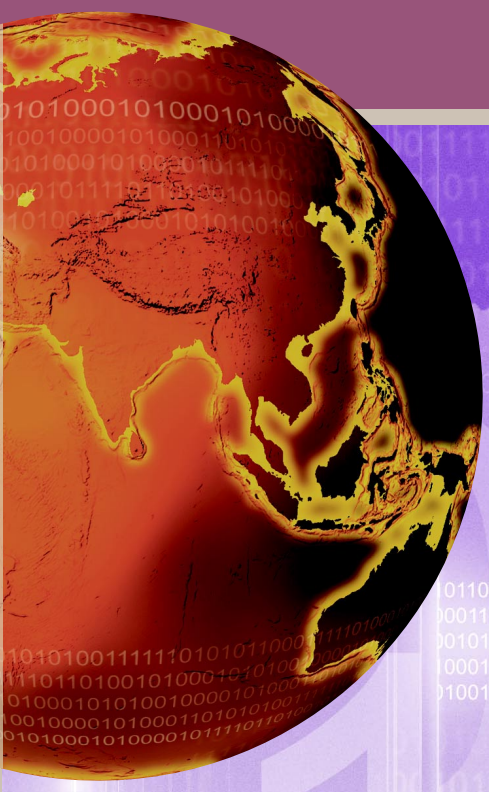

Links to the individual chapters of this publication are available at the contents page

CONTENT

DIGITAL REVIEW *of* *Asia Pacific*

2003/2004

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Nalaka **Gunawardene**
Samudra E. **Haque**
Jong-Sung **Hwang**
Huixin **Ke**
Norbert **Klein**
Hugh Thaweesak **Koanantakool**
Emmanuel **Lallana**
Ching-Yi **Liu**
Muhammad Aimal **Marjan**
Jamshed **Masood**
Narantsetseg Baljin
Onno Purbo
Sushil **Pandey**
Phonpasit **Phissamay**
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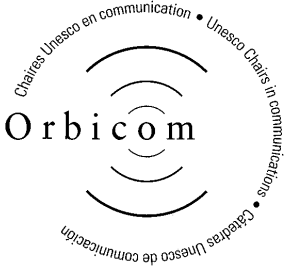

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Contents

The co-publishers

Asia-Pacific Development Information Programme of the United Nations Development Programme

In the Asia-Pacific region, the United Nations Development Programme (UNDP) has established the Asia-Pacific Development Information Programme (APDIP) to promote the strategic and effective use of information and communications technology (ICT) for poverty alleviation and sustainable human development. Launched in 1997 and based in Kuala Lumpur, APDIP operates at both national and regional levels through a network of 25 UNDP country offices covering 42 countries in the Asia Pacific. At the national level, APDIP assists national and sub-national institutions by providing ICT technical and policy support as well as building capacities. At the regional level, APDIP strives to build synergies between national ICT programmes and activities and provide a regional platform to facilitate multi-country co-operative approaches to ICT for development. <http://www.apdip.net>

Pan Asia Networking Programme of the International Development Research Centre

The International Development Research Centre (IDRC) is a public corporation created by the Parliament of Canada in 1970 to help developing countries use science and technology to find practical, long-term solutions to the social, economic and environmental problems they face. Support is directed towards developing an indigenous research capacity to sustain policies and technologies developing countries need to build healthier, more equitable and more prosperous societies. IDRC's Pan Asia Networking (PAN) Programme promotes socially responsible ICT application and innovation in developing countries, especially for deprived communities, through participatory and applied research in Asia. PAN examines the impact of ICT project interventions on people, livelihood, culture and gender and conducts research into how they impact on the economy and society as a whole with policy-relevant studies.

Orbicom

Jointly created in 1994 by UNESCO and Université du Québec à Montréal, Orbicom, the network of UNESCO Chairs in Communications, embodies 28 Chairs and over 250 associate members in 71 countries with representation from communications research, ICT for development, journalism, multimedia, public relations, communications law and more. The international collaboration of academics, corporate decision makers, policy consultants and media specialists makes Orbicom a unique network and constitutes a truly multidisciplinary approach to the promotion of communications development. Since 1996, Orbicom has general consultative status with the Economic and Social Council of the United Nations. Orbicom is engaged in a number of efforts focusing on ICTs, including assessment instruments such as *Digital Review of Asia Pacific* and *Monitoring the Digital and Knowledge Divides*. In 2002, Orbicom received the UNESCO/UNITWIN award for the quality of its projects. To find out more about Orbicom, visit its trilingual website <http://www.orbicom.uqam.ca> or contact <orbicom@uqam.ca>

Southbound

Southbound is an independent scholarly publishing house specialising in development communication and information issues. It has co-published widely with international R&D and development agencies in these areas. Southbound was founded in 1990 and its work has closely tracked the advent and diffusion of ICTs in developing countries. During this time, it has evolved a focus on participatory communication processes, and its current work explores the fit of the new ICTs into existing communications and social systems. <http://www.southbound.com.my>

Riding the waves of change: Transforming the digital divide into digital opportunities

Shahid Akhtar **UNDP-APDIP**
Claude-Yves Charron **Orbicom**
Maria Ng Lee Hoon **IDRC-PAN**

> "The new communications era should not be perceived as a purely technological phenomenon. Its ultimate impact is social and cultural, although technological advancement is the key enabler. This new era invites a change in social and cultural patterns."
>
> Tengku Mohd Azzman Shariffadeen[1] (1996)

The *Digital Review of Asia Pacific* aims to report on the state-of-practice of ICTs in the region, on the innovative ways the new technologies are being deployed to advance the socioeconomic development of Asia-Pacific countries and on emerging attempts to transform the digital divide into digital opportunities.

To take stock of the situation and elicit some of the future trends involved, four organisations decided to come together on this initiative as co-publishers of this volume: the Asia-Pacific Development Information Programme (APDIP) of the United Nations Development Programme (UNDP), the Pan Asia Networking (PAN) Programme of the International Development Research Centre (IDRC) and, the network of UNESCO Chairs in Communications (ORBICOM) in close collaboration with Southbound. This publication is an extension of the innovative editorial concept for the *Pan Asia Networking Yearbook* published in the early years of the digital revolution by IDRC.

The readership we are aiming to serve includes all who work at societal transformation through ICTs for development, including policy makers, members of industry, ICT specialists and development practitioners both within the Asia-Pacific region and on the international scene.

The authors participating in this initiative belong to the same diverse constituencies as the target audiences and come from 27 economies in the region, including areas for which almost no data was available until very recently.

The authors and members of the editorial board met in Kuala Lumpur in November 2002 to conduct a peer-review process, which determined the content of this publication and elicited the regional trends published here. They also enjoyed the opportunity of taking part in a public forum at the MIMOS headquarters while in Malaysia.

A choice was made by the participants of the Kuala Lumpur meeting for a non-technology focus for this first edition of the *Digital Review of Asia Pacific* to complement the existing body of literature devoted mainly to connectivity, access and e-readiness issues,[2] ensuring that this publication meets the current critical need of reporting on how the region is deploying ICTs for development.

A number of our contributing authors took part in the Asia-Pacific regional consultation on the World Summit on the Information Society, and the series of case studies presented here provide us with an impressive diagnostic of the transition between the digital divide and the digital opportunities for the countries covered. These diagnostics will be updated on a regular basis via e-mail to registered subscribers. This publication will be followed up by the 2004–2005 edition.

The case studies and the regional trends discussed in this edition present us with a unique source of information by key scholars, members of the industry and policy makers who are well established in their respective countries. The chapters provide solid, well-grounded and nuanced perspectives on current issues and challenges. They make a unique contribution to ongoing national debates concerning endogenous development and to regional and international debates leading to the two phases of the World Summit on the Information Society of December 2003 in Geneva and November 2005 in Tunis.

The regional trends provide us with the building blocks for a discussion on the leadership needed to effectively deploy ICTs to achieve development goals and about the different types of actors involved: national governments, corporations, scholarly communities, civil society and donor agencies.

One of the weak links undoubtedly relates to the lack of leadership within some technology and scholarly communities to strengthen the response of the education system to the ICT revolution and to provide leadership in the localisation of content.

A very young man, more than 40 years ago, presented a PhD dissertation entitled *Struckturwandel der Offentlichkeit*,[3] later published by Herman Luchterhand Verlag (1962). One might consider, when reading the 28 essays here, that we could expand on Habermas' analysis of the role of the press in the creation of a new public sphere and consider that we are entering a new communications era, with the technologies and the cultural and social changes they induce, confronting us with a new type of public sphere, very different from the traditional mass media, much more participatory in nature and much more international.

Such a new set of dynamics, be it in Afghanistan or in Japan, Timor-Leste, China or India, invites us to an unfamiliar way of riding the waves of change. We still have to learn how to cope with these new dynamics and to ensure that they allow for the realisation of the millennium development goals.

Notes

1. Azzman Shariffadeen (1996). New Communications Era: Economic, Social and Cultural Consequences for Developing Nations. In A. Goonasekara, Y.S. Beng & A. Mahizhnan (Eds), *Opening Windows: Issues in Communications*. (pp. 104–12). Singapore: Asian Media Information and Communication Centre.
2. Dutra, S., Lanvin, B. & Paua, F. (Eds) (2003). *The Global Information Technology Report: Readiness for the Networked World*. New York : Oxford University Press.
3. Habermas, Jurgen (Translated by Thomas Burger) (2000). *The Structural Transformation of the Public Sphere*. Cambridge, MA: The MIT Press, 11th printing.

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Acronyms

3D Three-Dimensional
3G 3rd Generation Wireless Format
ADB Asian Development Bank
ADSL Asymmetric Digital Subscriber Line
AI3 Asian Internet Interconnection Initiatives
AMPS Advanced Mobile Phone System
AOL America Online
APDIP Asia-Pacific Development Information Programme, UNDP
APEC Asia-Pacific Economic Cooperation Forum
APNIC Asia Pacific Network Information Centre
APRICOT Asia Pacific Regional Internet Conference on Operational Technologies
AS Administrative System, or Administrative Site
ASCII American Standard Code for Information Interchange
ASEAN Association of Southeast Asian Nations
ASP Active Server Pages, or Application Service Provider
ATM Asynchronous Transfer Mode, or Automated Teller Machine
B2B Business-to-Business
B2C Business-to-Consumer
B2E Business-to-Enterprise
B2G Business-to-Government
BBC British Broadcasting Corporation, or Binary Block Code, or Backup Bus Controller
BBS Bulletin Board System
BMP Basic Multilingual Plane
BOO Build-Own-Operate
BOOT Build-Own-Operate-Transfer
BOT Build-Operate-Transfer
CAD Computer-Aided Design
CB Citizens' Band
ccTLD Country Code Top-Level Domain
CCTV Closed Circuit Television
CD Compact Disc
CDMA Code Division Multiple Access
CD-ROM Compact Disc Read-Only Memory
CDRW Compact Disc Read and Write
CGI Common Gateway Interface
Cisco Computer Information System Company, or Cisco Systems Inc.
.com DotCom
COBRA Common Object Request Broker Architecture
CRM Customer Relationship Management
DCOM Distributed Component Object Model
DES Data Encryption Standard
DHTML Dynamic Hypertext Mark-up Language
dirAP Digital Review of Asia Pacific
DNS Domain Name System
DOT Force Digital Opportunity Task Force
DRAM Dynamic Random Access Memory
DSL Digital Subscriber Line
DVD Digital Versatile Disc, or Digital Video Disc
DWDM Dense Wavelength Division Multiplexing
EDI Electronic Data Interchange
ERP Enterprise Resource Planning, or Electronic Resource Planning
FAO Food and Agriculture Organization of the United Nations
FAQ Frequently Asked Questions
FPGA Field Programmable Gate Array
FTP File Transfer Protocol
G2B Government-to-Business
G2C Government-to-Citizens
GATS General Agreement on Trade in Services
GATT General Agreement on Tariffs and Trade
GDLN Global Development Learning Network
GDP Gross Domestic Product
GIF Graphic Interchange Format
GIS Geographic Information System
GNU Gnu's Not Unix
GPL General Public Licence
GPRS General Packet Radio Service
GPS Global Positioning System
GSM Global System for Mobile Communications
HDML Handheld Devices Mark-up Language
HTML Hypertext Mark-up Language
http Hypertext Transfer Protocol
IC Integrated Circuit, or I See (chat code)
ICANN Internet Corporation for Assigned Names and Numbers

ICIMOD International Centre for Integrated Mountain Development
ICQ I Seek You
ICT Information Communication Technology
IDA Industrial Development Agency/Authority, or Infocomm Development Authority of Singapore
IDC International Data Corporation, or Internet Database Connector
IDRC International Development Research Centre
IEC Information, Education and Communication/ Counselling
IETF Internet Engineering Task Force
IMAP Internet Message Access Protocol
IP Internet Protocol
IPO Initial Public Offering
IPV6 Internet Protocol Version 6
IRC Internet Relay Chat
ISDN Integrated Services Digital Network
ISO International Organization for Standardization
ISP Internet Service Provider
IT Information Technology
ITSP Internet Telephony Service Provider
ITU International Telecommunication Union
IVR Interactive Voice Response
IX Internet Exchange
JICA Japan International Cooperation Agency
JIT Joint Interoperability Tool
JPEG Joint Picture Experts Group
K Kilo
Kbps Kilobits per second
KU Frequency sub-band
LAN Local Area Network
LCD Liquid Crystal Display
LDC Least Developed Country
LTSP Linux Terminal Server Program
MAE Metropolitan Area Exchange
Mbone Multicast Backbone
Mbps Megabits per second
MCT Multipurpose Community Telecentre
MIME Multipurpose Internet Mail Extensions
MIT Massachusetts Institute of Technology
MMS Mail Management System, or Maintenance Management System
MNC Multinational Corporation
MOO Object-Oriented MUD
MP3 MPEG 1 Layer 3
MPEG Motion Picture Experts Group
MPLS Multi Protocol Label Switch
MT Machine Translation
MUD Multi-User Dungeon/Dimension
NAP Network Access Provider
NASDAQ National Association of Securities Dealers Automated Quotations system
NC Network Computer
NGO Non-Government Organisation
NIR National Internet Registry
NMT Network Management Terminal
NNTP Network News Transport Protocol
NT Windows NT operating system
OCR Optical Character Recognition
OECD Organisation for Economic Co-operation and Development
OS Operating System
OSP Online Service Provider
OSS Open Source Software
P2P Peer-to-Peer, or Person-to-Person (chat)
PABX Private Automatic Branch Exchange
PAL Phase Alternation Line television format
PAN Personal Area Network, or Pan Asia Networking
PC Personal Computer
PCO Public Call Office
PDA Personal Digital Assistant
PDF Portable Document Format
PDH Plesiochronous Digital Hierarchy
PGP Pretty Good Privacy encryption program
pH Potential of Hydrogen
PHS Personal Handyphone System
PICS Platform for Internet Content Selection
PIN Personal Identification Number, or Packet Identification Number
PKI Public Key Infrastructure
PNG Portable Network Graphics, or Papua New Guinea
POP Point of Presence
POP3 Post Office Protocol Version 3
POTS Plain Old Telephone Service
PPP Point-to-Point Protocol
PPTP Point-to-Point Tunnelling Protocol
PRC People's Republic of China
QoS Quality of Service
R&D Research and Development
RFC Request For Comments
RMB Renminbi (currency of PRC)
RSAC Recreation Software Advisory Council
RSVP ReSerVation Protocol
SAARC South Asian Association for Regional Cooperation
SAP Secure Agreement Protocol
SCM Supply Chain Management
SDH Synchronous Digital Hierarchy
SDMI Secure Digital Music Initiative
SET Secure Electronic Transactions
SIM Serial Interface Module
SLIP Serial Line Interface Protocol
SME Small and Medium Enterprise
SMS Short Messaging Service
SMTP Simple Mail Transport Protocol
SSL Secure Sockets Layer
STD Standard Trunk Dialling
SWIFT Society for Worldwide Interbank Financial Telecommunications

T-1 T-carrier
TA Terminal Adapter
Tbps Terabits per second
TCP Transmission Control Protocol
TDM Time-Division Multiplexing
telco telephone company
Telstra Telecom Australia
TRIPS Agreement on Trade-Related Aspects of Intellectual Property Rights
TTP Trusted Third Party
TVRO Television Receive-Only
UDLR Uni-Directional Link Routing
UK United Kingdom
UN United Nations
UNCITRAL United Nations Commission on International Trade Law
UNCTAD United Nations Conference on Trade and Development
UNDP United Nations Development Programme
UNESCO United Nations Educational Scientific and Cultural Organization
UNOPS United Nations Office for Project Services
UPU Universal Postal Union
URI Uniform Resource Identifier
URL Uniform Resource Locator
US United States
US$ United States Dollar
USA United States of America
USAID United States Agency for International Development
vBNS Very High Speed Backbone Network Service
VITA Volunteers in Technical Assistance
VM Virtual Machine
VOIP Voice Over Internet Protocol
VPN Virtual Private Network
VRML Virtual Reality Modelling Language
VSAT Very Small Aperture Terminal
W3C World Wide Web Consortium
WAN Wide Area Network
WAP Wireless Application Protocol
WCDMA Wideband Code Division Multiple Access
WDM Wave-Division Multiplexing
WHO World Health Organization
WiFi Wireless Fidelity (IEEE 802.11 wireless networking)
WIPO World Intellectual Property Organization
WLAN Wireless Local Area Network
WLL Wireless Local Loop
WML Wireless Mark-up Language
WSIS World Summit on the Information Society
WTO World Trade Organization
WWW World Wide Web
XML eXtensible Mark-up Language
XSL eXtensible Style-sheet Language

Asia-Pacific ICTs: An overview of diversity

Chin Saik Yoon
Chief Editor

Asians became the largest Internet user group towards the end of 2001. An estimated 160 million users had gone online across Asia Pacific by then. They accounted for 33 percent of all Internet users in the world and nudged North American users from the top spot by just one percentage point (ITU, 2002).

What is significant about this milestone is not Asia Pacific taking first place, but that the region had done so with such a small proportion of its population having Internet access to begin with. The most populous nations in the region also happen to have some of the lower Internet-user densities per 10,000 inhabitants – 68 for India, 191 for Indonesia, and 256 for China. The potential is therefore vast.

While the rural hinterlands of the region were busy spinning the first strands of their Web, other parts in the region have raced ahead. Hong Kong, India, Japan, South Korea, Singapore and Taiwan have become global leaders in a number of areas ranging from broadband technologies, hardware and gaming to call centres, offshore software development and backroom operations.

Several countries, particularly Singapore and Malaysia in Southeast Asia, had profited as regional manufacturing hubs for hardware companies. But they are suffering deepening losses because multinational companies are relocating their hubs to lower-cost production centres in China. As a result, the "bust" in Southeast Asia has been happening in tandem with a "boom" in China. To some observers, this is another episode in the continuing "race to the bottom" where localities and nations compete to attract capital investment in a globalised digital economy (Schiller, 2000).

Although a sizeable portion of the manufacturing of ICT goods takes place in Asia Pacific, much of the value created in this process goes to intellectual property rights (IPRs) holders located outside the region. The same is also true of ICT services. India has been a highly productive international software originator centre for a number of years, but, as in the case of hardware, the IPRs for what the Indians create belong overseas. Another example of this occurring in the content field comes from New Zealand, which provided not only the stunning locations for the *Lord of the Rings* trilogy but also much of the digital special effects seen in these highly successful films. But here again the larger chunk of the IPRs for the productions is locked away overseas (see p. 209).

There are exceptions though; they are found in Korea, Japan, Singapore and Taiwan – bases to a significant number of homespun international ICT companies and global brands. These successful exceptions have matured into role models of what is possible for the region.

Even more inspiring is the active group of ICT professionals in the region who are not driven solely by profit-oriented IPRs. The open source movement in a number of Asia-Pacific countries operates purely according to altruistic principles. Indonesia is a good example. "Copyleft" software, or software without copyright restrictions, runs a large number of the computers in the country (p. 103). Indonesian innovators have gone a step beyond software and have started to freely share cleverly adapted wireless technologies to bring Internet access to communities who would otherwise not be able to gain Internet access.

Bangladesh is the other country with smart adaptive innovations. Here, local ISPs are using customised LAN equipment to deliver their services (p. 52). After a period of trial and error, the Bangladeshi ICT professionals have begun to manufacture locally extra-robust LAN equipment for outdoor installation in order to build networks that enable subscribers without telephone lines to get online.

Taken as a whole, the world's largest Internet user group is quickly evolving into one of the larger groups of customers for ICT goods and services in the world. This significant segment of the international marketplace extends deeply into the services sector, where many economies have become enthusiastic consumers of online content and services originating

from outside the region. The chapters which follow show that this is especially true among Asia-Pacific communities who are fluent in English.

The staggering number of languages used across the region, in addition to English, is one of the most vivid demonstrations of the diversity of Asia Pacific. Besides being home to some of the technologically most advanced economies, it is also home to some of the most technologically deprived countries in the world. Afghanistan (p. 21) and Timor-Leste (p. 279) have just recently begun reconstruction of their infrastructure. And citizens in a couple of other economies in the region still find the Internet a largely forbidden zone.

This diversity presents the ICT community in Asia Pacific, and beyond, with a testbed where technologies, policies, legislation, business models, content-creation strategies, and services can be piloted and their impact measured. We have much to learn from the region as it finds its own way forward.

Content

The Asia-Pacific content sector is most vibrant in the non-English-speaking economies of the region. China, Indonesia, Japan and Korea all report of active and viable local content producers. Their "linguistic isolation" appears to have helped them nurture the strongest online publishers. The chapter on China reveals that more than 80 percent of its Internet users visit Chinese language websites (p. 74). It also reveals that more than 75 percent of China's Internet users visit Chinese language news sites (p. 75).

Newspapers operate the most popular websites in the region, as in most of the other parts of the world. The popularity of news websites is not surprising given that newspapers are probably the only organisations online with the capacity to update content on a regular basis.

A common complaint across the region is of websites with static content. What is often found lacking consists not only of outdated content but also content generating little interest or providing limited utility. Many organisations, including government agencies, post online brochure-like information – scanty bits of information devoid of the breadth and depth which makes information useful to visitors. Associated with this complaint is the non-interactive nature of most websites. The complaint is heard the loudest of public sector websites since most users visiting government websites expect some form of virtual government service that helps them get around the often time-consuming bureaucracy of the real world.

Content and ICTs: Challenges, innovation and prospects

Danny Butt and Madanmohan Rao on behalf of the **Authors' Working Group on Content**

Content plays an important role in the potential use of ICTs to develop the diverse societies of the Asia-Pacific region. In many cases, the availability of relevant content and related services motivates groups to adopt digital tools, platforms, standards and channels to create and access digital content. However, a digital content strategy also needs to include content in non-digital formats (e.g. traditional media like books, newspaper, television, radio) to raise awareness of the potential of digital content, particularly in developing countries where diffusion of digital technologies may not be as widespread.

Challenges

Challenges to content development exist in tools, standards, human capacity, financial models, political culture and legal frameworks.

The ready availability of relevant local language content is critical for the development of productive capacity in new media. One of the challenges in the early years of Internet diffusion lay in the dominance of the English language and US-centric content, with little relevance to many Asia-Pacific Internet users. Without locally relevant content in local languages, immediate uses of ICTs for day-to-day activities may not be apparent.

A starting point for local language content generation is the availability of affordable hardware and software tools (with local language interfaces and support manuals) for viewing, creating and manipulating content. Technical standards (such as Unicode) also need to represent local language content. Unfortunately, not all Asian languages have standardised Unicode representations or keyboards (e.g. Khmer). Some Asian languages being official languages in multiple countries further complicates standards issues. For example, Tamil is officially recognised in India, Singapore, Malaysia and Sri Lanka, requiring international cooperation to develop effective standards. Finally, effective tools for automatic content conversion from non-digital formats are also required.

Existing proprietary software tools for content production can be prohibitively expensive in developing Asia-Pacific countries. Open source software can provide cost-effective alternatives, with a lower total cost of ownership over the long term and significant benefits for skill development in local communities. Regulatory and licensing frameworks, particularly in developing countries, need to be supportive of open source development.

Digital content generation and design are key skills for the workforce across multiple sectors (not just the ICT industry), and capacity building in this area is a major challenge for many Asia-Pacific policy initiatives. It is difficult for formal education programmes to keep up with the pace and expense of developments in the field, and serious questions of return on investment face ICT-driven human development strategies in many countries.

Questions of cultural hegemony in the digital content sector add to and shift established conflicts in print and broadcast media. Will new media facilitate globally diverse cultural representation, or will it reinforce Anglo-American dominance in the cultural realm? Will there be a level playing field for new content from developing countries, or will the main distribution channels remain difficult for new players to access? Policy makers will need to negotiate a careful balance between local versus global content, remaining open to the diversity of foreign content while encouraging their citizens to generate local content.

Sustainable models of financial support for creation of digital content are sorely lacking, whether in government or private sector approaches. In the more advanced ICT economies of Asia Pacific, new content players are also facing stiff competition from incumbents. In the current post-dotcom climate, independent content ventures are facing particularly bleak prospects.

Innovative responses

A number of innovative actions are emerging across the Asia Pacific in response to the above challenges. For instance, local language tools, international standards and conversion programs are emerging for many Asian languages via initiatives such as the International Forum for Information Technology in Tamil. Networks of collaboration for content creation are being formed in regional groups, such as ASEAN. Digital content generation is increasingly promoted by the government, private sector and local communities, with community telecentre initiatives facilitating access to this content. New responses to the digital divide integrate education, technical support and content into the provision of ICT facilities, with a focus on the ability of people to make effective use of the technology rather than just gaining access to it.

In the more advanced Asia-Pacific economies, content translation solutions are emerging via software and outsourcing. Legal frameworks are increasingly negotiating issues of traditional copyright and innovative licensing models such as open content or "copyleft". Financial sustainability is being explored via new models and incentives, with increasing emphasis on tri-sector partnerships between government, community agencies and the private sector. Asia-Pacific content creators are increasingly aware of the need to negotiate intellectual property rights in the global information economy, particularly where they are part of transnational production processes.

Prospects

Amplifying the published base and user applications of local content in Asia Pacific will be a long process. Long-term thinking, considerable effort and proactive alliances will be required to address the uneven development evident across the region.

In Asia-Pacific countries at a basic or intermediate level of economic development, donor agencies are increasingly involved in the promotion of content. The use of open source content tools will undoubtedly increase in the region, reducing dependence on foreign software companies for basic infrastructure. Government-generated digital content will increase in the developing countries of Asia Pacific, while more sophisticated public-private partnerships will continue to develop in the advanced information economies.

In the post-Napster world, innovative content applications and technologies such as peer-to-peer (P2P) will continue to disrupt dominant content industries and intellectual property regimes. Struggles between the promotion of linguistic and cultural diversity and the interests of dominant cultural producers will continue to expand in the digital realm. Single-language dominance of Internet content is likely to decrease with the cost of translation, while the amount of English content will not decrease; the need to engage increasingly diverse audiences will require content to be available in multiple languages.

Over the longer term, the digital future of Asia Pacific will increasingly reflect the cultural and linguistic diversity of the region. Content will be a key issue on the digital agenda for the Asia-Pacific region, as a key driver of the use of ICTs.

This criticism can also be validly applied to the private sector. The popular news websites are largely online facsimiles of conventional newspapers and magazines or digitised versions of analogue editions repackaged for broadcast via the new ICTs. Really successful news websites tend to provide interactive features, such as online polls, searches of news archives, and links to related stories which provide a historical context and analysis to a particular news story.

A couple of interesting news websites which were born online, and continue to be published exclusively on the Web, are Detik.com <http://www.detik.com> (p. 98) and Malaysiakini.com <http://www.malaysiakini.com> (p. 190). Detik.com is the leading online news source in Indonesia. It garnered much of its reputation as being the most accurate breaking-news website during the 1998–99 student demonstrations. Malaysiakini.com built its reputation under somewhat different circumstances by providing alternative coverage of major national news events. It has now included a "blog", or a weblog, in its daily editions. Blogs may be considered an original genre of the Web. It is a mix of a diary and a newspaper column, but offering links to an eclectic collection of related webpages about the topic being discussed and supplemented with comments from its readers.

Malaysiakini.com also exemplifies the challenges faced by dedicated online media. The news site is discovering that it is very difficult to generate paid subscriptions from its users to sustain its operations in the long run. Readers still expect to receive their online news free. The conventional news media have been able to sustain their online operations as they view them very much like online promotions, or cross-selling channels, for their print editions and the lucrative advertisements which they carry.

The popularity of online audio and video content is limited to Asian economies with established broadband access. Internet users in Korea (p. 142) and Japan (p. 123) not only stream audio and video but also use their broadband access to download music and play games. Apart from these exceptions, much of the content consumed in Asia Pacific is downloaded as text.

In some countries, even textual content poses a technical challenge. In Nepal (p. 197) and Cambodia (p. 133), for example, the lack of a standardised electronic font for the two national languages in these countries places content providers in a quandary as to which of the many available fonts they should use for their online textual content. There is no perfect solution when faced with such a quandary. The most practical strategy is to mount the content as large pieces of graphic images bearing text which does not require a font to access. However, this stopgap solution leads to other technical problems as large graphic images tend to take a much longer time to download and so they clog up the limited bandwidth available in most of the affected countries.

The challenge for the other Asia-Pacific countries, with a population fluent in English, is competing with foreign sources of content. North American and European news websites such as BBCi News, CNN.com and the New York Times on the Web are popular across the region. Their popularity has been a source of anxiety for many regulators, who worry that foreign media may sway public opinion at home, especially on crucial political and socioeconomic issues. Media critics, on the other hand, are concerned about the biased worldview shaped locally and globally by these influential media. The 2003 Iraq War has been cited as a prime example. One of the most critical assessments was delivered by Greg Dyke (2003), BBC's director general (who paradoxically leads one of the dominant media groups himself), who denounced the "gung-ho patriotism" of one of the largest US news networks in covering the war: "This is happening in the United States and if it continues will undermine the credibility of the US electronic news media."

At the same time, Asian news sources are not without their share of criticism. Biased and inadequate reportage is often cited as the major failure of the national media. The SARS outbreak in early 2003 demonstrated the deadly consequence of stifling news flows. The knee-jerk reaction was to control the release of information on the disease. This initially led to ignorance about SARS, even on the part of medical practitioners, and contributed to the early spread of the disease. As news leaked through interpersonal channels about the outbreak, and as the official sources of information continued to maintain their silence, people braced themselves for the worst and believed all snippets of information which came their way, no matter how inaccurate they were. When the official news channels began to tackle the epidemic in a transparent way, it took them a while to recover the confidence of the public and very precious time had been lost in mobilising preventive and containment measures within the affected communities.

In spite of the occasional failures of the local sources of information, the international news organisations do not monopolise the Asia-Pacific readership. Asians continue to log on to their national news websites for the local perspective on current affairs. The Asian diaspora, dispersed around the world, has also found in the national news sites the near perfect channel for keeping abreast with the

latest happenings back home. It is thought that these people account for a significant number of hits logged at these websites. Although reportage by foreign online media remains controversial – especially about significant political and economic affairs in the region – their availability online to all Internet users has encouraged national and regional media to be more forthright and candid in their coverage of events at home. This, more than any form of gate-keeping, will serve in the long run to check the influence of foreign news sources on Asia-Pacific communities.

One of the original and most rewarding uses of the Internet is in support of R&D. Many of the national networks in the Asia Pacific began within the academe and the R&D community before popular demand for connectivity commercialised the Internet, overwhelmed the R&D networks and relegated the digital pioneers from the academe to the backwaters of the sector. However, the R&D networks continue to thrive quietly in the background, deploying ICTs in efficient ways and with socially meaningful impact. A good example of this can be found in Vietnam, where 70 percent of universities are connected to the Internet. A number of them are building electronic libraries, bringing new research and learning resources to faculty members and students. The Hanoi Polytechnic University offers an outstanding example of an electronic library with linkages to electronic libraries of universities abroad.

Vietnam's Ministry of Education and Training has launched the Education Gateway Project, which will eventually connect all universities, colleges and vocational schools (p. 298). Most of the other countries in the region have initiated similar networks. China's CERNET links national educational and research organisations, offering information in both Chinese and English (p. 76). The Institute for Afghan Studies, run by young Afghan scholars from around the world, has compiled and made available on the Web comprehensive collections of historical information, analyses and bibliographies that are useful to ongoing efforts to reconstruct Afghanistan (p. 25). The National Library of Bhutan has also made available on the Web both current and historical information about the country, which used to be inaccessible to researchers with an interest in the country who work outside Bhutan (p. 69).

Documentation on some of the darker episodes of recent Asian history has also been made accessible: Yale University's Genocide Documentation Project has mounted its documents on the Web in both Khmer and English (p. 132).

Researchers dedicated to development issues have been energised in their work by the advent of numerous websites sharing research results and resources. The Global Environment Centre in Japan has placed online seven databases specialising in environmental topics, such as water treatment, air pollution control, soil and groundwater contamination, and energy conservation (p. 124). The Pacific Islands Forum Secretariat website is the source of documents on regional policies and action plans as well as information on political, development and economic issues (p. 309). R&D information on rice, the staple of the majority of Asians, is available from the International Rice Research Institute based in the Philippines (p. 219).

The original purpose of the Internet is very much alive and continues to make significant contributions to broader efforts to improve the quality of life in the region. The developmental impact of these strands of the Web is sometimes forgotten in the rush to nurture the commercial side of the Internet. However, the significant but difficult-to-quantify return on investment of the R&D-supporting initiatives of the Internet should not be underestimated nor ignored.

Turning to the lighter side of the Web and the coverage of sporting events, cricket websites are a uniquely South Asian phenomenon. CricInfo <http://www.cricinfo.com> of Pakistan claims to be the world's top cricket website. It generated in excess of 1.5 billion pageviews by 15 million users in 180 countries in 2001. The company is also helping to produce eight of the ten official websites for Test-playing countries. Cricket.org and CricketNext.com are the two notable Indian websites for this sport. Sri Lanka's equivalent is <http://www.lankacricket.lk>. They are all world-class online media operating in a highly competitive environment. Their coverage during major Test matches is both intense and unrelenting. Each move on the field is quickly reported on the Web. This is one rare niche in online content that is dominated globally by Asians.

Online services

E-government

The complex and time-consuming bureaucratic procedures of many governments in Asia have helped to endear many members of the public to the Internet and ICTs. One of the most frequently reported acknowledgements of the usefulness of the Web, by villagers and others who would normally not even think of going online, concerns the facility offered by many local government authorities for downloading official forms for filing all sorts of applications. For these citizens, interactions with officialdom usually requires a minimum of two visits

Online services

Narantsetseg Baljin on behalf of the
Authors' Working Group on Online Services

Online services require a combination of factors to be set in place before they can be run successfully. An Internet infrastructure operating at a fairly good speed is a prerequisite. Users need to develop a suitable degree of trust in the systems they will be interacting with remotely. This trust is in turn built upon secured systems not prone to hacking and abuse. Paramount in building the trust is the safeguard of private information. If legal or contractual transactions are to be completed entirely online, a reliable digital signature protocol needs to be made freely available to users. For commercial transactions to be completed entirely online, an electronic payment facility, such as a credit card system, stored-value card, or e-cash needs to be accessible to both consumers and merchants. And reliable merchandise delivery services, such as special postal deliveries and courier companies, are essential if the online transactions involve the purchase of consumer products. Some Asia-Pacific communities are innovating unique solutions to providing services online. For example, in Japan, e-commerce orders are placed online, but the goods are delivered to the neighbourhood store nearest to the customer for collection and payment by cash, replacing the well-established norm of paying with credit cards and delivery via courier service.

Asia-Pacific communities may be segmented, rather arbitrarily, into three groups based upon the extent of penetration of ICT services in the respective countries. The three groups are the "new", "intermediate" and "advanced" countries.

Challenges

"New" countries are challenged by a lack of awareness, political commitment and acceptance of online services and applications. The challenges facing "intermediate" countries include the lack of a critical collection of online content and services and a sufficient degree of trust in online systems among potential users of such services. "Advanced" countries are challenged by the development of value-added services which can be sustained on the long term through popular usage and patronage by the intended user groups. They also need to strike a balance between sharing information freely and safeguarding private information.

Responses

The "new" countries will be focusing on the training of citizens and government personnel and providing rural communities with access to ICTs. "Intermediate" countries will be promoting online services, enabling online transactions and devising alternative payment mechanisms. "Advanced" countries will be integrating e-services, strengthening security and privacy of information, and establishing one-stop e-commerce and e-government sites.

Prospects

The response will be mixed in the "new" countries. Governments will lead the way in the "intermediate" countries by delivering online more of their services. The prospects for e-commerce will be influenced by global dynamics rather than simply local responses; and distance education will grow in importance. Integrated one-stop online services will increase in the "advanced" countries, while the quality of services delivered via conventional channels are expected to deteriorate.

Some issues common to all countries

Governments must play a crucial leading role in promoting, initiating and nurturing online services. Online services will be designed and built around knowledge and information resources as the central elements. Policies and plans need to be put in place to ensure that members of underprivileged communities are not deprived of equal access to ICTs and online services.

to the nearest town where a government administrative centre is located. The first visit is usually dedicated to queuing for long hours to collect the necessary forms. These precious documents are then taken home where they are completed, often with the assistance of a literate relative or neighbour, and then brought back into town on another day for processing by the local official. Now the citizens can just pop down to the nearest telecentre or cyber café and have the forms downloaded and printed, saving them at least one expensive and time-consuming trip into town.

The people's appreciation for ICTs grows even fonder when procedures can be completed online. Citizens of the Philippines can now apply for the renewal of their passports and register births,

marriages and deaths via the Internet (p. 221). In the Indian state of Andhra Pradesh, an area with one of the most IT-savvy state governments of the country, the people have also found the new online system of property valuation more transparent and less corruptible in addition to being time-saving (p. 115).

The intensity of use of government online services by citizens varies considerably between subregions. The uptake of online services in Hong Kong has been reported to be slow (p. 92). The government there offers 110 different types of online services ranging from filing of tax returns and payment of taxes to applying for senior citizen cards and updating personal information, such as addresses, in government databases. Singapore, on the other hand, reports high usage of e-government services (p. 248). One-third of all Singaporeans deal with their government via the Internet. An average of 400,000 transactions are logged each month. The 1,625 online services offered by the Singapore government, as of October 2002, represent 83 percent of all government services which are considered suitable for online transactions. The most popular service is the filing of tax returns; nearly 600,000 taxpayers used the service in 2001.

The Australian government delivers online almost as many services as in Singapore – a total of 1,315 types of services by March 2001 (p. 35). The World Markets Research Centre ranks Australia as the second in e-governance in the region. Top place goes to Taiwan, which also ranks second in the world following the USA. The Taiwanese Government Procurement Information System is one of the most active. It had posted 720,000 public bid-request announcements by the end of 2001. The system receives about 300,000 enquiries every month and a total of about 8.5 million queries at the time of writing (p. 287).

E-government initiatives involving the collection of personal data often raise major concerns within civil society because of ethical considerations and the risk of misuse of such private information. One example of such an initiative is the highly controversial programme in Japan to build a national database network containing the personal information of citizens. It quickly polarised civil society and some branches of government. The network was designed to share key citizens' data across all municipalities and central government agencies. The potential invasion of individuals' privacy alarmed not only civil society but also a number of local governments; the city of Yokohama decided not to connect to the database nor permit its citizens' private data to be included in it (p. 127).

E-commerce

The chapter on Singapore offers the most detailed statistics on how online services have grown in the private sector. E-commerce, in particular, seems to have done very well in the recent past. In Singapore, B2B sales more than doubled during the 1999–2000 period, rising from S$40 billion to S$92 billion. B2C sales also rose dramatically – from S$36 million in 1998 to S$200 million in 1999 and S$1.17 billion in 2000 (p. 249). Data from the Australian chapter shows that 10 percent of the population had made purchases online by the end of 2001. This more than doubled compared with the previous year, when only 4 percent of Australians purchased online. It is also significant that 82 percent of the Australians who shopped online also paid for their purchases online, thereby displaying a high level of trust in the e-commerce system (p. 35).

There are a number of encouraging initiatives to customise e-commerce to serve developing country needs. B2Bpricenow.com of the Philippines is one of these initiatives (p. 222). The website helps farmers market their produce. Traders from around the country log on to negotiate purchases with the participating farmers, who are trained in the use of the Internet and the website by local NGOs. The Pan Asia Networking programme of the International Development Research Centre (IDRC, one of the co-publishers of this review) also runs a website <http://www.PanAsia.org.sg> where NGOs market the products made by their partners and members in villages.

The effort to localise e-commerce has even led to the creation of the "e-marketer" – an online sales person. The Foundation of Occupational Development, an NGO based in Chennai, South India, has trained out-of-school youths to go online to promote and help sell Indian crafts such as saris and stone sculptures at its Indiashop website <http://www.xlweb.com/indiashop>, which specialises in Indian crafts (Chin, 2002b). The e-marketers are helping local craft artisans reach an international market, to which they had no access previously. The experience obtained from running Indiashop has inspired the idea of a home-merchandising scheme which will involve women operating virtual supermarkets contained in a CD-ROM that runs on a desktop or laptop computer. In the concept, women virtual supermarket managers will take orders for everyday consumer products from their neighbours, consolidate the orders and e-mail them to a central depot for fulfilment.

Appropriate services for development

Distance education and telemedicine are the main prongs of what many consider to be the most promising applications of ICTs in development. Pakistan set up its Virtual University <http://www.vu.edu.pk> in 2002 to extend the reach of tertiary education in the country. The university uses an astute mix of old and new media: television and the Internet play equally important roles in the conduct of its programmes. The first course offered by the Virtual University is the Bachelor of Computer Science programme. Postgraduate programmes are planned for the future (p. 239).

The Pacific Islands have been involved in distance education since the mid-1970s. The University of South Pacific began using postal mail and radio communications long before progressing to telephone conferencing and e-mail. More sophisticated digital technologies were introduced in 2000 to set up a WAN called USPnet linking learning centres in 12 countries. The network offers real-time, two-way videoconferencing for students to interact with faculty members. The network also links academics from partner institutions in Australia, Japan and the USA and makes available to the students learning material from these locations (p. 309).

Massey University in New Zealand delivers and supports 300 of its courses on the Internet and 15,000 of its students are registered to make use of its web-based facilities. In Waikato University, 100 of its faculty teach online; 800 of its courses are offered with some form of e-learning support and 100 out of this total are offered fully online (p. 208).

Thailand has connected about 5,000 of its approximately 34,000 schools to the Internet. The connected schools make up SchoolNet. The Internet serves to enrich the formal educational programmes conducted in the conventional way by teachers. The focus is now on creating quality educational content in the Thai language for online delivery. Thailand is one of the linguistically isolated countries in the region. The lack of engaging and useful content in Thai on the Web is one of the reasons users, especially in the rural areas, have not gone online in larger numbers (p. 272).

Inspiring as they are, the above cases are rare examples of e-learning activities in the developing countries of Asia Pacific. Obstacles such as limited Internet access and low bandwidth discourage learning online. Many of the countries, already challenged by difficulties of effectively managing conventional educational programmes, are not able to invest efforts in extending their already stretched resources to online programmes. Nor should they, many would argue.

The same reasons standing in the way of e-learning also hinder the development of telemedicine. However, the arguments for investing in the latter make a stronger case. Telemedicine extends limited medical expertise to more people. It has the potential of saving lives. But it also costs more to set up. The widely dispersed population of the Pacific Islands are the beneficiaries of the Pilot Telehealth Project coordinated by the Fiji School of Medicine and the Pacific Islands Telecommunications Association. The pilot is based on the model of the Western Pacific Health Net, which covers US-affiliated islands in the North Pacific. It will use a “store-and-forward” approach rather than live videoconferencing which is favoured by developed countries. High-quality still images of radiographs, electrocardiograms, patient photographs and other materials will be sent from medical outposts by primary health-care providers to medical specialists based in urban hospitals for diagnosis. The specialists may then either request for additional information from the health-care providers or prescribe treatment for the patients. Apart from facilitating consultation and diagnosis, ICTs are also used to run e-mail discussion lists for health professionals and medical practitioners. The Pacific Public Health Surveillance Network is one such example (p. 312).

The private sector is the prime mover of telemedicine in Bangladesh, where companies are setting up health-care centres in areas without adequate medical services. The centres are equipped with pathology laboratories, scanners and other diagnostic equipment to serve as remote centres where patients’ diagnostics are recorded and sent via the Internet to specialists in the cities for diagnosis (p. 56). The Philippines is served by a popularised variation of telehealth services. Users may either e-mail or send SMS messages to doctors with their medical questions; the doctors will give their diagnosis or medical advice also by e-mail or SMS (p. 223).

Innovative and key initiatives

Asia Pacific is replete with a wide range of ICT initiatives led by the public and private sectors as well as civil society. One of the most extensive public sector initiatives can be found in China’s e-government programme. It comprises “12 golden projects” which touch most aspects of high-level decision making. The projects bear ambitious goals, including the refining of the whole structure of its e-government and strengthening the competitiveness of industries as well as their capacity to innovate. The Chinese government has invested an estimated RMB 60 billion in the programme in 2001–2002. Further investments, projected at RMB 200 billion, are planned for the following five years (p. 77).

Governance: Policy, legal and regulatory issues

Goh Seow Hiong on behalf of the
Authors' Working Group on Governance

Asia-Pacific economies share many governance issues relating to ICTs. These common issues of interest are discussed towards the end of this sidebar. We will first take a look at the unique issues. Economies with the same degree of ICT uptake generally share the same sets of unique concerns. We cluster the economies into three groups along a spectrum based on the degree of ICT penetration and development: "new", "intermediate" and "advanced" countries.

Unique issues

Legislation and regulation

"New" countries: Their common challenge relates to incomplete or outdated legislative and regulatory frameworks. Often, new laws have not yet been put in place to deal with the changing ICT environment, and existing laws were drafted at a time when the uniqueness and challenges faced in the ICT environment today were not envisaged.

"Intermediate" countries: Some ICT legislative and regulatory frameworks are in place here. However, it is not unusual for such legislative frameworks to have historically developed within the purview of different parts of governments, independently of counterparts. Hence, the challenge that has emerged for these countries is the lack of consensus and consistency between different government agencies and policies.

"Advanced" countries: Where time has allowed for coordination and consistency to be built across different agencies, the challenge is one of taking a more philosophical perspective to the approach of regulation in considering whether the government's intervention should be proactive or reactive in nature. In the proactive approach, legislation and regulation will preemptively establish what is permissible and what is not. In reactive regulation, the approach will be for the government not to take any steps towards enforcement or regulation until an issue or problem has arisen and state intervention is required. This latter state may be more conducive for encouraging the free flow of information and ideas.

Implementation

"New" countries: Issues and difficulties often arise in the enforcement and implementation of the laws and regulations. This may be due to a variety of reasons, including the lack of the necessary expertise and capacity within the country to effectively carry out enforcement and implementation.

"Intermediate" countries: The capability and expertise exist in these countries. The challenge shifts to one of establishing an appropriate balance and cooperation between the government and the private sector, rather than a primarily government-driven or government-initiated environment. Greater reliance on industry self-regulation will also be seen rather than government regulation and enforcement. The inclusion of industry players in a regulatory partnership, and the delegation of some regulatory functions to them, means that the industry and the information that is produced can be "lightly" regulated.

"Advanced" countries: The challenges move from looking inwards at implementation and enforcement to wider cross-border issues. For instance, if a particular website is deemed inappropriate or illegal within a jurisdiction (e.g. child pornography or promotion of criminal activities), a country's legal framework may be able to outlaw such websites. However, the likely consequence is that the site will be moved to another country and will remain accessible over the Internet. Hence, the solution to this problem is no longer domestic but requires a coordinated international effort to ensure that such illegal material is more effectively removed. An individual country on its own cannot solve these issues, so greater international cooperation and treaties will be needed to address such concerns and challenges.

Infrastructure access

"New" countries: Many countries evolve from an environment where there is a monopolistic telecommunications infrastructure provider. The challenges faced by new players in these countries in gaining access to the digital infrastructure relate to difficulties in negotiating with monopolies and in persuading them to act in a manner that responds to the emerging needs of the marketplace. Monopolies also tend to object to the introduction of competition. Negotiating with such monopolies is difficult since there are no alternatives and monopolies prefer to put their energies into maintaining the status quo.

"Intermediate" countries: As new providers of infrastructure enter the markets, the challenges in governance relate to the appropriate level of liberalisation and deregulation that should be implemented for the market. A variety of considerations, including the size of the market, the structure of the incumbent and the readiness of the industry, etc., that must be taken into account in liberalising the market.

"Advanced" countries: Where multiple players and providers of infrastructure are in the market, the governance issues that will take prominence are related to managing competition and anti-competitive behaviour between different players, and dealing with situations where there are market failures and dominance of the incumbent operator in spite of the liberalised environment. Among other issues arising is the occasional failure of the market to meet the needs of hard-to-service consumers, such as those in remote and isolated areas. Also, poorer consumers may find themselves ignored by the providers in the market. One example is where ISPs insist on a credit card number before an account can be opened.

Level playing field

"New" countries: The environment here often involves a single entity, perhaps a state entity, playing both the role of the regulator and the provider of infrastructure services. From the industry perspective, this can lead to a situation of conflict of interest, where it is difficult for a new player to deal with the regulator as the latter also has an interest as the competitor of the new player, i.e. the incumbent. There are also instances where regulators and policy makers sit on the board of state-owned telecommunications corporations.

"Intermediate" countries: It is expected that the market forces of industry players will reduce the role of the state as an operator of infrastructure and, over time, will marginalise it. The challenge may then be how the state-owned infrastructure can be evolved to become privately owned

"Advanced" countries: Issues of equality may emerge. The electronic and network environment poses new challenges in the form of a silent majority and a noisy minority. In such an environment, the voices of a few can dominate and make a minority perspective appear larger than it truly is. There may even be long-term implications for the concept of democracy or equal representation if the minority views continue to dominate and overshadow the majority views. At a less philosophical level, issues of equality also arise in providing a sound and level playing field for all players. The divide between the young and old, urban and rural, genders, and educational levels may become more prominent as electronic services become mainstream over traditional services, and those with difficulty accessing electronic services will become disadvantaged and potentially prejudiced. This is particularly the case where resources are progressively removed from face-to-face service networks as online services are rolled out. Commercially, there are also governance issues in balancing the bargaining powers of an incumbent versus a new player so that new players are not stifled in the market.

Common issues across economies

Convergence

There is accelerating technological convergence between IT, telecommunications, broadcasting and media and this phenomenon is taking place irrespective of the stage of ICT development in a country. As such, it is necessary to consider the issues and implications of convergence and to put in place the appropriate policy and legal frameworks to deal with the changing environment.

Expertise

The challenge of having the appropriate expertise is an age-old problem, both within government and the private sector. At each point of the spectrum, a government needs to have the right mix of skills and

expertise, with the right mindset, within its ranks to be able to manage and regulate the environment effectively. The industry similarly needs skilled technical expertise to develop, grow and contribute towards the economy.

Forums

The issue of forums can be divided into two areas. Domestically or locally, the challenge is to find or establish an appropriate forum where industry and government can dialogue effectively. Such a forum allows for feedback on the issues and difficulties faced, and for the feedback to be systematically followed up and action and rectifications put in place.

Internationally, the issue is in relation to the lack of representation and participation by Asia-Pacific countries and economies at various international forums, such as ICANN, WIPO, ITU, ISO, etc. (see sidebar on "Internet politics", p. 18). There are unique challenges such as language, font, domain name and other standardisation efforts faced by many Asia-Pacific countries and economies, and their voices are under-represented at such international forums. It is not uncommon for decisions affecting Asia-Pacific countries and economies to be taken without seeking the input and consensus of the stakeholders.

Security

Concerns about security risks and exposures in relation to the use of electronic services rise with the growth of the electronic environment, especially if such risks are not commonly or well understood. Over time, the electronic environment is likely to control or connect the critical infrastructure of a country. Adequate measures will need to be taken to ensure that security concerns are addressed to protect the electronic environment from attacks. Mechanisms will also need to be established for reporting and resolution of security incidents.

The government as user and promoter

Many of the challenges and issues identified above deal with infrastructure and content issues, where the government has a large role to play in terms of enacting legislation and creating a framework for regulation. In contrast, the layer between infrastructure and content – relating to computers, IT applications and services – is less likely to be regulated. In this regard, the challenges may relate more to the government acting as a user of technology, rather than a regulator of it. For example, some governments are considering whether to make a policy decision to use open source technology rather than proprietary systems. Such policies, when implemented, usually require implementation in government-related agencies only, and not the private sector.

Another aspect of governance is the promotional role of the government in adopting and championing ICTs and providing services using digital means. A related governance consideration is the appropriate incentives or supportive schemes that can be instituted to help the industry develop and innovate, and that can motivate consumers to learn and adapt to technology. The industry development role of the government should not be neglected at the expense of the industry regulation role, though it need not be performed by the same agency.

Conclusion

The responses that different countries and economies have taken to deal with these challenges vary. It is worthwhile noting as a parting remark that, while the issues are presented as a spectrum above, it is not necessarily true that a country growing through the different stages of ICT development will necessarily face all the challenges depicted in the spectrum above sequentially. As each environment is unique and different, it is possible for a country or economy to "leapfrog" some issues. The intent of this discussion is to highlight the common themes of the challenges so that the policy maker and interested citizen can have a broad perspective and can assess what is most relevant and necessary to address within his or her environment.

Australia's government initiative, Creative Nation, goes back to 1994. The project was backed by generous government grants to mobilise the private sector to produce CD-ROMs using national cultural material for Australian schools. Film agencies were also encouraged to adopt new ICTs. Multimedia forums were established to provide practitioners with space to debate issues. The initiative succeeded in encouraging the formation of alliances among content providers, ICT specialists and government (p. 36).

Malaysia's Multimedia Super Corridor (MSC) initiative was launched in 1996. It was conceptualised as a very large experiment, within an area of 750 square kilometres, encompassing the new national administrative centre as well as a new industrial zone dedicated to the ICT industry. MSC is served by state-of-the-art infrastructure and secured by legislative and contractual guarantees to companies setting up shop in the zone. The initiative succeeded in capturing the imagination of Malaysians about the potential offered by ICTs and it inspired several state governments to launch copy-cat corridors of their own (p. 192).

The E-Taiwan initiative is aimed at transforming Taiwan into one of the most e-oriented economies in the region. The vision driving the initiative is of a "green silicon island" powered by environmentally friendly wireless technologies. The initiative is funded with a budget of US$1 billion and a further US$3 billion in business opportunities. One of its aims is to connect six million households to broadband services by 2008. Small and medium companies will also be provided with assistance to use the Internet to develop their businesses (p. 288).

Civil society's initiatives are infinitely modest when compared with governments', but they sometimes demonstrate more vividly the development potential of ICTs. In the Solomon Islands, people in some of the most remote areas of the Pacific Islands are provided with e-mail access to help them keep in touch with civil society in the face of widespread disruption of public administrative services following the civil unrest which took place in mid-2000. E-mail is South Pacific's most important Internet application. The People First Network provides low-tech e-mail service to users living in remote islands. Members of the network make use of simple PCs connected to short-wave radio transmitters, which are widely used across the Pacific Islands, to connect to a hub at Honiara, the capital of the Solomon Islands. During these connections, incoming and outgoing e-mail is automatically exchanged. The hub acts as the Internet gateway for the rest of the network. Network members also assist rural islanders, who do not know how to use a computer, to send and retrieve their e-mail and to access news and government information (p. 313).

In Sri Lanka, a private company MediaSolv has developed the village personal digital assistant (PDA), a handheld device which can be used to access the Internet. Each unit of the PDA will cost US$25–$40. The device is equipped with wireless Bluetooth technology and an ETHERchip which enables it to log on to the Internet at special locations equipped for the purpose. Seven village PDA users can share a telephone line and a single Internet connection at these locations. The device has already been field-tested in Sri Lanka and Kenya. MediaSolv is encouraging global electronic companies to adopt the village PDA for large-scale production (p. 165).

Enabling policies

The e-ASEAN Framework Agreement <http://www.aseansec.org/6267.htm> is a unique example of a package of enabling policies for ICTs backed by a subregion (the other example is the regional plan of the Pacific Islands described below). ASEAN, or the Association of Southeast Asian Countries, comprises ten member states: Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam. The agreement was signed, appropriately enough, with both handwritten and digital signatures in November 2000. It has four stated aims: to promote cooperation and strengthen the competitiveness of ASEAN's ICT sector; to address the digital divide within and between member states; to promote cooperation between the public and the private sectors; and to liberalise trade in ICT products, services and investments in the subregion. Within this framework, ASEAN countries will eliminate duties and non-tariff barriers on intra-ASEAN trade in ASEAN ICT products in three tranches beginning in 2003. The lifting of trade barriers and removal of duties will be deferred by five years for four member countries: Cambodia, Laos, Myanmar and Vietnam.

Nearly all the enabling policies reported in this publication were designed to nurture national ICT initiatives. One of these policy packages is the *Bill of Guarantees* <http://www.msc.com.my/mdc/msc/bog.asp> introduced by the Malaysian government to backstop MSC. It committed the government to provide ten sets of financial and non-financial incentives to companies granted special "MSC status" to locate in and operate from MSC. These incentives include a world-class infrastructure; unrestricted employment of local and foreign knowledge workers; complete freedom of ownership of the companies

Open source: Empowering the Asia Pacific

Pindar Wong

Open source[1] software such as the Linux[2] operating system, appears to be gaining wider acceptance in the region. It is now promoted by local user groups, conferences, universities and governments. However, the motivation for adopting open source software varies widely: from attraction to its royalty-free licensing scheme and superior security to its ability to process Asian languages and scripts. Whatever the reason, it appears that open source is here to stay.

When software is created, it is typically authored by human programmers, who write the software source code in an appropriate programming language. This source of programming instructions, while intelligible to humans, is unfortunately not directly executable on a computer. For this to occur, the source code is translated into object code by a program called a compiler.[3] Traditional models of software distribution only include the executable object codes (frequently referred to as binaries or executables) coupled with various licence restrictions (e.g. where this code may be executed). The original source code is not included and thus options for others to read, understand and change the software are limited.

Another model of software distribution includes the source code in addition to the binaries. The source code is thus "open" to be read, understood, modified and compiled by programmers other than the original authors.

The motivation behind open source is simple: "When programmers can read, redistribute, and modify the source code for a piece of software, the software evolves. People improve it, people adapt it, people fix bugs. And this can happen at a speed that, if one is used to the slow pace of conventional software development, seems astonishing. We in the open source community have learned that this rapid evolutionary process produces better software than the traditional closed model, in which only a very few programmers can see the source and everybody else must blindly use an opaque block of bits." [4]

However, open source does not simply mean access to the source code, it is also associated with specific licensing terms. The Open Source Initiative has a formal definition of criteria for software to be considered open source.[5] These criteria cover how the software can be redistributed free from licensing royalties and without discrimination against persons, groups or fields of application.

The royalty-free aspect of open source software is an initially appealing adoption factor in environments where monies paid to software royalties might be used to lower computing costs – or better used for other purposes. For example, educational institutions in Singapore are adopting Linux to save on royalty fees and ISPs in Bangladesh are using monies saved to increase their hardware expenditures and buy more components to keep as spares. Indeed, by developing lower-cost solutions, global initiatives such as the Linux Terminal Server Program (LTSP) are significantly influencing the development of school networking and Internet cafés in places like Indonesia.

However, software royalty savings (or dissatisfaction with existing licensing regimes) are not the only motivating factor in the region's adoption of open source software. The empowering ability to modify the source code to overcome existing limitations to address specific local needs is clearly another compelling factor. The most obvious need is to solve local language computing requirements, where the emphasis on local language representation and processing is currently unserved: Bhutan, Cambodia and Nepal are all examples of this.

Lastly, concerns surrounding software security, software self-reliance and intellectual property independence are other concerns (particularly shared by governments) leading to open source software adoption being encouraged.

In the region, open source is being promoted and advocated by local open source advocacy and user groups (in particular, local Linux user groups), universities and educational establishments, conferences, local training programmes and in some instances the government itself (by encouraging local open source software procurement).

Indeed, the Philippines has at least eight major open source user and advocacy groups. China, Malaysia, Singapore, Thailand and Vietnam all have government-linked projects to encourage open source development and adoption. As a first step in its IT roadmap, Sri Lanka has even identified making itself an open source software hub for the region.

UNDP has recently established the International Open Source Network <http://www.iosn.net> to serve as a centre of excellence for open source software in the Asia-Pacific region.

Although the future for open source software in the region looks bright, ironically software piracy may actually hinder its widespread adoption beyond existing niche user communities (e.g. ISPs, universities, schools). Even though open source software is royalty-free, and therefore available at low or no cost, it needs to compete to change consumer buying patterns, especially in economies where software piracy is common. Indeed, confusion and ignorance of open source software lead to consumers continuing to use pirated software when open source alternatives exist. Thus, the adoption of open source software faces significant social challenges in encouraging consumers to respect intellectual property rights by using legally licensed software – in the case of open source, this would be under the open source licences or its classic variants.[6]

If we can find mechanisms to manage the piracy issue, while also encouraging local software development capability, then the region will be further empowered by the freedom and responsibility that open source software provides.

Notes

1. "Open source" should not be confused with "free software". For an important distinction, see <http://www.fsf.org/philosophy/free-sw.html>.
2. GNU's Not Unix <http://www.gnu.org>.
3. Programming languages that do not require compilation also exist and can be translated for execution in real time by an "interpreter".
4. Open Source Initiative <http://www.opensource.org>.
5. Open Source Initiative <http://www.opensource.org/docs/definition.php>.
6. Open Source Licenses <http://www.opensource.org/licenses/index.php>.

and their operations; freedom to raise capital globally; tax incentives including waiver of income tax for ten years; intellectual property protection; no censorship of the Internet; and competitive telecommunications tariffs. The package attracted much attention when it was announced; the commitment not to censor the Internet was considered particularly novel. The Malaysian government may be the first, and is probably still the only, government to have formally undertaken such a commitment in the region. This and other features of the *Bill of Guarantees* are being monitored with interest by the ICT community.

e-Korea Vision 2006 introduced in April 2002 is the Republic of Korea's third ICT master plan. It is considered more "concrete" and progressive than the preceding plans. The third plan sets out to steer the Korean ICT sector towards three goals. The first is to improve social systems and productivity by reforming methods of conducting business. The second is to transform the relationship between the government and the market, with the government's role restricted to laying the foundations for the new knowledge-based economy and providing the autonomy for the private sector to thrive and be creative. And the third goal is to encourage the pursuit of a "lead strategy" in key services and technology sectors instead of the "catch-up strategy" adopted in previous plans. These goals are to be achieved through three sets of strategies. The first set aims to increase the value of IT, expand Internet usage to 90 percent of the population, provide B2B networks and secured electronic transactions to 50 types of businesses, and expand and upgrade e-government services. The second set of strategies sets out to upgrade the infrastructure: citizens will soon have access to high-speed Internet connections of 1 Mbps from anywhere in the country at a low cost; Internet Protocol Version 6 (IPV6) will be adopted; wireless infrastructure will be built to operate at a speed of 2 Mbps; and cyberspace will be secured. The third and last set of strategies will see strengthened international collaboration with organisations such as OECD, ITU and APEC. The collaboration will also extend to developing countries with the altruistic goal of closing the digital divide (p. 146).

It is useful to compare Korea's policies, which are aimed at protecting and extending its global lead in the ICT sector, with those of Vietnam – a country which has recently adopted ICT. The comparison brings out the diversity present in Asia Pacific. Vietnam's ICT master plan until 2005 aims at bringing 1.3–1.5 percent of the population online as subscribers and 4–5 percent as users. The plan has also astutely given priority to getting institutions

online: all universities, colleges and vocational schools will be connected to the Internet. Half of all government-operated schools and hospitals will also be connected. The plan will also nurture a cadre of 50,000 IT specialists, half of whom will have advanced skills and be fluent in foreign languages. It also calls for local industries to assemble 80 percent of the computers required as well as to produce US$500 million worth of software, 40 percent of which is to be exported. Vietnam will implement key programmes in the following areas: human resource development, upgrading the Internet and telecommunications infrastructure, and developing the local hardware and software industry (p. 301).

The 14 Pacific island states are developing their ICT-enabling policies at the time of writing. This is facilitated by the UNDP e-Pacifika programme <http://www.undp.org.fj/RAS-99-064.htm>. Three main goals drive the programme. Firstly, it will sensitise policy makers to the usefulness of ICTs in coping with emerging international issues which affect the region, such as global warming, which threatens to raise the sea level and drown many of the islands. Secondly, each country will formulate its own ICT strategy. Thirdly, the programme will collaborate with the respective countries in implementing national programmes which will help in the realisation of their strategies. Pilot programmes are planned for 2003.

The ICT Working Group of the Council of Regional Organisations of the Pacific, chaired by the Pacific Islands Forum Secretariat, has begun implementing the Pacific Islands Information and Communications Technologies Policy and Strategic Plan (PIIPP). This regional plan <http://www.forumsec.org.fj/division/infra/infrastructure.htm> will focus on four areas: human resources, infrastructure, applications for public-private sector cooperation, and governance frameworks. PIIP was approved by the ministers of the Pacific Islands in April 2002. The plan doubles up as a regional policy to coordinate cooperation within the region, besides serving as a guide for action at the national level (p. 314).

Bhutan is also busy preparing its national ICT policies, regulations and master plan at the time of writing (p. 70). As with the Pacific Islands and countries beyond the Asia-Pacific region, Bhutan has a number of interesting policy models and cases within the region to study and reflect upon while evolving its own unique policy package and ICT plan.

Some trends and concerns

Nearly every economy in Asia Pacific has engaged ICTs as components in broader strategies to make life better. Many of the strategies have modest intentions; only a few are deliberately aimed at transforming the economies which they serve. Given the range of social, cultural, economic and political heritage present in the region, the chances of ICTs transforming life in Asia Pacific are as great as the possibility of the region changing the technologies. This may happen when ICTs are customised to fit specific circumstances. Gordon Graham's (1999, p. 169) philosophical inquiry into the new technologies concluded that "we may expect the Internet to be tempered by human nature and the human condition as much as, indeed more than, we may expect it to transform them". The developed countries in the region have already shown that they are very capable masters of ICTs. Some of the developing countries have also demonstrated their mastery by simplifying and paring down complicated technologies to meet their special needs.

However, the majority of the countries in Asia Pacific are just beginning to get a firm grip on the new technologies. Training people to install, operate and maintain ICTs is the first step for many of the economies. The region will continue to benefit from a large number of human resource development programmes in the short term. Although many of the programmes will be targeting formal education, an increasing number will be informal efforts conducted over the Internet using plain e-mail or mailing lists. The encouraging experience of the Indonesian ICT fraternity in providing informal ICT training will be an inspiration to many others in the region, especially those from developing countries.

The infrastructure across the region will continue to be enhanced in the near future. However, the economic problems faced by many of the economies will curb both public and private sector investments in the infrastructure. Countries which have just adopted ICTs will be busy building the primary infrastructure to connect their population to the Internet for the first time. This will be a major undertaking in many of the remote areas as they do not just lack Internet connections but also nearly all the other channels of communication – telephone, television, postal services and newspaper. In the developed areas of Asia Pacific, infrastructure building will upgrade existing networks to high-speed capacities, which will enable true multimedia and interactive applications, including video, audio and gaming.

As infrastructure improves and the technical capacity to send and receive information increases, national information gate-keepers across the region will continue to diverge in their approaches to Internet regulation. It will be an extension of the divergence already clearly evident in the region. Many will permit a free flow of information with perhaps oversight by senior members of civil society empowered in the fashion of press councils. This will be the light-touch approach.

Others will be more assertive and will establish blocking and information-filtering mechanisms, and perhaps apply even more intrusive surveillance systems, to bring traditional gate-keeping online. This approach creates a dilemma for policy makers. While it may help to address official concerns about the free flow of information and communication, at the same time it undermines the very reason why ICTs were adopted in the first place – to engage in the information economy. The growth of the new economy is merging the channels used in business and social communication with those deployed to deliver information goods and services. These channels must be secure, and trusted to be so, for such transactions to take place (Diffie & Landau, 1999). Channels which are monitored, filtered and blocked will retard the development of the information economy.

The region's preoccupation with governance of the Internet within the boundaries of their respective economies may prove to be detrimental to local interests in the long run. Asia Pacific, as the largest user group in the world, exercises surprisingly limited influence on how the Internet is run at important forums like ICANN. The region's lack of engagement and initiative in international governance can also prove to be expensive. The national bandwidth inquiry undertaken by the Australian Information Economy Advisory Council (1999) showed that international charging arrangements, at the time of the study, were "inequitable" because Australian ISPs were not reimbursed for carrying US-generated traffic on the trans-Pacific links. This meant that Australian ISPs and Internet users were in effect subsidising US ISPs and their customers, thereby eroding Australia's international competitiveness.

Asian participation in legally binding international negotiations which determine how intellectual property is protected and exchanged is just as weak. Some of the most critical negotiations underway at the time of writing are those relating to the services sector being conducted at the WTO. An expert meeting (UNCTAD, 2002) on audiovisual services underlined the importance of developing countries asserting their positions in these negotiations. The experts recognised that these services play an important function in "transmitting civilizational values". They concurred that audiovisual services, like other cultural industries, have a "significance that transcends their economic value". These services represent a nation-building instrument that ensures respect for cultural diversity, traditions, national values and heritage. In addition to this primary role, they are also quickly evolving an increasingly vital economic function as "a pillar of the new economy". In relation to this new role, some of the experts noted with concern the concentration of market power among Internet access providers. They also noted the "growing penetration of commercial models for providing information on the Internet". The experts recommended that action be taken at the international level to ensure that a public domain is preserved for free public access. For these reasons, the public and private sectors in the region should engage themselves urgently in these international negotiations so as to safeguard their local interests in the long run.

The Internet is better known today as a cheap, ubiquitous channel for delivering information and online services. However, its true transforming potential lies in the interactive capabilities of ICTs. They were invented to provide a two-way communication channel. This changed when the private sector went online in large numbers and converted the Internet into a low-cost broadcasting platform for the delivery of its content and services globally. Many practitioners working on the World Wide Web ignore the interactive potential of ICTs and design systems and websites which deliver content and services in a top-down and urban-to-rural fashion. The preference of users in Asia Pacific (as well as the rest of the world) for the two-way mode of communication is clearly evident in the continuing popularity of e-mail applications. Many of us now find e-mail an indispensable component of our daily lives; we can probably make do without web access for a while but will find our work significantly impaired without our daily downloads of personal mail. The popularity of e-mail for interpersonal communication is clearly evident in post office statistics from Brunei. In 1993, the country received 349,000 kilograms and sent abroad 78,700 kilograms of conventional mail. Eight years later, in 2001, Brunei received 222,900 kilograms and sent abroad only 37,300 kilograms of mail (p. 61). Out going mail had been reduced by more than half; apparently e-mail is quickly replacing postal mail.

An encouraging number of Asia-Pacific communities have discovered the transforming qualities of two-way information flows. Nepal's National Planning Commission posted the draft national information technology policy on the Web and invited stakeholders to e-mail their comments and suggestions on how the draft could be refined in the final draft. This simple strategy proved both useful and popular. It helped mobilise stakeholders not only around the drafting of the policy but also in its implementation (Chin, 2002a). Mongolia is involved in a similar experiment. In 2001, the office of the Prime Minister created a website for "open government" which enables citizens to interact online with officials and to post their comments on draft laws and regulations (p. 179).

One-fifth of the Asia-Pacific population, or about 614 million people, will not be able to go online even if Internet access is made available and given free to everyone in the region. The reason is that they are illiterate. Not since the invention of printing with movable type about 500 years ago have we seen the introduction of a mass communication technology which excludes illiterate users. The telephone, radio, television and fax machine have catered to the needs of everyone. The predominantly text-based ICTs have excluded the 398 million women and 216 million men from the region who cannot read and write (UIS, 2002).

This should not be the case. With multimedia capabilities, ICTs need not be used to run solely text-based applications. Touch-screen navigation and the use of icons, visuals and audio can all potentially help illiterate users get online. A variety of strategies have been piloted in the region for making the Internet available to not only illiterate users but also other members of communities. The Kothmale Community Radio Internet Project (UNESCO, 2001) in Sri Lanka involves broadcasters researching questions phoned or mailed in by listeners, on a computer with an Internet connection. The answers are read on air and reach not only the people who asked the questions but others who are listening in. Another promising experiment is being carried out in Pondicherry, in the south of India, by the M.S. Swaminathan Research Foundation. Project staff download a map from a US Navy website every day. Information about wave heights and wind directions contained in the maps is then read aloud over loudspeakers to members of the fishing community served by the project (Dugger, 2000). This simple web-to-voice experiment is literally saving lives by steering people away from dangerous sea conditions.

The time may be opportune for practitioners and industries in the region to innovate their own voice and audio-based technologies to extend the benefits of ICTs to everyone in the region. The solution may be in the form of a simple, low-cost village PDA which enables users to navigate the Web using voice and audio facilities. It may evolve to be a super telephone offering not only affordable international calls to anywhere in the world but also to audio-based databases where users can retrieve content or record their own contributions to the collection.

Asia Pacific is headed in different directions to find the best match of the new ICTs to the particular requirements of the different economies. These differing orientations offer us fascinating cases to learn from. The numerous experiments will yield invaluable lessons to Asians and others studying us from outside the region. Although the methods may differ, the region is united in what it sees in the digital future. This vision was succinctly defined by representatives of 48 countries, 21 international organisations, 53 private sector entities and 116 NGOs who met in early 2003 in Tokyo, Japan, for a consultation on the World Summit on the Information Society (WSIS):

> The concept of an Information Society is one in which highly-developed ICT networks, equitable and ubiquitous access to information, appropriate content in accessible formats and effective communication, can help people to achieve their potential, promote sustainable economic and social development, improve quality of life for all, alleviate poverty and hunger, and facilitate participatory decision-making processes (WSIS, 2003).

References

Australian Information Economy Advisory Council (1999). *National Bandwidth Inquiry*. Canberra: Department of Communications, Information Technology and the Arts. p. 183 <http://www.dcita.gov.au/Article/0,,0_1-2_1-4_14914,00.html>.

Chin, Saik Yoon (2002a). Participatory Policy Making in Nepal. In *Pan Asia ICT R&D*. pp.17–22. Singapore: International Development Research Centre.

Chin, Saik Yoon (2002b). The E-Marketers of South India. In *Pan Asia ICT R&D*. pp. 9 –12. Singapore: International Development Research Centre.

Diffie, Whitfield & Landau, Susan (1999). *Privacy on the Line: The Politics of Wiretapping and Encryption*. Cambridge, MA: The MIT Press.

Dugger, Celia W. (2000). Connecting Rural India to the World. New York Times on the Web, 28 May <http://www.mssrf.org>.

Dyke, Greg (2003). Dyke Slates "Gung-Ho" War Reports <http://news.bbc.co.uk/2/hi/entertainment/2973163.stm>.

Graham, Gordon (1999). *The Internet: A Philosophical Inquiry*. London: Routledge.

ITU (2002). *Asia-Pacific Telecommunication Indicators 2002*. Geneva: International Telecommunication Union.

Schiller, Dan (2000). *Digital Capitalism: Networking the Global Market System*. Cambridge, MA: The MIT Press.

UIS (2002). *Regional Adult Illiteracy Rate and Population by Gender. July Year 2002 Assessment*. Montreal: UNESCO Institute for Statistics <http://www.uis.unesco.org>.

UNCTAD (2002). *Report of the Expert Meeting on Audiovisual Services: Improving Participation of Developing Countries*. Geneva: United Nations Conference on Trade and Development.

UNESCO (2001). *Kothmale Community Radio Internet Project*. CD-ROM. UNESCO New Delhi Regional Office.

WSIS (2003). *The Tokyo Declaration: The Asia-Pacific Perspective to the WSIS*. Tokyo: World Summit on the Information Society Asia-Pacific Regional Conference.

Internet politics: A personal view

Pindar Wong

Ask about IP and you'll usually hear references to the "Internet protocol" or "intellectual property". What you will not often find reference to is "Internet politics", the art or science of governing the Internet.

As in many human endeavours, politics exists and it would be foolish to believe that the Internet realm is any different – it isn't. What is different is the global scale and far-reaching effects of local political and policy decisions made regarding this globally important infrastructure – and vice versa. To date, this rapid and constantly evolving infrastructure enjoys its own "network culture" which has traditionally avoided too much governmental involvement and regulation.

However, in the USA and Europe, one IP-related organisation has gained considerable attention over the last several years – an organisation called ICANN. This has been within the context of general debates surrounding "Internet governance" – a trendy but unfortunate term.

The Internet Corporation for Assigned Names and Numbers (ICANN)[1]

It has been argued that the Internet has no "centre" and therefore there is nothing to "control". While this may be topologically true, it does not obviate the need for central "coordination" to allocate certain resources. Specifically, how numeric IP addresses (e.g. 192.124.42.6) and associated domain names (e.g. www.undp.org) are assigned and administered. This central coordination is needed to preserve important technical properties in order for the network to function (e.g. global uniqueness of publicly routable IP addresses or the universal resolvability of domain names[2]).

ICANN was formed in 1998 in response to the US Department of Commerce's *White Paper*[3] and exists as a private sector non-profit corporation incorporated in California.

Since its inception, this organisation has been shelled by constant criticism and mired in endless online debates, in English, about process.[4] Notwithstanding this criticism, the online tyranny of a few individuals, the functional paralysis, etc., ICANN managed to liberalise the ".com" monopoly and introduce several new top-

level domain names (e.g. ".aero", ".biz", ".coop", ".info", ".museum", ".name" and ".pro"),[5] together with a system for resolving domain name disputes.[6]

While some of this criticism is no doubt warranted (and some of it misplaced), it is clear that there are widely different interpretations as to ICANN's role and function. Some participants clearly want a single entity to be responsible for "governing the Internet" (even when this is well beyond ICANN's mandate, ability and focus). Some just want to use ICANN for furthering their own private purpose. Nevertheless, it was not until March 2002 that ICANN tried to better articulate a mission statement,[7] and even now the debate continues.

The vanishing role of individual representation in the ICANN process

One of the most contentious debates surrounded the "at-large membership" in ICANN's governance structure.[8, 9] In the original ICANN structure, there was envisioned to be a "balance" between board directors with specific functional interests (e.g. domain names, IP addresses and protocol identifiers) and "at-large" directors.

In 2002, ICANN held the first global online direct election for five "at-large" directors, one director from each of the five ICANN regions (i.e. Africa, Asia Pacific, Europe, Latin America Caribbean, and North America). Although participation from the Asia-Pacific region in ICANN's online forums and meetings had not been overwhelming, the response to the online election was overwhelming with over 17,745 valid votes cast[10] – numerically the most of any region! (Only 130 votes were cast for the whole of the African continent.)

Notwithstanding the election, and a formal At-Large Study,[11] ICANN embarked on a process of evolution and reform in 2002. The result was the adoption of a new set of bylaws on 31 October 2002, with individual at-large representation having no formal voting seat on the board whatsoever (originally it had 9 seats out of a 19-member board). Instead, individual at-large representation now has one non-voting liaison seat appointed by an At-Large Advisory Committee.[12]

There are many reasons for this change in representational structure; and while all organisations must evolve, the potential impact of this change is still breathtaking when one considers the challenges facing Internet users in the Asia-Pacific region.

Will all those not here please speak up now

While for now the "at-large" debate has come and gone, it is clear from the chapters contained here that many economies in this region are still in the early stages of Internet development. Each economy faces a myriad of local challenges and opportunities, each demanding resource commitments and attention.

Nevertheless, before the economies in the region can fully contribute online, the challenge is arguably to be represented in the policy process, to secure the very resources needed to meaningfully participate! For example, since 2000 there has been debate concerning internationalised domain names (i.e. domain names using non-ASCII[13] character sets, e.g. from non-English languages).[14] Assuming that local language content issues are eventually solved (e.g. for Khmer or Dzongkha), it would be a shame for new users to find that they are handicapped when navigating to this content by having to use English domain names.

Although they may be the best resourced, perhaps we have relied too much on governments to represent our collective interests on the international stage or perhaps, in some instances, we have not relied enough. Unfortunately, it appears that the traditional governmental approach most familiar to us may be particularly hamstrung and ineffective when it comes to the development of Internet policy.

The conflicting involvement of governments

It was specifically mentioned in the *White Paper* that "the U.S. continues to believe, as do most commenters, that neither national governments acting as sovereigns nor intergovernmental organisations acting as representatives of governments should participate in management of Internet names and addresses".

In 1998, it was fashionable thinking that government lead organisations were too slow to adapt to the constantly evolving nature of the Internet, or that they did not fully understand it. Furthermore, that direct government involvement might actually hinder innovation. Therefore, private sector approaches such as ICANN, envisioned to be more knowledgeable and nimble, were preferable. Indeed, with ICANN, direct governmental representation was initially marginalised and involvement kept at an arm's length, for example by not allowing government officials to be represented on the board and formal government participation kept to a Governmental Advisory Committee (GAC).[15]

Ironically, it is in the governmental area that it can be argued that this region is playing a leading role (with the first GAC chairperson coming from Australia and the second coming from Malaysia)!

Notwithstanding this, it is curious to note that if governmental representation in ICANN is kept outside the mainstream policy debate and given mechanisms for adequate user representation are now no longer open, it can be argued that the two strongest, and perhaps most "natural" mechanisms for adequate representation from this region are ineffective![16]

On the one hand, governments may be our best traditional mechanism for adequate representation, yet on the other hand their effect may be marginalised.

Greater coordination required

Specifically, if it is not governments most effectively representing our interests in processes such as ICANN, then who will?

Perhaps a solution is to encourage greater participation by individual Internet volunteers through the remaining representational channels of country code top-level domain name administrators[17] or the existing regional Internet registry structure (e.g. APNIC[18]). All of this will take a sustained commitment in time, money and effort which cannot easily be built overnight.

Regardless of the approach taken to participate and be represented in Internet policy-making processes, it is clear that there needs to be far greater participation, coordination and perhaps pooling of resources from the region as a whole.

In 2002, ICANN restructured itself with a better bounded focus of activities and a greater emphasis on governmental participation in its processes. Those "Internet governance issues" now clearly outside of ICANN's purview will still need to be addressed over time, but not within ICANN. If not ICANN, then where? Perhaps the most appropriate and timely venue to start the discussion is the World Summit on the Information Society.[19]

Lastly, Internet politics may indeed be a misnomer and that the Internet is, and should be, ungovernable – unfortunately there will always be those who will try.

Notes

1. ICANN <http://www.icann.org>.
2. A Unique, Authoritative Root for the DNS, 9 July 2001 <http://www.icann.org/icp/icp-3.htm>.
3. Department of Commerce (1998). *White Paper*. 5 June <http://www.icann.org/general/white-paper-05jun98.htm>.
4. *ICANN Watch* <http://www.icannwatch.org>.
5. New TLD Application Process Overview <http://www.icann.org/tlds/application-process-03aug00.htm>.
6. Uniform Domain Name Dispute Resolution Policy <http://www.icann.org/udrp/udrp-rules-24oct99.htm>.
7. Toward a Statement of the ICANN Mission <http://www.icann.org/general/toward-mission-statement-07mar02.htm>.
8. *At Large Study Report* <http://www.atlargestudy.org/final_report.shtml>.
9. The NGO and Academic ICANN Study <http://www.naisproject.org>.
10. Election Dot Com <http://www.election.com/us/icann/region1.html>.
11. At Large Study Committee <http://www.atlargestudy.org>.
12. At Large Advisory Committee <http://www.icann.org/committees/alac>.
13. American Standard Code for Information Interchange
14. Internationalized Domain Names Committee <http://www.icann.org/committees/idn>.
15. GAC <http://www.icann.org/committees/gac>.
16. There is increased government participation in ICANN in the revised ICANN structure <http://www.icann.org/general/archive-bylaws/bylaws-15dec02.htm>.
17. WWTLD <http://www.wwtld.org>.
18. Asia Pacific Network Information Centre <http://www.apnic.net>.
19. WSIS <http://www.itu.int/wsis>.