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Philippines

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Total population	88,574,614 (as of August 2007) 90,675,900 (2008)
Literacy rate	Female = 90.4%; male = 86.8%
GDP per capita (in USD)	USD 3,200 (2007 est.)
Computers per 100 inhabitants	7.46 (2007)
Fixed-line telephones per 100 inhabitants	4.48 (2007)
Mobile phone subscribers per 100 inhabitants	58.88 (2007)
Internet users per 100 inhabitants	6.03 (2007)
Domain names registered under .ph	100,000
Broadband subscribers per 100 inhabitants	0.56
Internet domestic bandwidth	From 64 Kbits/s to 5 Mbits/s (2008)[1]
Internet international bandwidth	3,214.5 Mbps (as of 2008)

(Sources: ITU 2008; National Statistics Office 2008)

OVERVIEW

The Philippines' Information and Communication Technology (ICT) sector continued to contribute to sustainable economic and social development, despite setbacks and delays in the implementation of some projects. As early as 1972, the Philippine government recognized the significant role of ICTs in the country's growth and development when it established the National Computer Center (NCC) as the lead organization for human resources and systems development in this field. Today, the ICT sector continues to grow, with the private sector collaborating closely with government for the successful implementation of ICT programs and projects.

The Philippine ICT Roadmap of 2007 sets the country's strategic directions for achieving global competitiveness. The first strategy is to build physical infrastructure to speed up interconnectivity and assure wider public access to a minimum set of information and communications services. The second is to ensure the existence of an appropriate policy and legal environment to encourage the growth of ICT, and then allow the market to decide on how best to utilize investment, provide jobs, and stimulate progress in the sector. The third is to develop human capital that can use ICT and work in the ICT sector to enhance sustainable development.

TECHNOLOGY INFRASTRUCTURE

For wider access to ICT services, especially in unserved and underserved areas, national infrastructure development focuses on major telecommunications and ICT systems such as Cellular Mobile Telephone Service (CMTS), wired and wireless telephones, and Internet service.

In 2007, according to International Telecommunication Union (ITU) indices, there were 4.48 fixed telephone lines per 100 inhabitants and 58.88 per 100 inhabitants subscribed to mobile cellular phones. The combined fixed-line and mobile-cellular telephone density therefore rose to about 63 telephones per 100 persons in 2007.

The Philippine Long Distance Telephone Company (PLDT), the largest telecommunications company in the Philippines, and Bayan Telecommunications Inc. (BayanTel) are the major fixed line telephone service providers. In March 2000, PLDT acquired Smart Communications, which as of April 2008 had a mobile subscriber base of more than 32 million. PLDT's main competitors are Globe Telecom and Digitel in both the fixed line and mobile (via Smart's competition with Globe and Sun Cellular) markets.

BayanTel serves areas in Metro Manila, Bicol, and local exchanges service areas in the Visayas and Mindanao regions, covering nearly 33 percent of the Philippine population. A third telco, GLOBE Telecom, provides local and long distance telecommunications services to more than 12 million wireless subscribers throughout the Philippines. It also offers international wireless connectivity through partnerships with regional carriers, including Maxis Communications in Malaysia.

Internet subscribers numbered 2.5 million (or 2.84 subscribers per 100 inhabitants) in 2007. But there are far more Internet users — 5.3 million (or 6.03 users per 100 inhabitants) by some counts, and up to 14,000,000 by others. Yahoo estimates that up to 16 percent of the Philippine population is browsing and using the Internet.

Broadband subscribers numbered 496.2 in 2007, or 0.56 subscribers per 100 inhabitants. But there is strong potential for broadband growth in the Philippines because of high market awareness of the need for broadband and current low Internet penetration. In response to projected demand, PLDT, for example, has committed around PHP 20 billion (around USD 500 million) per year from 2008 to 2010 to improve its broadband connectivity. PLDT's investments in broadband connectivity are paying off with its broadband subscriber base growing by 184 percent to 302,000 by the end 2007, from 122,000 in 2006. Smart has 2,780 wireless broadband-enabled base stations providing high-speed Internet access to 625 cities and municipalities all over the Philippines. Wireless broadband revenues grew up to PHP 2.4 billion in 2007, a 190 percent improvement over the PHP 823 million in revenues in 2006.

A key development in national ICT infrastructure was the laying of the Philippine Cyber Corridor beginning 2006 as part of a strategy to gain competitiveness in the global business process outsourcing (BPO) market. This ICT channel, which runs over 600 miles from the north to the south of the Philippine archipelago, consists of a USD 10 billion high-bandwidth fibre backbone and digital network, redundant international connectivity, and reliable power supply connecting dedicated IT parks in urban areas. The channel is supported by a deregulated telecommunications environment, low rental rates with liberal terms, and proximity to internationally recognized property management companies. The IT parks are themselves major infrastructure initiatives in support of high technology industries. As of 30 June 2008, 378 IT enterprises were operating in 101 IT Parks around the country.

To provide a secure online environment for e-commerce and e-government, the Philippine government is aiming to establish a Public Key Infrastructure (PKI) Center and government Certification Authority (CA) by 2010. Work in this area started in March 2008 with a USD 3.5 million grant from the Korea International Cooperation Agency (KOICA).

KEY INSTITUTIONS AND ORGANIZATIONS DEALING WITH ICT

The Commission on Information and Communications Technology (CICT, http://www.cict.gov.ph) serves as the primary policymaking and coordinating entity of the Philippine executive branch for the promotion, development, and regulation of integrated and strategic ICT systems and reliable and cost-efficient communication facilities. Starting in 2007, CICT has focused on policymaking and program oversight activities, while the responsibility for implementing programs and projects has been lodged at specific line agencies and local government units (LGUs). Attached to the CICT is the NCC, designated as CICT's e-Government Development Group.

The National Telecommunications Commission (NTC) is the regulatory body. It is attached to the Department of Transportation and Communications (DOTC).

The Department of Science and Technology (DOST), particularly through its Philippine Council for Advanced Science and Technology Research and Development (PCASTRD) and the Advanced Science and Technology Institute (ASTI), implements research and development (R&D) programs that address critical application areas and support ICT-based entrepreneurship.

The Department of Trade and Industry (DTI) through its agencies involved with investment promotion, entrepreneurship, and export development, seeks to provide an environment that would attract investors in ICT and ICT-enabled service (ITES) industries. Attached to DTI is the Board of Investments, which lists ICT and ITES in its investment priority list; the Philippine Economic Zone Authority (PEZA), which oversees the development and management of the ICT Parks; and the Philippine Export Development Council, which lists ICT and ITES as a priority export.

ICT AND ICT-RELATED INDUSTRIES

The Philippine IT industry remains bullish, primarily as a result of the continued growth of the BPO sector. The Secretary of Trade has announced that the BPO sector posted USD 3.6 billion in revenue and accounted for 244,675 jobs in 2006. With the Philippines ranking second in the International Data Corporation's (IDC) list of top 10 BPO destinations in Asia Pacific in 2007, BPO is seen as a major growth engine, with a projected revenue of USD 10 billion by 2010 at a Compound Annual Growth Rate (CAGR) of 40 percent.

In 2005 total exports from the BPO industry amounted to PHP 76.5 billion (USD 1,387.9 million), 53.6 percent higher than the PHP 49.8 billion (USD 888.2 million) reported in 2004. Exports constituted about 69.5 percent of the industry's total revenue in 2005. In the contact centre and medical and legal transcription sub-sectors, more than 95 percent of the revenue came from exports.

In 2006, animation, other BPOs, and software development had an export share to revenue of 66.4 percent, 44.2 percent, and 40.1 percent respectively. The figures suggest that these sub-sectors are also providing services to domestic firms. Specifically, the animation industry serves the domestic print and broadcast media, while the software industry caters to the

software requirements (e.g. payroll system) of large domestic corporations.

The contact centre industry is the fastest growing segment, with 112 customer contact centres nationwide. Medical and legal transcription services grew by 97 percent. Software development, animation and other BPOs also grew by double-digit rates (40.8, 35.3, and 30.5 percent respectively).

According to the XMG intelligence report, the Philippine BPO revenue is expected to grow to about USD 4.1 billion, or 1.4 percent of the global market share. The gains in the sector may be ascribed to a 32 million-strong labour force with intercultural adaptability, high trainability, a strong customer service orientation, and moderate to satisfactory English proficiency. Another key factor is government incentives for investors in the form of income tax holidays (ITH) of four to eight years and duty-free importation of capital equipment. Technopark or ecozone locators are awarded a special 5 percent tax rate on gross income when the period for ITH lapses. They are also exempted from the 12 percent input value added tax (VAT) on allowable local purchases of goods and services (e.g. communication charges). In addition, IT companies are allowed unrestricted use of consigned equipment, exemption from wharfage dues and exemption from tax when employing foreign nationals. Philippine outsourcing and offshoring (O&O) competencies are highlighted during trade missions, and the Philippine government has allotted PHP 350 million (USD 9 million) to training scholarships for the O&O industry.

Another major growth segment for the IT industry is computer gaming, both PC-based and online. This segment has renewed the Internet café business in the Philippines. Computer gaming, particularly online gaming, is cutting across social boundaries (gender, age, and economic class) and is driving growth in computer literacy.

KEY ICT POLICIES, THRUSTS, AND PROGRAMS

The Philippine Medium-Term Development Plan for 2004–2010 identifies ICT as one of the priority areas to help propel economic development. The plan also envisions a people-centred, inclusive, and development-oriented information society that promotes quality of life and sustainable development. Several strategies and programs are being pursued with this vision in mind.

As mentioned, the Philippine Cyber Corridor hosts BPO companies, call centres, animation studios, software development and gaming businesses, medical and legal transcription outfits, knowledge process outsourcing (KPO) outfits, and back office operations of multinational companies. Metro Manila in the north, Metro Cebu in central Philippines, and Davao City in the south are the leading locations along the Corridor. Beginning 2007, ICT businesses were put up in 17 other cities as the cyber services industry establishes regional ICT hubs that can host O&O locators and generate more jobs and bigger revenues for the host regions. Thus, whereas 92 percent of O&O jobs were in Metro Manila three years ago, this figure went down to 80 percent in 2008. The target is to achieve a 50–50 ratio between Metro Manila and regional cities by 2010. There were 320,000 O&O jobs as of the end of 2007. The target is one million such jobs by 2010.

The Community e-Center (CeC) Roadmap for 2008–2010 was launched at the end of 2007 as part of government strategy to provide universal access to telecommunications and Internet services down to the *barangay*[2] level. The CeCs also provide customized ICT training to community members, in partnership with the LGUs, NGOs, and other stakeholders. As of November 2008, 112 municipalities (40 percent of 295 municipalities around the country) have CeCs.

The Electronic Governance for Efficiency and Effectiveness (E3 Project) of the CICT, with PHP 400 million (USD 10 million) in support from the Canadian International Development Agency (CIDA) and a five-year timeframe (from 2007 to 2012), has three major components: *(i)* policy review; *(ii)* capacity building among key government officials; and *(iii)* pilot projects in selected social services agencies. In April 2007, the E3 Project signed a Memorandum of Understanding (MOU) with the Management Association of the Philippines (MAP) and the National Competitiveness Council to build the capacities of ICT officials in government as well as private-public partnerships (PPP) to assure the utilization of delivery systems for e-governance. In September 2007, the E3 Project selected the Technical Education and Skills Development Authority (TESDA) as the first agency to implement the electronic governance initiatives. In 2008 three other agencies were tapped to improve their business-related processes: the Department of Health, Department of Social Welfare and Development, and National Disaster Coordinating Council.

DTI, CICT, and the Business Processing Association of the Philippines (BPAP, http://www.bpap.org) signed a memorandum of agreement on 22 November 2007 for the creation of an industry standard or scorecard to measure a location's ICT investment viability, and to attract more ICT investments through marketing efforts. The scorecard will serve as a guide to investors. The partners have identified 43 geographical areas, including the so-called 'New Wave Cities' outside Metro Manila and Metro Cebu, to be ranked in terms of ICT-readiness. These partnerships between the government and the private sector are a strategy for sustaining growth of investments in the ICT sector.

LEGAL AND REGULATORY ENVIRONMENT

The Philippine government acknowledges the significance of IT development in the country and its role in social and economic growth by undertaking measures to promote ICT consciousness, build capacity, and provide a conducive ICT environment for business, public administration, services delivery, education, and communications. In a bid to consolidate efforts in this regard, the Philippine executive has moved for the creation of the Department of Information and Communication Technology (DICT) to supercede the Commission on ICT (CICT). The proposal is up for discussion at the Senate, with the House of Representatives having approved on 5 August 2008 the proposal in the form of House Bill No. 4300.

Another piece of legislation that could further strengthen the ICT sector is the Joint Resolution of the Philippine Senate and House of Representatives creating a Commission to review science, technology, and engineering competitiveness. IT and IT-enabled services, and electronics and semiconductors, are among the six sectors to be reviewed by the Commission. The review is expected to lead to recommendations of legislative and executive action that can be taken to improve the competitiveness of these sectors. The resolution establishing the Commission was passed in February 2007 and approved by the president in April 2007.

An important piece of ICT-related legislation adopted in 2007 was Republic Act (RA) 9369, the New Election Automation Law. What is notable about the law is that it adopts a technology-neutral framework with respect to the automation of elections.

In 2008, CICT endorsed to Congress a draft 'Cybercrime Prevention Act of 2008'. The proposed act aims to secure the integrity of computer and communications systems, and to protect the citizenry from rising incidents of illegal, malicious, and life-threatening acts committed through the use of the Internet, mobile phones, and other computer systems or networks. The draft bill defines various forms of cybercrime offenses and prescribes corresponding penalties.

DIGITAL CONTENT

Twenty-five million pages of Filipiniana materials[3] from the collections of the National Library of the Philippines and the libraries of the University of the Philippines System, DOST, and Commission on Higher Education (CHED) have been digitized through the Philippine e-Library Project supported by the e-Government Fund. With some of the collections dating back to the 16th century, the digitized materials form a significant part of the Philippines' cultural, historical, and intellectual heritage.

Other education-related digital content projects are the:

- Open Content in Education Initiative (OCEI), which will convert DepEd materials into interactive multimedia content, develop applications for use by schools, and conduct student and teacher competitions to promote the development of education-related Web content.
- iSchool WebBoard, which will enable teachers to build and share online self-learning materials, and facilitate immediate access to useful references and interactive facilities on the Internet.
- PhEdNet, a 'walled garden' of educational, learning and teaching materials and applications for use by public school students, their teachers and parents. It is called a 'walled garden' because only DepEd-approved multimedia applications, materials and mirrored Internet sites will be accessible from school PCs.
- e-Learning modules in science and mathematics for the elementary school level developed by the DOST Science Education Institute and ASTI, which are being distributed free to public schools. The next phase of the work is for high school science and mathematics.
- e-Learning modules for the Alternative Learning System (ALS), which caters to out-of-school youth and adults. Eighty modules have been completed and about 120 more are due for completion in late 2008 and early 2009.

ONLINE SERVICES

As of the first quarter of 2008, 286 of 306 national government agencies (NGAs), or 93.5 percent, have a Web presence. In terms of the United Nations-American Society for Public Administration (UN-ASPA) stages of e-government, 14 NGAs (4.9 percent of those with a Web presence) are at Stage 4, characterized as 'Transactional Web Presence', where users are able to conduct complete and secure transactions online. The rest of the NGAs with websites are classified as follows: 35.31 percent are at Stage 3; 41.96 percent are at Stage 2; and 17.83 percent are at Stage 1.

Fully operational online government services to date include Land Transportation Office (LTO) licencing, National Statistics Office (NSO) civil registry certifications, Government Service Insurance System (GSIS) delivery of services and benefits to members, Security and Exchange Commission (SEC) registration and monitoring, and Bureau of Internal Revenue (BIR) online filing and payment for large corporate taxpayers. Other online services will soon be operational with the completion of the government's payment gateway.

A key online service is the e-Payment Gateway called 'eBayad'. Citizens can make electronic payments to government agencies using credit cards, debit instructions, and mobile wallets through this Internet-enabled payment portal.

eSerbisyo is the Philippine government's e-Services Portal with the motto 'bringing government closer to the people'. It is designed as a one-stop, citizen-centric, business-friendly front-line service-focused portal for accessing comprehensive information and government services. eSerbisyo has two reliable Internet Service Providers (ISPs) to handle multiple users at any one time. The service includes 'how to' and downloadable forms, public information, data about the Philippines, e-groups, feedback, job lists, and weather alerts. The eSerbisyo Pass is the citizen's single account to transact with government online using one username and password, while eSerbisyo Search allows him/her to look for specific content across all government websites in the portal.

Other e-government services have been developed though the e-Government Fund. These include:

- The BIR's Integrated Computerization Projects, including the electronic filing and payment system and BIR Data Warehouse.
- The NCC's Jumpstarting Electronic Governance in Local Government Units (eLGU) Project, which assists LGUs in the computerization of priority revenue-generating systems and the establishment of CeCs.
- The Food and Nutrition Research Institute's e-Nutrition Project, an automated Internet-based knowledge centre that will allow the electronic dissemination and utilization of nutrition survey data and results.
- The Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA)'s Interactive Climate and Weather Information Network (PICWIN) Project, which seeks to establish an interactive-based weather-related information system using cellular technology.

ICT-RELATED EDUCATION AND CAPACITY-BUILDING

In an increasingly technology-oriented and globalizing world, the use of ICT has become a critical factor in enabling more people to gain an education, which in turn ensures that a country's workforce is skilled and prepared to meet the challenges of development. Thus, ICTs are now part of Philippine basic education, workforce competency and capacity building, and special needs education.

In the basic education sector, CICT's i-Schools Project has equipped some 4,490 public high schools in the Philippines with i-Schools Learning Resource Centers (iSLRCs) from 2005 to date. An iSLRC is a wireless Internet laboratory that includes 10–20 Internet-ready computers, a liquid crystal display (LCD) projector, a computer printer, and two air conditioning units. To ensure appropriate use of these laboratories, school heads and teachers underwent a series of workshops on ICT integration in teaching and learning. Regular monitoring and evaluation activities are being conducted to ensure project sustainability.

The iSchools project complements the private sector-led Gearing up Internet Literacy and Access for Students (GILAS) program that has equipped about 2,020 public high schools with free Internet access and 10 computers per school.

The latest ICT-assisted basic education initiative is the eSkwela Project,[4] a CICT flagship project that aims to make out-of-school youth and adults globally competitive through the effective use of ICT in alternative learning. The eSkwela centres serve as venues where learners and other community members can gain literacy and life skills and competencies; develop new skills, including digital literacy; review for the Accreditation and Equivalency (A&E) Exam of the DepEd Bureau of Alternative Learning System; and/or prepare themselves to rejoin the formal school system. Five eSkwela centres have been established so far, each with around 20 networked computers, relevant peripherals, Internet connectivity for one year, and a customized learning management system. A major component of the eSkwela project is the development of more than 200 e-learning modules based on the ALS curriculum and the training of ALS instructional managers and mobile teachers in ICT-supported teaching and learning.

The Workforce Mobilization Program (WMP) is a partnership between CICT, CHED, the Technical Education and Skills Development Authority (TESDA) and private training institutions that aims to match workers to jobs and vice versa. A subprogram of the WMP is the 'Near Hire' scheme, which upgrades participants' skills to the level required for hiring by ICT firms. At the same time, the curriculum of higher education institutions (HEIs) is being reviewed and courses revised or developed to improve the competencies of graduates, including proficiency in spoken English, a core competency for the global BPO market.

In addition, WMP authorities are formulating the ICT competency standards and preparing the competency-based certification examinations to professionalize ICT human resources in the Philippines.

Other ICT-related capacity building programs in 2007–2008 are:

- The e-learning and/or technology-based distributed learning programs of open universities such as the University of the

Philippines Open University and the Polytechnic University of the Philippines Open University;

- The University of the Philippines IT Training Center, which has about a hundred graduates per year in its one-year post-baccalaureate IT training program and about 1,000 trainees in its one-two week IT training courses;
- TESDA's skills upgrading programs, which upgrade the competencies of IT graduates to enhance their chances of being absorbed by the IT and IT-enabled services industry, and training programs for individuals to gain ICT skills for purposes of employment;
- IT training programs for higher education teaching staff of the Philippine State Universities and Colleges Computer Education Society (PSUCCESS), Philippine Society of IT Educators, Computing Society of the Philippines and Philippine Computer Society;
- The Philippine National IT Standards (PhilNITS) Foundation's training courses for professionals from different industry sectors on 'Fundamentals of IT', with the support of DTI and Japan's Ministry of Economy, Trade and Industry;
- The Information Technology Foundation of the Philippines (ITFP)'s Philippine-Australia Quality Technical Vocational Education and Training Project (PAQTVET II);
- Training programs by the Cebu Educational Foundation for IT (CEDFIT) to increase the absorption rate of college IT graduates in industry; and
- Brain-Gain Networking's program to bring Filipinos overseas back to the country and help upgrade the competency of local talents, including those in the ICT fields.

Through a Mutual Recognition Agreement between PhilNITS and the Japan IT Engineers Examination Center (JITEC) of METI, PhilNITS gets technical support from JITEC in implementing the Fundamentals of IT Engineer (FE) Certification Standards and Software Design and Development (SW) Certification Standards. Technical assistance from the Japan External Trade Organization (JETRO) comes in the form of training facilities for the PhilNITS offices in Manila, Cebu, and Davao and the assignment of technical experts. There are scholarship and training grants from the Association for Overseas Technical Scholarships (AOTS) and provision of an e-learning system (hardware, software, and content modules) from the Center of the International Cooperation on Computerization (CICC). From 2003 to 2007, PhilNITS trained around 1,606 IT professionals and teachers locally and sent 124 scholars to Japan for training. From 2002 to April 2008, PhilNITS certified 573 IT professionals out of 4,852 registered examinees for the FE exams, and 15 out of 30 examinees for the SW Certification Exam.

The eCare Centers are specially designed to provide access and training programs for persons with disabilities (PWDs). The target is to establish one eCare centre in each region. The Philippine Web Accessibility Group (PWAG)'s program promotes Web accessibility for all, including PWDs.

These programs are covered in the ICT in Education Masterplan, which includes a National Roadmap for Faculty Development on ICT in Education and a National Framework Plan for ICTs in Basic Education (2005–2010).

ICT AND ICTD RESEARCH AND DEVELOPMENT

The DOST has included ICT as one of its five priority R&D areas in 2007–2010. Some of the concerns being addressed are providing rural communities with wider access to information, better delivery of essential information on disaster mitigation, and ensuring better performance of computer networks for R&D operations, generating innovations for technology-based entrepreneurship and improving governance.

ASTI in particular is engaged in advanced network research, research on wireless technologies and network applications, and software development. One of its projects is the Philippine e-Science Grid Program, which focuses on building a grid infrastructure for collaborative research activities by education and research institutions, and advanced distributed services by national institutions. For example, an application of grid computing in the Bioinformatics and Federated Geospatial Information System (FedGIS) provides thematic spatial data overlaid on base maps of the National Mapping and Resource Information Authority for use in hazard mapping and assessment. Partner institutions and independent researchers can use grid facilities for high performance tasks such as numerical modelling, protein folding, deoxyribonucleic acid (DNA) sequence assembly and alignment and computer animation rendering, as well as complex administrative tasks such as cross-institutional federated identity authentication and authorization and grid management.

The ICT for the Environment Program aims to develop cost-effective platforms and applications for real time monitoring and forecasting of environmental parameters.

Microelectronics and Embedded Systems R&D aims to promote technology awareness and establish the design foundation and expertise vital for the Philippines to enter the global market for integrated circuits (IC). It cultivates a skilled workforce adept in IC design and equipped for quality R&D work through training and exposure to actual design work.

The PREGINET Communities of Practice (CoP) project supports virtual networks of individuals and organizations

with a common interest in and commitment to developing and applying ICT in specific sectors or thematic areas to create socio-economic development impact. It builds on the knowledge resources and infrastructure of a wider set of stakeholders and targets other priority sectors, such as environment, education, and governance. Stakeholders will find these CoPs a safe and fertile venue for dialogue, knowledge exchange, and collaborative partnerships.

The Technology Transfer Program uses R&D for enterprise development and capability enhancement of industry and academe. Productivity enhancement and capacity building for the local electronics sector, particularly the small and medium-sized enterprises (SMEs), is given priority.

DOST's ICT4D project, which is supported by the International Development Research Centre of Canada, has yielded two case books that describe ICT projects in local governance, health, education, commerce, and other socially oriented programs that have benefited women, the poor and the less educated. Learning points collected from the cases have been brought to the attention of legislators, key policymakers in government, and stakeholders from the private sector for appropriate action.

OPEN SOURCE AND OPEN CONTENT INITIATIVES

Open source software (OSS) advocates from various sectors met at the 2008 Philippine Open Source Summit to discuss the development of an innovation ecosystem and the promotion of technology entrepreneurship. Open content and OSS in the Philippines is supported by the following NGOs:

- Philippine Linux Users Group (PLUG)
- UnPLUG, the University of the Philippines Linux Users' Group that has developed an open source application for student elections
- Advanced Software Foundation Inc., which supports ASTI's OSS development efforts
- Diliman Computer Science Foundation, which handles training, consultancy, and services in use of OSS
- DabaweGNU, Inc., a non-stock, non-profit organization based in Davao City that promotes open source technologies
- Pampanga Open Source eXchange (POSX), a budding community of OSS users, developers, and enthusiasts within and around the province of Pampanga

OSS development programs include the Java Education and Development Initiative (JEDI) of the University of the Philippines that, in cooperation with Sun Microsystems, has developed open source software for around 15 courses in Computer Science. The software have been translated to Portuguese and Bahasa Indonesia and are now being used by about 1,000 IT instructors in the Philippines and Indonesia.

The Bayanihan Linux Version 3.1 (www.bayanihan.gov.ph) developed by professionals of ASTI's Open Source Group is interoperable with MS Windows machines on a network. It is secure and nearly virus-proof and has a desktop operating system and office productivity suite.

Most e-government projects funded by the e-Government Fund utilize open source software. One of the earliest examples is the e-NGAS, a computerized version of the government accounting system aligned with international accounting standards (IAS)/international Financial Reporting Standard (IFRS) and developed using OSS.

During the National Innovation Summit in November 2007, the DOST and PEZA entered into a partnership for an Open Technology Business Incubation Program that aims to nurture start-up or growing enterprises using open software, open content, and open standards.

The Arellano University School of Law in Manila launched the Philippine version of the Creative Commons (CC) licence in January 2008. The initiative recognizes the need for a CC licence that is adapted to Philippine law for it to be enforceable and capable of giving citizens appropriate protection.

Public Domain Content is espoused by a partnership among CICT, the UNESCO–Philippines Commission, and Intel Philippines.

CHALLENGES AND OPPORTUNITIES

Although there have been significant gains in the Philippine ICT sector in 2007–2008 as a result of various programs and projects by the government and the private sector, a number of challenges need to be addressed and opportunities leveraged to ensure that the gains redound to the good of all citizens.

A persistent challenge is the need to ensure universal access to ICTs and ICT-enabled development. Communications infrastructure must be built on principles of fair competition as well as public and universal service. To ensure that benefits are extended to all social and economic groups, investment in the ICT sector should focus on capacity-building that is responsive to local needs, especially those of marginalized communities and indigenous groups. Access to and use of ICT must be planned for inclusion of persons with specific needs and requirements. In general, ICT programs of government and civil society need

to address issues relating to human rights in the information society within a framework of non-discrimination and gender equality.

Human capital development is another challenge. The mismatch between ICT education and skills development and industry requirements needs to be addressed through curriculum change and ICT integration. The brain drain of highly skilled ICT professionals may be avoided with improvements in salaries and other benefits in the local ICT sector.

Rampant software piracy is a huge drawback to further development of the local ICT sector. According to the BPAP, reducing software piracy from its current level of 71 percent to 61 percent could double the growth of the IT sector in one year, from USD 1.1 billion today to USD 2.1 billion by 2009. Cutting the piracy rate could add USD 470 million to the economy, create nearly 2,200 new IT jobs, and increase local industry sales by USD 325 million. For the Philippine government, it could mean an additional USD 25 million in tax revenues.

The e-Commerce Law (RA 8792) passed on 14 June 2000 is the nation's lone cyber law. It complements the Intellectual Property Rights Act, the Consumer Act and the Revised Penal Code. Other proposed measures against computer fraud, forgery and sabotage, damage to computer data or programs, unauthorized access to or interception of computer data, data or system interference, and unsolicited commercial communications are still pending. Addressing this gap in the legal environment will build greater confidence in the use of ICTs and enhance the free flow of information and knowledge.

A fifth challenge is how to ensure and sustain the participation of civil society in the information society at all levels, from policy planning to implementation, monitoring, and evaluation. The government needs to ensure that market competition is fair and that monopolies are not perpetuated. While promoting local content development and ensuring that the new technologies are not used for criminal gain, government should not be a regulator of information flow and content. Privacy needs be protected and surveillance and censorship must not threaten human rights, democracy, and freedom of expression.

In striving to meet these challenges, stakeholders in the ICT sector can take advantage of a number of opportunities, such as ICT entrepreneurship, particularly in the development and utilization of ICT-enhanced innovations that will lead to economic stability; the promotion of revenue generation through strategically located ICT industries throughout the country; and PPPs in local content development and applications in art and culture. The Philippines is already a major player in the global ICT market, particularly in e-services. This position needs to be strengthened and consolidated into a Philippine brand that evokes quality, innovation, and world-class sophistication, and gives Philippine companies a competitive edge.

NOTES

1. Bayan Telecommunications through BayanDSL ADSL offers from 768 Kbit per second to 2.5 Mbit per second, and through ZPDee cable Internet from 64 Kbit per second to 1 Mbit per second. ETPI SDSL offers from 256 Kbit per second to 2 Mbit per second. Global Destiny Cable Destiny Cable SDSL services provides up to 3 Mbit per second. Globe Telecom, through its subsidiary Innove offers ADSL from 512 Kbit per second to 2 Mbit per second. PLDT offers ADSL from 384 Kbit per second to 5 Mbit per second. Smart Communications offers wireless fixed broadband at 384 Kbit per second. In 2008, the latter has become available in pre-paid mode through the use of a USB modem where users can purchase load/credit at different handphone loading centres.
2. The *barangay* is the smallest administrative unit in the Philippines. Each municipality is made up of several *barangay*s.
3. Some 900,000 pages of historical pictures, rare maps, presidential manuscripts, Philippine insurgent records, and rare newspapers and journals have also been digitized.
4. 'eSkwela' is a play on the Filipino word for school ('eskwela') and 'e-school' (electronic school).

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