Visions of the Information Society

The nature of the information society: A developing world perspective

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1 Introduction

The vision of an information-enabled globally-connected, knowledge-based society is driven in large part by the smooth integration of new media—or what we call "information and communication technologies" (ICT)—with traditional media, combined with technical skill-sets, forward-looking government policies, an attitude of lifelong learning, and a desire to improve efficiencies and harness innovation in a humanely and environmentally sustainable manner.

This paper explores dimensions of "breadth and depth" of the information society vision, by presenting a scaleable framework for comparing the maturity of different information societies as well as the progress that a given individual country has made in its various national ICT initiatives. This framework is used to strengthen existing analyses of the information society and present new roadmaps for researchers and policy-makers.

There are two ways of looking at ICTs: as an instrument, and as an industry. As an instrument, affordable and usable ICTs can indeed transform the way societies work, entertain, study, govern and live—at the individual, organizational, sector, vocational and national levels. As an industry, ICTs represent a major growing economic sector covering hardware, software, telecommunications and datacommunications, and consulting services.

The paper charts the instrument and industry aspects of ICTs in developing nations, using a comparative framework called the "8 Cs" of the digital economy (parameters beginning with the letter C): connectivity, content, community, commerce, culture, capacity, cooperation and capital.[1]

Coupled with these two aspects of ICTs (usage and creation), the "8 Cs" framework is used to tease apart some of the key challenges in implementing the vision of knowledge societies, such as increasing ICT diffusion and adoption in developing countries, scaling up ICT pilot projects, ensuring sustainability and viability of ICT initiatives, creating ICT industries, and systematically analysing research on the global information society. The role of local stakeholders, multilateral agencies, donor institutions and the development community is highlighted.

Based on a combination of the "instrument" and "industry" aspects of parameters like connectivity, content, capacity and culture, the information societies of the world can be divided into eight categories at the national level: restrictive, embryonic, emerging, negotiating, intermediate, mature, advanced, and agenda-setting.

Through both lenses—instrument and industry—the performance of developing nations lags behind that of developed nations, but interesting patterns of variation and pockets of excellence are emerging. For instance, India has a thriving content sector and IT industry—but it also has a looming digital divide where ICTs are not accessible or affordable as instruments for a majority of the population. Countries like China have emerged as IT powerhouses, but are still wary about the impacts that unfettered flows of Internet information can have.

The paper concludes with a set of recommendations aimed at assisting developing nations to emerge as successful information societies, based on the scaleable framework of the "8 Cs." Roles and strategies for donor agencies and multilateral development institutions are also identified for information societies at different levels of maturity. The paper identifies promising trends like the explosion of wireless communications, growth of metadata movements and the rise of knowledge-based models of workflow.

2 ICTs in developing nations

In developed countries the Internet is approaching the status of a mainstream medium, but has a long way to go in attaining similar levels of penetration in developing countries. According to ITU findings, 80 per cent of the 500 million Internet users worldwide are in the developed world, and two out of every five people in developed countries are online. Conversely, in developing countries only one person in 50 has access to the Internet. Meanwhile though, even in developing countries, some applications and benefits of the information society are already becoming evident.

2.1 ICT initiatives: Practices and anecdotes

Despite the yawning digital divide, numerous success stories have emerged of ICT practices in developing countries, even spurring studies on the potential of ICT for poverty alleviation. Much excitement surrounded the early anecdotal findings, a few of which are listed in Table 1.

Table 1: Notable ICT initiatives in developing countries

ICT initiative	Description	Website
FarmNet	Resource for agricultural workers in Uganda.	www.telecommons.com/projects.cfm
Nabweru and Buwama telecentres	Telecentres for economic empowerment of women in Uganda.	www.agricinfo.or.ug
PeopLink	Artisans portal for 22 developing countries.	www.peoplink.org
MahilaWeb	Portal for information sharing about women and gender in Nepal.	www.mahilaweb.org
Tortas	E-commerce portal for homemade cakes made by Peruvian women.	www.tortasperu.com.pe
Bankilare	A community network in Niger.	www.fao.org
Across Borders	Network connecting Palestinians in refuge camps.	www.acrossborder.org
MarketWatch	Online service for agricultural price information in Mongolia.	www.marketwatch.mn
Nairobits	Internet services centre for slum children in Kenya.	www.nairobits.org
e-Bario	Telecentre for the Kelabit ethnic community in rural Sarawak, Malaysia.	www.ebario.com
Street Children Telecentre	Telecentre for IT skills in Ecuador.	www.chasquinet.org/ninosdelcalle/e-proyecto.html
Kothmale, Sagarmatha	Radio programs about ICTs in Sri Lanka, Nepal.	www.kothmale.net, www.radiosagarmatha.org
Gyandoot, Pondicherry telecentres	Community networks in rural India.	www.gyandoot.nic.in/, www.mssrf.org
Virtual Souk	Online market for underprivileged artisans in the Middle East and North Africa.	www.peoplink.org/vsouk
Multipurpose Community Telecentres	Telecentres in fishing villages in northern Philippines.	www.panasia.org.sg
GrameenPhone	Rural telecommunication services in Bangladesh.	www.grameenphone.com
HealthInfo	Online information service health workers in Ethiopia.	www.healthinfo.kabissa.org
Village Leap	Online service for selling scarves made by Cambodian women.	www.villageleap.com
Metrocomia	Company providing outsourced web services in Africa, Latin America and Asia.	www.metrocomia.com
BytesForAll	Free online resource about ICT and development in South Asia.	www.bytesforall.org
Rural Multipurpose Community Telecentres	Libraries and online centres in Benin, Mali, Mozambique, Tanzania and Uganda.	www.unesco.org/webworld/telematics/telecentre
Mountain Forum	Online forum for knowledge sharing on mountainous region communities in over 100 countries on topics like renewable energy, agro-industry, potato research.	www.mtnforum.org

Source: India Info Online at : www.indiainfoline.com/nevi/inwi/mm63.html.

2.2 ICT impacts and strategies: Studies and reports

As anecdotal reports and project successes of ICT initiatives in developing countries began to gather steam, numerous studies and frameworks emerged to provide a more solid theoretical foundation to the nature, evolution and impacts of the information society. For the purposes of discussion, these studies can be classified into the following types: infrastructural, market-oriented, political, cultural, policy-oriented, comparative, regional and strategic. Each of them measures some sub-set of the information society canvas as described in the "8 Cs" framework described below (e.g. human rights studies focus on freedom of online expression whereas market research studies focus on ICT revenue base; each of these are components of larger information society pictures). Here, it may be considered useful to survey some of the relevant literature to arrive at contextualized perspectives on the information society.[2]

For instance, from an information society infrastructure point of view, some of the earliest accounts of the growth of computer networking worldwide come from Quartermann (1990) and Aboba (1993); a more recent one has been published by Ramani and Verma (1997). Bandwidth-specific aspects of the global Internet economy are well covered by Gilder (2000). Within the Internet economy, the growth of specific technology markets is covered by Blum and Litwack (1993) for e-mail, DiBona (1999) for open source software, and Kalakota (2002) for the mobile Internet.

On the business and government strategy frontier, Tapscott (2000), Sawhney and Zabin (2001) offer in-depth analysis of e-business strategies in the old and new economies; an informative worldwide sweep of e-government case studies and lessons is offered by Heeks (2001). The role of geographical factors in regional Internet industries is well charted in the United States by Saxenian (1994)—and on a global level by Castells (2001), who also offers a comprehensive overview of the impact of the Internet on global civil society, government regulation, and economic development.

Organizational impacts of computer network-based communication were traced more than a decade ago by Rubinyi (1989). More recent analysis of organizational knowledge management techniques based on web platforms is offered by Honeycutt (2001) and Natarajan (2000).

In addition to e-business and e-government, socio-political aspects of Internet impacts are addressed by numerous researchers: community networks by Gurstein (2000), international relations by Perry (1992), civil society by Frederick (1993), cyberculture by Jones (1995) as well as Gibbs and Krause (2000).

The political economy of media technologies has been analysed in depth by researchers like Bagdikian (1971), Tehranian (1990), Stephens (1988), Mowlana, Gerbner, and Schiller (1992). The impact of the Internet on the publishing industry is well documented by Okerson and O'Donnell (1995) and Zollman (1999). Other analyses highlighting the mass media aspects of the Internet include Morriss and Ogan (1996). The ability of the online medium to open up larger news windows in a more interactive manner to "netizens" (i.e. "citizens" of the Internet) is documented by Gundrey, Murphy and Rao (1993) as well as Rao (1993). Incisive critiques of excessive Internet hype come from Stoll (1995) and Talbott (1995).

Analyses taking on a more international approach (with specific regional and national case studies around the world) to the growth of the New Economy include Thurow (1999) and especially Cronin (1996), Ohmae (2001) and Friedman (2000). Challenges to accelerating global Internet diffusion and overcoming the digital divide are well charted in the annual reports of the UNDP and World Bank, as well as in special reports of UNCTAD, ITU, the Markle Foundation and the Digital Opportunity Task (DOT) Force.

At a regional level, comparative studies of digital branding and business practices are offered by Dayao (2001) and Temporal (2001). A chapter focusing on the Internet in Asia is included in each of the recent books by Rohwer (2001) and Backman (2001). Rohwer highlights the vast potential of the Internet for countries like India, and Backman cautions against excessive hype and abuse of the spirit of "netpreneurship".

Ramanathan and Becker (2001) offer a wide-ranging set of essays covering the early stages of the Internet growth in Asia. Tan, Corbett and Wong (1999) offer an academic treatment of developments in IT education, infrastructure and e-commerce in the Asia-Pacific region; much of the data is drawn from the early and mid-1990s. Funk (2001) offers an excellent case study of the growth of the mobile Internet in Japan, innovative content models and consumer utilities for wireless users, and the experience in transferring these models to other markets like Europe.

Addressing opportunities for entrepreneurs in the new information society, Khan (2001) offers a set of lessons for Asian "technopreneurs". More fundamental works on technology startups—with case studies and interviews with successful entrepreneurs— include Nesheim (2000), Price (2000) and Nokes (2000). A more targeted treatment of the Internet entrepreneurship scene in regions like Europe is offered by Roberts (2001).

The importance of the Internet as a component of national infocommunications, media and infrastructural policies has been acknowledged by a growing number of countries around the world, and books have been published about the information society strategies of Britain (Barnett, 2000), India (Manzar, Rao and Ahmed; 2001) and Australia (Petre and Harrington, 1996; Butler, 2001). Naroola (2001) covers the growing success of Indian entrepreneurs in Silicon Valley's Internet economy; Singhal and Rogers (2001) touch on the domestic potential of the Internet in India, and Rajora (2002) provides a detailed case study in India of the community centre model of Internet access and local e-commerce.

Together, these publications provide useful conceptual and implementation frameworks for charting and navigating the information society; other analyses of popular opinion and perceptions regarding ICT impacts can also be unearthed from news media coverage and the reports of development agencies.

2.3 ICT impacts: A sector-wise analysis

From policy-makers, to industry players, to users, large swathes of the world's people are becoming increasingly aware that two of the most powerful forces of the twenty-first century are globalization of the economy and the rise of ICTs, such as the personal computer (PC), Internet and wireless telephony), and that both of these forces are becoming increasingly intertwined, inter-related and inter-dependent, with considerable social, regulatory, economic and industrial implications.

Focusing more on the infrastructural and capacity constraints of developing nations, systematic attempts to characterize and categorize instances of ICT application in developing nations have emerged, as in the recent reports of the United Nations Development Programme (UNDP), DOT Force, Markle Foundation, Regency Foundation and Bridges.org.

These typically involve a sector-wise or activity-based approach to ICT impacts on society, such as public health, disaster relief, education, media, civil society, agriculture, industry, services, trade, banking/finance, hospitality, transportation, law enforcement, commerce, government services, politics, cultural identity, workforce and diaspora populations.

ICTs can indeed bring benefits to each of these spheres of activity, via a whole host of applications, albeit also at a certain cost and risk. Numerous such initiatives have been launched by the cooperative efforts of local and international stakeholders, as summarized in Table 2.

From grassroots non-governmental organizations (NGO) and development analysts to information technology (IT) giants and multilateral international organizations, the promise and challenge of harnessing the potential of emerging ICTs for the greater human good has attracted numerous calls to actions and proposals for implementation the vision of the information society.

Multilateral organizations ranging from the United Nations (UN) to the World Bank and non-profit foundations ranging from Bridges.org to the Markle Foundation generally make the same overall recommendation: that ICTs can cost-effectively create and unleash the developmental force of human socio-economic and political networks. For emerging economies—particularly least developed countries—the key challenge will be to align the interests and strengths of various constituents of society and find their appropriate niches in the global information society. Unless adequate steps are taken to increase local ICT capacities (e.g. via local telecentres—see Box 1), the "digital divide" may exacerbate the existing social and economic inequalities between countries and communities; the potential costs of inaction are greater than ever before.

Table 2: ICTs in developing countries: Applications, benefits and active organizations

	Applications	Benefits	Organizations
Healthcare	Telemedicine (audio/image transmission, collaboration e.g. for radiology); Digital publication of medical research; Outsourcing of services.	Increased productivity, reduced travel costs; Broader service reach for experts; More responsive healthcare services for citizens.	World Health Organization, Medline (NLM), MaterCare
Agriculture	GIS systems for planning; Tele-education, scientific databases; Telecentres, information services for pricing.	More awareness of innovative approaches; Improved food production; Seasonal planning, risk mitigation.	FAO, WFP, CGIAR, Developing Countries Farm Radio Network, MAYAnet, FarmNet, Famine Early Warning System, GAINS, AgriWatch
Education	Distance education; Teacher training; Indigenous education.	Improved visualisation skills; Up-to-date course materials accessible from remote areas; Cost savings, on-demand education.	OLSET program (South Africa), TeleSecundaria (Mexico), African Virtual University, Orbicom, SchoolNet, RCP
Business	e-Banking, e-stockbroking; Logistics management; Global trading platforms.	Efficiency, less delays; Lower costs of marketing; Global exposure.	UNCTAD, UNTPDC, WTO, TradeCompass
Media/cultural industries	Digital newsrooms; Archival technology, methodologies, standards; New media formats.	More responsive news cycles; Preservation of local cultural forms via archives, interactive CD-ROMs and websites; Global projection of local media, culture.	UNESCO, OneWorld, DigitalPartners, WorldSpace, Drik
Environment	GIS mapping; Networking of environmental activists; Databases of crop patterns.	Better management of resources; Planning for disaster aversion; Improved awareness among activists.	World Bank GIS Laboratory, OneWorld, IntelSAT, ESRI, ICLEI, WorldWatch, VITA, APC, SDNP, ICLEI
Governance	Online information for citizens, businesses, NGOs; Planning and management of transportation; Simplified procedures for international business.	Less wastage of citizens' time, better access to crucial information; Improved accountability of government officials; Simplified tax procedures for business.	USAID, ActionAID, Transparency International, APC, CDT
Urban development	Urban planning, service delivery; Public telecom, Internet facilities; Urban telecentres.	Shared infrastructure for multiple sectors Better coordination of digging up roads! Urban telecentres	International Healthy Cities Foundation, SDNP, ICLEI, ADB
Rural development	Rural community networks, public call office; Rural tourism; Healthcare.	Rural community networks become economic drivers; New employment opportunities; Access to government services from remote locations.	APDIP, SDNP, ITU, Grameen Bank, CIDA

Source: Author, with inputs from "Telecommunications in Action" (Regency Foundation, 1999)

2.4 Cultural and political ramifications of new technologies

In addition to the economic and operational aspects of basic services to citizens, ICTs also have wide-ranging impacts on our linguistic, cultural and political environments. This has sparked off optimism in terms of being able to create a richer news environment, multilingual cultural repositories and forums, and global networks among diaspora communities—as well as concern over challenges like dealing with a "hegemony" of English language content on the Web, political dissident movements and cultural resistance in terms of adopting to new technologies. Let us survey some of these wide-ranging impacts and opinions on the cultural ramifications of the information society.

From dramatically changing business and political climates to grammatically changing spelling and sentence structures, particularly via short message service (SMS) texting, the Internet and wireless technologies are already transforming the world's countries and cultures in unprecedented ways. ITU data reveals that in many countries (including the developing world), the number of users connecting to communication networks via wireless devices is greater than via wireline devices, catapulting millions of consumers into the network society irrespective of decades-old last-mile problems.

Box 1: Telecentre initiatives

Generally speaking, telecentres have been set up as academic research or development networks, or information/communication centres. Telecentres in operation can range form private telephone shops (driven by the micro-enterprise model) to externally funded larger ICT multi-purpose centres (which can run the risk of not being self-sustaining after external funding has dried up). They have frequently arisen from isolated experiments.

Telecentres are a development tool that can help to fill social, economic and knowledge gaps. The ideal users of the telecentres are those low-income sectors that have little access to new communication technologies, and that are virtually cut off from conventional means of communication. They usually necessarily involve proactive participation from grassroots organizations.

Telecentre objectives have included training members of civil society, providing tele- and data-communication services, and conducting social, developmental and academic research. Some have multipurpose media and information offerings, such as library services, television viewing, educational services, and community radio. Commercial services have included fee-based printer, scanner, and fax utilities. Key impediments to survival and sustainability include the high cost of telecommunications relative to local income levels, and the lack of any frameworks to regulate access. Organizations and social groups involved in the telecentre projects must therefore press for the definition of policies and decisions, for which they need to have strategic allies at all levels.

Sustainability options include licence or franchise fees, and usage charges for phone, e-mail, browsing and other services. Centres can be run by a local entrepreneur, local management committee or local volunteers. Loans typically come from some government agency, or a municipal grant, or an NGO. Key challenges lie in providing training adapted to telecentre users' needs, of the kind that would convert Internet tools into instruments for pursuing the development agenda of the community itself.

Barriers here include language, lack of information and communication strategies, and inadequate information on managing telecentres and financial planning. Regional networks for articulating and exchanging lessons learned are therefore important capacity building mechanisms. It is important to develop synergy with telecentre initiatives in other parts of the world, to strengthen the dynamics and the processes of evaluating their impact. Another problem with telecentres has been the lack of any method for evaluating their impact as an instrument for strengthening their management.

In sum, more successful practices are needed to make telecentres self-supporting and self-financing, and this is a strategic gap that needs to be filled as soon as possible.

Source: Lessons from Telecentres in Latin America. See: www.idrc.ca.

On the content front, news media and the culture industries have been among the first organizations in developing nations to set up websites, thus providing a much-needed diversity of news sources for news consumers around the world and overcoming some of the news flow problems which sparked calls for a "New World Information and Communication Order" by developing nations in UNESCO in the 1970s.

One tycoon of Hong Kong, China also went so far as to say that Asian countries like Thailand and the Republic of Korea were hit particularly hard during the economic turmoil of the late 1990s since they were unable to react fast enough; this was due in part to the fact that not enough news and information services

were available online through channels like the Internet. Singapore and Taiwan, China, on the other hand, were able to react faster as they had better online resources.[3]

In an era of globalization, increasing migration and frequent business travel, the Internet is particularly useful as a "digital glue" for the vast global diaspora populations of Asia, Africa and Latin America, who can get access to online news and information from their home countries in ways that the local mass media in their newly adopted countries cannot provide. Many developing country Internet initiatives are being launched by diaspora in countries like the United States, such as VietGate.[4] And right from its early years, the Web has been a useful force for bridging the overseas Chinese community, via sites like SinaNet.[5]

As for social interaction in cyberspace, expectations range from social isolation and "cyberbalkanisation" to unbounded sociability. Numerous studies seem to indicate that reasonable use of e-mail enhances social life, helps maintain larger social networks, improves weak ties, and strengthens distant relationships. In fact, it has often been pointed out that the Internet is creating a new form of "networked individualism" by helping "netizens" develop "portfolios of sociability" and "communities of choice".[6]

On the political front, the Internet has spawned networked social, alternative media hubs, online activism (e.g. for human rights, gender, environment, labour, etc.), community access networks and e-government initiatives.

Challenges on the information society frontier in developing nations have typically revolved around inadequate access to digital tools, poor supply of electricity, high cost of online access relative to local purchasing power, lack of awareness about or skills related to ICTs, lack of local relevance of online services, lack of local language content and tools, concerns over security and reliability of ICT infrastructure, lack of supporting legal protection for online transactions, unsustainability of many ICT pilot projects, poor participation in global standards councils and government foot-dragging over creating a level playing field for telecommunication and datacommunication operators.

Governments and regimes accustomed to tight control over local media are finding the Internet to be a true challenge due to the instant global publicity and cross-border networking that the new medium offers to local dissidents. As a result, a number of countries have taken or reinforced measures to filter Internet content.

Thus, despite the vast new opportunities opening up for the news, cultural and technology industries, the pace of Internet diffusion coupled with globalization also seems to be sparking off concern about Western cultural hegemony over other world regions, as observed by numerous commentators and analysts. However, it is simplistic and inaccurate to paint a binary picture with polarized opposites like "the West versus the Rest" or "McDonald's versus Jihad" or "Coca Cola versus Ayatollah," cautioned one commentator.[11] With respect to Asia in particular, he argued that "One must acknowledge the American capacity for marketing their culture worldwide. For their part, Asians should leverage their own innate capacities in the online world. After all, the Internet actually plays to the creative and technological strengths of the Asian people—we should actively exploit it".

In terms of cultural identity, concerns over Anglo-American domination of Internet technology are not limited to non-western countries—they have also been expressed in countries like France and Canada. For instance, the Canadian Deputy Prime Minister in 1997 called for extending Canadian content requirements to the Internet to keep out the American "culture vulture".[12] The Internet is also viewed as a "moral pollutant" in some countries, where there is stronger sensitivity to content that can seem an affront to local social and moral values, and where concern is often strong about "protecting the young".[13]

But on a more proactive note, many developing nations are leveraging the Internet as a digital publishing platform to showcase their cultural traditions. "We have the opportunity to add our unique touch to the new Net culture," according to one journalist from the Arab world, who called for a pan-Arab initiative to develop Web tools and content in Arabic.[14] As another example, the Internet in Brazil is becoming less of an elite English-centric technology as access and Portuguese language content appears on the Web.[15]

Among other initiatives are Mabbim, the umbrella body for the Malay language in South-East Asia, called for setting up an official website for the Malay language, along with the publication of an online version of an encyclopaedia on the Malay race.[16] The Tamil-speaking diaspora have launched an initiative to boost Tamil language content and online tools on the Internet[17]; a similar initiative was launched by the "Speak Mandarin" campaign in Singapore.[18] Local language Web content initiatives have also been launched for

developing country languages like Marathi (see: www.puneflash.com).[19] Dozens of websites promote local music in countries like India, Brazil and South Africa.[20]

In terms of workforce impacts, the Internet is increasingly being viewed as a key information technology for boosting productivity. Some countries, like Malaysia, are even contemplating use of the Web to attract diaspora talent and reverse the "brain drain" of highly qualified workers migrating to other countries.[21] Even some governments that have traditionally eschewed strong industrialization policies have now changed tack to actively embrace ICTs as a plank of economic strategy.[22]

The electronic commons of the global Internet also throws up a complex host of issues revolving around domain name registration, multilingual name registries, fair regulation, e-commerce taxation, intellectual property, global cyberlaws, cultural preservation, and protection of the public interest. Numerous international organizations are leaping into the fray here: ICANN, IETF, IAB, OECD, OAS, UNESCO, WTO, ITU, Internews Network, Electronic Privacy Information Centre, Centre for Democracy and Technology, Global Business Dialogue on E-commerce, and Global Internet Project. But the high costs of participating in and tracking many of these forums is making it difficult for civil society in many countries (especially emerging economies) to take part in the global decision-making for Internet governance.

The way Internet governance issues play themselves out in countries around the world will depend on the political culture of each country—the degree of openness and cooperation that is possible between government, private, and civil sectors, according to one consultant.[23]

As the Internet marches into a crucial phase in its tumultuous history, it is becoming evident that Internet professionals around the world will need to pay greater attention to the interplay between technological, social, economic and policy issues pertaining to the information society.

In sum, ICTs can be regarded as what communications scholar Majid Tehranian calls "technologies of power"—they are not inherently "good" or "bad," but can effectively become instruments of power in the hands of proactive players.

3 ICTs in developing nations: A framework for analysis and planning

While analysing the impact and potential of ICTs by economic sector is a useful first step (as illustrated in Table 1), it nevertheless misses a crucial factor: ICTs like the Internet cannot be interpreted simply as digital forms of telecommunications, or as mere computers, or as media outlets. This is underlined by the way that many early well-intentioned ICT projects in developing countries failed because they were too technology-centric or stopped merely at the installation phase of computers.

The information society is not just about connectivity to the global information infrastructure then, but also about content that is accessible, the communities that congregate online and offline, the embedded and emerging cultural attitudes, the commercial and other motives behind such activities, an attitude of cooperation and lifelong learning, and a capacity for creating and governing such information spaces. The information society is not just about passively using "black box" technologies, but about actively creating and shaping the underlying technical, information and service infrastructure. Thus, a more powerful framework is needed which can contextualize ICT diffusion, usage and creation with respect to these attributes.

3.1 The "8 Cs" framework

Accordingly, this author has developed an approach over the years for analysing information societies in the digital age, called the "8 Cs" framework (all parameters begin with the letter C): connectivity, content, community, commerce, culture, capacity, cooperation and capital. This applies both to the instrument (usage) and industry (creation) aspects of ICTs, as outlined in Table 3.

3.1.1 Connectivity

The digital divide in developing countries is most evident at the phase of connectivity, i.e. lack of affordable access to PCs, Internet devices, modems, telephone lines, and Internet connections. Steps to reduce this digital gap include devising cheaper access devices (such as publicly accessible kiosks), lowering tariffs on import of computers and modems, creating Internet community access centres (with leased lines and shared devices), and bringing access rates down by creating a favourable climate of competition between ISPs.

The regulatory climate in many emerging economies has only recently welcomed private sector ISPs, and a key challenge lies in creating a level playing field between government-owned and private sector ISPs (in terms of operating licences, tariffs, cross-subsidies, and setting up international gateways). A government ISP player with a monopoly in one area (e.g. VSAT links, last mile connectivity, international telecommunications) should not use this monopoly power to wipe out an entire industry in another sector.

Work has begun on initiatives to increase Internet diffusion via kiosks (e.g. in Bangladesh), community centres (e.g. in Peru), cybercafés (e.g. in Ecuador), wireless delivery and non-PC devices (e.g. in India), but much innovation and investment is still called for here.

Costs of dial-up and leased lines are dropping, but could become more affordable. Organizational adoption of Intranets and Extranets (and hence virtual private network (VPN) services by ISPs) is only slowly emerging in developing countries. It is clear though, that universal access issues and peering agreements will continue to dominate the ISP scenario in many emerging economies for the coming years.

No peering agreements for forming national (let alone regional) Internet exchanges exist in most emerging economies; most inter-ISP traffic is routed via the United States, Europe or East Asia. To redress this imbalance, much potential lies in the hands of the public sector units, such as the power grid and railway authorities who have existing secure cable connections across these regions that can be tapped into. National ISP organizations also need to form to create greater collective bargaining power and to pool assets.

Special concerns arise in cross-country wiring for regions with mountainous terrain, large arid tracts, or with a high density of island space. Interesting developments to track on this front include the increasing feasibility of wireless access, ranging from cellular telephony and wireless in the local loop (WLL) to wireless fidelity (WiFi) networks and satellite links for voice and data traffic.

3.1.2 Content

The digital divide between nations arises not just in number and density of Internet service providers (ISPs), hosts connected to the Internet, proportion of individual users online, Internet diffusion ratios, and number of organizations with leased line connections, but this imbalance also extends to content, in terms of number of websites in developing countries, amount of local language content, and use of online content by key sectors.

There are at least seven measures of market maturity for online content in a country[24]:

a) total number of websites about (and published in) the country;

b) local relevance and usefulness of this content;

c) local language standardization and usage on the Web;

d) amount of sub-national content (about states, provinces, cities);

e) presence of meta-content like directories and search engines;

f) overall advertising revenues targeted at online audiences via these sites (e.g. via banner ads);

g) the presence of third-party services from online traffic auditors, ad revenue auditors and market research groups.

Emerging economies need to increase activity within each of these areas in order to help reduce the content gap. News media, public health services, government-citizen resources, NGOs, small and medium enterprises (SME), and emergency relief organizations need to make more content and services available online. For sustainable and growth-orientated access and use of ICTs in developing countries, it is important for them to generate high-quality digital content locally, especially in content and online service domains like education and healthcare, and to avoid access all content from overseas.

Many developing countries, however, have yet to agree on standards for representation codes of their languages, keyboard layouts and fonts; the problem can get more complicated when some of their languages are spoken across multiple countries whose language publishing representatives may not agree on the standards to be set. Other challenges arise in the case of languages for which Internet domain names and e-mail identification must be typed in the Roman alphabet only and not in the local languages.

In terms of content-hosting web infrastructure, world-class hosting infrastructure must be created in emerging economies so that locally generated content will be predominantly hosted in the region and not outside, thus saving lucrative foreign exchange revenues and safeguarding information sovereignty and security.

On the creativity and usability fronts, numerous web design considerations also need to be taken into account, such as time-stamping of sites, frequency of updates, interactivity of services, response time to e-mail feedback, back-end integration of workflow, payment/logistics gateways, indexing and search services, and offline help mechanisms (thus seamlessly weaving Internet, intranet and extranet sites).

3.1.3 Community

Online and offline forums need to be actively promoted to bring in larger and more diverse sections of community to discuss issues of common interest, especially with regard to creatively tackling the digital divide. Online, this includes e-mail lists, Web-based communities, searchable archives of online communication and e-mail digests, chat rooms, and online interviews. Offline, community activities include conferences, events, trade shows, seminars, educational summits, training sessions and panel discussions. While much attention is focused on web publishing, e-mail forums for content distribution and discussion can still play a useful role—especially in areas where bandwidth is low and the quality of phone connections is poor. In that sense, e-mail-based discussion lists are an under-utilized channel in online communications for many emerging economies.

For developing nations, the extent of community stretches beyond local borders to the global diaspora population; indeed, nations like India, Republic of Korea and Taiwan, China are great examples where involvement from the diaspora community has helped bootstrap and globalize the domestic ICT industries.

3.1.4 Commerce

Advanced Internet economies have moved beyond basic Internet infrastructure to dynamic e-commerce infrastructure: payment gateways, secure channels, digital certification authorities, overnight courier services, third party audit services, and online tracking capabilities.

To move beyond being mere destinations for e-commerce sales from the United States and European sites, emerging economies need to close the "e-commerce gap" by effectively building a domestic Internet economy and promoting online transactional capabilities for the consumer ("C"), business ("B") and government ("G") sectors (B2C, B2B, C2C, G2C and G2B). Logistics and delivery systems, contract laws, and consumer confidence in e-transactions are key pre-requisites in this regard.

This includes updating existing business and intellectual property rights laws to accommodate electronic contracts, online funds transfer, and stronger consumer fraud protection laws. Malaysia's cyberbill and India's IT Act 2000 fall in this category.

3.1.5 Capacity

To close the "digital skills gap," emerging economies need to improve the capacity of their workforces for Internet Age roles. This includes improving Internet access and educational offerings in schools and colleges, creating digital libraries for universities, and promoting professional training institutes.

The Internet should also be strongly promoted among sectors which would have the most propensity to harness it. Key priority areas for such Internet growth include the software and Web solutions/services sectors, whereby an emerging economy can harness the Internet not just as a tool but as a market in its own right.

Challenges also arise in closing the "techno-legal gap" in crucial capacity areas like cyberlaw. Legal developments concerning content classification, regulation and enforcement in countries around the world must be tracked. Regional representatives from the industry, academia and government should try to be present in forums of the UN, WTO, OECD, G-7, ASEAN, and APEC, dealing with cyberspace content issues like intellectual property rights, copyright protection, online privacy, online crimes, and digital watermarks.

Finally, policy-making capacity also needs to be built up among bureaucrats, legislators, politicians, industry leaders, academics and civil society organizations, particularly in developing countries.

3.1.6 Culture

This is probably the biggest challenge in closing the digital gap, and involves overcoming cultural inhibitions and insecurities about developing competence for surviving in the breakneck speed of the Internet age.

It includes getting governments in emerging economies to stop treating their telecommunication monopolies like cash cows, and instead getting government telecommunication players to invest in areas like research and development (R&D) on Internet telephony and voice over IP (VoIP), so that the technology is seen as a market opportunity on a global scale and not a threat on a local scale.

It also includes encouraging career-track diplomats, bureaucrats, academics and public sector employees to take up Internet training and harness the opportunities as well as the plentiful challenges that accompany Internet diffusion.

In areas like making government procedures transparent, a lot of political will and muscle will be needed. For instance, in areas like land records and getting power connections, some unscrupulous middlemen tend to get involved; openness and transparency will threaten them, but the government must display the political will to clean up these processes via open content publishing.

Most importantly, it entails the creation of a risk-taking culture, where accepting some initial failures by entrepreneurs should not be treated as sign of weakness or loss of face; high mobility between jobs should also be accepted as a reflection of a high pace of skill acquisition.

Table 3: The "8 Cs" of the Information Society

	ICTs as an instrument	ICTs as an industry
Connectivity	How affordable and widespread are ICTs (e.g. PCs, Internet access, software) for the common citizen?	Does the country have ICT manufacturing industries for hardware, software, datacommunication solutions and services?
Content	Is there useful content (foreign and local) for citizens to use in their daily lives?	Is content being generated in local languages and localised interfaces? Is this being accessed/used abroad?
Community	Are there online/offline forums where citizens can discuss ICT and other issues of concern?	Is the country a hub of discussion and forums for the worldwide ICT industry?
Commerce	Is there infrastructure (tech, legal) for e-commerce for citizens, businesses and government? How much commerce is transacted electronically?	Does the country have indigenous e-commerce technology and services? Are these being exported?
Capacity	Do citizens and organizations have the human resources capacity (tech, managerial, policy, legal) to effectively harness ICTs for daily use?	Does the country have the human resources capacity (tech, managerial, policy, legal) to create and export ICTs, and set standards?
Culture	Is there a forward-looking, open, progressive culture at the level of policy-makers, businesses, educators, citizens and the media in opening up access to ICTs and harnessing them? Or is there nervousness and phobia about the cultural and political impacts of ICTs?	Are there techies, entrepreneurs and managers proactive and savvy enough to create local companies and take them global?
Cooperation	Is there adequate cooperation between citizens, businesses, academics, NGOs and policymakers to create a favourable climate for using ICTs?	Is there a favourable regulatory environment in the country for creating ICT companies, mergers and acquisitions (M&A) activity, and links with the diaspora population?
Capital	Are there enough financial resources to invest in ICT infrastructure and education? What is the level of foreign direct investment (FDI)?	Is there a domestic venture capital industry; are they investing abroad as well? How many international players are active in the local private equity market? Are there stock markets for public listing?

Source: Author.

3.1.7 Cooperation

Clearly no single sector can take on the Internet economy by itself; much cooperation at the national level is needed to overcome the sectoral gaps between government, academia, private sector, civil society, and international organizations. This should happen at the state/provincial, national and regional levels; it can also extend to groupings based on culture (e.g. Latin America) or language (e.g. between the five countries where Tamil is an official language).

A better characterization would perhaps be the term "coopetition," where traditional competitors team up to a certain degree to grow the entire Internet pie instead of fighting over small slices. Activities like forming Internet advertising bureaux, national Internet industry associations, chapters of the Internet Society (ISOC) and other public-private partnerships fall in this category.

3.1.8 Capital

The highly volatile Internet economy is making it all too evident that the best chances for an Internet initiative to survive are if it is at least economically self-sustaining.

Thus, governments should ideally focus on creating open investment climates for incubation, launch, acceleration and implementation phases of an Internet start-up. The government need not spend excessive funds on incubation projects of its own; it should create conditions and safeguards conducive for the movement of domestic and international capital into the new economy.

Domestic venture capital funds and skills must be promoted, otherwise the "capital gap" in many emerging economies may lead to an excessive and unhealthy dependence on the "umbilical cord" of high-technology exchanges like NASDAQ in the United States.

As for capital investments in software, use of freeware and shareware packages and tools should be encouraged where possible, instead of relying on costly proprietary software solutions, such as in the use of the Linux operating system and Apache web server for digital publishing.

Based on this "8 Cs" framework, a more sophisticated analysis of the evolution of the information society is possible, for developed and developing nations. The framework allows for a detailed sector-wise analysis along these 8 parameters which are all necessary conditions for success, thus enabling the identification of potential obstacles and strengths in the growth of the information society in developing nations.

Unless care is taken to adequately address *all* the 8 Cs for each of the sectoral ICT projects or policies, the chances are that the initiatives will not be sustainable or scaleable across the entire country. For instance, telecentres may not be a financially sustainable access option ("connectivity") unless fee-based services ("commerce") are blended with free services for marginalized communities; this will typically require the joint efforts ("cooperation") between development activists and IT-savvy ("capacity") local entrepreneurs. Linguistic and cultural diversity ("content") will not be feasible in the online medium unless local language tools are made affordable and easy to use for content generation and archival; this also calls for standardisation (via "cooperation") of local language representation codes (e.g. Unicode) and keyboard layouts, which has been problematic for some Asian languages like Tamil and Khmer.

For the purpose of this paper, Table 4 teases apart the ICT scenario in developing nations only, focusing largely on innovative responses to the challenges of ICT diffusion and adoption.

Table 4: Innovative responses in developing countries: "8 Cs" framework of necessary conditions

	Education	**Business**	**Government**	**Civil society**	**Health care**	**ICT industries**
Connect-ivity	Low cost or free access to educational institutions. *E.g: KENET, IRANET.*	Cybercafés for SMEs. E*.g.: iWay cybercafe chain in Indi.a*	Special ISPs for govern-ment agencies. *E.g.: National Informatics Centre.*	Telecentres, low-cost devices. *E.g.: PubliNets in Tunisia, RCP (Peru), Internet Bus (Malaysia), WLL/CorDECT, Info-Centros (El Salvador).*	Handheld devices, health centres, low-cost ISPs. *E.g.: HealthNet.*	Low cost high-bandwidth Internet access. *E.g.: STPI.*
Content	Digital libraries. *E.g.:African Digital Library, African Journals Online.*	Directories of exporters, MP3 music files. *E.g: HoneyBee Network.*	Publishing of government content online, interactive ser-vices. *E.g.: e-Census (Philippines).*	Content support for rural constituencies, Open source tools and open content. *E.g; MahilaWeb (Nepal), Centre for Education and Documentation.*	Tele-radiology, medical journals. *E.g.: OpthoNews, HELINA-L, MEDINET.*	Low-cost IT books (e.g. in India), and magazines.
Community	Forums for teachers, administrators. *E.g.: Community learning centres in Ghana, Kenya.*	Forums for tourism. *E.g.: MarketWatch (Mongolia).*	e-Government forums.	Rural community networks. *E.g: e-Bario (Malaysia), Mountain Forum, VOICES (India), SIDSNet.*	Forums for AIDS workers. *E.g.: InfoDev.*	Lobbying organizations, open source initiatives. *E.g.: Computer Asso-ciation of Nepal, NASSCOM in India.*
Commerce	Online courses. *E.g.: African Virtual Universit.y.*	Hybrid payment options. *E.g.: AfricaOnline, PeopLink, Central Asia Craft Support Associa-tion, PAN-Asia.*	Interactive online services for filing taxes, tenders. *E.g: e-Dirham (UAE)*	Services for finding prices in urban markets. *E.g.: Gyandoot.*	Pricing of e-Health services. *E.g.: medical transcription in Philippines.*	Outsourced technical support.
Capacity	Workshops for course developers. *E.g.: Distance education centres in Mauritius.*	Workshops in cybercafes, dedicated centres. *E.g.: Metro-comia, Cisco's Networking Academies.*	Workshops for government officials. *E.g.: Leland Initiativ.e*	Workshops for rural communities. *E.g.: Nairobits,"Internet clubs" in Egypt, Global Forest Watch.*	Workshops for healthcare professionals.	Conferences, private sector educational institutes.
Culture	Academic networks. *E.g.:Egyptian Universities Network.*	Formation of cyberlaws.	National policy bodies. *E.g.: ICT Task Force of Tanzania.*	Freedom of Information Act.	Launching teleconsultation services.	Global outlook. *E.g.: The Indus Entrepreneurs.*
Cooperation	Formation of consortia, partnerships with ISPs. *E.g.: AfricaOnline.*	Support from diaspora networks.	Regional caucuses e.g. e-ASEAN.	Governance of Internet infrastructure. *E.g.: APNIC, IPEF.*	Worldspace, HealthNet, GIPI Project.	Joining standards organizations. *E.g.: AfNOG.*
Capital	Spinning off academic networks as private ISPs. *E.g.: Centre for Informatics (Mondlane University).*	Investments by entrepreneurs, formation of regional ISPs. *E.g.: DOT Force Entre-preneur Network.*	Removal of taxes from computers.	Pilot projects by UN, World Bank.	Fee-based services for tele-cardiology in Jordan.	Intellectual property rights, licensing, venture capital funding. *E.g.: FONTEC fund (Chile).*

Source: Author.

3.2 New frontiers of the information society: The outsourcing industry

One of the interesting applications of this framework is in analysing the spectacular rise of ICT-enabled outsourcing practices and the generation of large employment opportunities in developing countries: a direct function of the informatization of business activity, global telecommunication and datacommunication connectivity, differences in wage levels across countries, and emergence of pockets of technology and business skills in different parts of the world.

Countries which can quickly leverage the "8 Cs" parameters for their local core competencies can position themselves as attractive outsourcing destinations for global organizations. For instance, India has tax incentives and infrastructure sops for companies which can set up offshore design labs and business process outsourcing centres for multinational companies like Intel and multilateral organizations like the World Bank; this is supported by a huge training and publishing industry along with financing from venture capitalists. Other outsourcing hotspots have rapidly emerged in developing countries, as summarized in Table 5.

Table 5: Outsourcing hotspots in developing countries

Country	**Outsourcing niche**
China	Hardware components
Costa Rica	Spanish-language call centre operations
Eastern Europe	IT services
India	IT services, chip design, back office work
Mexico	Near-shore IT services for US markets
Philippines	Animation, call centres
Russia	Software, R&D
South Africa	Call centres for European markets

Source: Author.

While proponents of outsourcing are quick to point out the "win-win" nature of outsourcing for both originating and receiving parties of outsourced work, challenges can arise on this front—especially when outsourcing involves "offshore" components to remote locations in other parts of the world. For instance, companies that outsource work can tap into pools of knowledge and skills in domain areas not directly in their core competencies (e.g. back-office processing managed via the Internet, call centre operations run via remote satellite links), thus leveraging economies of cost and retaining focus on their key business lines. For countries in which the offshore services companies are located, the practice of outsourcing offers new job and learning opportunities for local labour pools without leading to brain drains via migration.

At the same time, however, this can lead to politically charged impacts via significant loss of jobs in countries where companies outsource work abroad. Such a backlash to workforce realignment in the information age (particularly in some developed countries, where similar reactions arose to outsourcing of manufacturing jobs) could potentially be one of the key ethical and political confrontation points of the twenty-first century information society (see Table 6 for a comparison of the opportunities and challenges of outsourcing from the viewpoint of host and destination countries).

Table 6: Future of work in the information society: Impacts of outsourcing

	Host country (e.g. US, EU)	**Destination country (e.g. India, Philippines)**
Advantages	**Direct benefits:** cost reduction, access to talent, improved quality, compressed time to completion, productivity improvements and better service levels. **Indirect benefits:** additional investment into revenue-generating activities like R&D or sales, and better focus on key strategic and core business issues.	**Direct benefits:** jobs, income, client lock-in. **Indirect benefits:** exposure to global work culture, exposure to best practices, exposure to global benchmarks.
Challenges	Morale damage of local employees, perceived conflict of interest, poor control or visibility of projects, loss of quality; political loyalty to local labour forces.	Brain drain, "coolie" syndrome, cultural displacement, skewed wage levels, disorientation due to reverse working hours.

Source: Author.

4 The information society: Research strategies and repositories

One of the strengths of the Internet is that the Internet itself is a great "observatory" for charting and analysing the growth of the global Information society. Numerous useful websites and portals (such as those listed in the References section) are testimony to the growing body of research being conducted and published about the impacts of ICTs on society. While it is hard to "standardize" on the visions and realities of the information society, it is useful to come up with consistent benchmarks, frameworks and longitudinal studies on ICT diffusion, adoption and creation.

The UNDP's Human Development Index, ITU's telecommunication indicators, the e-Readiness Index, the market research reports of Gartner and IDC, and the e-government index of UNPAN are useful combinations of qualitative and quantitative lenses with which the information society can be viewed. Measures of the digital divide in developing nations exist in number and cost (absolute and relative) of PCs, phones, Internet hosts, Web sites, Internet users, residential/organizational/international Internet bandwidth, technical capacity, and advanced applications like e-commerce.

The UNDP has also devised a country measure called the Technology Achievement Index, drawn from technology creation (number of patents), diffusion of recent innovation (Internet), diffusion of old innovation (electricity, telephones), and human skills (years of schooling, technical students).

In terms of a mixed approach, the "8 Cs" framework outlined above is already being used as the foundation for two book series edited by this author ("The Asia-Pacific Internet Handbook" and "The Knowledge Management Chronicles").

Other notable forthcoming studies include “The Digital Review of the Asia-Pacific” (APDIP/Orbicom), which provides a cross-sectional comparison of the ICT environments in all countries of the Asia-Pacific based on infrastructure, content, enabling policies and open source initiatives. Table 7 provides a snapshot of some of these ICT initiatives in the Asia-Pacific. Cross-sectional reports of ICT environments in other parts of the world like Africa and Latin America are also being launched (e.g. a series of books co-edited by this author about IT in Africa called AfricaDotEdu, AfricaDotGov, AfricaDotBiz).

Box 2: From the Information Society to a ‘knowledge society’: A paradigm shift

Moving from "information" to "knowledge" aspects of the twenty-first century, a movement based on the centrality of knowledge management, innovation and learning organizations is mushrooming at numerous levels: corporate, industry, thinktank (e.g. Brookings Institute, National Research Council) national policy (e.g. in China, Singapore, Sweden), regional policy (e.g. EU Knowledge Conference), multilateral organizations (e.g. Global Knowledge Partnership), and independent networks (e.g. Entovation).

Numerous professional roles are now being created for such positions as chief knowledge officer, chief learning officer, chief leadership officer, and chief innovation officer; other emerging roles include knowledge engineer, knowledge editor, knowledge cataloguer, knowledge analyst, knowledge broker, knowledge handyman, knowledge steward, knowledge facilitator and competitive intelligence professional.

Debra Amidon, in "The Innovation Superhighway," profiles knowledge practitioners from around the world involved in regional forums, knowledge portals, youth initiatives, leadership programs, networks of e-lancers, technology transfer partnerships, technopolis frameworks, standards boards, and indigenous knowledge.

The knowledge movement in developing countries focuses on goals like capacity building, better healthcare, improved governance, via initiatives such as the Global Knowledge Partnership (hosted in Malaysia), Development Gateway, and New Partnership for Africa's Development (NEPAD). "The knowledge agenda has actually created a level playing field and inspired developing countries to innovate their own future," claims Amidon.

Source: Author.

Table 7: Sample ICT initiatives in the Asia-Pacific

Country	ICT examples
Bhutan	Community telecentres
Cambodia	E-mail forums (e.g. NGO Forum of Cambodia)
China	12 Golden Projects (e.g. smart cards, agricultural services)
Hong Kong, China	Electronic Service Delivery, Cyberports, CERT, Electronic Transaction Ordinance
Indonesia	Indonesia Digital Library Foundation, Indonesia Digital Knowledge Foundation
India	Drishtee rural kiosks, ICT applications for Amul Dairy Cooperative, e-government services in southern states, IT/Outsourcing industry
Laos	Computerisation of tax departments, Luang Prabang community centre
Nepal	Study loans for IT students, procurement of low-cost computers from World Computer Exchange, ICIMOD GIS systems
Pacific Islands	News dissemination via the Internet, e.g. Pacific Island News Association
Pakistan	Badar e-commerce project, ThreadNet services for rural craftsmen
Philippines	SMS services for consumers, Open Minds open source initiative, Outsourcing industry
Singapore	Capacity building by IDA, InfoComm 2001 strategy plan
Sri Lanka	Village PDAs, online propaganda battles!
Thailand	Agricultural Information Network, SchoolNet, Thai language interface for SMS
Vietnam	Hybrid media strategies for information dissemination

Source: "Digital Review of the Asia-Pacific" (2003, APDIP/Orbicom)

5 The information society: Visions, realities and positioning

Despite recent turbulence in the so-called "new economy", it is undeniable that new ICTs like the Internet have transformed businesses and markets, revolutionized learning and knowledge-sharing (see Box 2), generated global information flows, empowered citizens and communities in new ways that redefine governance, and created significant wealth and economic growth in many countries.

In addition to Moore's Law and Metcalfe's Law (about the exponential increase in chip power and network value), the network economy is characterised by four new laws, according to Bernard Lang, founder of the Association for French-speaking Users of Linux (AFUL).

- The Law of Self-Organization holds that the success of a society or industry will depend on how well its constituent members can oganize themselves and bring about co-regulation or self-regulation.
- The Law of Unlimited Effects maintains that new content and software are available instantly to the global Internet population, with a scale and speed never seen before.
- The Law of Large Numbers holds that sizable communities can be formed very quickly on the Internet.
- The Law of Zero Marginal Cost maintains that once something has been created online, the extra cost to distribute it to user after user is zero.

Table 8: Classification of information societies based on the "8 Cs" framework

Type	Characteristics	Examples
Restrictive	1. ICT infrastructure is very limited 2. ICT usage is tightly controlled by government 3. Awareness of ICT among general population is very low	North Korea
Embryonic	1. ICT infrastructure is just being rolled out 2. Donor agencies are active in funding and providing human resources 3. Most ICT activity is driven by diaspora, NGOs	Afghanistan East Timor
Emerging	1. Internet infrastructure exists in urban areas 2. Local capacities exist for ICTs, policy bodies are being formed 3. Widespread digital divide exists, e-commerce is not yet widely prevalent	Nepal, Bangladesh
Negotiating	1. Widespread Internet/wireless infrastructure exists 2. Local capacities and markets exist for ICTs, e-commerce 3. Government is "negotiating" benefits and challenges of new media; authorities exercise strong control over online content, search engines; political and cultural censorship of Internet is practised	China
Intermediate	1. Sizeable markets for Internet, e-commerce, wireless exist 2. Digital divide is still an issue, donor agencies are active 3. Political climate is generally free of censorship for traditional and online media	India, Philippines
Mature	1. Large-scale penetration of Internet, wireless 2. Mature business models for online content 3. Political climate is generally free of censorship for traditional and online media	Australia, New Zealand, Italy
Advanced	1. Large-scale penetration of broadband and wireless Internet (including 2.5G, 3G) 2. Political climate is generally free of censorship for traditional and online media 3. Some ICT companies are major players in global markets; wireless content models are being exported	Japan, Republic of Korea
Agenda-setting	1. Large-scale penetration of ICTs, global powerhouses in ICT 2. Political climate is generally free of government censorship 3. National policies on ICTs in these countries are generally followed by other countries, their ICT media and academic journals are dominant on an international scale, donor agencies of these countries drive many ICT initiatives in developing countries	United States
Ideal	1. Universal diffusion of ICT and traditional media 2. Political climate free of government and corporate censorship 3. Peace-loving culture, in harmony with nature, driven by knowledge and wisdom, tolerant of all faiths	None

Source: Author.

Many of these laws have been effectively played out in the synergistic explosion of the Internet and of the Linux movement. But Internet access patterns around the globe are quite uneven, and reflect other existing socio-economic gaps affecting the "instrument" and "industry" aspects of the information society; unleashing these laws in developing countries will therefore take some effort and planning.

The "8 Cs" framework can be used not only to analyse ICT initiatives within a sector, community or country, but also to compare and categorise different information societies. Based on a combination of the "instrument" and "industry" aspects of parameters like connectivity, content, capacity and culture, the countries of the world can be divided into eight categories: restrictive, embryonic, emerging, negotiating, intermediate, mature, advanced, and agenda-setting. ICT diffusion for the populace, strength of online content and cultural sectors, and the projection of domestic ICT industries progressively increase along the spectrum, as does openness of political expression (see Table 8).

Developing nations in the "restrictive" phase include some countries where an authoritarian regime and foreign policy pressures have cramped the ICT benefits that the citizens could have otherwise enjoyed. Other developing countries have moved on into the next phase: "embryonic," where information infrastructure was not well established or was largely destroyed, and ICT initiatives are now largely being driven by donor agencies.

Large digital divides and extensive donor activities still in the next class of information society -- "emerging"—but local ICT capacities have emerged and formal ICT policies have been formed. Infrastructure for Internet and wireless communication are much more widespread and robust in the next category—"negotiating"—but government is concerned over the political dissent and cultural changes that can be ushered in by unfettered Internet access. Such countries actively promote ICT infrastructure and deployment, but wish to exercise strong control over online content and search engines.

Staying away from political and cultural censorship of new media is a defining characteristic of the next phase of information society—"intermediate"—while also having local ICT capacities and some international ICT or outsourcing players co-existing with large digital divides and active donor presence.

Donor agencies need not play as active a role in the next category of information society—"mature"— where funding for ICT initiatives comes mostly from government agencies or from public-private partnerships. These countries also have large-scale penetration of Internet and wireless, and mature business models for online content and commerce.

Countries in the "advanced" phase have gone a step further—their ICT industries have become global giants (e.g. Japan, Republic of Korea), in addition to providing cutting-edge infrastructure like broadband Internet and 2.5G/3G wireless. But "agenda-setting" information societies like the US are key players not only in the ICT industry sector but also in formulating regulations and policies regarding convergent media and cyberlaws, publishing academic literature on the information society, thought leadership in news media of the ICT sector, and creating donor programmes for ICT initiatives in developing countries.

The challenge for developing nations is to move at least to the "mature" stage on this spectrum. The goal should be to not just be able to tap the world's pool of collective knowledge, but contribute actively in increasing the pool in the information age.

A ninth category of information society—"ideal"—does not have any members as yet! It will be a truly supreme feat to arrive at a societal stage with universal diffusion of ICT and traditional media, a political climate free of government and corporate censorship, and a peace-loving culture that is at harmony with nature, driven by knowledge and wisdom, and tolerant of all faiths. That is the ultimate information society goal, not just for individual countries but for all of humanity.

This classification of countries into nine categories is more sophisticated than a mere binary classification of countries into "developed" and "developing"—the spectrum actually allows for five categories of developing countries and four categories of the developed.

This framework for classifying information societies is also much broader and more comprehensive than that of the UNDP, which categorizes countries into only four groups based on ICT performance: leaders, potential leaders, dynamic adopters, and marginalized. Potential leaders have diffused old technologies widely but innovate little; dynamic adopters have important high-tech hubs but the diffusion of old technologies is incomplete. Developing countries typically have four choices of policy stances towards new

technological innovation: promotional, permissive, precautionary and preventive. This calls for a balance between the freedom to innovate and the desire to mitigate risks.

6 The Information Society in developing nations: Recommendations and roadmaps

Despite a climate of increasing political and military confrontation in different parts of the world, the global economic downturn and the demise of the dotcom era, it is undeniable that new ICTs like the Internet have transformed businesses and markets, revolutionized learning and knowledge-sharing, generated global information flows, empowered citizens and communities in new ways that redefine governance, and created significant wealth and economic growth in many countries. But access patterns around the globe are quite uneven, and reflect other existing socio-economic gaps.

For developing countries, focusing on the vision of the information society must occur in parallel with and buttress other socio-economic goals as well. After all, the digital divide is in part a reflection of other socio-political divides. Overcoming the divide must therefore be concomitant to other targets such as the UN Millennium Declaration regarding hunger, poverty levels, education, gender inequality, infant mortality, health services and environmental resources.

Bringing to fruition the vision of the ideal information society calls for a knowledge-centric attitude at all levels: individual, organization, industrial sector, vocation, private/public/non-profit actors, states, regions and multilateral institutes.

A number of national governments have launched digital divide initiatives. Japan has promised a total of USD 15 billion over five years in aid towards bridging international digital divide, and pushed other governments to focus on the digital divide at the G8 summit in July 2000. The Digital Entrepreneur Network brings together funding from the corporate foundations of IT giants like HP and Microsoft.

Other digital divide bodies include the United Nation's ICT Task, the Global Business Dialogue on E-Commerce's Digital Bridges programme (digitalbridges.gbde.org), UNDP, Andersen Consulting, and the Markle Foundation's "opportunITy initiative" (www.opt-init.org).

According to Bridges.org, digital divide policies and projects are often included as part of wider action plans to harness ICT to benefit economies and societies. The archetypal example is the EU's "e-Europe" plan, which has the stated goals of creating a digitally literate Europe. The British Government's initiatives include two special cabinet posts known as the "e-Minister" and "e-Envoy". Putting in place the appropriate infrastructure and widely deploying ICT is a multi-sectoral and multi-stakeholder task. The DOT Force observes that substantial governance decisions and policies are made regularly by new and existing international bodies that have major implications for the way in which ICT and the Internet are and will be deployed, such as cross-border access, digital copyrights, and Internet domain names. Unfortunately, developing country stakeholders are often the absent player during the formation of these policies.

Bridges.org describes the digital divide as a failure of development initiatives, a failure of market forces and a failure of governments. Development initiatives are often top-down and do not involve local partners and the business community. The private sector has slowly spread technology to middle income groups, but on the whole they fail to see the developing world and underserved populations as viable markets that require targeted products. Governments often tend to the short-term demands of their constituencies, but do not provide a coherent, long-term plan for prosperity and effective ICT integration, and a legal and regulatory framework that foster ICT use. All three failures need to be turned around in order to bridge the divides with practical applications of technology and sound policy-making.

According to the Digital Opportunity Initiative (DOI), a collaboration between Accenture, the Markle Foundation, and UNDP, there are no unique answers to finding the right "ICT formula" for a country—each has to find its own niche, such as export-oriented growth in Costa Rica, a domestic-industry focus in Brazil, and an overall development focus in Estonia.

The Malaysian government has attempted to replicate the Silicon Valley model in a developing country. South Africa's IT Strategy Project (SAITIS) was developed in consultation with the private sector and other stakeholders. Tanzania plans to leapfrog, or "antelope-jump" many stages of ICT development; particularly notable are its "e-Secretariat"and "e-ThinkTank".

As we have seen, a country's ICT strategy should focus on infrastructure, human capacity, enterprise culture, and local content and applications. Solutions should also be realistic, flexible and sensitive to local conditions, should have local participation, and must be backed by political will at the highest level. These can then ignite a virtuous circle of sustainable social and economic development—"a development dynamic".

When wisely applied, ICTs offer opportunities via network effects to narrow social and economic inequalities and support sustainable local wealth creation, new market access, and innovation in services. In order for their development potential to be realized, the DOT Force recommends that all stakeholders—governments, business, international organizations, local civil society groups and individuals—need to work together towards achieving real change.

Priority actions to be taken include formation of national e-strategies, improved connectivity, building human capacity (knowledge and skills), support for local entrepreneurs, and integration of ICT in donor development assistance.

The "8 Cs" framework hopefully provides a useful roadmap for the maturation of developing countries along the information society spectrum outlined above, as well as a clustering of recommendations to policy-makers for leveraging the full benefits of ICTs in conjunction with existing development imperatives.

6.1 Connectivity

Developing nations should pursue near-universal and affordable access strategies via low cost devices, open source or shareware software platforms, reasonable tariff levels, and level playing fields between telecommunication and datacommunication operators. Getting the telecommunication regulatory house in order will remain a major challenge in the years to come for most developing nations, many of whom still perceive of telecommunications as a cash cow which has to be milked as much as possible. Other associated infrastructure—like reliable sources of electricity—should also be ensured. Where necessary, access discounts and tax breaks should be given on a priority basis to needy sectors like education and healthcare.

Shared access models should be actively pursued, via cybercafes, kiosks and rural telecentres. According to UNDP research, monthly Internet access charges amount to only 1.2 per cent of average monthly income for a typical US user—compared to a staggering 614 per cent in Madagascar, 278 per cent in Nepal, 191 per cent in Bangladesh, and 60 per cent in Sri Lanka. Telecentres, Internet kiosks, and cybercafés will thus play a key role in Internet diffusion in emerging economies. New access methods like VoIP and wireless (WLL, WLAN) have tremendous potential especially for remote areas or dense urban clusters and should be actively explored.

6.2 Content

Access should be promoted to global content via the Internet as well as promote cultural diversity and generation of locally relevant content in local languages. This includes multilingual domain names, local language tools, digital libraries, archives of local cultural resources, and laws protecting intellectual property rights while also encouraging open content.

Government agencies need to play a bigger role as online content providers by publishing citizen information on the Web and promoting online services for applications like downloading and submitting tax forms, land records, import/export documents and pension claims.

6.3 Community

Communities of interest, communities of practice and even communities of conflict are becoming globally linked. Policy initiatives should have a strong grounding in local communities. Online and offline forums should be promoted for communities of interest and communities of practice to exchange knowledge on harnessing and creating ICTs.

Exposure to global communities involved in ICTs is a must, for benchmarking and sharing of expertise. Many developing countries have extensive diaspora communities, which should be tapped for a source of ideas, development partnerships and capital.

6.4 Commerce

Legal infrastructure is necessary to fostor and promote e-commerce and m-commerce. Online services (e.g. e-government) should be designed with a mix of free and fee-based services so as to ensure commercial sustainability of ICT initiatives in the long run.

As major consumers of ICT products and services, governments in developing countries can also lead by way of example in the use of ICT, implementing best organizational practices and spurring local markets.

6.5 Culture

A culture of knowledge and lifelong learning should be encouraged at all levels of society, along with an openness to a wide spectrum of ideas. Policy-makers should have the wisdom, conviction and commitment to change when and where necessary. Efficiency and innovation should become the hallmarks of national culture.

The Internet culture today is characterized by a four-layer structure: the techno-meritocratic culture, the hacker culture, the virtual communitarian culture, and the entrepreneurial culture, according to Manuel Castells (2002). These sets of cultures have spurred the open source movement, the gift economy, cyberpolitics, virtual communities, and new venture capitalists.

"The culture of the Internet is made up of a technocratic belief in the progress of humans through technology, enacted by communities of hackers thriving on free and open technological creativity, embedded in virtual networks aimed at reinventing society, and materialized by money-driven entrepreneurs into the workings of the new economy," according to Castells. All four sets of cultures need to be promoted actively in developing nations as well.

6.6 Capacity

Measures should be implemented to increase ICT literacy across all sectors of society; private sector training institutes will play a major role here. Technical, managerial and design capacity should be built up in the adoption of ICT, creation and maintenance of secure nationwide ICT infrastructure, and scaling up of domestic ICT industries.

Capacities should be built up not just in adoption of ICTs, but in creativity with regard to devising new applications, R&D focus areas, filing technical patents, and publishing results, surveys and forecasts in news and academic media.

6.7 Cooperation

Stakeholders in private, educational, government, donor and multilateral sectors must pro-actively form partnerships to ensure ethical and economic usage of ICTs. Developing countries must track and participate in collaborative standards forums like IETF and ICANN.

Notable multi-actor alliances in the developing world include the e-ASEAN initiative for ICT in south-east Asia; G-8 initiatives in the IT arena include the DOT Force. Transparency and equitable representation across national boundaries is a requisite for emerging global governance bodies like ICANN.

6.8 Capital

Creating funding options for ICT initiatives should be explored, including venture capital, private equity, stock markets, corporate foundations, donor grants, and revenue-sharing based on projected use. Special financing should be set aside for ICT initiatives involving marginalized communities, the disabled, refugees, migrant populations and youth.

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[1] The " 8Cs" framework was developed by the author over a number of years.

[2] See also list of references in the final section.

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