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An Overview of ICT Policies and e-Strategies of Select Asian Economies



Emmanuel C. Lallana

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UNDP Asia Pacific Development Information Programme
United Nations Service Building,
3rd Floor, Rajdamnern Nok Avenue, Bangkok 10200,
G.P.O. Box 618, Bangkok 10501, Thailand.
Telephone: 66-22881234, 22882129
Facsimile: 66-22883032
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Foreword

Information and Communication Technologies (ICTs) such as telephones, computers, television, radio and other ubiquitous communication devices are fast becoming essential components of our day-to-day lives. ICT use is noticeable and significant even in developing countries. Farmers can access real-time information on weather, small enterprises are using ICTs to cut costs, and a growing number of communities are getting connected online. ICTs have also been used successfully to assist in poverty eradication programmes, health services, long distance education, business, preserving religious texts, libraries and in almost every other conceivable sector.

This positive trend has enabled far more efficient delivery of public services, which inevitably leads to good governance and enhanced citizen interactions. All this signals a move towards better quality of life for people.

ICTs are instrumental in the development of countries in this century. They allow nations to address development goals and assist them in achieving these goals faster and more efficiently. Due to this growing and important role of ICTs, we are witnessing improvements in infrastructures, content delivery and access, capacities and new national policies relating to the role of ICTs.

What emerges from such diverse applications of ICT is the important role of government in taking stock of such initiatives, and providing national guidance and frameworks that enable the development and propagation of technologies that benefit citizens in the long run. This, in essence, underscores the importance of national ICT policies and e-strategies.

It is important for countries to coordinate in order to streamline policies through learning and sharing. The exchange of best practices ensures that society overall takes a shared responsibility for human development. For example, countries interested in propelling economic growth through ICTs would be well served by looking at relevant experience of other countries, to avoid costly mistakes. ICT policies and e-strategies must be tailored to the conditions and needs of countries, based on various socio-economic factors.

This study, *An Overview of ICT Policies and e-Strategies of Select Asian Economies*, comes at the right time since countries in the region are aspiring to learn from each other as they incorporate ICT strategies into their development agendas.

This publication is part of UNDP-APDIP's ICT4D Series. It is designed to provide policy-makers the necessary tools, information and knowledge to facilitate the formulation and adoption of ICT policies and e-strategies. It may also be considered as a resource for countries in other regions of the world, since there will always be economies eager to learn from the experiences of other nations. In addition, it serves to highlight how countries have evolved within their

own respective frameworks and environments to support their respective national ICT agendas.

I am pleased to note that in recent years there has been very close interaction between APDIP and United Nations Economic and Social Commission on Asia and the Pacific (UNESCAP), and I would like to see more such praiseworthy cooperation in our future delivery of services to countries in Asia and the Pacific.

Kim Hak-Su

Executive Secretary of UNESCAP
The United Nations Building
Rajadamnern Nok Avenue
Bangkok 10200
Thailand

List of Abbreviations

| | |
|----------------|--|
| .in | India ccTLD |
| .jp | Japan ccTLD |
| .kr | South Korea ccTLD |
| .lk | Sri Lanka ccTLD |
| .my | Malaysia ccTLD |
| .np | Nepal ccTLD |
| .ph | Philippines ccTLD |
| .sg | Singapore ccTLD |
| .vn | Viet Nam ccTLD |
| 3G | Third Generation |
| 4G | Fourth Generation |
| ADSL | Asymmetrical Digital Subscriber Line |
| ASAS | Advertising Standards Authority of Singapore |
| ASEAN | Association of South East Asian Nations |
| BcN | Broadband convergence Network |
| BPO | Business Process Outsourcing |
| CEDES | Computer Education for Elementary Schools |
| CERT | Computer Emergency Response Team |
| CICT | Commission on Information and Communication Technology, the Philippines |
| CINTEC | Council for Information Technology, Sri Lanka |
| CMM | Capability Maturity Model for Software |
| CONSTEL | Continuing Studies Via Television |
| ETC | Electrical Telecom Company |
| FTTH | Fibre To The Home |
| GDP | Gross Domestic Product |
| GISP | Government Information Systems Plan |
| GNI | Gross National Income |
| GNP | Gross National Product |
| GSM | Global System for Mobile Communications |
| HLCIT | High Level Commission for Information Technology, Nepal |
| ICT | Information and Communications Technology |
| ICTA | Information and Communications Technology Agency, Sri Lanka |
| ICT4D | Information and Communications Technology for Development |
| IDA | Infocomm Development Authority, Singapore |
| IEEE | Institute of Electrical and Electronics Engineers |
| IPR | Intellectual Property Rights |
| ISD | International Subscriber Dialling |
| ISP | Internet Service Provider |
| IT | Information Technology |
| ITECC | Information Technology and Electronic Commerce Council, the Philippines |
| IXP | Internet Exchange Point |
| KERIS | Korea Education and Research Information Service |
| KII | Korean Information Infrastructure |
| LAN | Local Area Network |
| MAGE | Math Games for Excellence |
| MCMC | Malaysian Communication and Multimedia Commission, Malaysia |
| MDGs | Millennium Development Goals |
| MIC | Ministry of Information and Communication, Republic of Korea |
| MITA | Ministry of Information, Communication and the Arts, Singapore |
| MPHPT | Ministry of Public Management, Home Affairs, Posts and Telecommunications, Japan |
| MPT | Ministry of Post and Telematics, Viet Nam |
| MSC | Multimedia Super Corridor, Malaysia |

| | |
|----------------|--|
| MTNL | Mahanagar Telecom Nigam Limited, India |
| NTP | New Telecom Policy, India |
| NAPITSE | National Policy on Information Technology in School Education, Sri Lanka |
| NBIS | National Basic Information System, Republic of Korea |
| NCB | National Computer Board, Singapore |
| NCERT | National Council for Educational Research and Training, India |
| NGO | Non-Governmental Organization |
| NITA | National Information Technology Agenda |
| NITC | National Information Technology Council |
| NITP | National Information Technology Plan, Singapore |
| NRI | Network Readiness Index |
| NTA | National Telecommunications Authority, Nepal |
| NTC | Nepal Telecommunication Corporation |
| NTT | Nippon Telegraph and Telephone Corporation |
| OFWs | Overseas Filipino Workers |
| PC | Personal Computers |
| PCO | Public Call Office |
| PCPS | Personal Computers for Public Schools |
| R&D | Research and Development |
| SLII | Sri Lanka Information Infrastructure |
| SMEs | Small and Medium Enterprises |
| STD | Subscriber Trunk Dialling |
| TAI | Technology Achievement Index |
| TRIPs | Trade Related Aspects of Intellectual Property Rights |
| US | United States |
| UTL | United Telecom Limited, Nepal |
| VGK | Vishva Gnana Kendra, Sri Lanka |
| VNPT | Viet Nam Post and Telecommunications |
| VoIP | Voice Over Internet Protocol |
| WEF | World Economic Forum |
| WIPO | World Intellectual Property Organization |
| WISP | Wireless Internet Service Provider |
| WLAN | Wireless Local Area Network |
| WLL | Wireless Local Loop |
| WTO | World Trade Organization |

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Preface

In the 21st Century, Information and Communication Technologies (ICTs)¹ are seen to be instrumental in the development of countries, particularly those in the developing world. As did the enabling technologies of the past, ICTs will allow nations to achieve development goals faster and more efficiently. ICTs enable development in at least three key ways. First, they enhance access to and creation and sharing of knowledge. Second, ICTs effectively speed up the production process and facilitate financial transactions throughout the economy while reducing costs. Third, ICTs connect individuals, groups, enterprises, communities and governments faster and more cost-effectively.

The role of ICTs in development is being increasingly understood throughout the world. Already, governments are focusing on improving their respective ICT infrastructures and addressing the 'digital divide' at the regional and global levels. As noted in *Measuring the Digital Divide and Beyond*, a study of 139 countries' Infostate (a country's stock of ICT capital and labour, and their uptake and use) between 1996 and 2001, "each and every country had a higher level of Infostate every year"².

However, the same study showed that "...the differences between the top and the bottom, in absolute terms increase over time ... despite the fact that the rates of growth of countries with lower Infostates are higher than those with higher Infostate."³ In fact, out of the 139 countries studied, 94 countries, accounting for 82 percent of the population, are performing below average.

Several important lessons have already emerged for countries seeking to harness the power of ICTs for developmental purposes. In *Information and Communication Technologies for Poverty Alleviation*⁴, Roger Harris summarizes the lessons learnt from the relationship between ICTs and poverty reduction thus:

- ICTs alone are insufficient for significant benefits to emerge;
- ICTs will not transform bad development into good development, but they can make good development better;
- Effective applications of ICTs comprise both a technological infrastructure and an information infrastructure;
- In rural settings in developing countries (where the vast majority of poor people live), it is always a challenge to install the technological infrastructure, but the task is relatively simple compared to establishing the information infrastructure;
- The application of ICTs in the absence of a development strategy that makes their use effective will inevitably result in sub-optimal outcomes; and

¹ In most instances, the acronyms ICT and IT are used interchangeably in this report.

²George, S. (ed), *Measuring the Digital Divide and Beyond* (Montreal: Orbicom, 2003), p. 48.

³Ibid.

⁴Harris, R.W. *Information and Communication Technologies for Poverty Alleviation*, (Kuala Lumpur: UNDP-APDIP, 2004), pp.35-36.

- While ICTs provide opportunities for development, desirable outcomes always arise from the actions of people.

This study provides an overview of the ICT policies and e-strategies of nine Asian countries: India, Japan, Republic of Korea⁵, Malaysia, Nepal, the Philippines, Singapore, Sri Lanka, and Viet Nam. The goal of the study is to document the ICT policies (e-policies) and ICT strategies (e-strategies) of these countries and provide a preliminary assessment of how they are shaping their legal and regulatory environment to take advantage of ICTs as a developmental tool. At the outset, it was decided that three countries from each of the World Bank's (WB) categories of high-, middle- and low-income countries in Asia would be selected⁶. It was also decided that as far as possible, East Asia, South East Asia and South Asia would be evenly represented in the study. This provides a representative sample in terms of Gross National Income (GNI) and geography. However, a third criterion was the availability of primary and reliable documents (in English or English translation).

The study is divided into three chapters. The first chapter presents the current state of infrastructure development in the countries included in the research. A country's GNI is juxtaposed against its level of ICT development. The second chapter reviews the existing ICT policies in the countries under study. It shows that governments of high-income countries have taken an early and active lead in launching integrated ICT policies. Middle-income countries in the sample have also initiated their own ICT master plans, which range from the state-led to the market-driven. Finally, low-income countries in the study have already identified ICTs as a key to national development, as is evident from their governments' active push for ICT policy development.

The third chapter presents a comparison of the ICT policies of the countries included in the study. Five key areas are examined:

- The development of IT infrastructure;
- The creation of a secure cyberspace environment;
- The creation and management of local content;
- The establishment of an effective regulatory policy and agencies; and
- The launch of education policies that utilize and encourage the expansion of ICT capacities.

This study concludes that governments' role in ICT development is primarily to create appropriate and effective ICT policies and e-strategies. Countries that have led in ICT development have also implemented concrete ICT master plans. Finally, in some countries, the government has also played a lead role in building the information infrastructure.

⁵Republic of Korea is referred to as Korea hereafter.

⁶The World Bank defines low-income economies as those with per capital GNI of US\$ 735 or less; lower middle-income with per capita GNI of US\$ 736-2,935; upper middle-income with GNI of US\$ 2,936-9,075; and high-income with per capita GNI of US\$ 9,076 or more.

The State of Play

As can be expected, the high-income countries in the study – Japan, Korea and Singapore – have high fixed line, mobile phone and Internet penetration (see Table 1). Of the three countries, Singapore has the highest telecommunications (fixed line and mobile) penetration, which is perhaps due to the ease of wiring a small island with a highly concentrated and economically well-off population. Korea has the highest Internet penetration and is a world leader in broadband deployment and use. Japan is the global leader in mobile Internet.

However, it must be pointed out that while high incomes account for better telecommunications infrastructure, technology use and innovation, and readiness for a networked world; studies have also shown that good telecommunications infrastructure helps improve national income⁷. Gary Becker, the 1992 Nobel Laureate for Economics, has pointed that “from 1995 to 2000, almost all of the improvements in productivity (in the US) were either due to investments in information technology or advances in the output of information-technology related goods”⁸. The ‘dotbomb’ phenomenon notwithstanding, Becker also believes that the effect of the IT revolution is only beginning to be felt: “...prospects are excellent for long-term growth in output per worker at a rate of 3 percent per year or higher for perhaps decades. Income per worker could double in 25 years or less.”⁹ The positive effect of IT on the economy is felt not only in the US but elsewhere as well. An empirical study on the Digital Divide reports that a one point increase in Infostate leads to an increase of anywhere between

Table 1. High-income Countries

| | GNI (US\$ billion) | Per Capita GNI (US\$) | Fixed Line Penetration | Mobile Penetration | Internet Penetration |
|-----------|-----------------------|--------------------------|---------------------------|-----------------------|-------------------------|
| Japan | 4,265 | 33,550 | 40.1% | 61.1% | 44% |
| Korea | 473 | 9,930 | 57% | 61% | 54% |
| Singapore | 86 | 20,690 | 47% | 74.7% | 48% |

Sources: Unless otherwise indicated, GNI and per capita GNI data for Tables 1, 2, and 3 were taken from the *World Development Indicators 2003* published by the World Bank. Fixed line; mobile and Internet penetration data were taken from *Digital Review of the Asia-Pacific 2003/2004*.

⁷Talero, E. ‘National Information Infrastructure in Developing Economies’, in Kahin, B. and Wilson, E. (eds.), *National Information Infrastructure Initiatives: Vision and Policy Design* (Cambridge, MA: MIT Press, 1997), p. 294.

⁸Becker, G. S. ‘The productivity boom is just warming up’, *BusinessWeek*, 20 Oct 2003, p. 16.

⁹Ibid.

US\$124 to US\$164 in per capita Gross Domestic Product (GDP)¹⁰.

The telephone (fixed and mobile) and Internet penetration of the middle-income countries in the study – Malaysia, the Philippines and Sri Lanka – is a tier below that of the high-income countries (see Table 2). Malaysia, a high middle-income country, leads the pack in terms of telephone (fixed and mobile) and Internet penetration. These three countries have also launched initiatives to position themselves on the global ICT map. Malaysia is known for its Multimedia Super Corridor (MSC) initiative. The Philippines is an emerging player in ICT-enabled services such as call centres and Business Process Outsourcing (BPO). Sri Lanka has boldly declared that by 2007 it will be “better known as the e-Sri Lankan Miracle, a model achievement drawing global recognition in the deployment of ICT towards the achievement of Social and Economic Development”¹¹.

Table 2. Middle-income Countries

| | GNI (billion US\$) | Per Capita GNI (US\$) | Fixed Line Penetration | Mobile Penetration | Internet Penetration |
|-------------|-----------------------|--------------------------|-----------------------------------|-----------------------|-------------------------|
| Malaysia | 86 | 3,500 | 20.5% | 32.8% | 27% |
| Philippines | 81 | 1,020 | 8.91% | 15.89% | 4.27% |
| Sri Lanka | 16 | 840 | 8.0% (fixed & mobile combined) | 3.6% | 0.785% |

A similar pattern of GNP and telephone and Internet penetration is evident in the three low-income countries in the study (Table 3). Despite its low-income country status and low telephone and Internet penetration, India is a global player in software development and ICT-enabled services. Viet Nam is a transition economy that has identified ICT as an engine of growth. Nepal intends to be on the global IT map by 2005.

Table 3. Low-income Countries

| | GNI (billion US\$) | Per Capita GNI (US\$) | Fixed Line Penetration | Mobile Penetration | Internet Penetration |
|-----------|-----------------------|--------------------------|---------------------------|-----------------------|-------------------------|
| India | 501 | 480 | 4.2% | 1% | 1.65% |
| Nepal | 5 | 230 | 1.42% | 0.09% | 0.43% |
| Viet Nam* | 35 | 430 | 2.57% | 2.23% | 0.12% |

*Fixed line, mobile and Internet penetration for Viet Nam from Fact Book on the Telecom and IT Industry in Asia, January 2002.

The three high-income countries are also rated high in the Technology Achievement Index (TAI). The TAI (Table 4), which looks at the degree of technological diffusion and use in 72 countries, ranks Japan (4), Korea (5) and Singapore (10) among the ‘Leaders’, or countries at the cutting edge of technological innovation. Malaysia (30) is included among “Potential Leaders” – those who have diffused old technologies widely but innovate little. The Philippines (40), Sri Lanka (62) and India (63) belong to the “Dynamic Adopters”, or those who have imported hi-tech hubs but where diffusion of old technologies is still incomplete. Nepal (69) is categorized as ‘Marginalized’ – where diffusion of old technologies and skill-building has a long way to go. Viet Nam is not ranked.

¹⁰George, S. *Measuring the Digital Divide and Beyond*, p. 87.

¹¹See <http://www.adbi.org/book/2004/11/05/725.implementing.egovernment.book/2.summary.of.country.reports/>.

Table 4. TAI and NRI Rankings

| | Japan | Korea | Singapore | Malaysia | Philippines | Sri Lanka | India | Nepal | Viet Nam |
|-----|-------|-------|-----------|----------|-------------|-----------|-------|-------|----------|
| TAI | 4 | 5 | 10 | 30 | 40 | 62 | 63 | 69 | - |
| NRI | 12 | 20 | 2 | 26 | 69 | 66 | 45 | - | 68 |

Source: World Economic Forum 2003-2004.

Available at http://www.weforum.org/pdf/Gcr/GITR_2003_2004/Framework_Chapter.pdf

The relationship between income, and technology use and innovation is also evident in the Network Readiness Index (NRI), which measures “the degree of preparation of a nation or community to participate in and benefit from information and communications technology (ICT) development”¹². The NRI is a composite of three components: the environment for ICTs offered by a given country, the readiness of the community’s key stakeholders (individuals, businesses, and governments) to use ICTs, and the usage of ICTs amongst these stakeholders¹³. The NRI for 2003-2004 ranks Singapore (2), Japan (12) and Korea (20) among the global leaders (Table 4). Malaysia, a high middle-income country (ranked 26 in the NRI), and India, a low-income country (NRI rank 45), are in the top half of this ranking of 102 countries. Sri Lanka is 66, Viet Nam is 68 and the Philippines is 69. Interestingly, Viet Nam, a low-income country, is seen as better prepared for the networked world than the Philippines, a middle-income country. Nepal is not ranked in the NRI.

¹²Dutta, S. and Jain, A. ‘The Networked Readiness Index 2003-2004: Overview and Analysis Framework’, in Dutta, S., Lanvin, B. and Paua, F. (eds.), *The Global Information Technology Report 2003-2004* (New York: Oxford University Press, 2004), p. 3.

¹³*Ibid.*, p. 4.

Overview of ICT Master Plans

High-income Economies

High-income countries stand out in this study because they have laid the foundation for ICT development since the 1970s. In Japan, “[t]he phrase *johoka* – usually translated as ‘informatization’ and denoting change to an information-oriented society – has been a slogan of Japanese government policy (since the 1970s)”¹⁴. Singapore’s first IT master plan was formulated and implemented between 1980 and 1985. Korea’s first national computerization project was initiated in 1987. Japan, Korea and Singapore started the debate on the role of ICTs in development much earlier than the other countries in this study. They also developed and successfully implemented a number of ‘integrated’ ICT for Development (ICT4D) master plans – plans in which telecommunications and IT policies were not developed separately but constituted one coherent design.

Japan

The ‘e-Japan Strategy’ was announced as a national strategy for information technology (IT) on 22 January 2001¹⁵. e-Japan envisions a society “where everyone can actively utilize IT and fully enjoy its benefits”. To achieve this goal, government must “establish an environment where the private sector, based on market forces, can exert its full potential and make Japan the world’s most advanced IT nation within five years”.

The specific goals of the e-Japan strategy are to:

- Build an ultra high-speed Internet network and provide constant Internet access at the earliest date possible;
- Establish rules on electronic commerce;
- Realize an electronic government; and
- Nurture high-quality human resources for the new era.

¹⁴West, J., Dedrick, J. and Kraemer, K.L. ‘Back to the Future: Japan’s NII Plans’, in Kahin and Wilson, *National Information Infrastructure Initiatives*, p. 66.

¹⁵See www.kantei.go.jp/foreign/it_e.html

On 29 March 2001, the 'e-Japan Priority Policy Programme' was adopted to realize the e-Japan Strategy and clarify all measures that the government should rapidly implement by 2006. The roles of the private and public sectors are detailed in the Programme: the private sector is to play the leading role in the area of IT. The Programme also identifies five areas for action:

- Formation of the world's most advanced information and telecommunications networks;
- Promotion of education and learning as well as development of human resources;
- Facilitation of electronic commerce;
- Digitization of the administration and application of IT in other public areas; and
- Ensure security and reliability of advanced information and telecommunications networks.

'e-Japan Strategy II', launched in July 2003, aims to create a "vibrant, safe, impressive and convenient" society with the active use of IT. The new strategy proposes to implement leading measures in seven areas that are closely related to the lives of the people: medical treatment; food; life; small- and medium-sized enterprises; finance; knowledge; employment; and government service. The strategy also seeks to advance the development of a new IT social

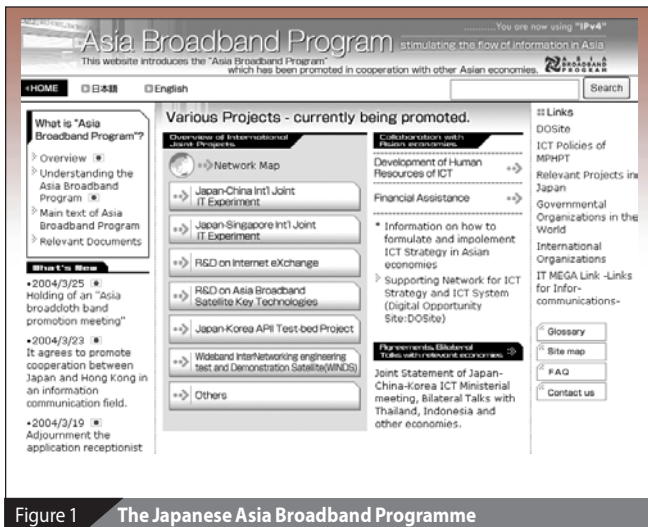


Figure 1 The Japanese Asia Broadband Programme

Source: <http://www.asia-bb.net/en>

infrastructure, which is important for the sophisticated use of IT during this second phase.

Japan also launched an IT use promotion strategy – 'Building A New, Japan-Inspired IT Society' – when it discovered that despite low access fees to high-speed Internet, availability of lines outstripped subscription. The government also launched its 'e-Project' to provide a glimpse of its vision of Japan as "the world's most advanced IT nation".

The e-Japan Strategy was preceded by the 'Basic IT Strategy' (formulated in November 2000), and the 'Basic Law on the Formation of an Advanced Information and Telecommunications Network Society' (the 'IT Basic Law', enacted on 6 January 2001). The IT Basic Law calls for the "promotion of an Advanced Information and Telecommunications Network Society, and

providing stipulations on the development of a priority policy programme for the formation of an advanced information and telecommunications network society". In 1995, Japan launched 'Towards an Advanced Information Society', which was supplemented with a mid-term plan and action plans in 1996 and 1998.

e-Korea

In December 2003, the Korean government unveiled its fourth ICT master plan, called 'Broadband IT Korea Vision 2007'. This new master plan focuses on improving national productivity and individual quality of life through informatization. It calls for a doubling of



Figure 2 e-Korea

Source: http://www.mic.go.kr/eng/res/res_pub_sep_ekv_2002.jsp

Korea's IT exports from US\$46.3 billion in 2003 to US\$100 billion in 2007. It also envisions the commercialization of telematic applications, next-generation computers and sophisticated service robots. It likewise provides for the creation of a 'Broadband convergence Network' (BCN) that will increase data transmission rate by 50 percent and fuel the nation's growth¹⁶.

Korea's third master plan, 'e-Korea Vision 2006', embodies the belief that "the promotion of informatization in all aspects of society will lead to an increased effectiveness of all socio-economic activities, higher national performance, and higher quality of life."¹⁷ Its objectives are to:

- Maximize the ability of citizens to utilize ICT to actively participate in the information society;
- Strengthen global competitiveness of the economy by promoting informatization in all industries;

¹⁶Tae-gyu, K. 'Korea Aiming to Double IT Production by 2007'; available at <http://www.times.hankooki.com/lpage/biz/200312/kt2003121717253411860.htm>.

¹⁷See <http://www.mic.go.kr/index.jsp>

- Realize a smart government structure with high transparency and productivity through informatization efforts;
- Facilitate continued economic growth by promoting the IT industry and advancing the information infrastructure; and
- Become a leader in the global information society by playing a major role in international cooperation.

The Korean government adopted the first Master Plan for Informatization Promotion in June 1996, following the enactment of the Framework Act on Informatization Promotion in August 1995. To further the goals of the first informatization plan, the government also established a national organization for planning and implementation. In March 1999, the government formulated the second informatization master plan called 'Cyber Korea 21'. This provides a blueprint for the new information society of the 21st Century, in order to overcome the Asian economic crisis and transform the Korean economy into a knowledge-based one.

The roots of e-Korea go back to the National Basic Information System (NBIS), a national computerization project initiated in 1987¹⁸. NBIS initially focused on public sector computerization, with the objective of creating a smaller and more efficient government and laying the foundation for the development of IT industries by stimulating initial markets. This strategy was also expected to raise the private sector's interest in the application of IT to internal business operations, allowing industry to follow the achievement of the government. NBIS is the crystallization of the Korean government's realization, in the early 1980s, that IT and its applications would play crucial roles as the new national infrastructure.

Singapore

Singapore is currently implementing 'Connected Singapore' with its vision of 'infocomm' as "a key enabler, unleashing the potential of individuals, organizations and businesses to become more productive and efficient, and to create new ideas that enrich lives and produce new value"¹⁹. This, Singapore's fifth ICT master plan, will be implemented through four 'galvanizing strategies':

1. *Infocomm for Connectivity, Creativity and Collaboration* – which aims to drive the development of an infocomm infrastructure for pervasive and secure access, promoting the development of useful applications for work, play, lifestyle and learning, encouraging usage of applications and services; and promoting infocomm literacy.
2. *Digital Exchange* – a strategy to develop Singapore as a leading global digital distribution and trading centre to create a new source of growth and extend Singapore's hub status in the digital medium.
3. *Engine of Growth* – which aims to grow new economic activities and create jobs in infocomm, emphasizing opportunities that leverage Singapore's traditional hub status.
4. *Agent for Change* – a strategy that aims to help businesses and government agencies use infocomm to achieve higher efficiency, effectiveness and customer satisfaction.

¹⁸Jeong, K.H. and King, J.L. 'Korea's National Information Infrastructure: Visions and Issues', in Kahin and Wilson, *National Information Infrastructure Initiatives*, pp. 112-118.

¹⁹See <http://www.ida.gov.sg>

Supporting the four strategies are three foundational blocks: Capability Development; Technology Planning; and Conducive Business Environment. The Singapore government, through the Infocomm Development Authority (IDA), plays “the role of master planner for the strategies and acts as a catalyzing agent and facilitator for the initiatives”. However, it is recognized that “the success of each programme is heavily dependent on the participation of industries and citizens”.

Singapore’s first IT master plan was the National Computerization Plan, which was implemented between 1980 and 1985. This plan envisioned the computerization of the public service. It was followed by the National IT Plan (NITP), which was implemented between 1986 and 1991. The NITP was aimed at extending government systems (such as TradeNet and LawNet) to the private sector. It identified seven building blocks for IT development in Singapore: IT Manpower; IT Culture; Information Communication Infrastructure; IT Applications; IT Industry; Climate for Creativity and Entrepreneurship; and Coordination and Collaboration. The NITP was succeeded by the IT 2000 Plan (1992-1999), which envisioned Singapore to be “among the first countries in the world with an advanced nation-wide information infrastructure”. This advanced national information infrastructure would be used as the foundation for five strategic thrusts. In 2000, a new ICT master plan was unveiled – Infocomm 21. Infocomm 21 has six broad strategic thrusts: Singapore as a Premier Infocomm Hub, Singapore Businesses Online, Singapore Government Online, Singaporeans Online, Singapore as Infocomm Talent Capital, and Conducive Pro-Business and Pro-Consumer Environment.

Middle-income Economies

The countries in the middle-income group – Malaysia, the Philippines and Sri Lanka – have also integrated ICT master plans as part of their national development strategies. In Malaysia, the government plays a more active role in promoting ICT development in the country. The Philippines has a more market-led approach. Sri Lanka, emerging from decades of civil war, is looking to use ICTs to develop its economy, alleviate poverty, and improve the quality of life and opportunities for all of its citizens.

Malaysia

The National IT Agenda (NITA), launched by the National IT Council (NITC) in 1996, serves as the main policy statement on the development of ICTs in Malaysia. As stated in the Eighth Malaysia Plan (2001), NITA provides “the framework for the orderly development of the country into an information and knowledge-based society by 2020”²⁰.

NITA’s theme is ‘Turning Ripples into Tidal Waves’. The ‘ripples’ are essentially specific initiatives by the government – such as the Multimedia Super Corridor (MSC) – that are aimed at providing the necessary environment to empower the people, who in turn are expected to bring about the ‘tidal wave’ of change.

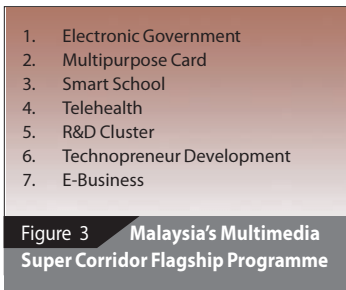
The NITC, which is the apex ICT body in Malaysia, has formulated an NITC Strategic Agenda with five key thrust areas to enable the country to “migrate to the e-World of the new

²⁰See <http://www.nitc.org.my/>

millennium". These are:

- *E-Community* – to enhance the quality of life of all Malaysian communities through ICT;
- *E-Public Services* – to get the public, private and community sectors to collaborate on an ongoing basis to enable the provision of people-oriented, customer-focused services electronically;
- *E-Learning* – to create and develop, through ICT, formal and informal learning networks for communities, with the goal of cultivating an ethos of life-long, continuous learning for individual, organizational and social advancement;
- *E-Economy* – to oversee the optimal usage of ICT in developing a knowledge economy, making it grow and become globally competitive;
- *E-Sovereignty* – to focus on building a resilient national identity. It is envisioned that citizens and institutions zero in towards enhancing national identity, integrity and societal stability in the face of borderless challenges to the nation.

The MSC is an important component of the Malaysian e-strategy. It is a dedicated 15 x 50 km corridor outside Kuala Lumpur that aims to attract global ICT companies to undertake research,



develop new products and technologies, and export from this base²¹. Conceptualized in 1996, the MSC is envisioned to become a global test bed for ICT applications. It is also intended to be the ideal growth environment for Malaysian ICT Small and Medium Enterprises (SMEs) seeking to transform themselves into world-class companies. To attract the targeted companies, the Malaysian government has committed to the following four promises: a Bill of Guarantees, world-class infrastructure, a suite of cyberlaws, and

incentives. At the end of MSC's three-phased development, it is anticipated that Malaysia itself would become one Multimedia Super Corridor.

The Communications and Multimedia Act of 1998 also provides the following all-encompassing policy objectives:

- a. To establish Malaysia as a major global centre and hub for communications and multimedia information and content services;
- b. To promote civil society where information-based services will provide the basis of continuing enhancements to quality of work and life;
- c. To grow and nurture local information resources and cultural representations that facilitate national identity and global diversity;
- d. To regulate for the long-term benefit of the end user;
- e. To promote a high level of consumer confidence in service delivery from the industry;
- f. To ensure an equitable provision of affordable services over the ubiquitous national infrastructure;
- g. To create a robust applications environment for end users;
- h. To facilitate the efficient allocation of resources such as skilled labour, capital, knowledge

²¹See <http://www.msc.com.my/msc/msc.asp>

- and national assets;
- i. To promote the development of capabilities and skills within Malaysia's convergence industries; and
- j. To ensure information security and network reliability and integrity.

The Philippines

In 1998, the Philippine government launched the National Information Technology Plan for the 21st Century. Dubbed 'IT21', the plan articulates the vision and strategy to spur the country to global competitiveness through information technology. It sets down the following goals and timeframes:

- *By 2000*: the Philippines will have laid the infrastructure for every business, every agency of government, every school, and every home in the Philippines to have access to information technology.
- *By 2005*: IT use will be pervasive in daily life. Philippine IT companies will be producing competitive IT products for world markets.
- *Within the first 10 years of the 21st Century*: the Philippines will be a Knowledge Centre in the Asia-Pacific, that is, a leader in IT education, in IT-assisted training, and in the application of information and knowledge to business, professional services, and the arts.

In July 2000, a Government Information Systems Plan (GISP) was approved and adopted as a framework and guide for all computerization efforts in the government (Executive Order 265). The GISP aims to create a system of governance that will lead to: faster and better delivery of public goods and services; greater transparency in government operations; increased capacities of public sector organizations; and proactive participation of citizens in governance.

In 2003, the Information Technology and Electronic Commerce Council (ITECC), then the country's ICT policy-making body, defined its vision of the Philippines as "an e-enabled society where empowered citizens have access to technologies that will provide quality education, efficient government service, greater source of livelihood, and a better way of life". Its more specific goals are to:

- Provide government services to stakeholders online;
- Develop an IT-enabled workforce;
- Develop the country as a world-class ICT services provider;
- Create an enabling legal and regulatory environment; and
- Provide affordable Internet access to all segments of the population.

ITECC identified specific priority projects to be completed by 2004 for each of the five goals. For instance, for the goal of developing the Philippines as a world-class ICT service provider, ITECC undertook the following projects in 2003-2004:

- Setting quality standards and certification for individuals in support of IT services and IT-enabled services;
- Implementing a sustainable ICT skills survey;
- An International Communications and Marketing Programme;

- Aggregation of IT services and IT-enabled services groups through an industry-wide portal;
- Developing small and medium IT enterprises;
- R&D programme for niche ICT products in Centres of Excellence; and
- Enabling Capability Maturity Model for Software (CMM) certification for ICT firms.

In 2003, the Philippine government created an e-Government fund. Under the 2003 national budget, the e-Government fund amounted to around 4 billion pesos. Close to half of the amount has been allocated to eight priority projects of various government agencies, including a portal for more than three million Overseas Filipino Workers (OFWs); a national business registration facility; automation of import declaration; an e-library; and an e-government portal.

The creation in 2004 of the Commission on Information and Communications Technology (CICT) as the government's "primary policy, planning, coordinating, implementing, regulating and administrative entity... that will promote, develop, and regulate integrated and strategic ICT systems and reliable and cost-efficient communication facilities and services", is an important recent development²².

Sri Lanka

e-Sri Lanka's vision is to "take the dividends of ICT to every village, to every citizen, to every business and also transform the way Government works"²³. The country hopes to achieve this vision by 2007 through a seven-programme strategy.

Programme 1 - Re-engineering Government aims to transform government business processes through the effective use of ICT, thereby making government more citizen-friendly and efficient. Included in this programme are efforts to automate proceedings and associated governing processes of the parliament; provide faster communication of documents between government offices; and encourage government leaders to use ICT in their day-to-day work.

Programme 2 - Building Information Infrastructure aims to:

- Provide a modern information and communication infrastructure that gives user-friendly access to all citizens;
- Establish a legal infrastructure that is internationally aligned; and
- Establish common standards for an information security framework and infrastructure implementation architecture.

Some key initiatives under this programme are the establishment of a network of Vishva Gnana Kendras (VGKs or Tele Centres) throughout the country for ICT connectivity and access for citizens; the installation of two broadband Regional Telecommunication Networks; and the establishment of a development-conducive telecommunications regulatory environment.

Programme 3 - ICT Human Resource Development aims to use ICTs to enhance education, increase the number and quality of high-level ICT professionals, and develop a computer-literate citizenry. The programme aims to build a workforce skilled in ICT use; increase the employment

²²Executive Order No. 269, 'Creating the Commission on Information and Communications Technology', available at http://www.ops.gov.ph/records/eo_no269.htm

²³See <http://www.esrilanka.lk/>

of graduates; strengthen teaching in primary and secondary schools, tertiary education and universities; and strengthen management and professional skills in the ICT industry.

Programme 4 - ICT Investment and Private Sector Development intends to achieve major economic and employment growth in Sri Lanka by using ICTs to re-engineer the local industry and to improve Sri Lanka's efficiency to compete effectively in the global marketplace, as well as to encourage multinational corporations to invest in Sri Lanka.

Programme 5 - E-Society aims to facilitate and promote awareness, training and capacity-building to empower citizens in Sri Lanka, to create a fair and equitable information society. This programme will promote the use of ICTs to empower disadvantaged /unserved groups. It will also facilitate the development of innovative ICT applications for social and economic development based on Millennium Development Goals (MDGs), and set up a fund to support such initiatives.

Programme 6 - Technology Architectures and Security Standards aims to identify technologies, architectures, standards, security and privacy requirements of all programmes of the e-Sri Lanka initiative, including service provision, transaction processing and systems. It also aims to introduce the required technology and standards, ensure that Sri Lanka is adequately represented in international standardization efforts, and to promote research, development and excellence in the ICT sector in Sri Lanka.

Programme 7 - E-Leadership and Policy-making aims to use ICTs at different levels of government, thereby ensuring that ICT promotion will be driven by the national leadership and a shared vision.

Low-income Economies

India is the clear leader in ICT development in this cohort. As early as 1971, it established a Department of Electronics (DoE), which is responsible for recommending and implementing policies for the country's IT sector. This early focus has created a globally significant software industry. On the other hand, Viet Nam began its push for ICT development only in the 1990s. In 2000, the Communist Party of Viet Nam officially acknowledged that "IT use in Viet Nam... is still backward. Progress is slow, creating the risk of a growing gap compared to many countries in the world and in the region".²⁴ Nepal has also embarked upon an ambitious ICT programme that mainly was kick-started with the National IT Policy, 2000. Further revision of this policy is being pursued now in light of developments taking place in the country and outside.

India

Until the 1980s, India was pursuing a restrictive import-substituting policy regime. However, in the early 1990s, the government introduced sweeping economic reforms that led to the restructuring of the information and communications sectors²⁵. India is currently on its 10th

²⁴Policies and Legal Documents on Information and Telecommunication Technology of Viet Nam (Hanoi: The National Steering Committee on Information Technology, 2002), p. 15.

²⁵Pertrazzini, B.A. and Harindranath, G. 'Information Infrastructure Initiative in Emerging Economies: The Case of India', in Kahin and Wilson, *National Information Infrastructure Initiatives*, p. 220.

Five-Year Plan. For the IT sector, the objectives identified in this Plan are:

- To ensure the sustained growth of software and IT-enabled services and increase India's share in the global IT market as well as expand the domestic market;
- To put in place a policy framework to make India a major force in the hardware manufacturing sector;
- To use IT in governance;
- To bridge the digital divide;
- To promote the development of software in Indian languages; and
- To improve the quality of human resources, skills, and research and development (R&D) in the sector.

The strategy for the 10th Plan includes specific initiatives for hardware development; software development and marketing; human resources development; legal and regulatory issues; financial issues; convergence; e-governance; computer penetration, affordability and the digital divide.

The Plan also identifies major initiatives and projects to be pursued: encouraging new software technology parks; setting up community information centres; developing Indian language interfaces to computers and IT; encouraging e-commerce and e-governance; Media Lab Asia; training and research on IT security; and human resources development. Issues to be particularly addressed are: the lack of qualified faculty and poor infrastructure in technical education, connectivity to Government Senior Secondary Schools on a pilot basis and upgrading of IT infrastructure in institutions of higher learning.

The Plan also identifies IT-enabled services as a major growth market for India. It declares: "Since the Indian IT industry has matured enough, IT-enabled services are expected to grow through private initiatives..." The Plan reaffirms the government's 'hands-off policy' towards the IT sector, as it "will confine itself to being a facilitator and a catalyst for accelerated growth of the sector". This is consistent with the overall thrust of the 10th Plan where the role of the government in production will continue to decline while increasing provision of better public services and regulatory environment for private enterprises.

The telecommunications sector has not received as much government attention as IT has. Thus far, telecom sector reforms have been undertaken in three phases. The first phase began in the early 1980s, when private manufacturing of customer premise equipment was given the go-ahead in 1984. A proliferation of individual STD/ISD/PCO networks also took place throughout the country, through private individual franchises.

The second phase of telecom reforms commenced in 1991 with the announcement of a new economic policy. The government de-licensed the manufacture of telecom equipment in 1991. It also opened up radio paging services in 1992. In 1994, basic telephony was opened to the private sector by granting operating licenses to six companies.

The National Telecom Policy, announced in 1994, was part of this second phase of reforms. It emphasized universal service and qualitative improvement in telecom services, among other objectives. The third phase of reforms began with the announcement of the New Telecom

Policy (NTP) in 1999²⁶. The underlying theme of NTP was to usher in full competition through unrestricted entry of private players in all service sectors. The policy favoured the migration of existing operators from the era of a fixed license fee to a revenue sharing regime. With these reforms, the telecom sector began witnessing a growth trend never seen before.

India's 1999 telecommunications policy recognizes that provision of world-class telecommunication infrastructure and information is the key to the country's rapid economic and social development. It is not only critical for the development of the IT industry, but will also have ramifications for the entire economy of the country. It is also anticipated that a major part of the GDP of the country will be contributed by this sector. Accordingly, it is vital that there be a comprehensive and forward-looking telecommunications policy that will create an enabling framework for the development of this industry. NTP 1999 also sets targets such as achieving a tele-density of 7 by the year 2005 and 15 by the year 2010. This is aimed at encouraging development of telecoms in rural areas and making rural communication mandatory for all fixed service providers, increasing rural density to 4 by the year 2010, and providing reliable transmission media in all rural areas.

The National Taskforce on Information Technology and Software Development was established by the Prime Minister of India on 28 May 1998 to formulate a long-term National IT Policy for the country and to remove impediments to the growth of the IT industry. The main objective was to help India emerge as an IT software superpower. The Task Force submitted three key reports to the government, suggesting various measures to build India's IT industry and encourage widespread use of IT in the country: IT Action Plan I: Software; IT Action Plan II: Hardware; and IT Action Plan III: Long-term National IT Policy²⁷. These three reports form the master plan for IT growth in India. Similarly, the New Telecom Policy of 1999 is the master plan for the telecommunication sector that was responsible for most of the telecom reforms that ensued.

Nepal

Nepal's IT policy aims to put the country on the global IT map by 2005²⁸. Its objectives are to: make IT accessible to the general public and increase employment through this means; create a knowledge-based society; and establish knowledge-based industries. The policy spells out the following 15 strategies to realize the vision:

1. For the government to act as an IT promoter, facilitator and regulator;
2. Accord high priority to research, development and extension of IT with participation of private sectors;
3. Develop competent manpower;
4. Encourage domestic and foreign investment in the development of IT and the related infrastructures;
5. Place the country on the global map of information technology;
6. Promote e-commerce with the passage of appropriate laws;
7. Use IT for e-governance;
8. Apply IT for rural development;

²⁶See <http://www.gipi.org.in/ict/NewTelecom99.php>

²⁷See <http://www.gipi.org.in/ITPolicyInIndia.php>

²⁸See http://www.npc.gov.np/it/it_policy.pdf

9. Promote the IT sector;
10. Provide speedy and qualitative service at a reasonable cost by creating a healthy and competitive atmosphere among IT service providers;
11. Incorporate computer education in the academic curriculum;
12. Enhance professional efficiency through the use of IT;
13. Extend IT networks to rural areas;
14. Place the country on the international market through IT; and
15. Increase export of services related to IT (software and hardware).

Nepal's IT plan also identified 16 activities that constitute its IT policy. These include declaring IT a policy priority; providing Internet access to all of the country's Village Development Committees; computerizing the system in all government offices; developing – with private sector participation – IT parks; promoting e-commerce and e-health; and enacting necessary laws. The action plan for implementing the IT policy includes:

1. Participation of the private sector in infrastructure development;
2. Infrastructure development;
3. Human resources development;
4. Dissemination of IT; and
5. Promotion of e-commerce.

Though ICT policy has been formulated to encompass many sectors, its implementation seems weak due to the socio-political situation and the weak economy and governance. The harsh topography of Nepal also makes ICT infrastructure deployment difficult. Recently, Nepal created the High Level Commission of Information Technology (HLCIT) under the chairmanship of the Prime Minister as an apex body for IT development. This Commission has been responsible for the recent review of the IT Policy, 2000 and also has taken the initiative to draft relevant legislations including the one that has been approved on e-Transactions. The 10th Five-Year Plan emphasizes IT development in general. However, it does not give adequate attention to mainstreaming ICTs in the overall development process.

Viet Nam

Directive No. 58-CT/TW, on Accelerating the Use and Development of Information Technology for the Cause of the Industrialization and Modernization of the Communist Party of Viet Nam, is the touchstone document for ICT development in the country. Directive 58 identifies IT as “one of the most important enabling forces for development” that “creates deep changes in the social, economic and cultural life of the modern world”²⁹. The document identifies three principal objectives to be achieved in Viet Nam by 2010:

- IT use shall be increased in every sector;
- The national information network shall be developed to reach nationwide coverage; and
- The IT industry shall become a spearhead economic sector with a growth rate higher than [that of] any other sector of the economy.

²⁹Policies and Legal Documents on Information and Telecommunication Technology of Viet Nam, p. 13.

There are five programmes, as follows:

- Promoting use and application of ICT for e-Viet Nam (e-learning, e-government, e-enterprise and e-commerce);
- ICT industry development;
- Telecoms and Internet infrastructure development;
- ICT human resources development; and
- Enhancing an enabled environment for use and application of ICT.

Based on these five programmes, the following four key strategic projects have been identified:

- Build up an infrastructure for e-society;
- Build up an infrastructure for e-government;
- Build up a key network infrastructure to promote Internet access abilities; and
- Enhance national ICT managerial abilities.

Directive No. 58 enumerates five guiding views and five programmes and projects to be undertaken by all sectors and at all levels. The government subsequently adopted this directive and five goals for IT use and development for the country were identified³⁰.

Viet Nam is currently drafting a new strategy for the 'Development of Information and Communications Technology (ICT) of Viet Nam until 2010 and Orientation until 2020'. The proposed strategy has four components: ICT infrastructure; ICT industry; ICT applications; and ICT human resources. These four components are inter-related and they support one another's development.

Three stakeholders are identified as promoting the four components of the draft master plan:

- The *government* will create the legal framework, and develop the institutional arrangements and policies with regard to ICT development. It will play the key role in coordination and cooperation, training, international cooperation, as well as promoting ICT development;
- The *entrepreneurs*, particularly small and medium entrepreneurs, will participate in making investments, supplying products and services, and developing the market. They will assist the government in developing and implementing ICT development policies; and
- The *users*, who will indirectly make investments in the market and participate in designing and improving the quality of products and services. They will also assist the government in developing and implementing ICT development policies.

³⁰Policies and Legal Documents on Information and Telecommunication Technology of Viet Nam, pp. 46-66.

Comparing ICT Policies and e-Strategies

This section documents and analyzes five key policy areas of the ICT strategies of the nine countries included in the study. These are:

- Developing the information infrastructure;
- Creating a secure environment in cyberspace;
- Developing and controlling content;
- Creating effective policy and regulatory agencies; and
- Creating an appropriate education policy that recognizes and utilizes ICT.

Information Infrastructure

Given their early focus on developing the IT and communications sector, it is not surprising that the high-income economies in this study (Japan, Korea and Singapore) are already preoccupied with broadband deployment (Table 5). On the other hand, the policies of both middle- and low-income countries focus on enhancing the national information infrastructure networks, with most setting specific targets in terms of telephone density and/or Internet penetration.

Building the broadband infrastructure is also in the agenda of developing nations. However, high-income countries in this study, where government took an activist role in the construction of national broadband networks, are not necessarily the only models to consider. In a global survey of national efforts in broadband deployment, James Savage has identified three distinct roles that governments play: the light touch approach; the cooperative approach, and comprehensive national broadband plans³¹.

The light touch approach requires minimal government intervention, focusing on transparent regulatory frameworks to encourage private sector activity and competition. Switzerland and New Zealand practice this approach. The cooperative approach to broadband development sees government activity in rural areas and/or applications (e.g., telemedicine for the poor). The private sector takes the lead in providing broadband services in business centres, cities

³¹Savage, J. 'International Public Programs to Provide Broadband Access to the Internet'; available at http://broadband.gc.ca/english/resources/inter_summ_jan05.pdf.

Table 5. National Information Infrastructure I: Policy Environment

| Economy | Information Infrastructure Initiatives/Telecoms Policy |
|--------------------|---|
| Japan | <p><i>e-Japan Priority Policy Programme</i> Calls for the formation of the world's most advanced information and telecommunications networks, including "Fibre to the Home" (FTTH).</p> <p><i>Promoting the Development of Technology for the Convergence of Broadcast and Telecommunication Act</i> To support development of convergent technologies and to accelerate/drive development of services that converge communications and broadcasting, enacted in November 2001.</p> <p>Japan has also presented to the International Telecommunication Union (ITU) its vision of the fourth generation (4G) mobile communications system, successor to the third generation (3G) mobile communications system currently being deployed in some advanced countries.</p> |
| Korea | <p><i>Korean Information Infrastructure (KII) Master Plan</i> Drafted in 1995 to build three kinds of high-speed networks such as KII-Government, KII-Public and KII-Testbed by 2005. In 2000, when the three stages were completed, high-capacity and high-speed optical transmission backbone networks were constructed throughout Korea. In particular, to upgrade Internet speed in homes, many new technologies have adopted ADSL, cable modem and satellite data communication. This project paved the way for the successful rollout of broadband Internet in Korea.</p> <p><i>e-Korea Vision</i> Calls for high-speed Internet of at least a 1Mbps level to be considered as "social overhead capital" to ensure that every Korean citizen has access to high-speed Internet at a low charge anywhere in the country by 2005.</p> <p><i>Broadband IT Korea Vision 2007</i> Aims to establish a "Broadband Convergence Network" that will create an environment that allows anyone to use digital products and services conveniently regardless of the mode of information transmission.</p> <p><i>Closing the Digital Divide Act</i> Enacted on January 16, 2001 to reduce gaps in the access to and use of information technology by supporting low-income earners, the handicapped and the elderly, who are at a disadvantage in information usage due to economic, physical and social conditions.</p> |
| Singapore | <p><i>Connected Singapore</i> Under this master plan, Strategy 1 deals with Infocomm for Connectivity, Creativity and Collaboration. Strategy 1 aims to place infocomm products and services in the hands of everyone for more productive and enriching lives. It envisions an integrated network linking wireless LAN, mobile telephony, broadband Internet that will bring Singaporeans closer to 'anywhere, anytime' communications and computing. By 2006, IDA aims to achieve pervasive wireless connectivity, with 50 percent of households on broadband, and consumers enjoying a wide range of 3G services.</p> |
| Malaysia | <p><i>Communications and Multimedia Act 1998 / Act 588</i> Based on the objectives of the Act, the Ministry of Communication, Multimedia and Energy set the following targets: (1) <i>To Increase Penetration Rates</i> to reach 50 and 25 for every 100 population for the country as a whole and for rural areas respectively by 2020. An interim target of 30 per 100 persons has been set for the country as a whole by the year 2005. (2) <i>Quality Service at Affordable Costs</i>. (3) <i>Infrastructures Development</i> Communications and multimedia infrastructures will be adequate and effective in supporting overall economic development. (4) <i>Creation of a Hub</i> to serve as a global hub for the communications and multimedia industry in this region.</p> |
| Philippines | <p><i>Public Telecommunications Policy Act of 1995 (Republic Act 7925)</i> Liberalized telecommunications services by allowing multiple operations of local service providers in most segments of the domestic and international telecommunications markets. The law, however,</p> |

| Economy | Information Infrastructure Initiatives/Telecoms Policy |
|------------------|---|
| | imposes significant constraints for convergent industries by providing that an entity cannot engage in both telecommunications and broadcasting under a single franchise. |
| Sri Lanka | <p><i>e-Sri Lanka</i> Targets 5 percent for fixed line penetration by 2007, and a similar target for mobile lines; national backbone development and networking to global backbones will be addressed as a top priority; also targets rural connectivity, national backbone development and fibre wiring of a few hot spots, commercial centres in the capital and surrounding business cluster and key industrial parks in Sri Lanka.</p> |
| | <p><i>Proposed National Communications Policy</i> Supports the establishment and promotion of a modern and efficient Sri Lanka Information Infrastructure (SLII), with focus on convergence of Information Technology, Media and Telecommunications as well as new ICTs such as the Internet, Electronic Commerce and Electronic Government.</p> |
| India | <p><i>1999 National Telecoms Policy of India</i> Seeks to provide affordable and effective communication systems for citizens; achieve a balance between the provision of universal service to all uncovered areas and of high-level services capable of meeting the needs of the country's economy; and create a modern and efficient telecommunications infrastructure taking into account the convergence of IT, media, telecom and consumer electronics and thereby propel India into becoming an IT superpower.</p> |
| Nepal | <p><i>Telecommunications Act, 1997 & Telecommunications Regulation, 1997</i> To create a favourable and competitive environment for the development, expansion and operation of telecommunications services in Nepal.</p> <p><i>Amendment of Telecom Policy</i> Privatization of the State-owned Nepal telecommunication corporation.</p> <p><i>Nepal IT Policy (2000)</i> Calls for the creation of an "info-super highway and a north-south info-highway"; Internet nodes in all development regions by 2001/2002 and in district headquarters in 2003/2004.</p> |
| Viet Nam | <p><i>Decision No. 158/2001/QĐ-TTg of the Prime Minister on the approval of Viet Nam's Post and Telecommunication Development Strategy until 2010 and Orientation until 2020</i></p> <p><i>Draft ICT Strategy</i> Envisions an "efficiently and coherently applying/operating market mechanisms with a socialist direction under the State administration in the fields of Posts and Telecoms and informatics". By 2020, Viet Nam shall reach the advanced standard in ASEAN in terms of informatics technology and telecommunication infrastructure (being one of three top countries in ASEAN).</p> |

and major urban areas, with little or no government support. The UK and the US follow this approach. In contrast, Japan, Korea and Singapore are practitioners of the all-inclusive national broadband plan, which calls for a comprehensive national ICT infrastructure and skills development requiring government and industry-wide coordination.

An important lesson that can be learned from broadband deployment is that merely providing broadband access is not enough. Japan launched its 'New, Japan-Inspired IT Society' when it discovered that its broadband network was not fully subscribed to despite the world's lowest access fees for high-speed Internet. As has been seen elsewhere, content and application development must accompany infrastructure development.

The middle- and low-income countries in the study are focused on enhancing their information infrastructure. The low-income countries have had success in developing their information

infrastructure³². In the period 1999-2002, India's fixed/wired telephones grew by 82 percent, Nepal's by 33 percent, and Viet Nam's by 74 percent. In the same period India's Internet users increased by 492 percent, Nepal's by 71 percent, and Viet Nam's by an impressive 1,400 percent. Yet much remains to be done. Despite impressive growth, fixed line telephone, mobile phone and Internet penetration rates in these countries remain low.

Fortunately, new technologies to connect communities cheaply and reliably to the Internet, have become available. Among these, WiFi or wireless fidelity is the most promising. WiFi is the popular name for a broadband, Wireless Local Area Network (Wireless LAN) that conforms to the Institute of Electrical and Electronics Engineers (IEEE) 802.11 standards.

WiFi not only eliminates the need for cables to connect computers in offices, homes and buildings, it has also paved the way for Internet access through Wireless Internet Service Providers (WISP). It is estimated that by 2005 there will be about 120,000 WiFi hotspots all over the world. In the US, the Yankee group expects that WISPs will serve 4.6 million wireless Internet users by 2007³³.

WiFi is already high in the agenda of some of the countries in this study. Korea had 8,500 commercial hotspots in the first half of 2003 (which is half of the world's total!)³⁴. Singapore has eight public WLAN service providers with 500 public hotspots. It aims to be the first to establish a countrywide WiFi network³⁵. In 2002, Japan amended relevant ordinances to promote the introduction and upgrading of wireless LANs. In 2003, the Philippines and India issued new rules and regulation on wireless Internet access. In the same year, Viet Nam set up its first commercial hotspot.

WiFi's potential goes beyond enterprise use. It is increasingly being seen by the development community as a cost effective way to provide last mile connectivity to rural and underserved areas. UN Secretary General Kofi Annan believes that "...it is precisely in places where no infrastructure exists that WiFi can be particularly effective, helping countries to leapfrog generations of telecommunications technology and infrastructure and empower their people."

Already, a number of interesting WiFi deployments in low-income countries in this study exists. In the Loni-Shirdi area of the western Maharashtra of India, over 200 villages have formed a cooperative and have set up nearly 50 wireless hotspots that use the latest WiFi systems so that villagers can get agriculture market information right at their doorsteps³⁶.

The Indian State of Kerala is launching a statewide effort to make its population e-literate by 2005 using wireless technologies³⁷. In Nepal, the Everest base camp and the surrounding villages

³²Data for this discussion is taken from Paua, F. 'Global Diffusion of ICT: A Progress Report,' *The Global Information Technology Report 2003-2004*, pp. 39-45. See http://www.weforum.org/pdf/Grc/GITR_2003_2004/Progress_Chapter.pdf

³³Compton, J. 'High on WiFi,' *PC Upgrade 2003 Special Issue*, p. 10.

³⁴MobileInfo.com News Issue #2003 - 15 (May 2003); available at http://www.mobileinfo.com/News_2003/Issue15/WiFi_news.htm

³⁵Wireless Local Area Network Developments in Singapore; available at <http://www.ida.gov.sg/idaweb/wireless/infopage.jsp?infopagecategory=articles:wireless&versionid=2&infopageid=I2595>

³⁶India's rural masses have embraced latest WiFi technology, say experts; *The Hindu*, 4 May 2003; available at <http://www.infochangeindia.org/searcharchives.jsp?recordno=2168&secno=9&detail=T>

³⁷Kerala: e-powering masses; *The Times of India*, 15 Jan 2004, p. 1.

have been wirelessly connected to the Internet³⁸. A BBC article describes how yak farmers are using WiFi in Nepal³⁹.

Indian Government policies on WiFi adaptation are stringent with respect to appropriateness and frequency spectrum allocations. The notification issued by the Government of India on 19 April 2003 only permits the end user to use the 802.11b and Bluetooth technologies for personal use, without any license, and only within the campus or office premises of the end user. This is not considered to be an encouragement of WISPs. It is feared that the notification suffers from favouring a particular technology instead of de-licensing the spectrum. Both the industry and users are demanding that Government de-license the ISM spectrum irrespective of the technology used, so as to encourage WISPs and improve Internet connectivity in rural and remote areas.

Another wireless technology that is making inroads in the developing world is the Wireless Local Loop (WLL). Proponents of WLL suggest that there are definite economic advantages to deploying this technology over traditional wired solutions, particularly in adverse terrains and/or widely dispersed subscriber areas⁴⁰. Not only can WLL technology be deployed quickly (no copper lines to string), it also has a lower incremental investment cost than copper wires (the cost of deploying last mile connectivity for wireless is decreasing while it remains constant for copper wires). It is generally seen that WLL is one-third the cost of copper landline service. The deployment of WLL is seen as part of the reason for the projected doubling of India's telecoms network between 2001 and 2006. Nepal's new entrant (United Telecom Limited - UTL) is also competing with the incumbent by providing basic telephone service based on WLL technology.

A key point for low-income countries seeking to enhance their information infrastructure is the observation that "the cost of real time, circuit-switched communications is sufficiently high that it may not be the appropriate starting point for rural connectivity"⁴¹. As has been demonstrated in the store-and-forward network being deployed in rural India, asynchronous Internet service (i.e., e-mail and voice messaging) coupled with wireless technology reduces the cost of communications service delivery by two orders of magnitude below landline expenses. According to Sandy Pentland, this rural Indian experience suggests the need for a reorientation of the universal service programme away from the "copper-to-village-centre" model toward a "broadband village-area network" serving everyone within the village centre⁴². Another factor influencing the development of the information infrastructure is the demise of the view that telecom is a natural monopoly. Globally, the move to greater competition in the telecom sector has meant lower prices, new and better products and services, and expanded choices for consumers. Competition in telecommunications also has quantifiable benefits for the whole economy.

³⁸'Rising to the Challenge', in The Wireless Internet Institute (ed.), *The Wireless Internet Opportunity for Developing Countries* (New York: Information for Development Program, World Bank, United Nations ICT Task Force, Wireless Internet Institute, November 2003), pp. 43-45.

³⁹See <http://www.news.bbc.co.uk/1/hi/technology/3744075.stm>

⁴⁰The International Engineering Consortium, 'Wireless Local Loop', Web ProForum Tutorials; available at <http://www.iec.org>

⁴¹Pentland, S. 'Toward a broadband village area network', in *The Wireless Internet Opportunity for Developing Countries*, p. 26. See http://www.w2i.org/pages/wificonf0603/wiofdc_toc.html

⁴²Ibid.

Following global trends, all the countries in the study have moved away from monopoly towards competition in the provision of telecommunications services (see Table 5). However, it is also important to point out that most Asian governments, invoking 'infant industry' reasons and the 'orderly exit' of incumbents, preferred 'managed competition' or gradual introduction of competition in telecommunications⁴³.

We have already detailed the impressive growth rates achieved by low-income countries in developing their information infrastructure in the last three years. Singapore's decision to embark on a 'big bang' approach to full competition in April 2000 has led to an estimated US\$1.8 billion new investment and 2,500 jobs in three years⁴⁴. India is said to be on the verge of a telecom boom because the private sector "is creating demand for its offerings across a broad range of services: fixed line and cellular telecom, Internet, data connectivity, and national and international long-distance telecom"⁴⁵. In Nepal, the Telecom Policy has been replaced with Telecom Policy 2004, which has the objective of further liberalizing the telecom sector by attracting investments from the private sector. Most importantly, the State-owned Nepal Telecommunication Corporation (NTC) has been changed into Nepal Telecom, a private organization. Likewise, a private mobile operator is being selected to end the monopoly on cellular service. These new developments in the telecom sector, particularly the presence of multi-operators and increasing private ownership, are expected to lead to further growth and better services.

An important recent trend in telecommunications is the increasing use of mobile phones at the expense of land/fixed/wired lines (or 'fixed-mobile substitution')⁴⁶. The rise of cellular telephony has undermined the basis of the incumbent's strength – its extensive fixed line network and the high cost of rolling out fixed lines. This trend has also resulted in the revenue erosion of traditional fixed/wired line providers. There are now more cellular lines than fixed lines worldwide. In six countries in this study (Japan, Korea, Singapore, the Philippines, Malaysia and Sri Lanka), there are already more cellular/mobile phones than wired/fixed lines⁴⁷. And in the other three countries where there are more fixed lines, cellular growth has been phenomenal: between 1999 and 2002, India's cellular subscribers grew by 573 percent, Viet Nam's by 479 percent, and Nepal's by 298 percent.

Competition in the telecommunications markets exists not just between fixed and mobile service providers but also between mobile providers. It has been argued that the lack of vested interests in cellular service has meant full (as opposed to managed) competition in this sector. For instance, in the fiercely competitive cellular phone market in the Philippines, the number two player, Globe Telecoms, spent approximately US\$178 for each new postpaid subscriber acquired in 2003⁴⁸. Of this amount, 94 percent went towards handset and SIM card subsidy while the rest to promotional and marketing expenses. The cost of acquiring a prepaid subscriber

⁴³Chane-Kune, B., Fukasaku, K., Maur, J.-C. and Rajan, R. 'Liberalization and Competition in the Services Sectors: Experiences from Europe and Asia', in *Asia and Europe: Services Liberalization* (Paris and Manila: OECD and ADB, 2003), p. 152.

⁴⁴IDA, 'Singapore's Telecom Liberalization Draws ATT, MCI WorldCom and Other Global Players'; available at <http://www.ida.gov.sg/website/idacontent.nsf/dd1521fe79ecf3bc825682f0045a340>.

⁴⁵India, *Fact Book on the Telecom and IT Industry in Asia*, January 2002, p. 43.

⁴⁶Beardsley, S., Morgenstern, I.B. von, Enriquez, L. and Verbeke, W. 'Towards a New Regulatory Compact', *The Global Information Technology Report 2003-2004*, pp. 71-86.

⁴⁷Discussion based on Paua, F. 'Global Diffusion of ICT', *The Global Information Technology Report 2003-2004*, pp. 23-55.

⁴⁸Agustin, V.C. 'New opium of the masses', *Philippine Daily Inquirer*, 2 Feb 2004, page B3.

is lower (less than US\$10), with 58 percent of the amount going to handset subsidy.

There is also competition in the provision of Internet access in the nine countries in this study (Table 6). In an executive survey that rated 102 countries on whether there is sufficient

Table 6. National Information Infrastructure II: Market Structure

| Economy | Fixed Line Licensees | Mobile Licensees | ISPs |
|--------------------|--|---|--|
| Japan | NTT East, NTT West, KDDI, Japan Telecom, TNet, Kyushu Telephone | NTT DoCoMo, KDDI, J-Phone, Tu-Ka, Astel | Hundreds of ISPs offering dial-up, DSL, cable, and mobile phone access |
| Korea | Korea Telecom, Hanaro Telecom, Dacom, Onse Telecom | SK Telecom, KG Freetel, LG Telecom | 82 |
| Singapore | SingTel, StarHub are the major players | SingTel Mobile, MobileOne, StarHub Mobile are the major players | SingNet, Pacific Internet, StarHub Internet are the major ISPs. There are 62 ISP licenses issued so far ⁴⁹ |
| Malaysia | Telekom Malaysia, Celcom, Maxis, DiGi, TimedotCom | Telekom Malaysia-Celcom, Maxis-TimedotCom, DiGi | 2 (Jaring and TM Net) |
| Philippines | PLDT, Smart, Pilipino Telecom, Globe Telecom, IslaCom, Digital Telecom, BayanTel, PT&T, Phil Global Com, Eastern Telecom, PAPTELCO, TELOF | Smart/Pilipino Telecom, Globe Telecom/IslaCom, Express Telecom, Sun Cellular | Approximately 191 ISPs nationwide but only 5 in Tier 1 |
| Sri Lanka | Sri Lanka Telecom, Lanka Bell, Suntel | Dialog GSM, Celltel, Mobitel, Hutchison | 23 licensees |
| India | MTNL, Tata, Bharti, Hughes, BSNL India has introduced a new license called the Unified Access Service License, which enables both fixed and mobile service provision through the same license. There is now less relevance of Fixed Line or Cellular (Mobile) License separately. | Aircel, Bharti, Birla AT&T, BPL, Escotel, Fascal, Hexacom, Hutchison Max, JTM/ Evergrowth, Koshika, MTNL, Reliance Telecom RPG, Spice Comm, Sterling Cellular, Tata Cellular, Usha Martin | Number of ISP licenses issued 385 Operational ISPs – 175, VoIP licenses – 121, IXP – 4 (falls under National Internet Exchange of India) ⁵⁰ |
| Nepal | Nepal Telecom (NT), United Telecom Limited (UTL), STM Telecom Media ⁵¹ | Nepal Telecom | 15 ISPs |
| Viet Nam | Viet Nam Post and Telecommunications (VNPT), Viet Nam Post and Telecom Company (Vietel), Electrical Telecom Company (ETC), Saigon Post and Telecommunications (SPT), Hanoi Telecom, Vina Shipping Electronic and Information Company (Vishipel) | Mobiphone, Vinaphone, S-Fone, Vietel, Hanoi Telcom (last 2 have yet to operate) | 6 licensed IXPs, 13 licensed ISPs, 10 licensed to provide VoIP |

Source: Fact Book on the Telecom and IT Industry in Asia, January 2002; Communications to author from various experts from the countries under study.

⁴⁹Infocomm Development Authority, Singapore (<http://www.ida.gov.sg>)

⁵⁰Department of Telecommunication, Government of India (<http://www.dotindia.com>)

⁵¹STM Telecom Media is a private rural telecom operator awarded license in the year 2003 to establish a minimum of two telephone lines via VSAT in the 534 villages in the eastern region of Nepal.

competition among Internet Service Providers (ISPs) to ensure high quality, infrequent interruptions and low price, Korea emerged number 1⁵². Japan is ranked 14, Singapore (18), India (26), Malaysia (36), the Philippines (41), Sri Lanka (44), and Viet Nam (85). The top three countries, where sufficient competition is seen to exist, also have the cheapest Internet fees. The cost of 30 off-peak hours for Internet access as a percent of per capita GDP is less than 1 percent in Japan (0.05 percent), Singapore (0.07 percent), Korea (0.08 percent), Malaysia (0.13 percent) and Sri Lanka (0.76 percent). In India, the cost of 30 off-peak hours of Internet service is 2.07 percent of the country's per capita GDP. In the Philippines, it is 2.44 percent. In Viet Nam, the figure is 4.64 percent⁵³.

Without an independent regulator and competition rules in place, liberalization would mean that former monopolists simply become dominant players. For instance, while there are four fixed line licensees in Viet Nam, 90 percent of the total revenue in telecom and Internet services is generated by Viet Nam Post and Telecommunications (VNPT). VNPT has the biggest market share in terms of network, services and clients. Almost 100 percent of the basic services and 65 percent of Internet services are now being provided by VNPT. Indeed, a liberalization policy without a corresponding effort to enhance the regulatory capabilities of government may not solve the old problems but may create new ones.

Trusted and Secure Environment

Developing trust is a key element in driving ICT use. This is particularly true for electronic businesses/commercial transactions where contracts sometimes need to be enforced by a third party. Although e-commerce emerged even before laws recognizing electronic contracts and transactions were enacted, as in other markets, its continued growth requires the existence of a legal infrastructure.

Given the interest in how ICTs can help countries develop, it is also not surprising that more and more countries are approving e-commerce and other ICT legislations. Seven of the nine countries in this study have already passed their respective electronic transaction laws (Table 7). Nepal only recently developed legislation on e-commerce related issues through a Royal Ordinance⁵⁴ pertaining mainly to online security. The only exception is Sri Lanka.

In an executive opinion survey conducted by the World Economic Forum (WEF) that rated 102 countries on the quality of ICT laws (i.e., from non-existent to well-developed and enforced), Singapore was ranked 2, Malaysia (7), Korea (12), Japan (27), India (36), the Philippines (52), Viet Nam (54), and Sri Lanka (69)⁵⁵.

The Philippines and India have adopted what can be described as an 'omnibus approach' to electronic transaction legislation. That is, the e-Commerce Act of the Philippines and IT Act of

⁵²'Competition in the ISP sector, 2003', in *The Global Information Technology Report, 2003-4*, p. 239.

⁵³'Affordability of Internet Service Provider Fees, 2001', in *The Global Information Technology Report, 2003-4*, p. 259. According to this study, Internet is cheapest in Sweden and Luxembourg (at 0.01 percent) and most expensive in Ethiopia (at 103.56 percent)

⁵⁴The Royal Ordinance is called "An Ordinance made for provisions relating to Electronic Transactions"

⁵⁵'Laws Relating to ICT, 2003', *The Global Information Technology Report 2003-2004*, p. 238. The WEF survey was conducted in conjunction with the Network Readiness Index (NRI). Laws relating to ICTs are considered in the NRI.

India cover commercial as well as criminal issues. Others have passed a number of laws that can be collectively considered as ‘cyberlaws’. Malaysia, with seven cyberlaws (as of last count), best exemplifies the ‘multiple laws’ approach. This works in a country where the national leadership (both of the executive and legislative branches) is strongly committed to ICTs as tools for national development. Otherwise, it is important to maximize the opportunity of getting a law passed by making its scope as broad as possible.

Whether countries espouse an omnibus or multiple laws approach, it is important that laws are generally-worded and technology-neutral. The danger of having laws and regulation that

Table 7. Electronic Transaction Laws

| Economy | Electronic Transaction Laws |
|--------------------|--|
| Japan | <p><i>Law Concerning Electronic Signature and Certification Services</i> This e-signature law, enforced on 1 April 2001, aims to ensure the easy use of electronic signature and prompt electronic data exchange. This law is included in the e-Japan Strategy⁵⁶ that was developed as part of a comprehensive national strategy to create an ‘enabling environment’ for the information society.</p> |
| Korea | <p><i>Digital Signature Act</i> Deals with the issues on digital signature of Public Key Infrastructure. Enacted and promulgated on 5 February 1999 and later enforced on 1 July.</p> <p><i>Framework on e-Commerce Act</i> Vests digital documents with the same level of legal effect as of written documents, securing the reliability of e-commerce, protecting consumers and driving forward the policy for e-commerce promotion. Enacted on 8 February 1999.</p> <p><i>Promotion of the Digitization of Administrative Work for the e-Government Realization Act</i> To promote the digitization of administrative work, such as digitization of administrative management; service digitization; reduction of document work; and promotion of the e-government project to improve productivity, security and social equality of administrative institutions. Enacted 28 March 2001.</p> |
| Singapore | <p><i>Electronic Transactions Act, ETA</i> Provides legal recognition of electronic contracts and electronic signatures. Clarifies the liability of network service providers that merely carry traffic. Provided for the issuance and acceptance of government documents electronically. Established the voluntary licensing of certification authorities as trusted third parties. Enacted in 1998. ETA is currently undergoing public consultation for review.</p> <p><i>Evidence Act</i> The original Act was amended in 1995 to provide for the admissibility of computer output as evidence in court. <i>Evidence (Computer Output) Regulations 117</i> establishes the criteria for certifying imaging systems that can archive documents in an electronic form.</p> |
| Malaysia | <p><i>Digital Signature Act 1997 (Act 562)</i> Gives digital signatures the same legal effect as hand-written signatures, thumbprints or marks.</p> |
| Philippines | <p><i>Electronic Commerce Act of the Philippines (RA 8792)</i> Gives legal recognition to electronic documents, electronic signatures and electronic transactions. This law applies to any kind of electronic data message, electronic document used in commercial and non-commercial activities, and/or transactions, including electronic transactions in government.</p> |

⁵⁶See http://www.kantei.go.jp/foreign/policy/it/0808summary/030808gaiyo_e.pdf

Table 7 continued

| Economy | Electronic Transaction Laws |
|------------------|--|
| Sri Lanka | <i>Computer Crimes Bill</i> Will provide legal recognition of digital signatures, which is seen as the basis for e-commerce and electronic data interchange. |
| India | <i>IT Act 2000</i> Provides for the legal recognition of electronic contracts and digital signatures; created Controller for Certifying Authorities and Cyber Appellate Tribunal. |
| Nepal | <i>Electronic Transactions Act</i> Once it becomes law, this act will have wide implications on security, electronic transactions, content management and data protection. His Majesty the King, through an Ordinance, has approved the Act. The principal area of this Act is online security and proper administration of security keys, those that are recognized as vital to maintain a secure transaction. |
| Viet Nam | <i>Electronic Transactions</i> <i>Decision No. 44/2002/QĐ-TTg</i> of the Prime Minister on using electronic documents as accounting documents for calculation and payment of capital in Payment Service Supplying Organizations. <i>Digital signature</i> <i>Decision No. 543/2002/QĐ-NHNN</i> of the Governor of the State Bank of Viet Nam on issuing provisions on establishing, issuing, controlling and using digital signatures on electronic documents in inter-bank electronic payments. <i>Draft Ordinance on e-Commerce</i> Ministry of Trade is preparing an ordinance that covers aspects of e-commerce, including legal validity of electronic data and its transmission, electronic contracts, electronic signatures, electronic contracts, responsibilities of ISP and the State management of e-commerce. |

are too detailed is that rapid changes in technology and the unpredictability of which of the emerging technologies would become the standard, might require frequent amendments. This concern is best illustrated in the different legal approaches to electronic authentication⁵⁷. Japan has adopted what has been described as the ‘organizational variant’ of the ‘digital signature approach’. Japan’s electronic authentication law addresses the organization of trusted third parties (Certificate Authorities) and the use of digital certificates in connection with digital signature applications. In this approach, the goal of the law is to promote trust and reliability in electronic transactions by ensuring that Certificate Authorities are reliable and secure. Singapore uses the ‘two-pronged approach’, where the law sets requirements for electronic authentication methods that will receive a certain minimum legal status and assigns greater legal effect to certain electronic authentication techniques. The Philippines uses the ‘minimalist approach’ – i.e., the law does not address specific techniques but relates to the functions that signatures may have to fulfil in trade, and the different levels of reliability with respect to the purposes that the signatures are used for. A proponent of the minimalist approach argues that the digital signature and two-pronged approaches focus too narrowly on signatures as such and not on formal requirements as a whole⁵⁸. The superiority of the minimalist approach is also said to lie in the fact that legal requirements of forms are generally dealt with in their

⁵⁷This discussion is based on Quimbo, R. N. ‘Legal and Regulatory Issues in the Information Economy’, Lallana, E.C. (ed.), *e-Primers for the Information Economy, Society and Polity* (UNDP-APDIP and eASEAN Task Force: Manila, 2003), pp. 9-12.

⁵⁸Ibid, p. 12.

entirety. Moreover, the minimalist approach allows for different functions for new techniques and adventitious developments.

Global electronic commerce is projected to grow to US\$1.8 trillion in 2004, with half of the revenue coming from non-US users⁵⁹. It is therefore not surprising that network security is an increasingly important global concern. Existing laws are not seen to apply to crimes committed in cyberspace. A case in point is the author or creator of the 'I Love You' virus. Despite the millions of dollars worth of damage the virus caused, the author (a citizen and resident of the Philippines) remains unpunished because at the time the cyber crime was committed there were no laws in the Philippines that were violated. It is not only economics that drives security concerns. In the light of the war against terrorism, governments have also been looking at securing their critical infrastructures.

All nine countries have addressed the issue of network/computer security (Table 8). Japan,

| Table 8. Network/Computer Security | |
|---|---|
| Economy | Security Regulations |
| Japan | <p><i>Unauthorized Computer Access Law (Law No. 128 of 1999)</i> Penalizes unauthorized computer access and computer-related crimes that are committed through telecommunication lines.</p> <p><i>Action Plan for Building Foundations of Information Systems Protection from Hackers and Other Cyber Threats</i> Adopted by the Interagency Director-Generals' Meeting on IT Security on 21 January 2000. The activities based on the Special Action Plan have been strengthened and promoted from May 2002.</p> |
| Korea | <p><i>Utilization and Security of the Information System and Protection of Personal Information Act</i> Calls for promoting utilization of the information communications network and securing Internet address resources; digital messaging usage; protection of personal information for information communications service users; protection of youth from lecherous and violent materials; security of the information communications network; control of infringement on the information communications network; and restriction of 'spam' (unsolicited e-mail). Enacted in 2001 and amended in 2002.</p> <p><i>Protection of Major Information Infrastructure Act</i> Establishes a systematic and comprehensive counter-measure for the protection of major information communications infrastructure against electronic fraud. Enacted on January 2001 and partially amended in 2002.</p> |
| Singapore | <p><i>Computer Misuse Act</i> The Act, passed in 1993, created new offences to deal specifically with unauthorized access and modification of computer systems. In 1998, the Act was further amended to address new attacks that had evolved with the spread of the Internet (e.g. denial-of-service attacks) and meted out harsher punishment for those who attack critical IT systems/networks. Further amendments were proposed in 2003 to deal with cyber-terrorism.</p> |
| Malaysia | <p><i>Computer Crimes Act 1997 (Act 563)</i> Lists four main categories of offences: unauthorized access to computer material; unauthorized access with intent to commit or facilitate commission of further offence; unauthorized modification of the contents of a computer; and wrongful communication of the means of access.</p> |
| Philippines | <p><i>E-Commerce Act (RA 8792)</i> While there is no unique Philippine law on cyber crimes, there are provisions on cyber crimes in the e-Commerce Act. This law penalizes hacking and online piracy.</p> |

⁵⁹See <http://www.epsit.net/ecommerce-growth.php>

Table 8 *continued*

| Economy | Security Regulations |
|------------------|--|
| | <i>Access Devices Regulation Act of 1998</i> Punishes credit card fraud and outlaws the use of unauthorized access devices to obtain goods or services broadly. |
| Sri Lanka | <i>Computer Crimes Bill</i> Provides punishment for computer specific crimes. A main feature of the Bill is that it outlaws the use of computers for child pornography. The Bill will also make any misuse of computers an illegal act. Approved by the Cabinet and awaiting passage by the Parliament. |
| India | <i>IT Act 2000</i> Defines hacking and provides punishment for it (imprisonment up to three years or fine). |
| Nepal | <i>Electronic Transaction Act</i> Contains relevant provisions on network and computer security. His Majesty has approved the Act and its focus is on security. |
| Viet Nam | <i>Criminal Code of Viet Nam</i> Covers computer and communication crimes. <i>Draft ICT Law</i> The Ministry of Posts and Telematics is currently in the first stages of drafting ICT law. |

Korea, Singapore, Malaysia, the Philippines and India have enacted new laws dealing with cyber crimes. Two countries – Sri Lanka and Nepal – have pending ICT/computer crime bills awaiting approval of their respective legislatures. Viet Nam has the task of applying its existing Criminal Code to ICT/computer-related crimes even as it has a draft law that will cover cyber crimes.

Another effort at ensuring security is the establishment of a Computer Emergency Response Team (CERT). A CERT is usually a national focal point that deals with Internet security issues. It provides Internet security incident response and gives expert advice on security issues. Globally, the emergence of CERTs can be dated to the “Internet worm” attack in 1988⁶⁰. Since that time the number of CERTs has grown, with each CERT having its own purpose, funding, reportorial requirements and constituency. Six countries in this study (Japan, Korea, Singapore, Malaysia, the Philippines and India) have national CERTs, with most of them organized by a national government agency. All ISPs in India are now under the technical guidance and control of CERT-INDIA, which was formed in 2003⁶¹. Malaysia has three CERTS – MyCERT, NISER and GCERT⁶².

Security is, of course, not the province of government-prescribed rules alone. Governments, as well as private sector firms, need to adopt best practices in network security and use the best applications that the security industry has to offer⁶³. Governments also have a role to play in increasing public awareness of the need to adopt appropriate network security measures.

While network security is an important objective, increased security may have consequences on

⁶⁰See <http://www.first.org/about/first-description.html>

⁶¹See <http://www.cert.org/in/>

⁶²See <http://www.securityunit.com/teams/>

⁶³The technical aspects of network security are not discussed here. For an overview of security issues see <http://www.securitydocs.com/>

Table 9. Data Protection/Privacy

| Economy | Laws |
|--------------------|---|
| Japan | <p><i>Law on the Protection of Personal Information</i> <i>Law Concerning the Protection of Personal Information Held by Administrative Organs</i> <i>Law Concerning the Protection of Personal Information Held by Independent Administrative Agencies and Other Organizations</i> <i>Law of the Examining Committee on Information Disclosure and the Protection of Personal Information</i> <i>Protection of Personal Information</i></p> <p>Comprehensively covers all fields, including unauthorized use of personal information for business purposes, enacted in May 2003. <i>Preparation Law on enforcement of the Law Concerning the Protection of Personal Information Held by Administrative Organs</i></p> |
| Korea | <p><i>Privacy Act</i></p> <p>Aims to prevent infringement of privacy due to unjust usage and illegal hacking of personal information. It clearly specifies the criteria for the collection and processing of personal information and guarantees various rights to the information owner on disclosure and correction of personal information. Enacted on 7 January 1994.</p> |
| Singapore | <p><i>Data Protection Code</i></p> <p>Voluntary code that articulates a set of principles governing the collection, use, safeguarding, etc. of personal information by service providers. The code provides for 11 data protection principles, differentiated roughly according to the different stages of data processing: accountability; identifying purposes; consent; limiting collection; limiting use, disclosure and retention; accuracy; safeguards; openness; individual access; challenging compliance; and transborder data flows.</p> |
| Malaysia | <p><i>Communications and Multimedia Act 1998</i></p> <p>Has a provision on the protection of privacy and integrity of electronic communications.</p> |
| Philippines | <p><i>Electronic Commerce Act of 2000</i></p> <p>Penalizes unlawful and unauthorized access to computer systems.</p> <p><i>The Anti-Wire Tapping Act</i></p> <p>Makes it unlawful for any person not authorized by all the parties to any private communication or spoken word, to tap any wire or cable or, by using any device or arrangement, to secretly overhear, intercept or record such communication or spoken word.</p> |
| India | <p>There is no specific law to protect privacy. To some extent the fundamental rights of citizens are protected under the Constitution of India, though such protection is only against the State and not against individuals. India is drafting a new legislation for data protection.</p> |
| Nepal | <p><i>Electronic Transaction Act</i></p> <p>While specific mention of data protection may not be implicit, a secure online environment ensures that such pre-requisites are fulfilled. The Electronic Transaction Act strongly emphasizes online security.</p> |
| Viet Nam | <p><i>Draft ICT Law</i></p> <p>Data protection and privacy are to be included.</p> |

privacy. Japan has the most extensive legislation on data protection and privacy (Table 9). Korea and Malaysia have passed data protection/privacy laws, while Nepal and Viet Nam have pending legislation. Singapore has adopted a different approach to data protection: industry self-regulation.

Many believe that there is a necessary trade off between security and privacy – that you may have to sacrifice some of your privacy in order to gain more security. Thus, it will be wise for policy-makers to carefully study the pros and cons of stringent security laws relative to their

consequential effects on privacy. How to achieve the delicate balance between privacy and security will be determined on a country-to-country basis.

Content Development

Compared to infrastructure development, content development has not received as much attention from governments worldwide. Already we see that lack of local content has driven Internet traffic in many countries to foreign sites. The Philippines, where an estimated 90 percent of the online population surfs websites in the US, is probably an extreme case.

Among the countries in this study, Korea stands out for its government's efforts to develop local content (Table 10). As a result, "most of the digital content consumed by the Korean people

Table 10. Content Management

| Economy | Regulation |
|------------------|---|
| Japan | <p><i>Law on Regulation of Transmission of Specified Electronic Mail</i> A countermeasure for spam. Came into force in July 2002.</p> <p><i>Amendment to the Wire Telecommunications Law</i> Establishes penal provisions for "wangiri" calls (random single-ring calls by commercial businesses aimed at making profits on return calls). Enacted in December 2002.</p> <p><i>Law on Restrictions on the Liability for Damages of Specified Telecommunications Service Providers and the Right to Demand Disclosure of Identity Information of the Sender</i> To deal with the casting of aspersions and the infringement of privacy of others on Web pages. Enforced in May 2002.</p> <p><i>Other (Administrative) Measures</i> The MPHPT holds Liaison Meetings for Supporting Telecommunications Consumers among other activities to enhance and increase administrative steps for consumer protection. The MPHPT engages in improving the market environment so as to promote production and distribution of network content by advancing demonstrative experiments through a collaboration between the government and the private sector.</p> |
| Korea | <p><i>National Digital Contents Management Act</i> Promotes the digitizing of public analogue content and the flow of digital content, so that the public and private sectors can actively utilize information knowledge resources. Enacted on 28 January 2000.</p> <p><i>Public Record Management of the Public Institutions Act</i> Calls for a uniform scheme on record management regarding a clear and systematic base for the collection and maintenance of major public record materials, such as the National Assembly, government and court of justice, and local self-governing bodies. Enacted on 29 January 1999.</p> |
| Singapore | <p><i>Connected Singapore</i> Creative Connections Programme, under Strategy 1, is aimed at harnessing Infocomm to give life to heritage and artistic resources, so that these can be transformed into new products, services and experiences. Common content exchange standards are expected to be set up by 2004, and pilots and trials will be implemented in up to three exhibition sites, including museums and galleries, by 2005. The distributed content management system will leverage on Singapore 1 in collaboration with other agencies, such as the National Arts Council, National Heritage Board and National Library Board, by 2006.</p> <p><i>MDA's Class License Scheme</i> Under which the Internet Code of Practice was issued.</p> |

| Economy | Regulation |
|--------------------|--|
| | <p><i>Internet Code of Practice</i> Drafted by the Singapore Broadcasting Authority in 1997. Establishes the guidelines for acceptable content that can be published over the Internet.</p> <p><i>Internet Content Code</i> Voluntary code to deal with the types of content industry players should be putting on the Internet. The main obligations for content providers adopting the code include:</p> <ul style="list-style-type: none"> • Not knowingly place inappropriate, objectionable or illegal content on the Internet; • Use their best efforts to ensure that no content deemed unsuitable for minors is made available to them freely on their service; • Adopt an appropriate content classification system to rate and label their websites; • Comply with the <i>Singapore Code of Advertising Practice</i> published by the Advertising Standards Authority of Singapore (ASAS). |
| Malaysia | <p><i>Communications and Multimedia Act of 1998</i> Makes it an offence to provide content that is indecent, obscene, false, menacing or offensive in character with intent to annoy, abuse, threaten or harass any person. Other laws (including the Penal Code, Sedition Act, and Internal Security Act) apply to content regulation of the Internet.</p> |
| Philippines | <p><i>RA 9208 An Act to Institute Policies to Eliminate Trafficking in Persons Especially Women and Children</i> Section 5 defines pornography as any representation through publication, exhibition, cinematography, indecent shows, information technology or by whatever means or of a person engaged in real or simulated explicit sexual activities for primary sexual purposes.</p> |
| Sri Lanka | No content regulation. |
| India | <p><i>IT Act 2000</i> Prescribes penalties for those who publish in electronic form 'any material which is lascivious or appeals to the prurient interest or if its effect is such as to tend to deprave and corrupt persons...' The Indian Government has authorized CERT through a legal notification to block websites.</p> |
| Nepal | <p><i>Electronic Transactions Act</i> Nepali UNICODE development is underway. Though there is no mention of content promotion in the Electronic Transaction Act, a process has been laid.</p> |
| Viet Nam | <p><i>Decree No. 55/2001/ND-CP of the Government of the Management, Provision and Use of the Internet Services</i> Chapter III, Articles 28, 32 and 33 provide for managing information and content on the Internet.</p> |

is produced in Korea and written in the Korean language⁶⁴. Singapore and Japan also have initiatives to develop local content.

Japan, Singapore, Malaysia, India and Viet Nam have laws and rules regarding objectionable Internet content, while Nepal has draft legislation (Table 10). Singapore is unique in combining government rules with industry self-regulation in managing content. Sri Lanka has neither Internet content regulation nor rules. While most prohibit content that are deemed pornographic, a number also regulate political content. In some countries, governments are nervous about content, especially that which is seen to be challenging the political and economic interests of the State or its allies. Content that has the potential for political mobilization also comes within the orbit of the State's surveillance, which is provided for by the laws enacted in these countries.

⁶⁴Hwang, J.S. South Korea, *Digital Review of the Asia Pacific*, p. 141.

The role of the government in providing support and resources in the development and deployment of content in local language may also come to the fore. For this, adequate policies need to be developed to re-enforce government commitment to broaden dissemination and use of local content in local languages.

A content-related legislation that has attracted a lot of attention (albeit for different reasons) is Intellectual Property Rights (IPR). IPR, which includes copyright, trademarks and patents, was developed to encourage innovation. It works by giving individuals the opportunity to commercially exploit their new and innovative ideas through monopoly rights. As John McMillan reminds us, “intellectual property (rights) involves mutually incompatible aims – rewarding the innovator versus allowing full usage of the ideas. There is no universal ideal degree of intellectual property protection. Whether it should be strong or weak varies with the circumstances.”⁶⁵ He endorses the view that the rise of Silicon Valley and the fall of Boston’s Route 168 as centres of the global IT revolution are related to the Valley’s culture of openness and mobility (ideas are widely shared and job switching is prevalent, if not the norm). Job-hopping, which has driven Silicon Valley’s success, is rare in Route 168 because Massachusetts’s law enforces a post-employment contract that prohibits employees from working with competing firms within a specified period. In seeking to protect the rights of IT firms to the ideas generated by its employees, Massachusetts inhibited the growth of Boston’s IT industry.

IPR has become more important not only because ideas have become the new coin of the realm but also because unauthorised reproductions of ideas have become easier through new digital technologies. In response to these threats, owners of intellectual properties have launched a global campaign to enhance IP protection. Globally, countries are addressing the IPR issue through (international) treaty commitments and national legislation. Among the global arrangements that countries have agreed to, the Treaty on Trade Related Aspects of Intellectual Property Rights (TRIPs) is probably the most important. TRIPs provides for “minimal rules for national intellectual property law in order to prevent member nations from using intellectual property as a hidden trade barrier against other nations”⁶⁶. It is said that TRIPs would profoundly affect ownership of two of the most important technologies of the 21st Century – digital technology and biotechnology⁶⁷. Japan, Korea, Singapore, Malaysia, the Philippines, Sri Lanka and India are contracting parties to TRIPs by virtue of their membership in the WTO⁶⁸.

The treaties being administered by the World Intellectual Property Organization (WIPO) constitute another set of documents governing IPR. Japan, Korea, Singapore, Malaysia, the Philippines, Sri Lanka and India are signatories to the Berne Convention for the Protection of Literary and Artistic Works, the pre-eminent agreement covering copyright relations among nations⁶⁹. Japan, Korea and Sri Lanka are parties to the 1994 Trademark Law Treaty. Only the Philippines and Japan are

⁶⁵McMillan, J. *Reinventing the Bazaar: A Natural History of Market* (New York & London: WW Norton & Co., 2002), p. 118.

⁶⁶‘Security in Information Technology and Patent Protection for Software Products’, Expert Opinion by Lutterbeck, et al. written at the order of the German Ministry of Economics and Technology; available at <http://swpat.ffii.org/analysis/trips/index.en.html>

⁶⁷Drahos, P. with Braithwaite, J. *Information Feudalism: Who Owns the Knowledge Economy?* (New York: The New Press, 2003), p. 10.

⁶⁸Nepal and Viet Nam are not members of the WTO. See http://www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm

⁶⁹See <http://www.wipo.org/treaties/>

Table 11. Intellectual Property Regime

| Economy | IPR Regime |
|--------------------|--|
| Japan | <p><i>Unfair Competition Prevention Law (Amendment)</i> Amendments of the law are following:</p> <ol style="list-style-type: none"> 1. The Japanese government added the new Act of Unfair Competition, which defines registration, possession or usage of the domain name that is identical or similar to another person's trademark in bad faith. 2. Someone whose business interests are infringed or are likely to be infringed by the new Act of Unfair Competition becomes entitled to request preventive injunction and/or claim for damages. |
| Korea | <p><i>Laws on Protection of Intellectual Property Rights</i> Korea stipulated the transmission right of copyright holders and allowed the replication and transmission between libraries via data processing devices by the amendment of the Copyright Act in January 2000. In addition, the Computer Program Protection Act was amended several times to establish a computer programme transmission right, banning activities incapacitating technical protection measures and allowing reverse analysis of programmes.</p> |
| Singapore | <p><i>Copyright Act</i> The Act, passed in 1987, primarily deals with the protection of copyright in works. Computer programmes are included as copyrightable works. The Act was amended in 1999 to clarify the concept of temporary reproduction in the Internet browsing environment, and introduction of "take down" provisions to deal with problems of unauthorized copies of works being made available through the Internet. There are also other laws related to IPR such as the Patent Act and Trade Mark Act.</p> |
| Malaysia | <p><i>Copyright (Amendment) Act of 1997</i> Provision for copyright owners to have the exclusive right to control in Malaysia the communication to the public of a literary, artistic or musical work and a film or sound recording; also provides for derivative works to be included as subject matter for copyright protection and enlarges the scope of infringement.</p> |
| Philippines | <p><i>Intellectual Property Code of the Philippines</i> Codified the Philippines' commitment to international conventions and treaties on IPR and WTO-TRIPS. Became effective on 1 January 1998.</p> |
| Sri Lanka | <p><i>Code of Intellectual Property Act No.52 of 1979 as amended by (Amendment) Act 13 of 1997</i> The said Act revised, consolidated, amended and embodied in the form of a code the law relating to Copyright, Industrial Designs, Patents, Marks, Trade Names, and Unfair Competition, and provided for better registration, control and administration.</p> |
| India | <p><i>Copyright Act of 1957 as amended in 1994</i> The new law is compatible with TRIPS from the stand point of substantive rights, except that the term of 'protection for performers' should be increased from 25 to 50 years.</p> <p><i>Indian Patents Act of 1970 (amended in 1999 and 2002)</i> The Indian Government has authorized CERT through a legal notification to block websites.</p> |
| Nepal | <p><i>Copyright Protection Act 2002</i> This law is compatible with international standards, including TRIPS. However, on the industrial property front, the country is still guided by the law that was introduced in 1965. A new Act on Copyright Protection is being worked on.</p> |
| Viet Nam | <p><i>Decree No. 76/CP of the Government on Guiding the Implementation of a Number of Provisions on Copyrights in the Civil Code</i> This Decree is further supported by Circular No. 27/2001/TT-BVHTT of the Ministry of Culture and Information on Guiding the Implementation of Decree No. 76/CP and Decree No. 60/CP of the Government on Guiding the Implementation of some Provisions on Copyright in the Civil Code.</p> |

parties to the 1996 WIPO Copyright Treaty and the WIPO Performances and Phonograms Treaty. Singapore may have FTA obligations to enter into these treaties.

Countries in this study have either enacted new laws or amended their IPR laws to make them applicable to the Information Age (Table 11). Though easier and faster, amending existing laws has drawbacks. For instance, although the Indian Patent Act of 1970 was amended in 1999 and 2000, that country's patent regime is still not completely TRIPS-compliant. This is partly due to the fact that the 1999 and 2002 amendments "were add-ons that left the structure of the 1970 legislation intact, resulting in inconsistencies"⁷⁰.

While discussing the need for IPR, it is important to note that Nobel Economics Laureate Joseph Stiglitz argues that the intellectual property regime created by the Uruguay Round "was dictated by commercial interests in the United States and elsewhere, paying little attention either to the concerns of the developing countries or of the research community throughout the world"⁷¹. Critics cite the attempted use of TRIPS by the United States, at the instigation of global pharmaceutical companies, to prevent South Africa (which has the highest incidence of HIV-infection in Africa) from importing low-cost anti-retroviral drugs from other countries as proof of the treaty's unfairness⁷². In this instance, the pharmaceutical companies who lobbied the US government to protect their intellectual property were seen as using TRIPS to protect their monopoly profits arising from patents at the expense of saving lives in South Africa. International moral outrage over their action forced the pharmaceutical companies and the US government to back down. It has also led to a WTO Ministerial Conference Declaration on TRIPs and Public Health that recognizes the right of developing States to deal with health crises.

Policy and Regulatory Agencies

It has long been recognized by policy experts that without appropriate governance structures, markets would not function properly⁷³. The Asian Financial Crisis of 1997 demonstrates the folly of liberalization without regulatory reform⁷⁴.

As ICTs are a relatively new area of concern, countries are still developing the most appropriate policy-making bodies for it. Three of the nine countries in this study, namely, Japan, Malaysia and Nepal, have their Heads of Government leading the national ICT policy-making bodies (Table 12), which strongly signals the importance that these countries are giving to ICT development. Other countries, such as Korea, Singapore and Viet Nam, have also established cabinet agencies to oversee ICT policy-making.

It is not clear if there is one best institutional model for policy-making and implementation. But it is important that whatever agency or commission is given the lead in ICT planning and

⁷⁰Just half measures', *Businessworld* (India), 12 January 2004, p. 66.

⁷¹Stiglitz, J. 'Development Policies in a World of Globalization'; available at <http://www-1.gsb.columbia.edu/faculty/jstiglitz/download/DevelopmentGlobalization.pdf>, p.5.

⁷²Discussion based on Drahos, P. with Braithwaite, J., *Information Feudalism*, pp. 5-10.

⁷³See, for example, Stiglitz, J., *The Roaring Nineties: Why We're Paying the Price for the Greediest Decade in History* (London: Penguin Books, 2003).

⁷⁴Krirk-Krai, J. 'Deregulation and Liberalization in Services: Experience and Perspective from Thailand', in *Asia and Europe: Services Liberalization*.

Table 12. Policy-making and Regulatory Bodies I: Apex ICT Policy-making Bodies

| Economy | Bodies/Institutions |
|--------------------|--|
| Japan | <i>The Strategic Headquarters for the Promotion of an Advanced Information and Telecommunications Network Society</i> The IT Strategic Headquarters is headed by the Prime Minister. Members include State Ministers and “those having superior insights into the formulation of an advanced information and telecommunications network society who have been appointed by the Prime Minister”. |
| Korea | <i>Ministry of Information and Communication (MIC)</i> Created in December 1944, with the expansion of the then Ministry of Communication, to unify the scattered functions of IT related works and strategically nurture the IT industry as an engine of the nation’s economic growth. The MIC is responsible for informatization; information and communication; radio and broadcasting; postal and postal financial services. |
| Singapore | <i>Ministry of Information, Communications and the Arts (MITA)</i> Formulates and administers policies to regulate and develop the Infocomm industry (which includes telecoms/IT/Postal Service) through the Infocomm Development Authority. MITA also supervises Singapore Broadcasting Authority (SBA), the agency responsible for regulating broadcasting and Internet content. |
| Malaysia | <i>National IT Council (NITC)</i> Established in 1994, chaired by the Prime Minister, and composed primarily of government ministers with private sector participation. |
| Philippines | <i>Commission on Information and Communications Technology</i> Established in 2003 to replace the Information Technology and e-Commerce Council (ITECC) as the government’s “primary policy, planning, coordinating, implementing, regulating, and administrative entity that will promote, develop, and regulate integrated and strategic ICT systems and reliable and cost-efficient facilities and services”. The Commission is attached to the Office of the President and the Chairperson holds a Cabinet rank. |
| Sri Lanka | <i>Information and Communication Technology Agency (ICTA)</i> . ICTA was established in July 2003 to replace the earlier Council for Information Technology (CINTEC). ICTA is the single apex body for the entire country involved in ICT policy and will be undertaking the national level implementation of ICT projects in Sri Lanka. |
| India | <i>Department of Information and Technology, Ministry of Communications and Information Technology</i> <i>Department of Telecommunications, Ministry of Communications and Information Technology</i> <i>Telecom Regulatory Authority of India</i> also has a significant role in ICT policy-making, mainly with telecom. |
| Nepal | <i>High Level Commission for Information Technology (HLCIT)</i> Chaired by the Prime Minister and composed of vice chairman, member secretary and members representations from key ministries and IT sectors of the society; is an apex body responsible for policy aspects of IT. Government Ministries with a direct role in ICTs include Ministry of Science and Technology and Ministry of Information and Communication, with the former associated with IT development and the latter entrusted with telecommunications, among others. |
| Viet Nam | <i>Ministry of Post and Telematics (MPT)</i> Assigned by the National Assembly in 2002 to be the leading agency and the key driver and facilitator for developing the ICT industry and strategies for national ICT development. |

development, it should be invested with the appropriate power and budget.

In the 1980s, Singapore’s National Computer Board (NCB) was the main body to promote computerization and IT industry development in the island state. Interestingly, the NCB was

placed under the Ministry of Finance to give it “the clout needed to plan and implement computerization projects for the entire public sector”⁷⁵. Today, with the Infocomm Development Authority as the lead ICT agency, the Ministry of Finance still plays a significant role in Singapore’s e-government programme.

The introduction of competition, as well as technological development, has changed the role of the regulator. In this changed environment, the regulatory agency is seen as having four major tasks:

1. To ensure that players’ business decisions can be based on business economics;
2. To ensure that regulatory change is a function of the market and of initial conditions;
3. To fully understand the constraints to change; and
4. To tailor regulatory approaches towards mutually consistent solutions⁷⁶.

There is also a growing consensus that there is need for an independent (as opposed to sector Ministry/Department) regulator to prevent industry and/or bureaucratic capture. The WTO Regulation Reference Paper, an annex to the GATS Agreement on Basic Telecommunications, calls for an independent regulator that is separate from and not accountable to any supplier of telecommunication services. Economists have also stressed the importance of the regulator’s independence from government to insulate decisions from political or vested interests (particularly when government owns the telecoms service provider).

A technological development that will significantly affect regulation is convergence. Digitization has made possible the use of one (digital) network to distribute services that used to require a number of different analogue networks. Thus, broadcasting, telephony and Internet can now be delivered using one network. A number of countries have created one regulatory agency to handle telecommunications and IT, in recognition of the convergence of information and communication technologies. Malaysia’s Communications and Multimedia Commission and Singapore’s Infocomm Development Authority are good examples (Table 13).

In contrast, while one Philippine agency– the National Telecommunications Commission – has supervisory and/or regulatory scope over telecommunications, broadcasting and the Internet, the three sectors are governed by different rules. The challenge of regulating in a developing country is perhaps best expressed by Arun Shourie, India’s former Minister for Communication, IT and Divestment, when he described the conditions he had to deal with:

“They [Government Regulations] made operators pay different amounts for the same license and imposed different taxes for the same services. They allowed telephone operators to choose the shortest or cheapest route for a call or to match the charges of a competitor. They created a distinction between licenses for wireline and wireless services, but allowed a selected few wireline operators to offer wireless service. They allowed new entry into wireline but not into wireless services, although the two competed with each other. They gave some operators more spectrum than others

⁷⁵Wong, P.K. ‘Implementing the NII Vision: Singapore’s Experience and Future Challenges’, in Kahin and Wilson, *National Information Infrastructure Initiatives*, p. 27.

⁷⁶Beardsley, et al. ‘Towards a New Regulatory Compact’, in *The Global Information Technology Report 2003-2004*, p. 83.

without any reason. They imposed obligations on different operators under the same name (for instance, rollout plan or universal service obligation) but different in severity.”⁷⁷

Table 13. Policy-making and Regulatory Bodies II: Regulatory Environment

| Economy | Agencies |
|--------------------|--|
| Japan | <i>Ministry of Public Management, Home Affairs, Posts and Telecommunications</i> |
| Korea | <i>Korean Communications Commission</i> Charged with deliberating issues concerning fair competition environments and consumer protection of telecommunication services, and with arbitrating disputes among telecommunication services carriers and between users and carriers. |
| Singapore | <i>Infocomm Development Authority (IDA)</i> Regulator of telecommunication and postal services. <i>Media Development Authority of Singapore (MDA)</i> Responsible for regulating broadcasting and Internet content. |
| Malaysia | <i>Malaysian Communications and Multimedia Commission (MCMC)</i> The Malaysian Communications and Multimedia Commission Act 1998 (Act 589) provides for the establishment of the MCMC with powers to supervise and regulate communications and multimedia activities in Malaysia. |
| Philippines | <i>National Telecommunications Commission (NTC)</i> Regulates telecommunications and broadcasting. Internet services, which fall within value-added services, are not regulated. Hence, ISPs, as long as they do not put up their own networks are subject to the minimum requirement of registration with the NTC and the quarterly submission of reports on their operations. |
| Sri Lanka | <i>Telecommunications Regulatory Commission of Sri Lanka</i> Provides the policy and regulatory framework for the telecommunications industry, and is increasingly dealing with issues of media convergence. |
| India | <i>Telecommunications Regulatory Authority of India</i> Plays a key role in policy interpretation and regulating prices/level of service and issues related to interconnectivity. |
| Nepal | <i>National Information Technology Centre (NITC) under the Ministry of Science and Technology</i> Acts as the facilitator and regulator of the development of IT Nepal, and acts as a secretariat to the apex body HLCIT. <i>Telecommunications Authority (NTA)</i> Autonomous regulatory body established in accordance with the Telecommunications Act of 1997 and Telecommunications Regulation 1997. Its objective is to create a favourable and competitive environment for the development, expansion and operation of telecommunications services. |
| Viet Nam | <i>Ministry of Post and Telematics</i> Drafts laws, ordinances and other legal regulations and documents related to the fields of posts, telecommunications and IT. Regulates and manages the number storage, number codes, domain names and addresses used in posts, telecommunications and IT. Performs the State management over activities of associations and NGOs in the fields of posts, telecommunications and IT as regulated by law. |

⁷⁷Desai, A.V. 'An apostle of convergent hope', *Businessworld* (India), 12 January 2004, p. 8. and abstract available at <http://www.businessworldindia.com/Jan1204/comments.asp>

Education and ICTs⁷⁸

Education is as important in bridging the digital divide as a well developed information infrastructure and affordable ICT goods and services, according to the International Telecommunications Union's Digital Access Index⁷⁹.

Despite the reputed value given by Asian societies to education, none of the countries in the study are among the top 10 countries (of 102 countries) with the highest public expenditures on education in 2000⁸⁰. Japan, Singapore and Korea were ranked 18, 23 and 29, respectively. The other countries that were ranked are Malaysia (37), Philippines (73), Sri Lanka (80), India (84) and Viet Nam (86). However, in a ranking of the quality of math and science education of the same 102 countries, Singapore topped the survey⁸¹. India at no. 14 ranked better than Japan (24), Korea (35), Malaysia (47), Sri Lanka (52), Viet Nam (57) and the Philippines (89).

As can be expected, the three high-income countries in this study have already implemented multiple ICTs in Education master plans in their respective economies.

Japan

Japan's strategic goal, as outlined in the Basic Plan for Science and Technology, is the promotion of interest in, and learning and understanding of, science and technology.

Among others, the plan focuses on the improvement of science and technology education through the provision of better teacher training, supply of adequate equipment and improved facilities for science and industrial education, introduction of educational computers, conduct of practical research on Internet use in education, and educational software development promoting the establishment of an Educational Software Library across the nation.

Japan is also pursuing the Informatization of Education (also known as the Millennium Project)⁸². Its two-fold purpose is:

- To enable children to use computers appropriately, by cultivating in them the ability to utilize information and transmit it themselves by sorting out the necessary information, without being led astray by erroneous information and unnecessary information; and
- To enable children to think about their own way of life by having them acquire ways to learn and think by actively using computers and the Internet for studying each subject, and by cultivating attitudes toward independently and creatively engaging in problem-solving and inquiry.

⁷⁸All country documents for this section, except for Nepal, are available at http://www.unesco.org/bangkok/education/ict/ict_enabling/ap_policy/main.htm.

⁷⁹Estopace, E. 'RP ranks poorly in global ICT Index', *Philippine Star*, 2 January 2004, p. B2.

⁸⁰'Public expenditures on education, 2000' based on UNESCO Institute for Statistics data, *The Global Information Technology Report 2003-4*, p. 250.

⁸¹'Quality of math and science education, 2003', *The Global Information Technology Report 2003-4*, p. 256.

⁸²Japanese Government Policies in Education, Science, Sports and Culture 2000: Toward a Culturally-Oriented Nation. See <http://www.mext.go.jp/eky2000/index-13.html#ss1.2.5.1>.

Specifically, the project aims to achieve the following goals by 2005:

- Installation of computers in public schools (two in all ordinary classrooms and six for each school for use in special classrooms);
- Internet access in all public schools;
- Installation of an intra-school LAN linking classrooms in public schools;
- Installation of computers and Internet access in private schools;
- Implementation of teacher training;
- Development of content for classes;
- Development of functions of the National Centre for Education Information.

Republic of Korea

Korea intends to adapt education to the Information Age by changing the educational system as a whole - the physical infrastructure, the institutions involved, and classroom environments.

The project for adapting education to the Information Age started in July 1970. In early 1990, State policy was outlined by the Framework Act for the Promotion of ICT, and in July 1996, the Enforcement Plan for Adapting Education to the Information Age was formulated.

The specific tasks for adapting education to the Information Age are carried out in four categories: in elementary and secondary education, in research and universities, in educational administration and in life-long education. The goal for adapting information to the current society is to develop creative human resources through the implementation of open education, life-long learning and a cyber learning system.

At least one computer lab has been built in every elementary and secondary school, fulfilling the necessary physical conditions for Internet access for every student, with free or almost-free Internet access in schools since July 2000.

In the year 2001, computer education became compulsory from the first grade of elementary school. Also, in every subject more than 10 percent of classroom activities are supposed to make use of computers. For this to work effectively, an information literacy certification system is now being used to evaluate and identify students' information literacy skills. Information literacy education, along with ICT skills, have been strengthened even more since 2003.

Staff education is also a priority project. Since 2001, in-service training is provided for approximately 33 percent of all teachers. Training is also provided for 10,000 professional instructors, one from each elementary and secondary school.

The Ministry of Education and Human Resources Development, each city and provincial Office of Education, and the Korea Education and Research Information Service (KERIS) are involved in the development and dissemination of education content. Beginning in 1988, the private sector has also become increasingly involved in the development of educational content. To promote development by the private sector, the purchase of educational software is supported for each school.

Singapore

Singapore's first Master Plan on ICT and Education was launched in 1997. In this plan, the underlying concern was to train students in skills such as the ability to think independently and creatively, to be competent and confident problem solvers, and to be life-long learners. The plan called for equipping schools and teachers with the necessary IT infrastructure as information technology was seen as a means of equipping students with these skills.

Master Plan for IT in Education (MPITE2) or mp2 is the second master plan on IT in education. Adopting a systemic and holistic approach, mp2 identifies the following target outcomes:

- Pupils use IT effectively for active learning;
- Connections between the curriculum, instruction and assessment are enhanced using IT;
- Teachers use IT effectively for professional and personal growth;
- Schools have the capacity and capability in using IT for school improvement;
- There is active research on IT in education; and
- There is an infrastructure that supports widespread and effective use of IT.

All of the key pieces – curriculum, assessment, instruction, professional development and schools' philosophy on the use of IT in education – are integrated and addressed. For instance, the Goals and Strategies for IT in Curriculum and Assessment are:

- Integrate IT into content to create a dynamic and flexible curriculum; and
- Leverage IT to expand the scope and nature of assessment.

Under Infrastructure and Support, the goals and strategies are to:

- Provide dependable, flexible and safe network access;
- Provide a multi-purpose, multi-functional, pervasive and ubiquitous IT-enriched environment; and
- Provide IT support services.

The approach calls for the involvement of major stakeholders in education and emphasizes that they work together to tap the potential of IT.

Malaysia

Malaysia's National Philosophy of Education calls for "developing the potential of individuals in a holistic and integrated manner, so as to produce individuals who are intellectually, spiritually, emotionally and physically balanced and harmonious".

The Ministry of Education sees ICTs as tools to revolutionize learning, enhance pedagogies, promote effective organizational structures in schools, establish stronger links between schools and society, as well as encourage the empowerment of learners. There are three main policies for ICTs in education:

- ICTs for all students, i.e., ICTs are used as enablers to reduce the digital gap between schools;

- The role and function of ICTs in education as a teaching and learning tool, as part of a subject, and as a subject by itself; and
- Using ICTs to increase the productivity, efficiency and effectiveness of the management system.

To support the country's ICT master plan and fulfill Vision 2020, the education system is being transformed to create a new generation of more creative and innovative Malaysians who are adept in new technologies and able to access and manage the information explosion. ICT-enabled Smart Schools act as a catalyst within this process. The first phase of implementation began in 1999 with 90 schools. These constitute the pilots of the array of schools in Malaysia. Broad deployment to the remaining schools started from January 2000, using a phased approach.

Smart Schools are characterized not only by the introduction of technology but also by their ability to deliver education in a better way. The Government envisages that all schools will be converted into Smart Schools by the year 2010.

The Philippines

The Philippines' Department of Education (DepEd) initiatives on the use of ICTs in education are embedded in the DepEd Modernization Program. Begun in 1996, it involved the introduction and use of modern technology to improve the teaching and learning process, educational management, and support operations in the educational system.

Other initiatives undertaken by the Department to introduce ICTs in education include: the Development of Multi-Media Packages, Computer Education for Elementary Schools (CEDES), TV-Assisted Instruction and the Eskuela ng Bayan Project at the primary level, the 1999 and 2000 DECS Computerization Program, Continuing Studies Via Television (CONSTEL), the Sci-DaMath Competition (which integrates IT in its various activities to increase the Science and Mathematics awareness of the learner and the public), e-MAGE 2000 (Math Games for Excellence), and the PCs for Public Schools Project (PCPS) for the secondary level.

DepEd is also pursuing an Information and Communications Technology Plan where educational development forms the core of the ICT programme. It focused principally on the quality of and access to basic education to empower learners with life-long skills. In pursuit of this goal, the sector shall strive to achieve the following objectives by 2009 through the use of ICTs:

- Provide the physical infrastructure and technical support necessary to make information and communications technology accessible and useful to students, teachers, administrators and support staff;
- Develop competence in the use of the technology and in the design, production and use of ICT-based instructional materials;
- Ensure access to the latest developments in ICTs and support research and development;
- Undertake a curriculum improvement programme focused on the integration of technology; and
- Promote the use of appropriate and innovative technologies in education and training.

Sri Lanka

The National Policy on Information Technology in School Education (NAPITSE) affirms the commitment of the government to providing state-of-the-art knowledge in IT to Sri Lanka's younger generation, preparing them to face the challenges of the 21st Century.

NAPITSE has the following overarching goals:

- Create conditions enabling the effective use of IT as a tool in learning and teaching at all levels in the general school education;
- Provide "information literacy" for all school leavers;
- Create conditions for effective involvement of the school system in life-long education of citizens; and
- Create an information literate population of teachers and teacher educators.

At the same time, Programme 3 on HRD of the e-Sri Lanka strategic plan calls for the mainstreaming of ICT education at multiple levels of learning. ICT education is to cover a wide spectrum, including training programmes in the use of ICT tools in those disciplines with the greatest impact on the economy, as well as ICT literacy in primary and secondary schools. e-Learning will be supported in priority disciplines and under-served areas. A specific target of e-Sri Lanka is that at least 15 percent of all primary schools will be equipped with ICT labs in the next three years.

e-Sri Lanka will help ensure that teachers undergoing training shall learn computer-based pedagogy for primary and secondary education. Prerequisites are a robust training programme for teachers, students and universities, as well as basic and affordable connectivity. A fast track approach will be taken with respect to connectivity and ICT usage in schools. The target is to increase the intake of undergraduates in ICT-based university courses by at least 1,000 per year. One hundred university staff would be provided training at MSc level, and the number increased subsequently.

Another aim is to use ICTs as a fundamental enabler for a multi-layered tertiary education across the country. This will be made possible through the use of e-learning infrastructure that will allow educational institutions to offer virtual education, as well as expand the breadth of curricula offered and the volume of students benefiting from the initiative.

India

In November 2000, the National Council for Educational Research and Training (NCERT) released the National Curriculum Framework for School Education in India, providing guiding principles for reshaping the curriculum for schools.

Identified goals include the formulation of plans for the integration of computers into the curriculum, the creation of a framework for enhancing learning opportunities using ICTs across the curriculum, designing a flexible curricular model that would embrace inter-disciplinary and cross-disciplinary thinking, and the development of attitudes that are value-driven rather than technology-driven.

It has also been deemed vital to the success of the implementation of ICTs to provide professional development opportunities for teachers, enabling them to act as facilitators of learning, helping the students to become their own teachers and to think for themselves.

Each State has its own interpretation of how these goals are best achieved. While the establishment of new learning centres remains a constant nationwide, investment levels, the minimum age of mandatory computer education, connectivity, and subjects specified for computer integration vary greatly.

Nepal

Nepal's IT master plan identifies the following necessary measures under the Action Plan for Human Resources Development:

1. Necessary facilities shall be provided to the universities in the country and graduate- and postgraduate-level classes of international standard shall be offered in computer science and computer engineering subjects;
2. A long-term programme with the slogan, "Computer education to all by 2010 AD", shall be formulated, and computer education shall be offered as an optional subject in some public secondary schools and made a compulsory subject in phases;
3. IT shall be used to improve the quality of education;
4. The private sector shall be encouraged to prepare middle-level manpower required for the IT sector. Assistance shall be provided to the private sector to set up institutions for education, research and development in the field of IT in each development region;
5. Computer knowledge shall gradually be made compulsory for all newly recruited teachers to enable them to introduce computer education in schools, and computer education shall be provided to all in-service teachers in phases using various means, including distance education;
6. Emphasis shall be given to the provision of computer education at the school level. Internet shall be made available free of charge to universities and public schools for four hours a day within the next five years (from 2000) to provide computer education in a systematic way;
7. His Majesty's Government shall provide scholarships to public and private sector technologists for higher study in IT; and
8. Necessary scholarships shall be provided to poor and meritorious students from remote areas to pursue higher studies in IT⁸³.

Unfortunately, the implementation of these measures has been weak.

Viet Nam

Viet Nam's Education Master Plan outlines the following objectives for the period 2001-2005:

- Build IT infrastructure for education and training. This consists of computer networks (local

⁸³See http://www.npc.gov.np/it_it_policy.pdf.

networks, intranets, Internet), computer rooms in schools, and computers in all educational institutions linked together and providing access to various databases and resources for teaching and learning activities and for educational management;

- Develop human resources for the IT industry. The target is 25,000-30,000 IT-trained specialists at all levels of qualification. Specialized IT training programmes for other disciplines are being developed to promote IT applications in different fields. Flexible training modes are encouraged;
- Use IT as a tool for teaching and learning to promote innovative thinking, initiatives, communication, independent problem solving skills, information searching and processing skills – in short, to facilitate life-long learning for all people. The aim is to develop IT applications for any subject, at any school, and at any level, through the use of educational software (software for teaching, learning, testing and evaluation); and
- Build suitable curricula, teaching methods and student evaluation systems for a teacher training programme and revamp educational management through student databases, teacher databases, databases for educational institutions, as well as legal and regulation documents. This information system will make policy decision-making faster and more efficient.

More specifically, Viet Nam aims to develop a computer-based information network system for education called EduNet, and to improve the computer ratio at educational institutions such that every school will have at least one classroom with five computers.

Viet Nam aims to strengthen training quality at all IT faculties, increase technical and practical work, regularly review IT faculties and update their programmes, set up more IT faculties at other State universities, increase the intake into two-year training programmes for technicians and technologists with more emphasis on practical skills, encourage second-degree training in IT for graduates holding bachelor degrees in other disciplines, create a quality accreditation committee for reviewing programmes at IT faculties and at other IT training levels, set up joint training programmes with foreign universities, and encourage students, lecturers and researchers to study in developed countries.

Conclusion

The preceding chapters have shown that the governments of high-income countries such as Japan, Singapore and Korea have played an active role in the construction of national broadband networks. Meanwhile, middle- and low-income countries are focusing on building their ICT infrastructure. The availability of new technologies that allow cheap and reliable networking, such as WiFi and WLL, is helping developing countries build the necessary infrastructure for national connectivity.

The experience of the economies included in this study adds credence to the claim that competition leads to better infrastructure and service provision. Competitive markets have played a role in improving information infrastructure in almost all of the countries studied. This is not only true in terms of access to telephony (via fixed line and cellular) in low-income countries but also in the deployment of broadband in the high-income countries. Korea and Singapore allow robust infrastructure-based competition (i.e., cable companies competing aggressively with telecommunications companies) in their respective broadband markets⁸⁴. In Japan, telecom services deregulation spurred growth in ADSL technologies.

The establishment of a legal framework creating a trusted and secure environment is a central factor in the development of ICT use, especially in business transactions. The countries in this study have adopted various approaches on the creation of a legal infrastructure ranging from the comprehensive to a multiple-laws approach. Whatever approach is taken, it was stressed that in crafting a legal framework for ICTs, the laws and regulations must be broadly defined and technology-neutral in light of the rapid changes in, and emergence of, various technologies. The various policy efforts at making secure critical infrastructure from cyber crimes were also examined.

One of government's undisputed roles in ICT development is content development⁸⁵. However, most governments – in this study and worldwide – have not focused on content development. In this study, only the Korean government has been aggressively encouraging the growth of local content. Governments, however, have not been remiss in regulating what is deemed as objectionable content. Most of the countries in this study have proscribed access to pornographic materials. Only Sri Lanka does not regulate content. The private sector (particularly the traditional media corporations) has taken the lead in online content creation. But there are limits to a market-led approach to content development. In most parts, only content with a potential 'market' gets created. Local online newspapers would not be attractive to these private content providers. Involving NGOs in such an activity is an alternative that has not been seriously pursued in the countries in this study.

A related issue is the protection of intellectual property rights. Countries are responding to the issue through international treaties and national legislations in conformance with the treaties,

⁸⁴Infrastructure-based competition is also characteristic of the broadband market in the US, Canada, Hong Kong and Belgium.

⁸⁵Stiglitz, J., et al. *Government in the Digital Age*. See <http://www.sbgo.com/Papers/CCIA%20FINAL.pdf>

even as critics denounce the treaties as being overwhelmingly in favour of companies in the developed world.

It has long been argued that without an appropriate regulatory infrastructure, the market would not be able to function properly⁸⁶. Technological change and the introduction of competition have changed the traditional roles of the regulator towards the need to ensure effective competition in the marketplace. Technological convergence also poses an important challenge to regulators, making urgent the need to upgrade regulatory skills and capabilities. We have seen the efforts of the countries in the study to move towards a policy and regulatory environment that would support their ICT policies and strategies.

Finally, education plays an important role in ICT development. The three high-income countries studied have already launched ICTs in their education master plans. The remaining six countries have drafted plans to incorporate ICT use in teaching and training in order to develop a pool of knowledge workers within the economy. The market is also considered to be important in creating an ICT-enabled workforce. In the Philippines, a large part of the ICT training is provided by privately owned training/educational institutions. Private corporations have also invested in evolving their own training programmes to develop the capabilities of their workers. The same is true in low-income countries such as Nepal.

There are a number of “lessons” that we can derive from the ICT strategies of Singapore, Korea and Japan. One is that the ICT strategies are not only well developed but also well implemented. They are also able to adapt quickly to changing circumstances. For instance, Singapore’s third IT Master Plan (IT2000), launched in 1992, was silent on the role of the Internet in development. But with the emergence of commercial Internet in 1994, the government quickly shifted gears and incorporated the Internet in its ICT development strategy. It is also important to note that in these economies, governments were able to channel a significant amount of investment (higher than what would have been if market forces alone were operating) to the ICT sector. Take the case of Korea’s broadband strategy. Analysts note that Korea’s broadband penetration (two-thirds of Korean households) is “three times the expected rate (based on the 1 percent of household income constraint) – even allowing for the fact that at just US\$ 30 a month, the country has among the lowest broadband subscription prices in the world”⁸⁷. This unusually high broadband penetration can be partly explained by government subsidy and promotion activities. Singapore, Japan and Korea are able to do all these not only because their leaders are fully committed to their ICT policies but also because of conducive institutional arrangements or a political order that ‘insulates’ the government from vested interests and allows decision-makers to make the best possible plan, and implement it effectively and efficiently.

The focus of this study has been on government policy because governments matter. However, it is recognized that there is almost always a gap between what governments intend and what actually gets done. Nevertheless, government policies are important because they set the

⁸⁶Polanyi, K. *The Great Transformations: The Political and Economic Origins of Our Time* (Boston, MA: Beacon Press, 2001).

⁸⁷ Beardsley, et al. ‘Towards a New Regulatory Compact’, *Global Technology Information Report 2003-2004*, p. 83.

parameters of what can and cannot be (legally) done in a given economy. They also provide the direction that the private sector should take. The global and domestic contexts of national ICT policies and e-strategies also set limits, as well as open possibilities, for all the actors engaged in deploying ICTs for development. As has been noted, the presence of vested interests has led to 'managed competition' in the traditional telephone market, while the lack of vested interest has meant real competition in the cellular or mobile market.

Stiglitz, in discussing the role of globalization in development, best articulates an important assumption of this study regarding contexts:

"... countries have to learn to live within the rules of the game, as unfair as they may be. Even within these rules, ...countries...can help shape globalization, to make it work, not just for the rich within the country, but for everyone. But if they are to do this, they must choose their own course, free of the simplistic mantras that have played such a central role in guiding economic policy... over the past decade. It will not be easy, but there is no alternative."⁸⁸

⁸⁸Stiglitz, J. 'Development Policies in a World of Globalization', p. 25.

About the Author

Emmanuel C. Lallana, PhD is Commissioner, Commission on Information and Communications Technology (CICT), Office of the President, Republic of the Philippines. The CICT is the primary policy, planning, coordinating, implementing, regulating entity of the Philippine government that promotes, develops, and regulates integrated and strategic ICT systems and enables reliable and cost-efficient communication facilities and services in the country.

Before he joined the Philippine government in September 2004, Dr. Lallana was actively engaged in research, training and consulting on ICT policy. From 2000-2002, he was the Executive Director of the e-ASEAN Task Force (eATF) – an advisory body to the South East Asian inter-governmental organization on developing ICT competencies among its 10 member countries. He also worked with the Philippine legislature in developing a legal framework for e-commerce (Republic Act 8792).

Dr. Lallana's recent publications include *SMS in Business and Government* (2004), *State of eGovernment in the Philippines 2003-2004* (2004); *mGovernment: Mobile Wireless Applications in Government* (available at www.egov4dev.org.topic4.htm). He was the Series Editor of *e-Primers on Information Economy, Society and Polity* vol 1-7 and author of the *Information Age* – the first volume in the series (online version: www.eprimers.org). Dr. Lallana also wrote the chapter on the Philippines in the *Digital Review of the Asia Pacific 2003-2004* (www.digital-review.org).

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