

# Pakistan

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## Overview

### Socioeconomic snapshot of the country

Pakistan is the second largest economy of South Asia and ranked among the seven most populous countries of the world.<sup>1</sup> The country is nearly four times the size of the UK, and it has India, Afghanistan, Iran and China as its neighbours. The economy is primarily driven by agriculture, which accounts for the largest share of GDP, about 25 percent. Pakistan is one of the world's largest producers of raw cotton, which serves as the input to drive the textile industry – the mainstay of industrial activity in Pakistan. The economy relies heavily on exports comprising primarily textile products, commodities such as rice, fish and raw cotton, and manufactured items including carpets, petroleum products, leather, sports goods and surgical instruments. Almost half of the exports are destined for seven countries: the USA, Germany, Japan, UK, Hong Kong, United Arab Emirates (UAE) and Saudi Arabia. Pakistan's GDP per capita is about US\$430.

In line with the prevailing global trends, Pakistan's economic growth slowed down in the past few years. However, the government is making all-out efforts to revitalise the economy and to demonstrate its commitment to business friendliness through internationally acknowledged fiscal policies, good governance and transparency in managing government affairs. During the past year, the economy grew by 3.6 percent in real terms.<sup>2</sup> Foreign direct investment (FDI) is an important indicator of economic stability, representing a benchmark of the confidence of international investors in the local economy. The FDI for 2001 stood at about US\$10 million.<sup>2</sup> The USA accounts for 60 percent of FDI inflows, followed by the UK and UAE. Almost half of the FDI was in the oil and gas and the power sectors, followed by the trade, communications and industrial sectors.<sup>2</sup>

Pakistan's population is estimated to be 146 million, which has been growing at an average rate of 2.8 percent per annum. Its labour force is about 42 million, of which 28.1 million are in rural areas and 13.4 million in urban areas. The agricultural sector employs 48 percent<sup>3</sup> of the workforce. Being a low-income country, about a third of the people live below the poverty line. Poverty in Pakistan is largely a rural phenomenon as 32 percent of the rural population lives below the poverty line against 19 percent of the urban population.

Access to education is regarded as one of the fundamental rights of the citizens of the country. The government is committed to increasing the literacy rate as well as improving the quality of education. The overall literacy rate is estimated at 50.5 percent<sup>4</sup> (male 63 percent; female 38 percent) with rural and urban literacy rates at 30 percent and 70 percent, respectively. Legislation has been promulgated for compulsory primary education for all its citizens.

### Physical communications infrastructure

Pakistan has worked consciously to develop its physical infrastructure to support trade, commerce, cross-cultural interaction and socioeconomic uplift of the country. The physical infrastructure can be broadly classified into land, air and sea transportation systems. The total length of roads in the country is about 250,000 kilometres, on which 4.5 million motor vehicles ply. Its national airline, Pakistan International Airlines, covers 33 international destinations and 21 domestic stations, covering all parts of the country. The country has two major seaports at Karachi and Port Qasim, which handle 30 million tons of cargo annually.

### ICT infrastructure

ICTs have been recognised by the government as one of the four priority areas of focus. These priority areas are selected to integrate the country into the global information economy. The vision of the IT policy adopted by the government in 2000 focused on harnessing the potential of IT as a key driver for Pakistan's sustainable economic development.<sup>6</sup> Efforts were made to accelerate the development of the country's ICT infrastructure.

Pakistan Telecommunication Company Ltd (PTCL) is the exclusive provider of basic telecommunications and ICT infrastructural services in Pakistan. Basic services include voice, domestic, leased-line and international communications. It manages a network of 4.38 million lines installed across the country, which is almost entirely digital, and has a fibre optic backbone connecting almost 400 cities and towns on high-capacity fibre optic links.<sup>7</sup> The backbone is being upgraded through the use of dense wavelength division multiplexing equipment, which would result in abundant capacity on the nationwide network. On the

international side, Pakistan is connected with the rest of the world through the Sea-Me-We3 submarine fibre optic cable and the Intelsat satellite network.

Expansion of Internet access across the country is a key objective of the national IT policy, and PTCL has led the way in achieving this objective. It claims to be the first telecommunications company in the region to provide dial-up Internet access at local call rates throughout the country. More than 1,050 cities and towns have been connected to the Internet under this regime. Efforts are underway to expand the reach of this service. PTCL is also the major Internet backbone provider in the country. It runs the major IP backbone through which access facilities are provided to the majority of Internet users in Pakistan.

The National Telecommunication Corporation<sup>9</sup> (NTC) is the organisation entrusted with the responsibility of providing telecommunications services to government agencies and designated users. NTC is deploying a countrywide ATM-based multi-service data network capable of carrying voice, video and multimedia traffic. It is also actively involved in deploying an IP network exclusively for universities and institutions of higher learning to enhance their access to the Internet and to expand avenues of collaborative research and interaction.

In addition to public sector operators, there are 80 private sector ISPs and nationwide data communication network operators, who provide Internet access in all major cities of Pakistan. Internet access has shown remarkable growth in the last three years. According to estimates, there are approximately 1.7 million Internet users in Pakistan.

Cellular telephony is also an important component accelerating the expansion of access to telecommunications services. There are four cellular network providers, who serve a collective subscriber base of 1.4 million throughout the country.

### People's access to technology

PTCL has installed more than a million new telephone lines since 1996. Teledensity has increased by 6 percent per year, but the national teledensity is still less than 3 percent. Almost 90 percent of PTCL's infrastructure is installed in urban areas where 34 percent of the population lives. Rural areas remain underserved for many reasons, resource constraints being one of them. The access of underprivileged people to ICTs is not well developed. The rural segment, which is close to 100 million people, is served by under a million telephone lines. However, where available, telephone services are affordable. At present, access charges are about US\$5 per month, while local telephone calls are priced at US\$0.04 for a 5 minute call. Peak-time domestic long-distance charges are currently capped at about US\$0.17 per minute.

## Pakistan facts

**Total population:** 146 million (estimated)<sup>3</sup>

**Rural population as a percentage of total population:** 67.7%<sup>3</sup>

**Key economic sectors:** Agriculture, manufacturing, mining, construction, wholesale and retail trade, transport, finance, insurance, community and services<sup>17</sup>

**Literacy in the national language(s):**  
Estimated 50.5% (male 63%, female 38%) for age 10 years and above; rural areas 30%, urban areas 70%<sup>4</sup>

**Literacy in English:**  
20% of literates (estimated)

**Computer ownership per 100 inhabitants:**  
0.41<sup>18</sup>

**Telephone lines per 100 inhabitants:**  
2.44 (working), 3 (installed)<sup>8</sup>

**Internet hosts per 10,000 inhabitants:**  
0.78<sup>18</sup>

**Internet cafés/telecentres per 10,000 inhabitants:** 5<sup>19</sup>

**Internet users per 100 inhabitants:** 1.16<sup>10</sup>

**Cell phone subscribers per 100 inhabitants:**  
0.56<sup>18</sup>

**National bandwidth within the country:**  
Domestic traffic exchange capacity: 68 Mbps

**National bandwidth to and from the country:**  
Current IP bandwidth available: 455 Mbps;  
from May 2003: 600 Mbps<sup>7</sup>

### Sources:

See Notes

### Quality of connection

PTCL is the exclusive provider of fixed-line telecommunications services. Most of its network is digital. Three-quarters of its network infrastructure was developed in the last 12 years. The quality of connection, where network is available, is quite good, especially in the major urban areas. Performance targets were laid down in the PTCL licence and are monitored and enforced by the industry regulator.

Internet access quality is a dynamic phenomenon, but efforts are underway to improve nationwide access to enhance the quality of services. The industry regulator is also conscious of service quality and has been pushing the major industry players, such as ISPs and cellular communication companies, to improve their quality of connection. It publishes the results of quality of service surveys in the newspapers.

In remote areas, to which Internet access has been extended during the past year, problems with quality of connection have been experienced and are being addressed at the time of writing.

#### Affordability of technology and connection

Households in Pakistan are classified into various income categories, starting with US\$20 up to US\$117 per month, in US\$17 increments.<sup>11</sup> Analysis reveals that households falling within the top three income brackets, from US\$83 per month upwards, can afford telephone connection. There is also strong, sustained demand for connectivity from the business sector. It is noteworthy that basic access to telecommunications is also facilitated through the 105,000 payphones, deployed all over the country.

In terms of Internet access, IP bandwidth prices have been brought down from US\$60,000 to US\$6,000 per 2 Mbps per month within three years. This drastic reduction has had a very positive impact on enduser pricing, which has become affordable, averaging US\$0.25 per hour during peak time in major cities of the country. Telephone access charges are capped at US\$0.4 for a unlimited duration local call from the user to the ISP. Broadband access is still expensive, priced at over US\$100 per month, but the prices are likely to decline as economies of scale are realised.

#### Internet access rate

There are currently about 1.7 million active Internet users in the country,<sup>5</sup> constituting about 1.2 percent of the population. Nearly all the access is through fixed-line dial-up connection. Some corporate users use point-to-point wireless links for Internet delivery, but the number is estimated to be less than 450. Direct satellite-based asymmetric download services were very popular until two years ago, but their role is increasingly being marginalised because of the rapid fall in IP bandwidth prices, resulting in decrease of arbitrage. It is estimated that there are about 575 direct satellite receive-only links currently functioning across the country, providing about 150 Mbps of downlink bandwidth in the country.

#### Open source movement

As the key enabler and facilitator of IT industry development, the government has fully committed itself to the reduction of software piracy and the safeguarding of intellectual property rights, especially in the domain of software applications. The government is a key proponent of the use of open source software and technologies. As a demonstration of its commitment to this, it has mandated that all software procured by government departments should either be properly licensed or be from an open source. It has further decided that all server systems procured by the government would be Linux-based with few exceptions.

The development of open source software applications and the use of Linux are being promoted at all levels. A task force has been set up under the IT Ministry's think tank group<sup>12</sup> with the objective of overseeing and promoting the development of Linux and accelerating the localisation of open source technology in the country. The task force has planned a number of activities, such as R&D and awareness programmes; policy formulation; training workshops; local language documentation; application design; introduction of Linux at school, college and university levels; as well as other initiatives aimed at promoting Linux and other open source software.

The local movement for open source and Linux is also gaining ground. The Pakistan Linux Users' Community <<http://www.linuxPakistan.com>> is one of the active GNU/Linux communities. It has been functioning since 1999 and has about 400 members. The group holds regular meetings and runs an active mailing list. It has set up local chapters in five cities.

#### State of development, promotion and use of indigenous fonts, scripts and languages

There are 52 languages spoken in Pakistan.<sup>13</sup> Urdu is the national language, while Sindhi, Punjabi, Pushto and Balochi are the main regional languages. Urdu has its roots in Arabic and Persian and is considered to be very interesting and challenging in its computation.

Efforts to develop Urdu as the language for official business date back many decades. In 1979, a National Language Authority<sup>14</sup> was established for facilitating the use of Urdu as the official language in place of English, the preferred language of business in Pakistan. Urdu software development dates back to the early 1980s; and applications, primarily for desktop publishing and word processing, have been developed for the past 20 years. Over a dozen indigenously developed local language word processing applications are available commercially.

The computation of the language has also come a long way, efforts have been made to standardise the code page for Urdu so that data exchange between applications could be standardised. Work is in progress for ISO standardisation of the Urdu code page. Urdu top-level domains have been finalised. Urdu keyboard layout, fonts, and e-mail and Internet applications are in the process of being standardised.<sup>13</sup>

Efforts have been underway to indigenously develop open-type fonts for Urdu. The Urdu software industry has gone through many interesting phases in terms of computing applications and has matured over the years. Urdu software owes a significant share of its success to the development of the Internet. Various categories of Urdu software are available in the form of academic, R&D and commercial products: editors, word processors, databases, OCR, natural language processors, ActiveX controls, compilers, web





[www.sdpi.org.pk](http://www.sdpi.org.pk)>, <<http://www.epoor.org>>, <<http://www.care.org.pk>>, <<http://www.heartfile.org>>, <<http://www.edhiweb.com>>, <<http://www.hrep.com.pk>>, <<http://www.wwwfpak.org>>, <<http://www.citizensfoundation.com>> and <<http://www.akdn.org>>.

Political groups have recognised the Internet as a useful medium to spread their message, and almost all the mainstream political parties have established their web presence. These include <<http://www.ppp.org.pk>>, <<http://www.insaf.org.pk>>, <<http://www.pml.org.pk>>, <<http://www.pakistanawamitehreek.com>> and others. Another relevant website in this category belongs to the National Reconstruction Bureau <<http://www.nrb.gov.pk>>, which is an organisation mandated to formulate policies and strategies for implementing good governance in all the institutions of the state.

The industry and commerce sector has long recognised the Internet as a useful medium for facilitating a business, and a number of websites dealing with B2B, finance and commerce have been set up. Internet diffusion has increased over the last two years, and almost all major corporations have established a web presence and more companies are doing the same. Popular websites on industry and commerce are *Business Recorder* <<http://www.brecorder.com>>, Karachi Stock Exchange <<http://www.kse.com.pk>>, Jahangir Siddiqui & Company Limited the brokerage house <<http://www.jahangirsiddiqui.com>>, State Bank of Pakistan <<http://www.sbp.gov.pk>>, Securities and Exchange Commission of Pakistan <<http://www.secp.gov.pk>>.

Education remains an area of high interest with the local Internet user community. The primary area of interest is in institutions of higher learning located in the USA and Europe. Other areas of interest include testing, information and scholarship services. Local educational institutions have also set up sites to attract local and international students. Some of the popular educational websites are <<http://www.etaleem.com>>, <<http://www.apnafuture.com>>, <<http://www.studentsguru.com>>, <<http://www.aku.edu>>, <<http://www.bci.edu.pk>>, <<http://www.lums.edu.pk>>, <<http://www.nust.edu.pk>>, <<http://www.giki.edu.pk>> and <<http://www.vu.edu.pk>>.

Agriculture and rural development are issues of key importance to Pakistan, an agriculture-driven economy. One of the popular agricultural information portals <<http://www.pakissan.com>> which provides information on crops, fisheries, forestry, horticulture and livestock in Pakistan. It also reports agricultural news, alerts, new technologies and so forth. Other websites and mailing lists of interest on agriculture are <<http://www.telmedpak.com/agriculture.asp>>, Pakistan Agricultural Research Council <<http://www.parc.gov.pk>>, Indus Farming <<http://www.geocities.com/indusfarming>> a non-profit, research-oriented, academic mailing list for information exchange on tropical and sub tropical farming, agriculture and allied topics. Monsanto Pakistan Agritech <<http://www.monsantopakistan.com>> contains information on

genetically modified crops and food. The Central Cotton Research Institute site <<http://www.ccric.org.pk>> has interesting links to resources on plant pathology and physiology, breeding and genetics.

Pakistan is located in a geographical region which boasts of strong cultural and literary heritage and is a place full of historical and cultural icons belonging to ancient civilisations. The Internet is helping to preserve and expose the rich cultural heritage of the country, for which a number of websites have been set up such as <<http://www.Pakwatan.wm>>, <<http://www.heritage.gov.pk>>, <<http://www.khyber.org>>, <<http://www.tharparkar.sdnpk.org>>, <<http://www.allamaiqbal.com>>, <<http://www.urdustan.com>>, <<http://www.faz.com>>, <<http://www.ijazulhassan.com>> and <<http://www.nushaira.org>>.

## Important local sources of content

Although no ranking has been scientifically carried out to classify popular websites, surveys and feedback from published media, ISPs and Internet users pick the following websites and sources of content:

### Government of Pakistan official website

<<http://www.Pak.gov.pk>>

This website provides links to important ministries and the government's views on various issues of national importance. Launched prior to Pakistan's Golden Jubilee anniversary, this site is an important disseminator of official information. It also carries a summary of news available from the official national news agency.

### Pak Avenue <<http://www.PakAvenue.com>>

This is among the most popular portals on Pakistan. It is a content-rich site about everything Pakistani on the Internet, including arts and entertainment, business, culture, education, news, sports, travel and web applications. A web digest features discussion forums on current affairs, history, lifestyles, careers, cities and overseas links. Pak Avenue offers an integrated Pakistani information resource. It is popular because of the comprehensive nature of its content.

### Urdustan <<http://www.Urdustan.com>>

This is an Urdu language portal and regarded by many as the starting point for Urdu on the Web. Claiming to be one of the largest and most comprehensive sites on the subject, it carries extensive links to other Urdu sites in its directory. Urdustan develops its own content and is actively involved in building an online community.

### eTaleem <<http://www.eTaleem.com>>

This is one of the most popular information portals on educational and career resources in Pakistan. Started as a free online service designed to provide solutions to various educational and career-related issues, it now serves

institutions, students, teachers and tutors, as well as bringing needy students and financial supporters together on a single platform.

**Karachi Stock Exchange** <<http://www.kse.org.pk>>

This is the official website of the Karachi Stock Exchange (KSE), the largest stock exchange in Pakistan with 724 listed companies and current market capitalisation of US\$8 billion. It provides a wealth of information about its members as well as news and stock rate tickers showing up-to-the-minute stock market movements. A brief synopsis of the role of IT at KSE is also accessible online. This site is popular with the financial and investor community for its stock trading information from around the world.

**Chowk** <<http://www.Chowk.com>>

Chowk is a portal and discussion website focusing on South Asia. It strives to create a new category of hyper-writing, akin to an emergent form of journalism. On Chowk, according to its editors, writers and readers interact to give birth to new ideas, sometimes diminishing and at other times enhancing the original messages. Chowk is a repository of over 100,000 essays, 1,400 articles and an additional 100,000 forum styles. It is considered as one of the largest repositories of contemporary writing from South Asia.

**MegaEast** <<http://www.MegaEast.com>>

This is one of the first commercially oriented, comprehensive portals developed in Pakistan. This information-rich and well-designed website features interviews, articles, trends and spot polls for all ages on various aspects of sports, entertainment and fashion, as well as a zone for hobbyists. There are sections on health, South Asian art and culture, life in Pakistan and society. The portal was developed as a commercial business, but it has been losing steam over time despite remaining mildly popular with local users.

**Alephinc** <<http://www.alephinc.net/pakistan/>>

This is a popular website containing informative articles, useful factoids, maps and details about Pakistan's rich natural and cultural heritage. It is one of the popular, well-designed websites about Pakistan and its major cities. An interesting feature is a destination city of the month, in which specific sightseeing areas in that region are outlined.

**Pakistan Virtual Library**

<<http://www.clas.ufl.edu/users/gthursby/pak>>

This website is a subsection of the South Asia WWW Virtual Library maintained at Columbia University. Its function is to provide a current record of electronically distributed sources of information about Pakistan and Pakistanis whether resident in the country or elsewhere.

**Pak.org** <<http://www.pak.org>>

This is another popular portal, conceptualised back in 1993 to serve as Pakistan's first web portal complete with search engine, news feeds, weather and stock exchange information, and Pakistan-related site listings. Since its inception, it has grown steadily and is among the busiest Pakistani website network visited by over 1.5 million people every month. One of its biggest accomplishments is the creation of a cyber community in the shape of Gupshup <<http://www.gupshupforums.com>>, with about 50,000 registered users contributing to discussion on Pakistan. Gupshup claims to be the leader in Pakistani cyber community life.

**CricInfo** <<http://www.cricinfo.com>>

No discussion on popular websites on Pakistan is complete without the mention of CricInfo – the world's leading cricket information website. Cricket is an obsession with a large majority of Pakistanis, and CricInfo is undoubtedly among the most popular websites, especially during cricket seasons. It claims to be the most popular cricket site in the world and is regarded as among the Internet's most visited sports sites, estimated to reach more than 15 million users in 180 countries. The company also produces official sites for eight of the ten Test-playing countries, including Pakistan. This site is regarded as one of the phenomena of the Internet. Its page views are considered legendary – in 2001, CricInfo generated in excess of 1.5 billion impressions. The site currently generates around 150 million page impressions per month.

## Online services

The IT policy and action plan of the government served as the enabler for the introduction of online services in Pakistan.

### E-government

The E-Government Programme was launched with much fanfare in 2001 with three objectives:

- (i) To encourage the use of ICTs in enabling information and service delivery to the citizens in a cost-effective manner.
- (ii) To initiate measures for reengineering of workflow in government departments and to enable electronic service delivery to citizens to bring efficiency in operations.
- (iii) To bring transparency to government functions and access to information.

As part of the E-Government programme, all government ministries will be brought online in phases over a three-year period, and later the scope will be extended to cover all regions, cities and towns with the view to fully enable the online working of the government to achieve the results mentioned above. The programme is ambitious and involves extensive work at all levels of the government to reengineer,

to revisit “rules of business”, to develop applications, infrastructure and capacity, and, above all, to motivate users to change old ways of working to embrace the requirements of the knowledge economy.

Under the programme, a specialised agency (the E-Government Directorate) has been created to implement the E-Government Plan.

At present, most of the ministries and departments have established websites with varying levels of interactivity and content availability. The government has its official page at <<http://www.pak.gov.pk>>. A comprehensive new look and feel web portal of the government <<http://www.pakistan.gov.pk>> has been launched to act as the focal point of government resources and information and to allow easy access to public information pertaining to all ministries of the federal government. There are over 250 websites of various government departments. Important government websites include those of the Central Board of Revenue <<http://www.cbr.gov.pk>>, Export Promotion Bureau <<http://www.epb.gov.pk>>, Federal Ministry of Education <<http://www.education.gov.pk>>, Geological Survey of Pakistan <<http://www.gsp.gov.pk>>, Board of Investment <<http://www.pakboi.gov.pk>>, Ministry of Finance <<http://www.finance.gov.pk>>, National Database and Registration Authority <<http://www.nadra.gov.pk>>, National Fund for Cultural Heritage <<http://www.heritage.gov.pk>>, National Highway Authority <<http://www.nha.gov.pk>>, National Reconstruction Bureau <<http://www.nrb.gov.pk>>, Pakistan Tourism Development Corporation <<http://www.tourism.gov.pk>>, Pakistan Water and Power Development Authority <<http://www.pakwapda.com>>, Securities and Exchange Commission of Pakistan <<http://www.secp.gov.pk>>, Supreme Court of Pakistan <<http://www.supremecourt.gov.pk>>, Survey of Pakistan <<http://www.surveyofpakistan.gov.pk>> and Pakistan Railways <<http://www.pakrail.com>>.

The Central Board of Revenue runs one of the most interactive websites, which contains a repository of information on tax and fiscal issues as well as a database of registered taxpayers and related information. Other interactive websites are those of the Securities and Exchange Commission of Pakistan, Pakistan International Airlines <<http://www.piac.com>>, Pakistan Post Office <<http://www.pakpost.gov.pk>>, among others. A detailed list of websites of government departments is available at <<http://www.pakistan.gov.pk>>.

### E-learning

E-learning or distance education was identified as a major area of focus in the government’s IT policy and action plan. In the early years of Internet development in Pakistan, small and fragmented efforts were undertaken to use the Internet

for promoting learning and distance education, without significant impact. However, realising the potential of the Internet for distance learning and education, the government has launched a major initiative in the form of the Virtual University (VU). The inspiration behind VU is to utilise the services of the best available faculty without relocating them. It even envisages using the services of experts from abroad. VU depends on an excellent national telecommunications infrastructure to provide educational facilities nationwide. The VU teaching methodology eliminates the need for qualified faculty at each campus, thereby providing a uniform learning environment all over the country. VU has started with a four-year Bachelor of Computer Science programme and will introduce the master’s degree and conversion programmes for engineers and scientists in the near future.

VU imparts IT education through the television and the Internet, thus replacing the conventional method of classroom teaching. It goes beyond geophysical boundaries and is spreading education all over the country, including remote areas. It is unique in its method because it employs the latest techniques and means of communication and training.

### E-commerce

E-commerce activities are still quite limited within the country, but the government is fully committed to promoting e-commerce with the objective of bringing efficiency in economic activities as well as enabling the integration of the country’s economy into the global information economy. A number of initiatives are underway. One of them is the “Financial Network” initiative led by the State Bank of Pakistan aimed at enabling electronic transactions in domestic and international banking. The banks are already mandated to connect their core branches to one of the two financial data networks managed by the banking consortium. They also plan to expand their connectivity and to produce quarterly reports on the state of their e-readiness in deploying e-payment systems and enabling e-commerce. Another important initiative is the Trade and Transport Facilitation Project aimed at revamping the traditional trade and transport facilitation practices, including information flows, documentation and legislation in order to develop new, streamlined documentation procedures. The goal is to enable the flow of electronic documentation to facilitate trade and transportation.

The government has formalised the *Electronic Transactions Ordinance* <<http://www.most.gov.pk>> to provide a legal framework for electronic transactions in the country.

## Telemedicine

For a developing country like Pakistan, with vast, remote rural areas where health-care facilities are inaccessible, the benefits of telemedicine cannot be overemphasized. The government has set up a task force to examine the potential of using telemedicine to deliver health-care services using traditional and Internet technologies. In the private sector, some initiatives are already maturing, the most visible one being the TelMedPak Telemedicine Centres project <<http://www.telmedpak.com>>. Four working telemedicine centres have been established under this project in the remote areas of the capital city, where doctors have been well trained in online teleconsultation.

## ICT industries and services

ICT-based industries have flourished in Pakistan for the past 30 years. The early wave focused on telecommunications equipment and legacy data processing system development. The industries have now moved on to cater to the demands of networked economies. This new wave also focuses on opportunities resulting from the growing trend of outsourcing hardware manufacturing and maintenance, software development, and offshore services such as call centres, transcription, back-office support, and related services.

The local ICT industries face challenges and threats in the global market. The biggest threat has resulted from the global slowdown of ICT activities in 2001 and 2002, which has had a negative impact on the local ICT industries. Before that, training and retention of personnel was the biggest threat faced by local companies, coupled with a lack of resources to effectively compete in the global marketplace and to bid for large-scale projects. The local market for these companies was also small and lacked the sophistication to build capacities to cope with global competition.

The Pakistan Software Export Board (PSEB) <<http://www.pseb.org.pk>> is the designated official agency of the government. It was established with the objective of developing and exploiting the IT business potential of Pakistan and helping to promote local IT companies in the international market, as well as assisting development in the local marketplace to encourage growth in this sector. Currently, about 550 companies are members of PSEB, working in diverse areas such as software engineering, data entry services, medical and legal transcription, reporting and technical support services, web design and development, e-commerce solutions, networks and communications, m-commerce applications, graphic design and multimedia, hardware manufacturing and a host of other specialised areas.

The IT industry currently exports about US\$35 million<sup>16</sup> worth of products and services per annum; but with a large pool of software engineers and English-speaking IT-enabled manpower, it has the potential to generate thousands of offshore IT jobs within the next five to ten years.

Pakistan Software Houses Association (PASHA) <<http://www.pasha.org.pk>> is one of the best-known representative organisations of the software industry. Founded in 1992, it has over 150 members. Its main objective is to promote and develop the software industry in Pakistan. Some of the biggest software companies in Pakistan are members of PASHA, for example, NetSol <<http://www.netsol.com>>, Techlogix <<http://www.techlogix.com>>, CresSoft <<http://www.cressoft.com>> and Xavor <<http://www.xavor.com>>.

Pakistan has a long history of developing and manufacturing IT equipment. A substantial infrastructure is in place to do this with state-of-the-art technology. The country offers a complete spectrum of production and assembly facilities for electronic and IT equipment. The hardware manufacturing and assembly sector has received US\$52 million in capital investment and currently has an annual turnover of US\$100 million per annum. It employs 3,600 personnel, including 300 professionals, and has over 30 fully functional manufacturing facilities across the country.

Offshore IT services is another area where Pakistan enjoys large-scale growth potential. Be it transcription, call centres or back-office services, the infrastructure in Pakistan is ready to take on the global challenge of providing the best offshore services. Some of the success stories in this arena are Align Technologies of the USA, which runs a 250-seat offshore call centre in Lahore; Ascott Drummand of the UK, which runs a back-office accounting support set-up in Lahore among other ventures of varying sizes.

## Examples of innovative and key initiatives

A number of interesting and important projects and initiatives have been implemented to encourage IT usage in Pakistan in various sectors, including human resource development, education, access to ICTs, conservation of cultural identity, creation of employment opportunities and income generation.

**Universal Internet Access:** PTCL <<http://www.ptcl.com.pk>> the national telecommunications company, launched this unique project to extend the reach of the Internet throughout the country to serve broader socioeconomic goals. In August 2000, local-call-based Internet access was available in 29 cities only. The scheme envisaged extending this access to remote areas so that users can connect via the long-distance network without paying long-distance charges. Bandwidth delivery infrastructure for remote areas has also been upgraded and enhanced. The scheme has proven to be very successful, and Internet access has reached over 1,050 cities and towns and continues to expand.



**Sustainable Development Networking Programme (SDNP):**

This project was part of a global UNDP network of websites carrying development-related information. In Pakistan, the project was managed by the World Conservation Union. The project was a pioneer in Internet connectivity in the country and has undertaken numerous Web-related activities over the last eight years. The project played a very important role in developing the Internet culture in the country and is still regarded as the beacon for all development-related activities related to the Internet.

**Virtual University (VU):** VU <<http://www.vu.edu.pk>> is the flagship project of the Ministry of Science and Technology in pursuance of the IT policy. The project went online in 2002 and intends to exploit the potential of IT as a key contributor to the socioeconomic development of Pakistan. Its aim is to contribute to the development of human resources in IT and make Pakistan an important player in the IT industry. (See also earlier discussion.)

**Operation Badar:** This project was launched with the objective of providing high-quality e-commerce application development education at very low costs to students and professionals in Pakistan. It was initiated by an expatriate Pakistani, whose target was to train 313 software architects and 10,000 developers within one year to meet the shortage of IT professionals. To reduce costs, Operation Badar has developed an interesting model whereby no capital investment is made by the project; rather, it makes use of existing computing and classroom facilities of universities and institutions on weekends and during the nights. To accommodate a large number of candidates, auditoriums, halls, etc., are rented during the time when they are not being used for regular business. In order to maintain quality, students are required to take certification examinations recognised and supported by IBM, Oracle, Sun Microsystems, BEA Systems, Hewlett-Packard, Novell, Oracle, the Sun/Netscape Alliance, and Sybase so that the qualifications are internationally recognised. It is already a huge success with more than 20,000 students enrolled in Karachi alone. The reach of the programme is being extended to other cities. One of its luminaries is Miss Afsah Shafqat, a 12-year-old girl recognised as the youngest Sun-certified Java programmer in the world.

**ThreadNet Hunza:** This project <<http://www.threadnet.hunza.com>> was started by the Karakoram Area Development Organization, a non-profit community-based organisation working to promote sustainable development of mountain areas in northern Pakistan. The northern region is the most underdeveloped and treacherously mountainous. Its economy is dependent mainly on subsistence agriculture. The area also suffers from a very high rate of unemployment, and there is virtually no industrial base. Recently, some of the traditional handicraft skills have been revitalised to

develop a local cottage industry to provide alternative economic opportunity to women. However, local handicraft trade is dependent on tourism as geographic constraints and a lack of infrastructure for business development make it very difficult to create and sustain viable export links abroad. This project has become the biggest craft development programme in the area.

Since its establishment in 1996, the programme has created more than 2,500 jobs for women artisans. It has sold local products worth approximately Rs 15 million and trained more than 30 local women as quality controllers, product designers, marketing and production supervisors and bookkeepers. At present, around 2,300 home-based women artisans work for the project. Another 60 women work at seven workshops daily to produce finished products, which are marketed under the brand name of ThreadNet Hunza through partnerships with local and national retailers. The project aims to transform local handicrafts into globally marketable products.

In order to bring the benefits of e-commerce to this remote region, ThreadNet is linked to the Pan Asia Networking website <<http://www.PanAsia.org.sg>>. The site contains photographs of the products being offered for sale and accepts mail orders using a credit card payment system.

## Enabling policies

The government has won accolades for its IT policy and action plan <<http://www.most.gov.pk>> announced in 2000. The plan aims to undertake measures to position Pakistan as a key player in the global IT arena so that it can capitalise on its human resource potential to attract global offshore services business. It also aims to promote the “export” of IT manpower across the world. A framework consisting of policy, legislation and operational guidelines was formulated with the government in the role of an “enabler and facilitator” for the growth of the IT industry. The private sector’s role is to lead the initiative as the main driver of growth. The key areas of focus are listed below:

### Human resource development

- (a) Development of a large pool of academically qualified and technically skilled IT manpower to meet local and export needs
- (b) Establishment of new IT universities as well as VU for distance learning
- (c) Strengthening of existing IT institutes
- (d) Encouraging expatriates to take up faculty positions in Pakistan

### Infrastructure development

- (a) Establishment of IT parks and incubators for facilitating IT business
- (b) Increasing the depth and the modernisation of telecommunications infrastructure

(c) Establishment of network infrastructure in the academic community to encourage information sharing and collaboration among universities

(d) Expanding broadband access

#### Software industry development

(a) Developing the export potential of the software industry

(b) Mandatory participation of local software companies in government and public sector projects

(c) Promotion of local content development in Urdu and regional languages

(d) Promotion of software exports through the establishment of the International Marketing Network, which is supported by the government

(e) Subsidised Internet infrastructure for software exporters

(f) Fiscal and tax incentives for software exporters

#### Hardware industry development

(a) Developing the competitive advantage of hardware manufacturers and assemblers

(b) Waiving duties and taxes on hardware

(c) Providing incentives to reduce the cost of raw materials

(d) Encouraging and funding R&D in universities

#### Internet

(a) Enabling and expanding affordable Internet access

(b) Encouraging competition, avoiding unnecessary regulations, and providing low-cost, reliable broadband Internet access

(c) Universal Internet access in areas connected to the telecommunications network

(d) Support for the development of national Internet content

#### IT promotion and awareness

(a) Massive IT promotion and awareness campaigns to be undertaken

(b) Support and funding for international marketing and participation in trade fairs

#### IT usage

(a) IT induction at all levels of government

(b) Key projects to be undertaken, including online government, e-governance programme and e-commerce

#### Legislation

(a) Legislation for digital signatures, intellectual property rights and copyright, consumer protection and e-commerce

(b) Revision of statutes that mandate paper-based or manual processing

The action plan is an integral part of the IT policy, providing a framework for the implementation of the policy through specific project formulation and implementation. The government has developed and implemented projects and programmes worth an estimated Rs 2.5 billion for the year ending June 2002. It is expected to spend approximately Rs 3.5 billion on these projects in the following year. The primary focus is human resource development and infrastructure strengthening.

The policy-making agency is the Ministry of Science and Technology, with collaboration from the following key agencies in implementing the projects:

- COMSATS <<http://www.comsats.net.pk>>
- Pakistan Computer Bureau <<http://www.pcb.gov.pk>>
- Pakistan Software Export Board
- National Telecommunication Corporation <<http://www.ntcpk.com>>
- Technology Resource Mobilization Unit
- Pakistan Telecommunication Company Ltd
- Provincial governments of Punjab, Sindh, North West Frontier Province and Baluchistan and the government of Azad Jammu Kashmir

## Regulatory environment

The various laws, rules and regulations affecting the ICT sector are described below:

### Regulation of the telecommunications sector

The telecommunications sector is regulated under the *Pakistan Telecommunications (Re-organization) Act 1996*, under which restructuring and reforms were initiated in this sector to make a shift from a monopoly regime towards full competition and an open market. Under this Act, all telecommunications operators including ISPs are required to be licensed by the industry regulator, the Pakistan Telecommunication Authority <<http://www.pta.gov.pk>>. At the time of writing there was only one service provider for basic telecommunications and international services, whose monopoly was to expire on 31 December 2002. Following this, the telecommunications sector will open up to full competition. The deregulation is an important element of the strategy to promote the growth of the ICT sector, given the importance of telecommunications networks as key elements of the ICT infrastructure. The deregulation policy was under active review at the time of writing.

### *Electronic Transactions Ordinance*

The *Electronic Transactions Ordinance* <<http://www.most.gov.pk>> has recently been promulgated to enable the development of a regime where electronic records and digital signatures are accepted as legal documents in Pakistan. The law envisages the creation of the Certification Council for

accreditation of certification service providers and to encourage uniformity of standards and practices. It enables legal recognition and acceptance of electronic documents and transactions in courts of law. It will also provide the basic framework for developing a regulatory structure for electronic transactions. The ordinance also addresses issues relating to cyber crime.

### Regulation of broadcast media in Pakistan

The *Pakistan Electronic Media Regulatory Authority Ordinance, 2002* provides the framework for regulation of broadcast media in Pakistan. The key objectives of this legislation are to improve the standards of information, education and entertainment; to enhance the choices available for news and entertainment; and to ensure accountability, transparency and good governance by optimising the free flow of information. Under this ordinance, the Pakistan Electronic Media Regulatory Authority has been established for regulating the establishment and operation of broadcast and cable television stations in Pakistan. Since this is a newly established body, it is streamlining its functions at present.

### WTO commitments

Pakistan is a member of the World Trade Organisation (WTO) and has actively participated in its deliberations. In 1997, Pakistan formally filed an offer for the opening up of its telecommunications sector to full competition by 2002. The same was reflected earlier in the *Pakistan Telecommunications (Re-organization) Act 1996*. In line with the WTO offer, the government is fully committed to opening up the telecommunications services to full competition on 1 January 2003.

### Other laws and rules

In addition to the laws mentioned above, other laws and rules relevant to the ICT sector include the *Copyright Ordinance 1962*, *Merchandise Marks Act 1889*, *Patents Ordinance 2000*, *Trade Marks (Invalidation and Summary Registration) Act 1950* and the *Trade Marks Ordinance 2001*.

## Future trends

The government and the private sector have both kept in focus developments in the IT sector, and conscious efforts are being undertaken to harness the full potential of IT for the development of the country. In order to achieve this objective, a policy and an enabling implementation programme were chalked out. Results of these efforts are likely to emerge in the next two to three years. Some of the likely outcomes are described below.

The most important area of focus is human resource development for IT. It was realised early on that without a critical mass of adequately trained IT manpower, no national IT development strategy could be successfully implemented. Therefore, a major effort was focused on this and hundreds of IT training programmes have been launched, which will start producing results in the next three to five years. The human resources will help in filling the vacuum that exists in trained manpower and will be instrumental in the implementation of IT programmes in the public and private sectors.

The government has initiated the e-government programme. It is expected that upon implementation, the delivery of government services to the masses through electronic means will improve efficiency at every level of government. In practical terms, it will mean that information, application forms, records and government notifications will be available over the Internet. Members of the public will be able to pay state levies, file returns, process applications, receive land records, apply for identity cards, passports and domiciles, etc., online. This process would also enforce transparency and decrease public interactions with government officials, thereby reducing the burden on the state. The scheme is likely to succeed since the government's active focus has resulted in the extension of Internet access to over 800 towns and cities, including those located in remote areas.

The e-commerce and trade facilitation programmes are in the pipeline and are likely to be implemented in two to three years, thereby creating an environment for the use of IT in day-to-day business, banking, trade and commerce. These trends would also help improve national efficiency and reduce the "parallel economy".

The open source movement is also likely to gain momentum as office and desktop applications are developed indigenously, and the government and its private sector partners are making efforts in this direction. One other important development is likely to be increasing content development in local languages. Until now, the computational capability of local languages has not been exploited to its full extent. However, this is likely to change with the growing recognition of local language content on the Internet, and the move is likely to gain momentum.

The deregulation of the telecommunications sector has been planned; and it is likely that major structural changes in the sector will occur, led by private sector entrepreneurs, who will participate in the sector's development once the monopoly of the state-controlled operator is terminated.

## Select bibliography on Pakistan

Important websites that offer detailed information about the state of ICTs in Pakistan are presented below:

### Ministry of Science and Technology

<<http://www.most.gov.pk>>

This body is entrusted with the task of leading the IT initiative. It has a specialised Information Technology and Telecommunications Division, whose primary responsibility is IT policy development and implementation. Its website contains important links to information on the state of practice of IT in Pakistan with emphasis on policy and regulatory and legislative frameworks.

### Pakistan Telecommunication Company Ltd (PTCL)

<<http://www.ptcl.com.pk>>

This is the government-owned key provider of telecommunications infrastructure, especially the Internet backbone. Its website contains useful information on the state of infrastructure readiness and future plans for the IT industry in Pakistan.

### Pakistan Telecommunication Authority (PTA)

<<http://www.pta.gov.pk>>

This body, regulates the establishment, operation and maintenance of telecommunications services. Its website provides useful information on the private sector operators of telecommunications services, particularly ISPs which provide IT infrastructure services.

### Sustainable Development Networking Programme of the UNDP <<http://www.sdnpk.org>>

This is a flag bearer of information on the state of ICT practice in various areas of development and serves as one of the most visible development and ICT portals in Pakistan.

### Technology Resource Mobilization Unit

<<http://www.tremu.gov.pk>>

This think tank of the Ministry of Science and Technology brings together resources, people and institutions to develop ideas into policies and follows through with projects and implementation frameworks. It has been actively involved in the IT policy implementation projects and has set up a number of task forces for expanding the role of IT in diversified areas.

## Notes

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