.kh

Cambodia

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Overview

From Phnom Penh, the development of Cambodia's ICT sector appears blindingly fast. One year ago there were no ATM machines in the country. Now one bank has 26 in Phnom Penh. Moto (the local name for motorcycles for hire) drivers in the big cities often have cellphones. Cellphones are always answered, even when in the middle of a kiss, a sandwich, a shower or a speech to 50 people. Yet little has changed in rural areas where electricity is still rarely available.

Cambodia's population at the end of 2005 was 14 million, with a density of 78 people per square kilometre. The GDP per capita was USD 440 and 8 per cent of the population had a landline or cellular phone.[1] Cambodia was one of the first countries in the world in which mobile phone subscribers surpassed fixed-line subscribers. In 2005, 97 per cent of all telephone numbers provided by eight telecom service providers were for mobile subscribers. Yet even with this penetration, only 1.1 million people had cellphones at the end of 2005 (see Table 1). In 2007 the *Cambodian Daily* reported that there are 1.5 million mobile subscribers or 11 per cent (World Bank 2007). This suggests that the number of cellular subscribers grew by nearly 25 per cent in 2006.

Although mobile phone penetration is increasing rapidly, the number of landlines per capita has actually decreased. Also remarkable is the fact that though phone ownership is low, many Cambodians can make calls using portable cellphone booths that are usually managed by one woman.

There are roughly 40,000 Internet users (0.28 per cent of the total population) in Cambodia.[2] Most of these users access the Web through one of the more than 340 Internet cafes (*Cambodia Yellow Pages* 2007) since less than three of every one thousand people have access to a home computer (ITU 2007). There has been almost no growth in computers and Internet access per capita during the past year.

Digital Subscriber Line (DSL) access during working hours is expensive—for example, USD 99/month for 256 Kb/s and up to 1 Gb/month total upload and download volume. Charges for data transfer (upload and download) per month range from USD 0.07 to USD 0.10 per Mb (Savage 2007). There are approximately 200 computer hardware companies, 100 software companies, and 10 Internet Service Providers (ISPs) listed in the May 2007 online *Cambodian Yellow Pages*.

Internet access costs as well as electricity costs in Cambodia are among the highest in the world. Given this and the country's recent history of conflict, it is not surprising that Cambodia also has one of the lowest electrification rates in Asia, with only 12 per cent of its population connected to an electric power supply. Outside the provincial towns, electrical power is rare. About 6 per cent of Cambodia's rural households have access to electricity and another 3 per cent own some type of individual power generating unit. Of the remaining 91 per cent of the rural population, some 55 per cent use automobile batteries (costing USD 2–3.5 per kWh) for occasional and limited use, and the rest (36 per cent) do without electricity completely (World Bank 2007).

Television and radio are very popular in the rural areas, as they serve as one of the few forms of entertainment. TV and

Table 1

Basic ICT indicators

ICT indicators	Value	Notes
Main phone lines	0.23/100 in 2005[1]	0.24 in 2000[1] (decreasing)
Cellular subscribers	7.55/100[1]	1.12 million[1] (1.5 million in 2007)[2]
Local network usage	72.8 per cent[1]	of total network capacity
Main phone line cost	USD 3.0/month[1]	residential, USD 0.03/local call[1]
Main phone line cost	USD 6.5/month[1]	business
International phone traffic	0.9 minutes	per capita[1]
Internet users	0.28/100[1]	.26/100 in 2004[4]
Computers	0.26/100[1]	~ same as 2004[4]
DSL subscribers	0.04/1,000[1]	1.1 per cent of phone lines[1]
Internet access cost	USD 0.50	Dial-up[4]
DSL Internet access cost	USD 350/month	128 Kb/s unlimited data volume[3]
	USD 39/month	64 Kb/s unlimited, off peak hours[3]
.kh domains	320	NiDA 2006[4]
Domain registration	USD 40	$30 annual renewal[4]

Sources: [1] ITU (2007) (statistics refer to 2005 year end)
[2] Welsh and Thul (2007)
[3] Savage (2007)
[4] Miyata (2006)

radio have the broadest reach among the different forms of mass media. While only eight of every one thousand Khmer own a television set, this form of mass media reaches more people than this statistic indicates, as whole villages will crowd around one set to watch a sporting event or favourite television series on one of the nine Khmer channels. A good example of the efficacy of this medium is that the UK's BBC weekly television drama *Taste of Life*, which dealt with issues such as HIV/AIDS, traffic safety and women's rights, was viewed by over 80 per cent of Cambodians during the two seasons in which it aired.

Radio is even more far reaching and accessible. Eleven per cent of the Cambodian population own radios, many of which are useable in areas off the electrical grid. Cambodia has two national radio stations and 14 local radio stations. There have been some attempts to set up community-run radio stations, but these efforts have been disallowed by the Ministry of Information.

Cambodia's Opportunity Index, which uses 10 indicators to measure ICT capital (network infrastructure), ICT skills, ICT uptake or usage, and the intensity of ICT usage,[3] grew from 20 in 2001 to 29 in 2005—a growth rate of 42 per cent. In 2005, Cambodia ranked 164th out of 183 countries. At first glance the growth rate might seem good. However, the speed at which ICT is developing throughout the world indicates that Cambodia is developing more slowly than most. To compare Cambodia with her neighbours: from 2001 to 2005 Myanmar's OI grew from 9 to 19 (ranking 177th), Lao PDR's OI grew from 24 to 39 (ranking

151st), Vietnam's OI grew from 44 to 77 (ranking 111th), and Thailand's OI grew from 75 to 99 (ranking 87th). The growth rates during these five years for Myanmar, Lao PDR, Vietnam and Thailand were 112 per cent, 49 per cent, 76 per cent and 32 per cent, respectively. Cambodia's ICT growth rate is lower than that of all of its neighbours except Thailand whose OI is three times that of Cambodia.

Key organizations

The government ministries, organizations, companies, educational institutions and NGOs that are involved in ICT can be categorized as illustrated in Figure 1. The categories used here are 'policy and regulation', 'infrastructure', 'content', 'enterprise' and 'human resources'.

In the past, the Ministry of Post and Telecommunications (MPTC) was responsible for all government policy, regulation and infrastructure. Government efforts to reform the telecommunication and ICT sector have resulted in a plan to divide these three functions into separate, independent organizations. In 2005–06 the responsibility for telecommunications infrastructure was moved from MPTC to Telecommunications Cambodia (TC). MPTC currently carries responsibility for both policy and the regulation of Cambodian telephony and ICT. In the next year or two, it is expected that MPTC will divest itself of responsibility for regulation of the telephony and ICT sector.

Figure 1
Key organizations involved in ICT
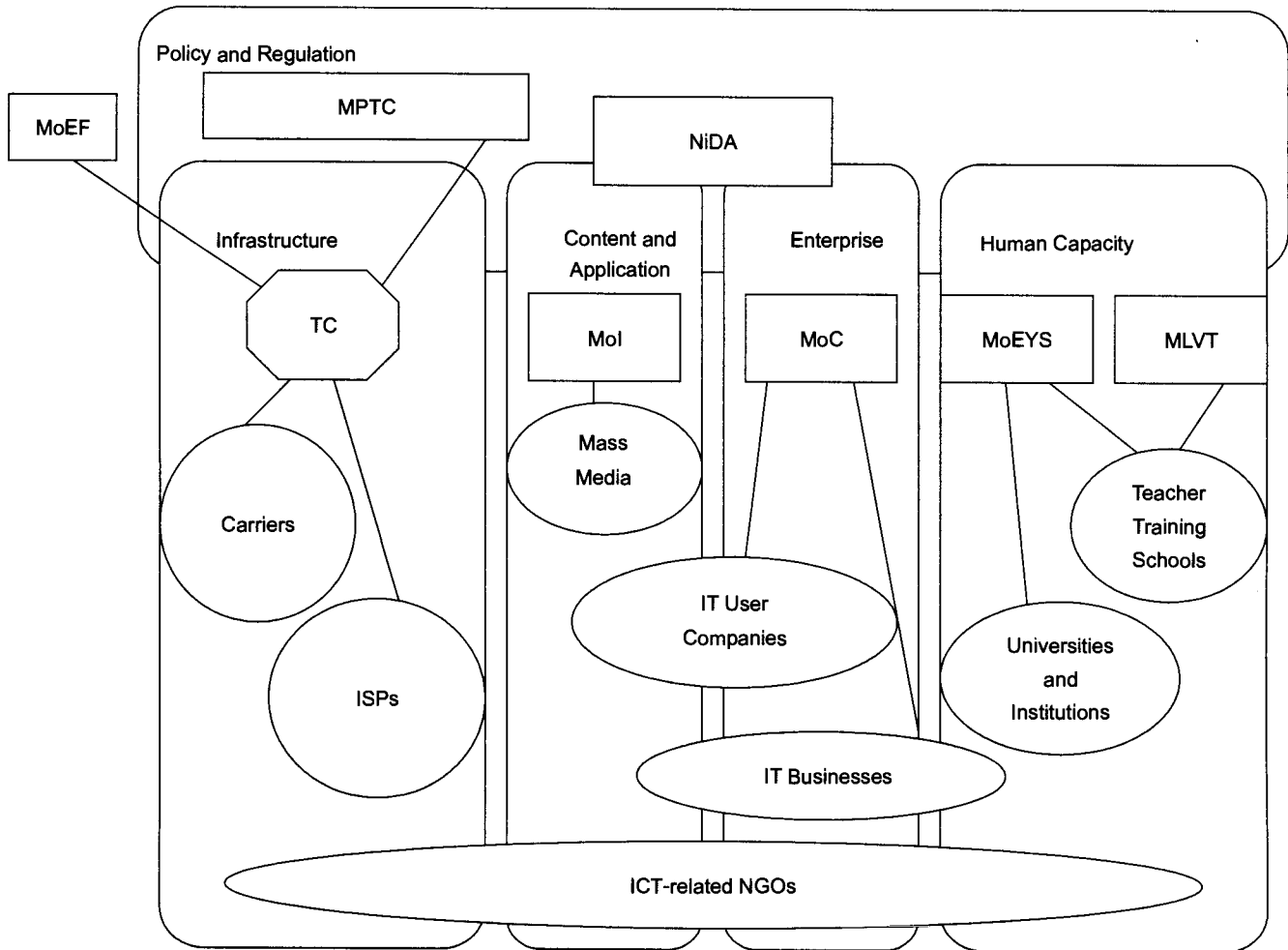
TC now has full responsibility for Cambodia's telecom and ICT infrastructure. This includes the major backbone landlines, international connections, connections to mobile phone service providers, and connections to the new IPstar satellite national network. TC's current backbone and planned extensions are illustrated in Figure 2. TC revenue last year was over USD 25 million, employing roughly 600 people operating in eight of Cambodia's 24 provinces. TC is jointly owned by MPTC and MoEF (Ministry of Economics and Finance).

In 2000, the National ICT Development Agency (NiDA) was created to promote ICT. It reports directly to the Office of the Council of Ministers and is chaired by the Prime Minister. Although NiDA was initially intended to formulate ICT policy for short, medium and long-term development, this responsibility clearly overlaps with MPTC, which has resulted in conflict and confusion. NiDA currently has five divisions: infrastructure, policy, human resource development, enterprise, and content

and applications. Partly in response to the confusion, NiDA has begun focusing on the content and enterprise areas, particularly toward the development of e-government (Miyata 2006).

The role of the Ministry of Information (MoI) is the development and regulation of media and publications. This also overlaps to some extent with the roles of NiDA and MPTC. Thus the MoI has been, and continues to be, actively involved in ICT policy discussions. The MoI's role also includes censorship of the media and control of information sharing. For example, the MoI appears to have stopped the licensing of community radio in 2006–07. The MoI does support the dissemination of important information about issues such as health and government activities.

The Ministry of Commerce (MoC) is responsible for enterprise development, import and export regulation and development, foreign and domestic trade, intellectual property issues,

Figure 2
Current national backbone and development plan
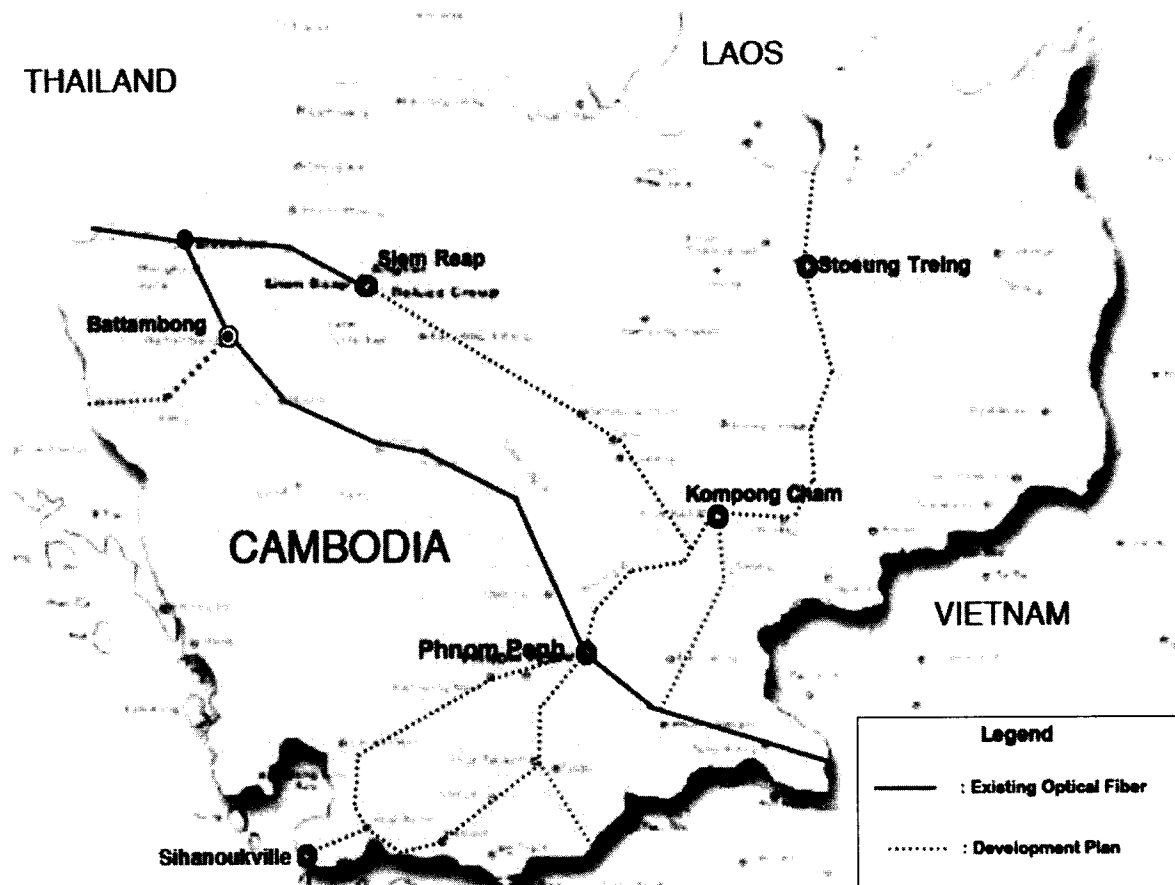
and supporting the development of rural Cambodian small and medium-sized enterprises (SMEs). MoC is also leading ICT for Rural Empowerment and Community Health (iREACH), which aims to develop local enterprises to sustain rural e-communities (see the box 'iREACH Cambodia').

The Ministry of Education, Youth and Sport (MoEYS) plans to integrate ICT within its various initiatives towards its long-term vision of 'education for all'. The ICT in education policy focuses on teacher training: the Ministry gives priority access to all teachers and to secondary schools, and emphasizes the role of ICT as a teaching and learning tool. MoEYS also endorses the use of various types of media technology in outreach education and the use of ICT to improve education administration.

The Ministry of Labour and Vocational Training (MLVT) is also involved in education and training, as well as in labour conflict resolution.

Two NGOs focusing on ICT are the Centre for Information Systems Training (CIST) and Digital Divide Data (DDD). According to Jessamy (2001),

DDD was established in Cambodia through a partnership between an international team of advisors and local people with a wide range of proven experience in the business, non-profit and social entrepreneurial sectors. DDD hires talented workers from some of Cambodia's disadvantaged groups, such as land mine victims and women, and trains them to provide data entry and digitization services outsourced from the developed world. DDD runs as a self-sustaining cooperative, with all profits going back into the business to provide fair salaries, ongoing training and health services for its employees.

The Centre for Information Systems Training (CIST) is an NGO that funds education for disadvantaged children and helps to employ young adults in Southeast Asia. CIST aids in the education of Khmer youth so they may contribute to the development of their country.

iREACH Cambodia

The iREACH (ICT for Rural Empowerment and Community Health) project launched in 2005 is a partnership between the Cambodian Ministry of Commerce and IDRC. Initially for three years, the project is generating and documenting evidence regarding the process, value and potential sustainability of building multi-purpose, community-driven computer-communication networks for rural people. Two 'e-communities' in Kep and Kamchai Mear are being piloted. The project's technical innovations and social and economic effects are intended to produce evidence to influence better ICT policymaking for rural people to benefit from a changed ICT world.

ICT-enabled services will be offered at numerous points throughout these two communities, including access to health, education and agricultural resources; low-cost telephony; local-area video conferencing; access to the Internet; and community radio and video. Examples of usage can range from providing timely and accurate weather forecasts for small fishing craft in Kep, to supporting the collection and dissemination of marketing information for fruits and vegetables, to distance education for pupils far from a secondary school, to a multi-village interactive video conference on maternal and child health among village women and a remote health expert.

Each pilot is conceived from the outset as a community-owned enterprise offering a suite of services capable of generating income and becoming sustainable. Building on an assessment of local needs, each pilot has a local management committee selected through a democratic process. In addition to the core staff, iREACH is employing and training 'content developers' from the communities to ensure that services are adapted to local needs. A key challenge is local institution-building, building the capacity of local people to plan and manage a successful enterprise.

Technologies deployed include innovative low-cost wireless such as WiMax, Wi-Fi and VoIP, as well as eco-friendly solar power since electricity is not available in most of the communities. A key component of the project is research—baseline research with the local community to help track the contribution of the initiative to poor people's lives; documenting the process to capture the lessons from mistakes as well as successes; and extracting policy lessons that can be used to inform ICT policy more widely in Cambodia.

Issues such as the link between rural development policy and ICT policy and the potential role of universal access funds in replicating such initiatives will be examined. The lessons learned from iREACH will be integrated with experience from around the world to develop potential policy initiatives.

Policy and regulation

The National Strategic Development Plan (NSDP) is Cambodia's comprehensive five-year plan for 2006 through 2010. It lists ICT as one of the government's 16 highest priority areas. The NSDP states the following in the section on key strategies and actions:

ICT: The long-term development vision is to develop a cost-efficient and world-class post and telecommunications system that has a nation-wide coverage. The realization of this vision would require high levels of investment to build the backbone infrastructure of the telecommunications systems, especially high-speed optical fibre cables for the development of rural telecommunications systems. The immediate challenge is to bring down the cost of telecommunications to help businesses and people at large. Telecommunications and Information Technology

(IT) should be made to work for the betterment of the poor. Priorities during NSDP, 2006–10 are:

- Expand the telecom network in urban areas and extend them to smaller cities and towns.
- Strengthen postal services and the capacity of concerned institutions to improve the coverage and quality of the services.
- Strengthen and improve efficiency and quality of Radio and TV broadcast networks.
- Continue to follow an open policy in promoting a high level of private sector participation.

Emphasis will continue on promoting extensive use of IT in all aspects of governance and government to improve efficiency and effectiveness in maintenance of records, data bases and websites which will provide easy access to the public at large on all matters of their concern. Each ministry or agency will host its own website and keep it

fully updated every six months or more often as needed. Such websites will contain all data and information pertaining to the ministry or agency.

The intent of the Royal Government of Cambodia (RGC) with respect to ICT policy and regulation is positive. However, the practice and implementation of this policy is very limited. For example, the MPTC has entered into joint ventures with foreign private investment companies to construct the mobile network. While this has helped to build infrastructure with little government funding, the implementation has been marked by a lack of consistency and transparency. The licensing of private mobile carriers has been dealt with case by case, without a clear legal framework. Currently, the sector is undergoing a major reform, as it is a condition of a Japanese soft loan for a fibre optic network between Sihanoukville and Kampong Cham.

The Telecommunication Sector Policy Statement is 'a national policy for the development of the sector' for 'the delivery of efficient, cost-effective and affordable telecom services to the people of Cambodia'. The statement primarily aims at reforming the sector by dividing MPTC into three independent entities responsible for policy, regulation and infrastructure. As noted earlier, MPTC would retain its 'policy' functions, TC has been created to deal with 'infrastructure', and a Telecommunications Regulator of Cambodia (TRC) will be created (Miyata 2006).

Consistent with the above policy statement, a new law on telecommunications has been developed over the past three years and in 2006 was sent to the National Assembly. This law is expected to establish the rules by which the TRC will regulate the ICT sector, including all telecom service providers (operators) (Miyata 2006).

In 2003, recommendations for a national ICT policy were developed within a study of the sector performed by NiDA with the assistance of UNDP-APDIP. The scope of this study included policy, infrastructure and access, content and applications development, human capacity development, and ICT enterprise development. It has been under review by the Council of Ministers for several years. According to Miyata (2006),

> [the] Prolonged process of formulating ICT policy revealed a serious strain of coordination and cooperation among key players, in particular, between MPTC and NiDA. Coordination and cooperation are crucial as ICT cuts across all sectors .... It seems that it is the Deputy Prime Minister ... who acts as a mediator and a coordinator among key agencies, namely MPTC, NiDA and MoI.

The intent in creating TC and moving responsibility for infrastructure out of MPTC was to separate this function from policy and regulation. However, although TC is now a separate corporation, it is state-owned, 100 per cent by MPTC and the MoEF. Thus MPTC still has a significant influence on the ICT infrastructure and operational functions.

It is clear that the transparency and consistency of the overall telecom and ICT policy and regulation environment have a major impact on sector development. The government is struggling with conflicting responsibilities for policy, for example, MPTC and NiDA's overlapping roles with respect to policy, and MPTC ownership of TC on infrastructure. This lack of clarity significantly retards development.

Achieving separate, independent, arms-length responsibilities for policy, regulation and infrastructure, which is the current government's plan, would have a significant positive impact on ICT sector development, including e-government, e-health, e-commerce and e-learning.

Education and capacity building

During the recent 30 years of internal conflict, primary, secondary and higher levels of education were all seriously weakened. The education system has been operating fully only since 1998. As a result, many Cambodians within the current working generation have not had adequate education, and many in the 20–45 age group lack sufficient primary education (Miyata 2006).

Recent enrolment increases in university level computing and IT courses are now producing many degree holders in Computer Science and Information Technology. However, many employers seeking ICT professionals have complained that these graduates have low levels of knowledge and inadequate skills for employment. Companies report that a great deal of time has to be invested in on-the-job training. There is often a lack of basic skills such as understanding how to plan and schedule work, complete tasks and meet deadlines. Currently, very few education programmes target these basic skills, and they are not adapted to meet ICT market needs.

On the positive side, in 2006, CIST performed a market study in Cambodia interviewing over 200 organizations and companies in both, the ICT sector and sectors that utilize ICT services. Specific skills were identified that ICT graduates need for employment in construction, consumer goods and services, education, energy and utilities, finance, health, NGOs, manufacturing, transportation and logistics, as well as ICT suppliers. CIST has plans to create an education programme that would be tailored to develop the skills that are most needed in these areas.

Many universities have developed ICT-related courses. With assistance from UNESCO, teacher training centres have been outfitted with second-hand computers and an introductory

computer class has been added to all teacher training courses. MoEYS has also slowly worked towards improving the quality of higher education. For example, MoEYS introduced a first-year foundation course in every university and has set up the Accreditation Committee of Cambodia.

The Institute Technologie du Camboge (ITC) in Phnom Penh which has a strong focus on IT has received substantial support from the French government. ITC also has an important role in addressing human capacity in applications development within the Khmer PAN Localization Project (see the box 'PAN Localization Cambodia').

Donor support of ICT

There has been, and continues to be, substantial donor support for the development of Cambodia's ICT sector. Donor-supported ICT4D projects are listed by 'Activity' and 'Theme' in Table 2. 'Activity' refers to the main project output category

Table 2

Current and recent donor ICT4D projects

Focus area of support			
Activity	Theme	Donors	Partners
Infrastructure Development	Telecom	KfW or Germany (east-west optic fibre network) Japan (Local exchange, optic fibre network) IDRC (first Internet connection)	MPTC
	E-Government	Korea (optic fibre in Phnom Penh)	NiDA
	Community centre	Korea (Internet Plaza), India (10 Internet Kiosks) USAID (22 Community Information Centres)	NiDA Asian Foundation
Policy Development	Telecom	World Bank, ADB ITU-UNDP	MPTC
	ICT General	UNDP-APDIP (ICT Policy) JICA (IT Action Plan for Cambodia)	NiDA
	E-Commerce/SME	ADB (e-commerce law) UNDP (e-trade strategy/e-assessment) ASEAN (e-ASEAN initiative) WIPO (IPR Laws) IDRC (survey on the use of ICT in SMEs)	MoC MCFA, MIME, MoC NiDA (planned)
	ICT in Schools	UNESCO (ICT Policy in Education)	MoEYS
	Rural Access	IDRC (2 Pilots) (see iREACH boxed article)	MoC
Human Capacity Development	ICT General	UNDP-UNESCO-IBM (IT awareness) InWent, Intel, Microsoft (basic IT skill trainings)	NiDA
	E-Government	Korea (IT Forum on e-government GAIS centre)	NiDA
	E-Commerce/SME	UNCTAD (training for government officials)	MoC
	ICT Skill Training and Education	Cisco Systems-UNDP-APDIP (Cisco Academy) Korea (National Polytechnic Institute of Cambodia) India (Cambodia-India Entrepreneurship Development Centre) Singapore (Cambodia Singapore training centre) France (Institute of Technology of Cambodia) France, Private IT Companies (establish Center for Information System Training: CIST)	NiDA MLVT MoEYS Enfant du Mekong
	ICT in Schools	UNESCO (use of ICT in EFA) Private and Individual contribution (Village Leap)	MoEYS NGO
	Khmer Scripts and Application	InWent (OpenOffice training)	NiDA/Openforum
Enterprise Development	E-Commerce/SME	World Bank, IFC (promoting SMEs using ICT) UNESCAP (e-biz development service for SMEs) GTZ, USAID (private sector promotion with ICT) GTZ-UNDP (village phone f/s) UNDP (support of local enterprise for job creation) Private and Individual contributions (Village Leap)	MPDF ICT Association n/a ODD NGO
Content and Application Development	E-Government	Korea (Government Admin. Info. System: GAIS)	NiDA
	ICT in Schools	UNESCO (use of ICT in EFA: creation of content)	MoEYS
	Khmer Scripts and Application	UNDP-APDIP (KhmerOS) CICC, Japan (Workshop and Seminars on FOSS) IDRC (Pan Localization) (see boxed article)	NiDA/Openforum MPTC
	Access to Info.	UNDP (support CIC pilot outreach) USAID (election information outreach via CIC)	Local NGO/CIC Asian Foundation

Note: Projects which only support attending international conferences, workshops and trainings are not included.

PAN Localization Cambodia

Access to most computing tools, and to most Internet and Web content and services, requires some level of English literacy. Unfortunately, very few Cambodians can read English, which severely limits the number of people who can take advantage of ICT tools, content and services. Khmer is the national language and is the official language of communication, official documents and government documentation in Cambodia.

The PAN Localization Cambodia (PLC) project aims to develop Khmer language access to computing. It was established in May 2004 with support from the International Development Research Centre (IDRC) of Canada through its Pan Asia Networking (PAN) programme and the National University of Computers and Emerging Science (NUCES) based in Lahore, Pakistan, and in partnership with the National Committee for Standardization of Khmer Script in Computers (NCSKSC).

The PLC project is addressing a number of aspects of Khmer language localization, including linguistic standardization of Khmer script for use in computing, applications, development platforms, content publishing and access, effective marketing and dissemination, and intellectual property right strategies. More specifically, the PLC project has explored both Linux and Microsoft platforms for a number of applications. During the past three years, the project has completed the following localization software and utilities:

- Khmer Encoding Conversion Utility
- Khmer Collation and Sorting Utility
- Khmer Basic Lexicon
- Khmer Word Segmentation Utility
- Khmer Spell Checker Utility
- Khmer Text Corpus (around 500,000 words)
- Khmer Mobile Interface Terminology (in progress)

Since its creation in October 2006, the PLC website has been accessed over 30,000 times. Khmer Unicode fonts and some of these tools can be freely downloaded from the website.

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while 'theme' refers to the main subject area. This list was created from projects mentioned in interviews and existing reports with an ICT4D focus. It does not include projects with non-ICT goals but which may have an ICT component. Some projects appear more than once in the table, since they have many activities (outputs) under a single topic. These groupings enable a comparison of the focus of donors. Most donors, for example, have focused on human capacity development. Infrastructure development has been through bilateral cooperation (Miyata 2006).

Challenges

The Kingdom of Cambodia and the RGC have been in existence since 1994, only 18 years. The previous 25 years of conflict destroyed nearly all of the country's infrastructure, including educational systems, health care, land titles, telecommunication systems, social institutions, civil society, financial systems and government structures. In the context of this tragic recent history, elements of Cambodia's ICT sector have developed rapidly, usually due to exceptional efforts by a few Khmer individuals, and at times, by the government.

However, Cambodia's start from near zero in 1994 and the lack of clear, consistent, forward-looking policy and regulation place the country's ICT sector far behind those of its neighbours. Cambodia's ICT sector is developing at a slower rate compared to ICT sector development in its neighbouring countries and most other LDCs. There is a lack of decisive and progressive government action towards implementing modern telecommunication and ICT policy and regulation, which in turn stems from a lack of progressive knowledge and expertise in the government teams in this rapidly growing field.

The RGC, in concert with many committed donors, has developed good plans and it has drafted laws that if implemented, would truly boost Cambodia's rate of development. The plan to

divide MPTC's policy and regulation functions and to privatize infrastructure development is positive. However, implementation of this plan is proceeding very slowly and, in some cases, also appears to subvert the intent (for example, MPTC's ownership of TC).

On the policy and regulation front, little has changed since the 2005–06 DirAP report (Klein 2005). Restrictive VoIP and community radio licensing continue to be examples of backward-looking policy and regulation that is hampering progress. The implementation of progressive ICT policy and regulation would unleash many Khmer private companies and entrepreneurs, with a corresponding substantially improved ICT sector rate of development. The impact of this should not be underestimated. It is not only the ICT sector that would improve much more rapidly; the much larger business, education, health and government sectors that depend on access to effective, efficient and economical ICT services would also hugely benefit.

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> The UNDP report was prepared under the direct guidance of Ms Yoko Konishi, ICTD Focal Point/Governance Specialist, Governance Cluster, UNDP Cambodia, and with valuable advices from Dr Brian W. Unger, Executive Director of GRID Research Center/Professor of Computer Science, University of Calgary, and Mr Dara Bunhim, IT Analyst, UNDP Cambodia. (Miyata 2006)

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Notes

1. Compare this with Laos at 12 per cent, Vietnam at 30 per cent and Thailand at 34 per cent.

2. Laos, Vietnam and Thailand have 0.42 per cent, 13 per cent and 11 per cent, respectively.

3. The 2007 *International Telecommunications Review* titled Measuring the Information Society defines an ICT Opportunity Index (OI) according to 10 indicators: main telephone lines per 100 persons, cellular phone subscribers per 100 persons, international Internet bandwidth, adult literacy rates, enrolment rates, Internet users per 100 persons, proportion of households with TV, computers per 100 persons, broadband Internet subscribers per 100 persons, and international outgoing phone traffic (min) per person.

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