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Pakistan

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Technology infrastructure

Despite the impact of negative shocks to the economy, including the tragic earthquake of October 2005, macroeconomic problems resulting from high international oil prices, the geopolitical scenario and other issues, 2006 was yet another landmark year of developments in the telecommunications field in Pakistan.

The telecommunications sector remained a high priority area for investments, spurring the development of the much needed technology infrastructure to support Pakistan's vision of becoming an Information Society. The sector attracted approximately USD 2 billion in foreign and local investments, translating into 54 per cent of the total foreign direct investment in the country (Pakistan Telecommunication Authority 2006). Thus, the cellular phone subscriber base went up to 48.5 million (Pakistan Telecommunication Authority 2007) and the fixed-line/Wireless Local Loop (WLL) subscriber base went up to about 5.6 million lines, or 3.5 per cent of the population.

The inland and international submarine fibre optic infrastructure for transport and transmission of telecommunication traffic was also a focus of attention. Two new Terabit international submarine fibre optic cable ventures came into operation, connecting Pakistan to the rest of the world. The first project is TW1, a private sector venture with a capacity of 1.28 Tbps. It is connected with FLAG, a global submarine fibre optic cable venture. The second project is the Sea-Me-We 4 project, a 20,000 km long submarine fibre optic cable managed by a consortium of 16 leading operators including PTCL, the dominant telecom operator.

Pakistan has an extensive fibre optic backbone infrastructure operated by PTCL. The aggregate length of the domestic fibre optic network exceeds 11,000 kilometres. Three consortia—

Total population	160 million (estimate)
GDP per capita	USD 847 (equivalent PKR 50,820; USD1 = PKR 60)
Fixed-line telephones per 100 inhabitants (including WLL)	3.5
Mobile phone subscribers per 100 inhabitants	30
Internet users per 100 inhabitants	7.5
Internet subscribers per 100 inhabitants	1.5
Broadband subscribers per 100 inhabitants	0.03125
Total Internet bandwidth consumption	800 Mbps

Sources: Pakistan Telecommunication Authority (2006, 2007a, 2007b); Ministry of Finance (2006); and Population Census Organization (n.d.).

Multinet, which is a wholly owned subsidiary of Telecom Malaysia; LinkDirect, a subsidiary of Mobilink, the largest cellular company in Pakistan; and Wateen, a subsidiary of the Dhabi Group which has cellular operations in Pakistan and some other countries in Southeast Asia and Africa—are building domestic nationwide fibre optic networks to meet the growing demand for voice and value-added data service traffic. Wateen is also in the process of rolling out a nationwide wireless broadband voice and data WiMAX network in Pakistan.

However, in terms of basic and broadband access to the Internet, the fruits of the deregulation of the telecom sector have not been fully realized. The Internet subscriber population is 2.4 million (or 1.5 per cent of the total population), with less than 30,000 DSL subscribers across the country. The entire broadband population is less than 50,000, including subscribers to wireless or cable broadband connections. The total Internet bandwidth consumption in the country has reached 800 Mbps.

Pakistan has seen large-scale deployment of CDMA Wireless Local Loop (WLL) networks, which are data access-enabled. One 3G CDMA cellular network is expected to go live before the end of 2007. Existing GSM cellular operators have introduced EDGE services. These initiatives are expected to address access problems faced by potential users and to generate demand for broadband Internet services throughout the country.

ICT and ICT-related industries

The telecom sector of Pakistan has experienced positive developments and hyper growth since deregulation. Investments in

telecom infrastructure development have increased and the telecom industry is beginning to make a significant contribution to GDP. But one cannot say the same of the IT sector. The reasons behind this lag are complex and varied.

The IT industry in Pakistan is characterized by low barriers to entry, a preponderance of small units, intense competition from industry power houses in neighbouring countries, limited skill sets and a highly competitive global marketplace. The IT industry is a mix of specialized businesses and entities, including more than 100 international call centres/business process outsourcing (BPO) companies, 50 medical transcription/data entry companies, five engineering outsourcing companies, 200 custom software companies, and several other businesses specializing in animation, mobile content, retail banking, industry-specific ERP (enterprise resource planning), and document management. There is also a sizeable population of businesses catering to hardware and local office automation applications.

The IT industry currently employs more than 4,000 call centre/BPO agents, 2,000 in the medical transcription/data entry business, 500 in the engineering outsourcing field, about 5,000–7,000 software professionals in export-related work, and undetermined numbers in other specialized areas.

Pakistan's IT industry is still in its infancy, with export revenues of under USD 72 million (Pakistan Software Export Board 2006). But government and private entities are trying their best to ensure that Pakistan becomes a competitive destination for local and international IT services and manufacturing and related industries.

Key institutions dealing with ICT

The Ministry of Information Technology (MoIT) is the Government of Pakistan's policy and implementation arm for planning, overseeing and implementing activities to promote information technology and telecommunications programmes and projects aimed at economic development. MoIT oversees a number of departments. In addition to the Federal Government, there are departments within provincial governments with the specific task of ICT promotion initiatives.

Also under MoIT is the Pakistan Software Export Board (PSEB), which has the sole mandate of promoting Pakistan's IT industry. It has undertaken the following programmes:

- Provision of appropriate IT-enabled office space for IT companies in PSEB-designated IT Parks;
- Quality certification programmes under which 100 IT companies have received International Standards Organization (ISO) certification;
- Human resource development initiatives, including an internship programme that has placed 2,500 interns within the IT industry;
- Promotion of Pakistan's IT industry in the international media; and
- Subsidized participation of Pakistan-based IT companies in international trade shows.

PSEB's Board of Directors consists of representatives of government, industry associations and the private sector.

The Electronic Government Directorate was set up in 2002 to drive the e-government initiative envisioned under the IT Policy and Action Plan adopted in 2001. The Directorate is responsible for the planning, preparation and implementation of e-government projects and for providing technical advice and guidelines for the implementation of e-government projects at the federal, provincial and district levels.

Enabling policies and programmes

Cognizant of the importance of developing the IT sector in Pakistan, the Government of Pakistan has undertaken measures to generate demand for ICT services and applications and to create a critical mass of companies and expertise in the ICT field. The Federal Government has been actively pursuing an enabling policy framework since 2001, with the aim of attracting investments into the ICT sector. The incentives offered include corporate tax exemptions on export earnings, 100 per cent repatriation of profits, tax holidays for IT venture capital funds and provision of a subsidized enabling infrastructure.

The e-Government Plan and the resulting ICT initiatives serve as the key demand drivers for the local ICT industry. The private sector also actively contributes to the growth of ICTs in the country.

To ensure that the fruits of technological advancements, starting with basic access to telecommunications, reach poor and underprivileged communities across Pakistan, the government has adopted a Universal Service Policy with the following goals:

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

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

- 85 per cent of the population should have telecommunication coverage and therefore access to e-services if desired;
- 5 per cent teledensity in the rural areas;
- 1 per cent broadband penetration; and
- preferably one telecentre for every 5,000 people, or at least one telecentre for every 10,000 people in Universal Service Fund (USF) contract areas (MoIT 2006a).

Telecommunication operators are required to contribute to the USF. In turn, they can tap into this fund for telecom service projects in underserved areas. Currently, the Fund has over USD 49 million in its account. An additional contribution of over USD 15 million annually will be used to improve rural access.

e-Government services

The following are the broad areas in which initiatives have been undertaken under the e-government plan:

1. Infrastructure development to provide government departments with computers, intra-Ministerial networking (LAN/WAN), office productivity tools and electronic communication to facilitate their work.
2. e-Office applications, which include internal communication, human resource, budgeting/finance, project management, document/file management and collaboration modules. An application suite is being implemented in test sites and will be replicated across all Federal Government departments in phases.
3. Agency-specific applications and e-services for citizens. High-impact core services and processes are being identified and automated at all government departments.

The following are representative e-government projects:

1. *Online Recruitment Management System for the Federal Public Service Commission (FPSC)*. The FPSC is responsible for the hiring and induction of government employees. Millions of candidates are processed for induction to government service annually. As part of the e-government initiative, an online job portal has been set up where job openings are posted, candidates can file online applications and examination and interview results can be accessed.
2. *Applications for the Dissemination of the Proceedings of Parliament*. Specifically, this project includes automation

of the flow of legislative processes within the Secretariats of the two Houses of Parliament, provision of a platform for cross-referencing of information, online interface for members of the National Assembly and Senate, and public access to information on Parliamentary proceedings.

3. *Online Access to Case Laws at District Bar Associations*. Online access to databases of statutory and case laws has been made available to 70 District Bar Associations, the Supreme Court Bar Association and 11 High Court Bar Associations to improve the quality of legal decision-making in remote areas and to ensure the ready availability of judgements in comparable cases in electronic form. Aside from unlimited 24 × 7 access to statutes and case law in all locations, there are computer operators to help users at each location.
4. *Online Processing of Hajj Applications*. Each year about 150,000 Pakistanis undertake a pilgrimage to Saudi Arabia to perform the Hajj, one of the pillars of Muslim faith. To facilitate the process for pilgrims, a suite of applications has been deployed with the following features: online Hajj application submission, balloting of Hajj applications, travel management, passport printing, pilgrim tracking (in Pakistan as well as in Saudi Arabia) and a private tour operator management system.

In addition, the e-government plan envisions the automation of services in government hospitals and civil service agencies, police and security services, training and human resource development, licensing and registration processes, and filing and processing of patents. A national data centre for hosting Internet and intranet applications of the Federal Government is also being deployed.

Education and capacity-building programmes

The Government of Pakistan is committed to promoting and supporting ICT initiatives to enhance Pakistan's capacity to develop and produce ICT products and services. This includes the development of a critical mass of ICT experts. The Higher Education Commission (HEC) was set up in 2002 with the objective of improving the quality of higher education and meeting the requirement for trained human resources that the country needs to meet the challenges and opportunities posed by the rapid evolution of ICTs.

As part of its mandate of human resource development, HEC has sponsored programmes to establish ICT infrastructure in universities across the country. The objective is to lay the platform for the delivery of a range of ICT-based educational

services, including a world-class digital library and conferencing facilities. HEC is setting up video conferencing lecture rooms and has initiated the 'Online Lecturing and Video Conferencing System' in all public universities. The conferencing system, which will come with collaborative tools to enhance student–teacher interaction, is in aid of distance learning, which is envisioned as a means of addressing the shortage of faculty members in universities located in far-flung areas and, ultimately, of uplifting the standard of education in Pakistan.

As part of its ICT promotion activities and to complement its effort to improve the quality of higher education programmes and establish new universities and institutions, HEC is conducting ICT awareness programmes in smaller cities and towns and providing opportunities for talented individuals from these areas to join the mainstream ICT industry in due course. A recent initiative in this respect is the Outreach Scholarship Programme (OSP) funded through the National ICT R&D Fund of the Government of Pakistan. The programme reaches out to talented young people who cannot afford higher education in top-tier universities in Pakistan and provides them with scholarships in ICT disciplines in these universities. The programme not only benefits these individuals but also develops a more diverse human resource pool for Pakistan's ICT industry. During the first phase of the programme, which was conducted in higher secondary schools, 250 secondary schoolteachers were trained to help students hone their skills and participate in the competitive process to join mainstream universities. More than 3,000 secondary school students participated competitively in the university studies scheme during the first phase of the programme.

There are also government-funded human resource development programmes in software development, including internships, apprenticeships and specialized training. At present about 20,000 IT graduates are being added to the workforce annually. Government-sponsored internship programmes have placed about 2,500 interns in the industry during the last four years, with almost 80 per cent of the interns finding permanent employment. In the next four years, the government plans to place 10,000 more graduates in the internship programme. In future, the apprenticeship programme will assist 1,000 new hires to undergo year-long industry-specific training.

Research and development

A National ICT R&D Fund has been established by the government to provide an incentive for local development of ICTs that are vital from commercial and development perspectives. The projects that are qualified for funding are based on an

innovative value chain concept through deployment of integrated and interactive thematic strategies. The following areas have been prioritized for the first policy cycle: HR Capacity Building, National Productivity Enhancement, ICT Product Development, ICT Market Development and Multi-Sectoral Support Programme.

Telecommunication operators are the primary contributors to the ICT R&D Fund, which is managed by the Ministry of Information Technology. Currently, the Fund exceeds USD 40 million.

Open source initiatives

One of the key deterrents to growth and widespread use of software and hardware in Pakistan is affordability. Computers are expensive for average citizens and numerous copyright and cost issues hamper the widespread use of software. Recognizing that open source software (OSS) and applications could jumpstart overall ICT development, the Government of Pakistan considers OSS adoption as a key ICT policy objective.

Some level of success has been achieved in the public, academic and private sectors with respect to developing a nucleus of users and developers of open source applications. And with interest in OSS spreading to educational institutions and the corporate sector, it is likely that OSS will enter the mainstream in the next few years.

In the public sector, the Government of Pakistan is the key sponsor of OSS promotion activities in terms of human resource development initiatives in Linux, extending support to interested companies for migration to and adoption of OSS applications, and development of open source applications for the automation of small and medium-sized enterprises. In addition, the government is contributing to programmes for creating awareness of OSS. The Open Source Resource Centre (www.osrc.org.pk) was established by the Government of Pakistan in 2005 to bring together expertise and resources on open source technologies under one umbrella. The Resource Centre has also brought together established technology vendors, open source community members, and enterprise IT users/customers to jointly explore new opportunities for OSS deployment in the local context. To date, the Resource Centre has helped train 4,000 end-users and 800 system administrators in OSS applications, created a network of open source developers, conducted numerous workshops and seminars, and assisted numerous government and private-sector organizations in adopting OSS.

Business organizations have successfully reduced their costs by eliminating proprietary software licensing through the adoption of OSS. This has helped in the creation of a critical

mass of vendors and a support industry actively providing and supporting solutions for desktop, server and middleware stacks, including enterprise-level technical support.

Civil society organizations have also been actively pursuing the OSS promotion agenda. The Linux Pakistan User Group is composed of 3,000 professionals. The Free and Open Source Software Foundation of Pakistan (FOSSFP), which is dedicated to promoting the overall adoption, development and usage of OSS, has over 850 Ubuntu-Linux user group members and over 4,900 registered certified users. FOSSFP claims to have trained and certified over 5,000 Ubuntu-Linux users in Pakistan and is also leading the initiative to develop a localized version of Ubuntu-Linux in Urdu, to be followed by other local and regional languages.

Conclusion

Developing IT and IT-enabled services in Pakistan along global standards is not only a possibility; it is also a pressing need. The correct set of policies and the necessary fundamentals have been put in place, and bold and strategic initiatives are being undertaken. It is now up to the direct and indirect stakeholders of the IT industry to grab the opportunity, not only for their own benefit but also for achieving the ultimate objective of sustainable economic development in Pakistan.

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