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Nepal

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Total population	27,094,000[a]
GDP per capita	(PPP) USD 1,550[a]
Key economic sectors	Agriculture, tourism, remittance
Computer per 100 inhabitants	NA
Fixed-line telephones per 100 inhabitants	2.99[b]
Mobile phone subscribers per 100 inhabitants	9.46[b]
Internet users per 100 inhabitants	0.31[b]
Domain names registered under .np	13,200 as of April 2008[c]
Broadband subscribers per 100 inhabitants	NA
Internet domestic bandwidth	NA
Internet international bandwidth	52 Mbps and 116 Mbps (uplink and downlink)[b]

(Sources: [a]UNDP 2008; [b]Nepal Telecommunications Authority 2008; [c]Mercantile Communications 2008)

OVERVIEW

In Nepal's current state of transition, the political agenda has taken priority over everything else, including ICT development. However, with the successful holding of the long overdue constituent assembly election in April 2008 following the signing of a historic peace accord, Nepal has entered a new era of political stability that is expected to usher in economic growth, including leapfrogging developments in ICT. The new leadership has acknowledged the importance and potential of ICT for development, although it has yet to actively promote and develop it.

A major ICT program rolled out in 2008 consists of government initiatives promoting e-governance. Progress in connectivity across the country is being made. Teledensity in Nepal as of January 2008 was 12.45, up from 1 in 1999. The recent deregulation of Internet telephony is encouraging and could lead to further expansion of connectivity, which in turn could provide unprecedented opportunities for developing education, tourism, health education, agriculture, trade, and various other sectors.

But more definitely needs to be done to make ICT services accessible to the masses. ICT can help extend educational opportunities to a wider segment of the population and meet the education targets of the Millennium Development Goals (MDGs). In particular, making available ICT-based distance learning facilities in the rural areas could improve access to educational resources and good quality teaching for students living in rural areas, and thus redress the imbalance of teachers and facilities being concentrated in the urban areas. A promising initiative is the One Laptop per Child (OLPC) Nepal project, which focuses on developing materials that are linked to the national curriculum to be used with the laptops, besides taking steps to scale up the project for nationwide coverage.

TECHNOLOGY INFRASTRUCTURE

The completion of the optical fibre network is considered essential as it will be the backbone for telecommunication services, including Internet services. With the completion of the second phase covering a distance of 900 kilometres, all of Nepal will be connected to India via several connecting points and the country will have a complete optical fibre backbone from east to west. The Indian government is funding the project for the most part.

Nepal Telecom (NT), with funding support from the Chinese government for the fibre optic project along the 115-kilometre Arniko Highway linking Kathmandu to Khasa, which borders China on the north, is set to complete the project. Once these two landmark projects are brought into operation by early 2009, Nepal will have the capability to link with the major nodal communication gateways of the world, which would substantially enhance its global communications capability. This can lead to cheaper and reliable alternatives to existing satellite communications, and prepare the ground for many kinds of ICT services ranging from telemedicine to e-education. Nepal would also eventually be a part of the Asian information superhighway connecting many countries in the Asian region.

At present there is a project to connect, via very small aperture terminals (VSATs), 1,000 Village Development Committees (VDCs) out of Nepal's 3,915 VDCs in mountainous regions

where other modes of telecommunications are not considered to be feasible. Each of the 1,000 VDCs will have two telephone lines via solar-powered VSAT technology to be used mainly for voice transmission. Once all VDCs are connected, the next target could be setting up telecommunication services or telecentre facilities in each ward of a VDC (nine wards make up a VDC). Wireless Fidelity (WiFi) and Worldwide Interoperability for Microwave Access (WiMAX) networks promise convergence and economic access by leapfrogging older technologies and could be a good means to establish telecentres at the ward level.

KEY INSTITUTIONS AND ORGANIZATIONS DEALING WITH ICT

Government ministries with a direct role in ICT development include the Ministry of Environment, Science and Technology (MOEST) and the Ministry of Information and Communication (MoIC). The MOEST formulates and coordinates ICT policy, while the MOIC has oversight over the telecommunications, postal, mass media, and broadcasting sectors.

The High Level Commission on IT (HLCIT) is an apex body under the MOEST providing crucial strategic direction and helping to formulate appropriate policy responses for the development of the ICT sector. It seeks to harness new technologies to meet key developmental challenges such as governance reform and catalyzing economic growth for poverty reduction. The National Information Technology Council (NITC), as the secretariat for the HLCIT, looks after the implementation aspects.

The Nepal Telecommunications Authority (NTA) is the regulatory body for telecommunications, including Internet service providers (ISPs).

The Internet Service Provider's Association of Nepal (ISPAN) is the umbrella organization for ISPs. ISPAN is committed to advocate for and support a healthy Internet industry in the country. It works closely with telecom operators, ministries involved in ICT-related matters, and various other organizations on various issues that affect the implementation of the ISPs' projects.

Among the telecom operators, NT and United Telecom Limited (UTL) operate fixed-line services. NT is the leading and the largest telecommunications service provider in the country. After serving the nation for 29 years as a wholly-owned government corporation, it was transformed into the present Nepal Telecom in 2004 to become a public, business-oriented, customer-focused company in a competitive environment. Shares in the company were recently floated in the market. In the mobile market NT and Spice Nepal (SNPL) are the two operators. Through the NTA, the government made a policy decision in March 2008 to invite a new operator, the fifth for the country, to provide telecom services to the western part of Nepal.

The NGO sector is active in using ICT for development. Organizations like FIT Nepal aim to bring the benefits of ICT to the rural and marginalized communities of Nepal by establishing community centres and building capacity in ICT use. e-Networking Research and Development (ENRD), another NGO, conducts basic computer education and hardware training in the rural areas. The organization Room to Read founded by John Wood, a former top executive of Microsoft, continues to establish computer labs in rural areas of Nepal. Rural Education and Development (READ), a Kathmandu-based NGO, is supporting no-cost public access to computers and the Internet and is committed to promoting computer literacy.

There are also organizations like IT Professional Forum (ITPF) and the Computer Association of Nepal (CAN) that work for the IT industry as a whole, including the educational and business aspects.

ICT AND ICT-RELATED INDUSTRIES

The Nepali IT market consists of hardware and software services, including business process outsourcing (BPO) services, call centres, software development, and creating solutions. Although the ICT industry here is small and immature compared to the ICT industry in more developed countries, there are companies, such as D2Hawkeye, Mercantile, HiTech Valley, Yomari, Serving Minds, and GeoSpatial, managed by visionary leaders and successfully providing products and services consistent with international norms.

The CAN estimates the volume of software business in the country to have crossed USD 40 million. Still, the expected rapid growth of the software industry has not taken place.

Some companies doing IT-enabled services are transforming Nepal into a global outsourcing centre, but their number is still limited. Aside from call centre services, they are engaged in software development, database maintenance, website creation, medical transcription, and digitization of maps. This sector needs to be developed further with appropriate policies, as it not only brings in foreign exchange but also provides employment on a large scale. Companies that have survived and are growing despite high insurance costs, political instability, average investment ranking in global markets, and average infrastructure (electricity and Internet), deserve appreciation. They contribute to economic growth and serve as models for others to emulate.

Fixed-line penetration has reached 2.99, with NT and UTL having a market share of 87 percent and 13 percent, respectively.

NT is providing services in all of the districts of Nepal through wired and wireless technology while UTL is providing service through wireless technology.

Lately, there has been a tremendous increase in the number of mobile subscribers. SNPL now holds 40.27 percent of the market share, while the market share of the incumbent NT has increased to 59.73 percent. The mobile customer base is growing continuously due to the prepaid mobile scheme, which is approaching the two million mark. Besides the Kathmandu Valley, NT provides mobile services in 43 districts while SNPL has extended its service to 34 districts. NT is aiming for an additional 3.5 million Global System for Mobile communications (GSM) users and 2 million Code Division Multiple Access (CDMA) users in the next three years.

Teledensity in Nepal as of January 2008 was around 12.45 — i.e. 2.99 for fixed line and 9.46 for mobile phones.

There are currently 35 ISPs in the Nepalese market. Total international bandwidth used is in the ratio of 1:2.25 with 52 and 116 Mbps for uplink and downlink, respectively.

NT, which is also an ISP, has introduced ADSL into Kathmandu to start with, and plans to expand to 85,000 lines all over the country for its fixed-line customers. The NTA has also asked NT to allow private ISPs to sell the service.

The use of the partly completed optical fibre link to India has reduced the cost of leased capacity for downstream ISPs and ultimately for the users. Using this new link, NT has increased its Internet bandwidth capacity to 400 Mbps. In the coming years, demand for broadband services with applications like video on demand and IPTV is likely to emerge and ISPs might also have to think about introducing Next Generation Network (NGN) technology. Recently, the NTA also decided to allow the ISP for Internet telephony to process and carry voice signals through the Internet Protocol (IP) network after obtaining a licence for this.

KEY ICT POLICIES, THRUSTS, AND PROGRAMS

Two policies govern the development of ICT in Nepal — the IT policy of 2000 and the Telecommunications Policy of 2004. Both have been extensively discussed in earlier issues of the *Digital Review of Asia Pacific*.

What needs to be pointed out now is that the IT policy needs to be revised in light of many new developments in the last few years and the highly dynamic environment. The HLCIT drafted a new IT policy in 2005 but this has remained on paper. The draft policy envisions Nepal as a knowledge-based society by 2015 through the effective use of ICTs to help achieve the goals of good governance, poverty reduction, and social and economic development.

The government also aims to achieve a teledensity of 24 by 2010, which is the end of the current three-year interim plan. Ten periodic plans have been completed in the five decades of planned development in Nepal. The current plan, the first after the epochal political change in the country, is seen as an interim one.

One of the key thrusts of the government is the implementation of the broad e-governance master plan developed by the HLCIT in 2006 with the help of the Korean government. The five-year Master Plan covers e-health, e-agriculture, e-education, as well as the delivery of basic public services. Its aim is economic development and productivity enhancement. A budget of USD 75 million has been allocated for its implementation beginning early 2008. The Asian Development Bank (ADB) has committed USD 30 million and the Korean government has committed another USD 30 million. The Government of Nepal will bear the rest.

LEGAL AND REGULATORY ENVIRONMENT FOR ICT DEVELOPMENT

The NTA is the telecommunications and Internet regulatory body of Nepal. This autonomous body was established in February 1998 in accordance with the Telecommunications Act 1997 and the Telecommunications Regulation 1998. Its objective is to create a favourable and competitive environment for the development, expansion, and operation of telecommunications services with the participation of the private sector.

In December 2006, Nepal promulgated the Electronic Transaction Act, also known as the Cyber Law, which legalizes all electronic transactions and digital signatures. The law also defines and sets penalties for computer and cybercrimes, such as hacking, piracy, and computer fraud. The Kathmandu Metropolitan Police Crime Division (KMPCD) has set up a separate Cyber Cell to deal with criminal cases involving cyber technology. The Supreme Court has started treating email correspondence as legal for judicial purposes. Earlier, only correspondence via facsimile and postal mail was considered authentic for judicial purposes.

In August 2007, the Parliament enacted the Right to Information Act (RTI), which requires all public offices — constitutional bodies, ministries, and NGOs, among others — to appoint information officers who will disseminate information about their respective offices in the interest of transparency and accountability. The Act affirms the principle that if information is denied to the public, the exercise of free expression is severely limited.

DIGITAL CONTENT INITIATIVES

The tourism industry has a strong Web presence. Tourism is a key sector of the Nepalese economy, and all major hotels, guesthouses, travel agencies, trekking agencies, and airlines have websites introducing their services. Many provide online services such as booking and planning. These tourism-oriented websites provide appealing content featuring graphics and photographs that highlight the country's culture, adventure activities, and the beauty of the Himalayas.

Many government ministries and departments as well as municipalities now have websites as well. Details of policies, speeches, laws, regulations, circulars, manuals, forms, and other information regarding the agencies are found in these websites. Majority are published in English but Nepali content is also slowly gaining prominence. Most international NGOs and many local NGOs also provide content focusing on their work, sharing knowledge and helping improve public access to quality information.

Most major newspapers in Nepal have an online presence. Major television networks also provide Internet-based news services. Some radio stations broadcast their programs on the Web, while a few radio stations have also started podcasting music to serve on-demand users. Popular magazines and webzines are likewise increasing their presence on the Web. These online news and current affairs services are useful for the international community, particularly non-resident Nepalese.

Although Nepal has lagged behind other countries in the use of computer-based ICTs, it is one of the countries in Asia where the concept and practice of community radio have been successfully implemented. Nepal's experience in community radio is considered worldwide as an innovative and successful model particularly for countries with a difficult terrain and a dispersed and isolated population. Community radio delivers both entertainment and developmental content. Outside Kathmandu valley, community radio stations are also now using the Internet to share digital content produced from a central hub in Kathmandu.

User-generated content in social networking sites has been increasing lately. These sites, which are community-focused, feature message boards, discussions, photo galleries, and videos by Nepalese living in various parts of the world. A growing number of blog sites are portraying Nepal and Nepalese as perceived by ordinary Nepali citizens. Sajha.com and weblognepal.com are two examples. Photo blogs are also emerging.

Entertainment websites in Nepalese feature sports, music, movies, fashion, and Nepali artists and models.

In the education sector, all of Nepal's four universities provide detailed information, including programs and courses offered, on the Web. Private schools are beginning to acquire a Web presence. There are also online directories and almanacs that can be used to locate schools, colleges, and training institutions in Nepal. In addition, the results of university and board examinations are published on the Web on a regular basis. However, there are hardly any courseware and educational materials linked to the curriculum.

ONLINE SERVICES

Although an act on electronic transaction is now in place, e-commerce in Nepal is just starting. Some banks have tied up with a host of third party vendors for e-shopping and e-payment services to allow online purchases and payments from all leading online shopping portals in the country.

The Nepal Stock Exchange (NEPSE) has granted brokers permission to start online trading of shares through the Wide Area Network (WAN), thus paving the way for online transactions in the Nepali stock market. The new facility allows selected stock brokers to place orders, sell, or buy shares from their office via the Internet without going to the capital market.

Many emerging private commercial banks now offer Internet banking services. A full range of services is provided to clients, from basic services such as viewing and printing account statements and requesting cheque books, to advanced functions such as transferring funds to different accounts, opening letters of credit, and bank guarantees. A few banks have also launched a short message service (SMS) alert facility whereby customers receive an SMS when transactions are made on their accounts. While they may be old hat in developed countries, these services are a significant development in Nepal.

In e-government, an ambitious master plan is being implemented with assistance from the donor community. In line with the e-Government Master Plan, the ADB released in January 2008 a USD 25 million grant to bring the Internet and other IT products and services to remote areas of Nepal through the establishment of telecentres.

ICT-RELATED EDUCATION AND CAPACITY-BUILDING PROGRAMS

The MDG Needs Assessment for Nepal shows that the government must invest USD 12.6 billion over the next decade if the MDGs are to be reached. More than half of this amount must be channelled to efforts to reduce poverty, improve education, and develop critical infrastructure. ICTs in education can broaden access, enhance the quality of teaching and learning, and make education provision more cost-effective.

However, while most of the private schools, which are located in major city centres and district headquarters, have included computer studies in the curriculum even as early as Grade 3, most other schools claim to have never seen a computer. Schools in the rural areas, many of which are government-run, compare poorly to schools in the cities in terms of computer facilities or access to educational materials and resources. On the other hand, computer education is now part of the secondary education curriculum and computer science has been introduced at the upper secondary education level as an elective subject.

In two remote government schools in the Lalitpur district, Open Learning Exchange-Nepal (OLE-Nepal), in coordination with the Department of Education, has formally launched the OLPC project. The laptops are intended for students in Grades 2 and 6 for initial use in English and Mathematics. Out of the 200 laptops donated by the Danish IT Society, OLE-Nepal has distributed 132 laptops. It is planning to introduce this project to other districts, including Makwanpur and Mustang. The Department of Education is thinking of integrating the OLPC project into the national system. But training teachers to effectively utilize this technology is equally important.

ICT in education projects are more relevant to teachers and students when there are curricular components, as in the OLPC project, which is linked with the Grade 6 Mathematics and English syllabus. The OLPC initiative can play a vital role in making ICT-supported education sustainable in Nepal. More importantly, it has a large open source base that enables localization and modification, which develops a sense of ownership. The challenge is more than to give laptops to children; it is how to develop educational materials that can enhance the teaching and learning process. ICT-enhanced educational materials are most useful when they are directly linked to the curriculum.

In higher education, formal programs in ICT are offered in all of Nepal's four universities, namely, Tribhuwan University, Kathmandu University, Pokhara University, and Purbanchal University. In addition, there are 56 ICT colleges operating in the country. According to CAN statistics, some 4,000 ICT graduates are produced every year. A large number of them go abroad where there are better work opportunities.

While some colleges and universities have offered one or two distance learning courses for students in campus, Kathmandu University has created its own courseware server using Moodle, a learning management platform. Additionally, distance learning courses are available in selected institutions that are affiliated with universities abroad. While a true distance education system has yet to be seen in Nepal, the potential for developing e-learning as a means to expand educational opportunities is high. Providing e-learning in the rural areas would increase equitable access to quality education for all. Already the government is working on establishing its first open university along the lines of similar universities in the South Asia region.

The Nepal Research and Education Network (NREN) led by Prime College was established recently to support advanced research through a high-speed data transfer network linking colleges, universities, and research centres.

Private training institutes are offering internationally recognized training courses, including those for Microsoft Certified Professional (MCP), Microsoft Certified System Engineer (MCSE), and Cisco Certified Network Associate (CCNA). Computer learning centres and training institutes, which have mushroomed all over the country, offer short courses on a wide variety of computer software use and applications. Some 28 percent of the total ICT workforce work as trainers and instructors in these training institutes.

Under the e-governance program, the government is also designing human resources development programs for government employees. Still, most ministries and government agencies are badly equipped to meet technical capacity. There is no career path for ICT professionals in the civil service, which makes it difficult to attract computer specialists to work for the government.

OPEN SOURCE/OPEN CONTENT

The development of NepaLinux by Madan Puraskar Pustakalaya (MPP, http://www.mpp.org.np), through the PAN Localization Project, is a significant contribution to the promotion of free and open source software (FOSS) and computing in Nepali. With every release of NepalLinux, the MPP team has been trying to make the system more user-friendly. MPP is also conducting Training of Trainers seminars to develop technical people who can deploy NepaLinux in the different rural user communities. In addition, there are plans to introduce NepaLinux and the localized software to some 25 schools initially.

The FOSS Nepal Community, which can be reached at fossnepal-committee@googlegroups.com, is becoming increasingly active in informing the general public about the usefulness and benefits of FOSS. Notably, the FOSS Nepal Community was declared one of the three winners of the Software Freedom Day (SFD) 2007 Best Event Global Competition, an annual event celebrated worldwide on the third Saturday of September.

However, there is no national policy regarding open source software or content. This is one of the issues that the government should address through a new IT policy.

ICT AND ICTD RESEARCH AND DEVELOPMENT

The PAN Localization Project has been extended up to January 2010. The Madan Puraskar Pustakalaya (MPP) aims to use the extension period to develop the Nepali Optical Character Recognition (OCR) system and further refine NepaLinux and other utilities such as the Nepali spell checker, thesaurus, and Nepali Unicode support.

An innovative application of wireless computer technology to connect Nangi, a remote native village in Nepal, to the global village won for Mahabir Pun, a 52-year-old Nepali citizen, the 2007 Ramon Magsaysay Award for community leadership. With several organizations working on ICT for rural development, Pun worked to establish wireless networks in his village supported with applications like telemedicine and education.[1] Pun is now working on connecting more rural areas with WiFi, including Makawanpur district, Dolakha, and some 15 districts in far western Nepal. His efforts are said to have influenced the government to de-licence the WiFi band, which led to the legalization of IP telephony.

Meanwhile, a decade since it was started, the government has finally completed the construction of Nepal's first IT Park at Banepa, 26 kilometres east of Kathmandu. The IT Park, which is to be operated by the HLCIT, cost NPR 260 million (about USD 400,000). NT laid the optical fibre cable from Kathmandu to Banepa for the communications infrastructure. The project included a plan to develop Banepa into an information technology city.

However, despite the investments in the necessary physical facilities, an ultra modern communications system, earthquake-resistant buildings, and various concessional schemes, the IT Park has not been able to attract a good number of IT companies and entrepreneurs and it has remained almost idle. A serious effort to assess the current obstacles to growth and formulate a favourable policy to attract entrepreneurs and companies to the IT Park is needed. Some thought must be given to how the IT Park can attract international companies, given the presence of similar IT parks in other countries in the region.

CONCLUSION

The e-governance master plan initiated in 2008 is a large-scale program covering e-health, e-agriculture, e-education, and other areas. It is hoped that the plan will not remain on paper but rather aid in value creation, productivity enhancement, economic development, and citizen-focused delivery of public services.

Putting in place a new IT policy should also be a priority, as it would serve as the blueprint for bringing in much needed foreign investment and developing the ICT industry. With the new political setup in Nepal, there is a greater need now for a new IT policy that would enable leapfrogging developments in ICT and ICT applications for development.

The technical breakthroughs in localization need to be exploited to make computing accessible to the majority of the population. In addition, rural connectivity and ICT use in the rural areas should be expanded through use of such technologies as WiFi, WiMAX, and Voice over Internet Protocol (VoIP).

With the advent of peace and political stability, expectations of Nepal's renewal are high. Much depends on the work of the constituent assembly over the next two and half years. There are definitely challenges but opportunities too prevail. Policymakers and the new leadership would do well to consider building a new Nepal based on the concept of e-Nepal.

NOTE

1. Pun's project was featured in the 2005–2006 edition of the *Digital Review of Asia Pacific*, before he received the Magsaysay Award.

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