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Pakistan

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INTRODUCTION

The year 2007 was historic for Pakistan. Alternatively listed as an A+ investment country and then as the ‘most dangerous place on earth’, Pakistan see-sawed between optimistic economic reports, violence, political instability, and uncertainty. However, despite the odds, the country experienced a strong foreign investment influx, with over USD 9 billion invested in the telecom sector alone (Rising Pakistan 2007). Exponential growth in the telecom sector, which constitutes 2 percent of Pakistan’s Gross Domestic Product (GDP) and is expected to account for 3 percent in the next three to four years, has resulted in the creation of 80,000 jobs directly and 500,000 jobs indirectly.¹

Currently, Pakistan has about 95.7 million phones: 89 million cellular, 4.5 million fixed lines, and 2.2 million Wireless Local Loop — WLL (PTA 2008). Teledensity in 2008 stood at 59.8 percent from a mere 4 percent in 2003.

With a score of 3.7 out of 10, Pakistan ranks 63rd in 67 countries in the e-readiness ratings (Economist Intelligence Unit 2007). The information technology (IT) and IT-enabled services (ITES) sectors also boast an impressive 61.18 percent growth in exports, making Pakistan a country to watch very closely.

Information and communications technologies (ICTs) have been responsible for progress in social development areas as well, with various ICT-supported initiatives aiming to contribute to Pakistan’s on track status in connection with the Millennium Development Goals (MDGs) of gender equality; maternal and child health; combating HIV/AIDs, malaria and other diseases; and ensuring environmental sustainability. However, work toward the goals for education and poverty alleviation is off track and, in the case of poverty, it is regressing. ICT planning by the

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| Total population | 150 million (est.) |
| Literacy rate (for those 10 years old and older) | 43.92 (male = 54.81; female = 32.02) (as of 1998 census) |
| GDP per capita | USD 847 (PKR 5,820; USD 1 = PKR 60) |
| Fixed-line telephones per 100 inhabitants (including WLL) | 3.5 |
| Mobile phone subscribers per 100 inhabitants | 7.5 |
| Internet subscribers per 100 inhabitants | 1.5 |
| Broadband subscribers per 100 inhabitants | 0.03 |
| Total Internet bandwidth | 800 Mbps |

(Sources: Finance Division 2006; Pakistan Telecom Authority 2008; Population Census Organization 2008)

government of Pakistan (GoP) has not been able to sufficiently address this critical issue. There is failure to recognize that overall growth in telecom and ICT will be in vain if poverty and lack of education continue to destabilize the country.

TECHNOLOGY INFRASTRUCTURE

In 2003 a coherent and forward-looking telecommunications deregulation policy was formulated by the GoP with assistance from the World Bank and in consultation with all stakeholders. The policy covers Long Distance and International (LDI) and Local Loop (LL, including WLL) services. Licences were also issued for data network operators (DNOP), Internet Service Providers (ISPs), and other value added licences. A transparent process for the awarding of licences and frequencies was adopted, resulting in two new mobile phone companies as well as a number of LDI, WLL, and LL licences being issued.

Key elements like Calling Party Pays (CPP), Mobile Number Portability (MNP), dynamic interconnect, and reducing interconnection costs from the ‘significant market powers’ (SMPs) have spurred growth. To enable development in unserved and underserved areas through the provision of local loops and rural voice and broadband communications, a Universal Service Fund (www.usf.org.pk) from regulatory fees paid by operators and counterpart funding from the World Bank, has been established.

In 2006–2008, cellular connections in Pakistan grew from less than 12 million to over 89 million. Coupled with the increase in WLL lines, this has increased teledensity to over

59 percent. Telephone penetration is expected to go over 100 million by 2009. What is significant is the large and diverse user base that will support the launch of value added services (VAS) and new operations, as well as delivery of total solutions addressing different market segments at the same time.

The bandwidth required by cellular and other operators is also driving the broadband market. Three new nationwide optical fibre systems with an aggregated capacity of over 4.5 Terabit per second expandable to over 45 Terabit per second (on 10 GigE) have been deployed. The actual fibre penetration is much deeper and over 550 locations have fibre access on the Pakistan Telecommunications Company Ltd (PTCL) fibre. The services now on offer include dark fibre, Multi-Protocol Label Switching (MPLS), and Gigabit Ethernet.

These new systems (in addition to the older PTCL system) connect over 100 cities. Metro-rings in over 20 cities are being deployed by different operators. Niyatel has deployed Pakistan’s first fibre-to-the-home (FTTH) network in Islamabad and is planning expansion to other cities. Operators are offering services ranging from triple play (voice, video, and data) to dark fibres to a whole range of end users. Access pricing has dropped to less than USD 12 per month for a 512 Kbps connection. Hybrid fibre-coaxial (HFC) cable operators are now upgrading their networks in order to offer triple play services after acquiring requisite licences from the Pakistan Telecommunication Authority (PTA) or entering into franchising relationships with existing operators.

In Internet and broadband the growth in demand has been phenomenal: over 7,700 percent over a five-year period (2003–2006), with over 12 million active users and 167,000 Internet hosts in 2007. In recent months the Direct Subscriber Line segment has been expanding due to the reduction in bandwidth prices, the PTA’s implementation of a fair interconnect with the PTCL landline network, and the issuance of licences for Worldwide Interoperability for Microwave Access (WiMAX) in the 3.5 GHz band. The number of Direct Subscriber Line users stands at over 100,000. The target is 1.6 million Direct Subscriber Line users by 2009. This will be achieved through support from the Universal Service Fund and the farming out of new frequencies in the 2.3, 2.5, 3.5, and other bands for WiMAX and other new wireless technologies. As mentioned, the private sector licencees are laying metro fibre for HFC cable fibre access (fibre-to-the-curb — FTTC — and fibre-to-the-home — FTTH) in over 20 cities. The PTCL optical fibre reaches into the heartlands at over 550 locations. This will help open the rural markets as the new private sector owners expand and utilize the installed infrastructure. Based on PTA statistics, as of June 2008 the total number of broadband connections in Pakistan is 170,000 of which 65 percent is DSL

connections, 25 percent is HFC, 8 percent is WiMAX, and two percent is FTTH.

Three operators (Mobilink, Wateen, and Burraq) are deploying nationwide systems on the WiMAX 802.16 d/e standards, resulting in a huge growth of international connected bandwidth as well as rapidly dropping prices. An E1 (2 Mbps) is available at USD 1,500 per month. With competition heating up, the price is expected to drop further to sub USD 1,000 levels.

New undersea transnational fibre systems have ensured a degree of redundancy and reliability not present earlier.

KEY INSTITUTIONS AND ORGANIZATIONS DEALING WITH ICT

ICT development in Pakistan has gone beyond the purview of a few key entities and promotion of ICT use has been taken up by different organizations and user groups. However, on an institutionalized basis the following organizations are responsible for ICT development:

- The Ministry of Information Technology and Telecommunications (MoITT) is responsible for policy in IT and telecommunications.
- The PTA is the telecom regulatory body.
- The Universal Service Fund Guarantee Ltd (USF) is responsible for telecom development in the under-developed areas via subsidies from a contributed Fund.
- The Pakistan Software Export Board (PSEB) oversees IT growth and export.

There are several trade bodies, some of which are powerful although informal in nature. They include:

- Pakistan All Software Houses Association (PASHA)
- Internet Service Providers Association of Pakistan (ISPAK)
- Computer Society of Pakistan
- Federation of Pakistan Chambers of Commerce and Industry (FPCCI)

ICT-RELATED INDUSTRIES

With a growth rate of 61.18 percent, Pakistani ICT and ITES companies have shown remarkable growth in 2007, and local companies have been recognized at various international events. The total industry size is USD 2.8 billion. IT and ITES exports were valued at USD 1.4 billion in 2007. The export target for 2006–2007 was USD 108 million (PSEB 2008).

At the end of 2007, 1,082 IT companies were registered with PSEB. Most of these are based in Karachi (384), Lahore (353), and Islamabad (276). There are 60 foreign IT and telecoms companies in Pakistan. There are 11 IT Parks covering an area of 750,000 square feet.

Aggressive efforts by P@sha (Pakistan Software Houses Association) and the PSEB have made quality a major thrust of the industry, and international quality certifications such as the Capability Maturity Model Integration (CMMI) have been actively promoted by both the private sector and government. One company is at CMM Level 5, another at CMMI Level 5, three at CMMI Level 3, and nine at CMMI Level 2. While the majority of companies are small, several have attracted sizeable foreign direct investments, and it is anticipated that within the next year or two, if Pakistan remains politically stable, the industry will see the formation of some large and more mature companies.

In 2005 there were 110,000 IT professionals employed in Pakistan’s IT sector, of which more than 15,000 were engaged in export-oriented activities (e.g. software development, call centres).

Total IT spending in 2005–2006 amounted to USD 1.4 billion.

KEY ICT POLICIES, THRUSTS, AND PROGRAMS

It is interesting to see the growth of several private and public sector programs without active government intervention. For example, a segment is addressing the resource and telecentre model (e.g. Sehat First, consisting of health-based consulting and primary care telecentres) and another segment is addressing e-banking, m-commerce, and m-banking. Integral to the dynamic growth seen in the IT and telecom sectors of Pakistan is the telecom deregulation and enabling policy framework aimed at attracting foreign investments. The incentives offered include corporate tax exemptions on export earnings, 100 percent repatriation of profits, tax holidays for IT venture capital funds, and provision of a subsidized enabling infrastructure.

Pakistan’s IT and telecoms policy framework has remained unchanged since its formulation in April 2000. Primary participants in the development and implementation of the policy framework include the MOITT and PSEB. Periodic informal reviews and updates have been conducted in consultation with the private sector. However, a formal new policy directive has yet to evolve.

A major policy oversight has been the lack of an ICT for development (ICTD) policy framework and non-inclusion of integrated objectives in the National IT and T Action Plan. Private sector groups, including the Federation of Pakistan Chambers of

Commerce and Industry, have initiated an advocacy campaign and are currently working as catalysts to create this critical roadmap. For ICTs to have an impact on development, a consensus on policy and implementation will have to be reached by all stakeholders, including the Ministry of Commerce (MoC), Ministry of Education (MoE), Ministry of Health (MOH), Ministry of Women’s Development (MOWD), and many others under the umbrella of the Pakistan Planning Commission.

In response to the call for an ‘ICT for Development’ plan, the government of Pakistan formulated the Universal Service Policy (USP) with the main objective of providing basic access to telecommunications to poor and underprivileged communities across Pakistan. Specifically, the USP aims to:

- Make voice telephony affordable and Internet access available to progressively greater proportions of the Pakistan population;
- Foster conducive conditions and an enabling environment in which teledensity can grow; and
- Jumpstart the broadband and ICT markets to facilitate e-services.

In terms of penetration of ICT services, the following targets have been set:

- Eighty-five percent of the population should have telecommunication coverage and therefore access to e-services if desired;
- Five percent teledensity in the rural areas;
- One percent broadband penetration; and
- Preferably one telecentre for every 5,000 people or at least one telecentre for every 10,000 people in USF contract areas. (IT and Telecom Division)

However, despite the USP, telecentres, e-services to the masses, and efforts to utilize ICTs to achieve the MDGs remain mainly on paper. Although various ministries have initiated ICT-based MDG-related projects, lack of integration with the MOITT has resulted in the failure of many of these projects, with serious consequences for citizens.

Private sector advocacy remains the backbone of ICTD efforts in Pakistan, and its impact is visible in government-managed projects, encompassing not only agencies responsible for IT such as the MOITT, PSEB, and EGD, but also non-traditional participants such as the Small and Medium Enterprise Development Authority (SMEDA), MOWD, and MOH. Substantial efforts by both the private sector and key government entities such as the Planning Commission will be decisive in determining whether ICT will play a role in human and social development in Pakistan.

LEGAL AND REGULATORY ENVIRONMENT FOR ICT DEVELOPMENT

The Electronic Transaction Ordinance (ETO) was issued in 2002. It covers public key infrastructure (PKI) and certification authorities (CA), electronic transactions, digital signatures, and related elements that constitute the basis for secure electronic transactions over the Internet.

Recently a bill on cybercrime was promulgated amid protests from the industry against the draconian penalties and the lack of clarity with regard to building the capacity of the implementers (police, investigation agencies, lawyers, courts). The bill will undergo necessary changes after review by the new government.

New laws relating to Internet Protocol (IP) protection, data security, and consumer protection are also being drafted.

The telecoms sector has a comprehensive set of laws that are supplemented by the requisite rules and regulations. The licensing process and sector regulation have proceeded successfully and a policy review is scheduled this year.

Issues related to spectrum (e.g. WiMAX) and broadband are being tackled on a real time basis (as the issues evolve) and resolved. Considerable spectrum clearance has taken place and it is expected that more bands will be cleared for licence-free transmission,² in addition to the current 2.5 GHz and 5.8 GHz Wireless Fidelity (WiFi) bands.

DIGITAL CONTENT

The lack of local language content is a major challenge. The gap is being filled by individual initiative and materials are now being developed for specific applications, such as education and training, health, and social networking. Innovations like machine translation sites (www.paktranslation.com) are creating new opportunities for start-ups. Local language websites such as hamari.com and others are proliferating. Efforts are being made to transform educational content into digitally usable format for spreading education and training to the grassroots using the newly available telecom networks. In Pakistan, Urdu is the dominant language of instruction (as is English) and most of the effort is going into this space with the creation of Urdu fonts, lexicon, Unicode registration, and embedding into the Microsoft Office. There are however strong currents requiring development in regional languages (Punjabi, Sindhi, Balouchi, and Pushto), and several parallel efforts are underway to create linkages between these. Part of this initiative has been funded by the government of Pakistan (see CRULP, www.crulp.org) and some by International Development Research Centre’s PAN R&D (research and development) Fund.

ONLINE SERVICES

e-Banking

There has been a steady increase in the number of e-banking products and services. According to the State Bank of Pakistan’s quarterly report, the volume and value of e-banking transactions in the first quarter of 2007–2008 (July–September) reached 30.1 million and PKR 3.4 trillion, respectively, indicating a growth of 7.5 percent and 9.6 percent, respectively.

The total number of active cards (ATM, credit, and debit) grew by 11.9 percent to reach 6.5 million. The total number of ATM machines as of the first quarter of 2007–2008 reached 2,470, representing an increase of 7.7 percent over the previous quarter. Real Time Online Branches (RTOB) reached 4,444 and now constitute 57 percent of the total branch network in the country. The number of Point of Sale (POS) terminals available to customers was 50,004 as of the first quarter of 2007–2008, reflecting a growth of 7.9 percent over the total for the previous quarter.

Five million transactions on other e-banking channels (POS, the Internet, call centre/Interactive Voice Response or IVR, and mobile) were recorded in the same quarter, reflecting a growth of 7.7 percent over the previous quarter. These transactions had a value of PKR 27.6 billion, a 9.5 percent increase over the previous quarter.

The use of electronic channels is growing consistently as the contribution of electronic transactions has increased to 26.1 percent in number terms and 8.5 percent of the value of total retail transactions.

Internet banking includes payments and electronic funds transfer (EFT). However, EFT is currently limited to intra-bank account-to-account funds transfer except for a bank offering interbank funds transfer facility through the Internet. Internet banking in Pakistan is growing slowly but at a steady pace. In the first quarter of 2007–2008 banks reported 0.283 million transactions involving an amount of PKR 8.8 billion. The figure is projected to grow to 40 billion by the end of 2008.

e-Commerce

One of the more innovative of recent e-commerce initiatives in Pakistan is Thread Net Hunza (www.threadnethunza.com.pk), an e-commerce site spearheaded by the Karakoram Handicraft Development Programme (KHDP), a community-based enterprise system. The project promotes culture-sensitive and environmentally sustainable micro-enterprises, thereby creating village-based income and employment opportunities for artisans, small producers, women, disabled members of the community, and other disadvantaged groups. At present, around 3,000 women

artisans are working from their homes under the Thread Net Hunza project. Another 60 women work at seven workshops daily and produce finished products that are marketed under the brand name of Thread Net Hunza by local and national retailers. Tourists are the prime market, and local and national exhibitions are held to promote the products. The site has generated over PKR 3.5 million in sales.

e-Government

The government of Pakistan through its e-Government Directorate (EGD) as well as other ministries has undertaken several important projects with a potential large scale impact specifically in terms of transparency and accountability. But although some of these projects were implemented several years ago, implementation hurdles, lack of integration with appropriate agencies, poor coordination, and a lack of project scaling/replication have prevented many projects from achieving the potential levels of impact.

Independent of the EGD's initiatives, work in different autonomous government departments has been proceeding at an excellent pace. This underlines the basic fallacy of trying to drive e-government via central control instead of decentralized implementations. Some of the latter are described as follows:

CBR Automation. The GoP through the National Trade Corridor (NTC) aims to provide a single electronic window operation for trade and commerce. To achieve this objective, the Pakistan Customs Computerized System (PaCCS) was developed as a pilot project and launched on 23 March 2005. It is currently operational in all three container terminals located at Karachi Port and Port Qasim. For the second phase of the project, CBR (Central Board of Revenue, now renamed Federal Board of Revenue or FBR) plans on building on the existing system by implementing the new Pakistan Automated Commercial Community System (PACCS) throughout the country.

NADRA Database. The National Database and Registration Authority (www.nadra.gov.pk) has created the largest citizens database in Pakistan, covering data for over 80 million people. The database is being used for activities ranging from issuance of identity (ID) cards and machine readable passports to creating electoral rolls. The applications, software, and systems were developed in-house and are now being used to develop similar systems in other countries. This internal R&D of NADRA has likewise created several more products such as payment kiosks for utility bills, prepaid mobile phone cards, and vehicle tracking systems based on radio-frequency identification (RFID) technology.

Land and Revenue Records Automation. The automation of land records service delivery has been a landmark project, contributing to long-lasting tenure security and more efficient

functioning of land markets. The project has been recommended for implementation across the country. The implementation has been started in several pilot areas and since this is a provincial jurisdiction, the speed and pattern of implementation is variable across Pakistan. However, at this time each province has pilots (e.g. Lahore) and full blown public-private partnership (PPP) based programs (e.g. Karachi) are now operating. The market size for the implementation of this is over PKR 10 billion for the IT companies for nationwide data entry, creating businesses like kiosks for delivery of ownership documents and one-window operations for clearing all land-related issues across Pakistan. This also opens up opportunities for downstream applications such as land title insurance, which is opening up the land home mortgage market to stimulating businesses, for example by creating clear land titles that can be recognized by banks for collateral for mortgage/loans for farmers and other business ventures.

Strengthening Electoral Processes to Ensure Greater Participation in Pakistan (SDEPP). This project by the Electoral Commission of Pakistan (ECP) sought to improve democratic electoral processes and ensure transparent, free, fair, and impartial elections through the use of ICTs. In the recent elections a voter could check if he/she had been registered by logging on the ECP website and validating well in advance whether his/her registration was valid so interventions could be made early if there were mistakes.

Wetland Project by UNDP and WWF Pakistan. The Protection and Management of Pakistan Wetlands Project is a project funded by the United Nations Development Programme/Global Environment Facility (UNDP/GEF) being implemented by World Wildlife Fund (WWF) Pakistan. The project has produced a detailed geographic information system (GIS) with cartographic maps, satellite images, and Global Positioning System (GPS)-based field observations for better management of Pakistan's natural resources. In addition, the project has laid a strong foundation for the successful implementation of conservation and sustainable use of the biodiversity of Pakistan's wetlands. Four different wetland complexes were identified through GIS and remote sensing techniques. Additionally, field work was carried out to establish floral and faunal baseline data in collaboration with the line departments and local NGOs/community based organizations (CBOs). Threats to these resources were identified in collaboration with the key stakeholders — the communities. Other ICT-based projects resulting from this project include the:

- Fauna Information System of Pakistan (FISP), a GIS containing all species of mammals and birds in Pakistan;
- Eco-zoning and land use GIS database in high altitude mountain ecosystems; and
- Land quality GIS database for saline and waterlogged lands.³

ICT-RELATED EDUCATION AND CAPACITY-BUILDING PROGRAMS

Meeting Community Education Needs through ICTs

In the late 1990s, IDRC, the Commission on Science and Technology for Sustainable Development in the South (COMSATS), the Karakoram Development Organisation, and the Baltistan Health and Education Fund started an ISP project in the remotest mountain area of Pakistan. As a result, 500 people’s organizations and enterprises are now connected to the Internet and more than 100 students have been trained in computer skills. Internet connectivity has helped boost tourism, and other businesses can now communicate more easily with their clients in the south of the country and abroad. The project has also raised awareness among Pakistani women and men about the uses and benefits of ICTs, and it has demonstrated that such a facility can be made sustainable, if there is competence, long-term commitment, and effective promotion.

As of July 2005, computers and networking facilities have been installed in two schools. Students, teachers, and school administrators have started using ICTs to access low-cost, effective, and high-quality learning materials. In addition, 270 people have benefited from training in ICTs. Local youth are taking an especially keen interest in the training sessions.

In addition, e-Village resource centres have been established in two villages (as of July 2005) and e-Village resource persons have been trained to ensure that the village organizations have the necessary capacities to run these centres on their own.

The capacity building that has resulted from this project has also been recognized by the Pakistani government.

National Education Database Program (NEDP) Pakistan

The NEDP is a collaborative and innovative PPP program launched by a consortium of expert private sector enterprises and supported by Intel, Microsoft, Oracle, TeleCard, and the MOE. The project utilizes a Web-based school management software available in the local regional languages, to facilitate the collection of data at the grassroots level, thus modelling the creation of a constantly updated National Education Database.

The pilot project, which was initiated in October 2005, had the additional objective of identifying key problem areas in actual implementation, to be used in planning nationwide implementation. The project successfully implemented the locally developed EMIS system in 100 government schools. However, the project is experiencing problems due to lack of understanding of implementation issues (business processes, content,

development of software and applications, backend systems, and consistent delivery and follow-up) by the MoE.

ICT in Higher Education

Pakistan’s Higher Education Commission (HEC) is implementing an agenda for reform that includes: (i) faculty development; (ii) improving access; (iii) excellence in learning and research; and (iv) relevance to national priorities. Over 500 scholars (teachers and students of graduate and postgraduate programs) are sent abroad annually to universities in Australia, Austria, France, Germany, New Zealand, Sweden, the Netherlands, the UK, and the US, and there are plans to increase the number to 1,000 scholars per year.

The HEC has also launched a mirror site of the Massachusetts Institute of Technology Open Courseware on the Pakistan Education and Research Network (PERN) (see ‘The Pakistan Education and Research Network [PERN]’) that enables open sharing of syllabi, lecture notes, and related materials of 914 courses.

An international lecturing program through video conferencing will also become operational in November 2008. Students in Pakistan will attend lectures interactively delivered from top universities around the world. Over 2,000 lectures by Nobel laureates and top professors have already been lined up to be beamed into Pakistan’s lecture theatres.

Furthermore, the HEC has a Digital Library Programme that provides universities and R&D organizations across the country with free access to over 23,000 international journals and 45,000 textbooks from the world’s leading publishing houses. The Programme has over 250 participating institutions, 30 databases, 20,000 full text journals, and 150 million items available through the British Library Document Delivery Service.

Higher education institutions that are leading the way in ICT-supported education in Pakistan are the Virtual University (VU) and the Allama Iqbal Open University (AIOU).

VU (www.vu.edu.pk) is Pakistan’s first university relying completely on modern ICTs. It was established by the government as a public sector, not-for-profit institution to provide affordable world-class education to aspiring students all over the country. Using free-to-air satellite television broadcasts and the Internet, VU allows students to follow its rigorous programmes regardless of their physical location.

The AIOU (www.aiou.edu.pk), which was established in 1974, is the first open and distance learning university in Pakistan and Asia. Its main campus is in Islamabad and it has a large network of regional centres spread all over Pakistan and the Middle East. Together with the Virtual University, AIOU serves over 750,000 students (growing at 14 percent annually), three times the combined student populations of all other universities in Pakistan.

The Pakistan Education and Research Network (PERN)

PERN is a network connecting 95 universities via optical fibre and providing facilities for video conferencing, connectivity to the Internet and local networked content, and VoIP services for communication between connected universities. It was established by the HEC in 2003. Since then, ICTs have developed at a rapid pace. PERN 1, as the original network is called, is based on legacy telecommunication Infrastructure that is not aligned with the modern architecture of National Research and Education Networks (NRENs) and not capable of supporting Next Generation network services and applications now being used by research and special interest groups.

Realizing the limitations of the existing network and the need to have a true end-to-end IP-based research and education network, the HEC has initiated PERN 2, which has the following core features:

- True packet switched network replacing legacy architecture
- A network architecture aligned with international practices and standards for NRENs and with connectivity to other peer networks (Internet2 and Geant2)
- Availability of high bandwidth for research and collaboration in areas like grid computing, high energy physics, telemedicine, research-related video and images exchange, and enterprise-level video conferencing

A complete transformation of the process of content creation and distribution, conversion of content for digital delivery, deployment of an independent DVB-S2 very small aperture terminal (VSAT) network for the Open University, and integration of campus management and education Enterprise Resource Planning (ERP) are some of the changes currently being implemented, for completion in 12 months (i.e. by mid-2009).

(Source: HEC 2008)

At present, approximately 20,000 IT graduates are produced each year by 110 universities in Pakistan that are offering IT and computer science programs. There are plans to set up six engineering and three technology universities in collaboration with Austria, China, France, Germany, Italy, Sweden, South Korea, and some other countries. These countries will provide the vice chancellors, faculty, training, and examination system and ensure the equivalency of degrees with their own system for 10–15 years. Each university will be established at an estimated cost of USD 400 million.

Finally, a major program has been launched by the HEC and National University of Science and Technology (NUST) to promote innovation and entrepreneurship in Pakistan that involves modification of curricula, introduction of courses in innovation and entrepreneurship within university systems, establishment of technology parks and technology incubators, and providing access to venture capital and soft loans to new start-up companies.

OPEN SOURCE/OPEN CONTENT INITIATIVES

The recently completed Open Source Industrial Automation Project was one of the most widely publicized open source

projects undertaken by the PSEB. It focused on five industry sectors — textile processing, automotive parts and accessories, readymade garments, hosiery, agriculture — for the development of open source ERP products. The ERP products (along with the source code) will be available free of cost to all member units of the associations in each of these sectors.

A vibrant OSS community is involving a large user advocacy base (Free and Open Source Software — FOSSP).

ICT AND ICTD RESEARCH AND DEVELOPMENT

While ICT has penetrated into the far reaches of the country, ongoing R&D on localization tools and rural connectivity and access will be the key to whether the potential of ICT is harnessed by ordinary citizens. The release of Urdu language tools by the Centre for Research in Urdu Language Processing (CRULP) has already proven to be instrumental in the extension of e-services to the masses. The CRULP has already successfully developed the Urdu lexicon, speech recognition system and fonts, and it is now also coordinating the PAN Localization project (<http://www.pan110n.net/>) for seven Asian languages.

The Government of Pakistan also continues to support ICT research with the R&D Fund, which is no longer being

administered by the PTCL. The new independent fund is managed by a 17-person committee and annually receives 1 percent of the gross revenue of all telecommunication service providers. Funded projects include: Automatic Control Programming of Robots through Imitation, GIS-based Optical Fibre Network Monitoring and Management System, Low Cost Ultrasound Training Simulator, and Artificial Immune System-based General Purpose Intrusion Detection System.

CHALLENGES AND OPPORTUNITIES

The World Bank’s *Doing Business 2008* report puts Pakistan in second place among South Asian countries in terms of certain economic indicators, such as ease of doing business, dealing with licences, and protecting investors. Indeed, Pakistan is quickly emerging as a powerhouse in the region, partly due to its fast paced IT industry. Government policies toward foreign investors have also contributed to making the country stand out. These policies include 100 percent foreign equity ownership, 100 percent repatriation of profits for foreign investors, and tax exemption for the sector till 2013. An increasing number of foreign companies also prefer Pakistan for their outsourcing operations due to the large pool of professionals proficient in English, cheap connectivity rates, and competitive operational costs.

Perhaps the most exciting development over the last few years is the increasing role of entrepreneurs in ICT-based projects, with younger people experimenting with launching their own businesses rather than looking for jobs. Several applications using Web 2.0, social networking, and other software-based businesses are growing. Some of these are either launched internationally (iScribe) or in advanced beta stage (paktranslations.com, thebc.com) all with venture capital and local equity funding. Other large enterprises have attracted private equity (www.lmkr.com) from big names like Actis.

In the development sector, the growth and increasing interest of the social entrepreneur is imminent as evidenced by VC (Acumen Fund) funding innovative projects like Sehat First, which is telemedicine on a sustainable and replicable basis.

All in all, the Pakistani spirit is alive and well. It has proved resilient in overcoming adversity and in converting challenges into opportunities. Growth on all sectors is positive and despite the major political and external challenges, all sectors of the Pakistani economy are going north.

The major political changes of the last few months taking Pakistan toward a broad based democracy will ensure that the pressure will be there to deliver on education, reduce poverty, and maximize the use of ICT as an enabler to optimize service delivery, reduce costs of doing business, and achieve better governance.

NOTES

1. Direct jobs are those created for setting up and operating the new networks, while indirect jobs include job in support services, outsourced operations and tasks, distribution networks, cellphone (hardware) marketing companies, and new businesses based on the spread of the telecom networks.
2. These are the industrial medical and scientific or IMS bands that do not require any licences and can be used by anyone on a ‘user beware’ basis since these bands are used without any protection or regulation like WiFi.
3. For more information, see <http://ictd.undp.org/it4dev/gpm/presentations/day3/Asia/pakistan/pakistan.ppt>

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