty of fostering market competition by using USPs to provide access even to those groups that could afford the services if they were competitively priced.

Perhaps Malaysia's USP can be considered the most successful in ASEAN. Much of the success owes to the fact that the regulator MCMC has effectively mobilized operators' contributions and state budget to finance USP, such that it is able to launch several projects to bridge the domestic digital divide by targeting schools, libraries and clinics in rural and remote areas. But it is not only resource availability that sustains these projects; credit must also be given to the design of the projects. Invariably, infrastructure support is combined with capacity building. That is, the various programs ensure that the disadvantaged sector is provided not only with

subsidized access to ICT infrastructure, but also the capacity to use the services through provision of ICT training.

Like Malaysia, the Thai government has been successful in launching ICT projects to extend access to marginal income groups. However, resources for these projects are drawn from the revenue streams of the state-owned operators, TOT and CAT. One such project is the SchoolNet that connects 4,600 rural schools throughout Thailand. The project success inspired its implementers to target connecting all 34,000 schools nationwide. Besides providing ICT access to schools, the state-owned operators have also initiated projects to provide low-cost internet access to the general public, as for example, setting up computer booths at post offices where the public can access the internet using prepaid cards at highly subsidized rates. Recently, the Thailand Ministry of Information and Communication Technology (MICT) upgraded its universal service goal – from one of providing internet access to diffusing broadband connection. To this end, TOT and CAT are mandated to bring down the monthly subscription fees for broadband services to 500 baht (US\$13) for 256 kbps, and 600 baht (US\$16) for 512 kbps. In comparison, the market rates range from about US\$34 to US\$56. Clearly, in the case of Thailand, it is market intervention, rather than market competition, that has spread the use of ICT.

Public funds for ICT projects are much more limited in other ASEAN economies, hence it is not feasible to follow the Thai's model of funding USP. The Philippines has relied on cross-subsidy flows from mobile and international calls to fixed line services, but after the service providers have satisfied their roll-out obligations stipulated in their licenses, the build-up of fixed line network halted. This demonstrates that the most practical strategy for sustaining USP in developing countries where fiscal constraints prevent state funding is by building funds out of operators' contributions, as in the example of Malaysia. However, even this strategy is not an option in ASEAN economies with very low ICT penetration rates, such as Cambodia, Lao PDR and Myanmar, where the major operators are state-owned and cash-strapped. For these economies, unless current restrictions on infusion of private and foreign capital on the operators are removed, they would have to rely on the generosity of foreign funding institutions to build their networks and extricate themselves from digital exclusion.

4. Closing the Gap

The ICT penetration in the ASEAN region reflects the broad diversity that characterizes the member economies. Indeed the region is home to economies that have achieved stellar penetration levels, as well as those sidelined by the digital revolution. A wide array of factors could influence ICT uptake such as demographics, culture and infrastructure, but the key ones are income and regulatory environment.

In the foregoing exposition, it was shown that after accounting for income differences, there remains a huge gap in ICT performance among ASEAN economies that could be best explained by differences in regulatory environment. Indeed, economies that are doing comparatively better than their GDP per capita levels would suggest, such as Malaysia and Singapore, have cultivated a favorable regulatory climate that is able to attract investments, foster market competition, while at the same time remedy market flaws through appropriate intervention. In contrast, those doing worse than their income levels suggest, such as Brunei, Indonesia, Lao PDR and Myanmar, founder in establishing credible and effective regulation, and retain significant restrictions to market entry and investments. Those economies with mixed performance, namely the Philippines, Thailand, Cambodia and Vietnam, have introduced some market reforms but need to strengthen their regulatory institutions and rid the sector of various impediments to market competition.

Could the various regional initiatives, like the e-ASEAN Framework Agreement, close the yawning gap in ICT access that currently separates member economies? Given the huge income divide in the region, it is unreasonable to aim for parity in access. However, one could realistically target all member economies to perform at par or greater than merited their by income levels. To attain such goal, however, requires regulatory and market reforms in economies that are behind in ICT penetration. Regional initiatives in ASEAN should prod member economies to institute the needed reforms, in much the same way that multilateral agreements such as those in the WTO have effectively compelled a growing number of economies to embrace reforms.

Notes

- 1 Target 18 under Goal 8 of the Millennium Declaration.
- 2 See for example Quibria et al (2003), and Chinn and Fairlie (2004).
- 3 Effective teledensity is the number of telephone subscribers (fixed lines and cellular) per 100 inhabitants. The six other countries with effective teledensity below 1 percent are Guinea-Bissau, Eritrea, Central African Republic, Chad, Ethiopia and Liberia.
- 4 Vietnam is following China's reform model of introducing market competition but restricting it among state-owned enterprises.
- 5 In Thailand, the arrangement between TOT, TT&T and the concessionaires is Build-Transfer-Operate (BTO) because of a constitutional prohibition against private sector ownership of public infrastructure.

References

- Accenture (2004) *eGovernment Leadership: High Performance, Maximum Value*. The Government Executive Series, May.
- Antonelli, C. (2003) "The Digital Divide: Understanding the Economics of New Information and Communication Technology in the Global Economy," *Information Economics and Policy*, 15, pp. 173-199.
- Australian National University–Asia Pacific School of Economics and Government, Society for the Advancement of Technology in the Philippines, and Thailand Development Research Institute (2004) "Liberalization and Harmonization of ASEAN Telecommunication Sector," report submitted to ASEAN-Australia Development Cooperation Program–Regional Economic Policy and Support Facility (ADCP-REPSF).
- Caselli, F., and W. J. Coleman, II (2001) "Cross-country Technology Diffusion: The Case of Computers," National Bureau of Economic Research, Cambridge, MA, Working Paper No. 8130.
- Chinn, M. and R. W. Fairlie (2004) "The Determinants of the Global Digital Divide: A Cross-Country Analysis of Computer and Internet Penetration," Working Paper 04-05, Santa Cruz Center for International Economics, University of California, Santa Cruz.
Available at <http://repositories.cdlib.org/sccie/04-05>.
- Dasgupta, S., S. Lall and D. Wheeler (2001) "Policy Reform, Economic Growth and the Digital Divide: An Econometric Analysis," World Bank Working Paper No. 2567 (March).
- Estache, A., M. Manacorda and T. M. Valletti (2002) "Telecommunication Reforms, Access Regulation and Internet Adoption in Latin America," World Bank Working Paper No. 2802 (March).
- International Telecommunication Union (2003) *World Telecommunication Development Report 2003*. ITU: Geneva.
- International Telecommunication Union (2004) *Asia-Pacific Telecommunication Indicators 2004*. ITU: Geneva.
- Kenny, C., B. Lanvin and A. Lewin (2003) "The Access Divide," *ICT and Development*, December, pp. 38-43.
- Kiiski, S. and M. Pohjola (2002) "Cross-country Diffusion of the Internet," *Information Economics and Policy*, 14 (2), pp. 297-310.
- Quibria, M. G., S. N. Ahmed, T. Tschang, and M. Reyes-Macasaquit (2003) "Digital Divide: Determinants and Policies with Special Reference to Asia," *Journal of Asian Economics*, 13, pp. 811-825.
- Wong, P. (2002) "ICT Production and Diffusion in Asia: Digital Dividends or Digital Divide?" *Information Economics and Policy*, 14 (2), pp. 167-187.
- World Economic Forum (2004) *The Global Information Technology Report, 2003-2004*. Oxford University Press: New York and Oxford.