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Pakistan

Jamshed Masood

fixed phones

int'l telephone traffic

mobile

Internet users

hosts

PCs

literacy

residential phones

enrolment

TV households

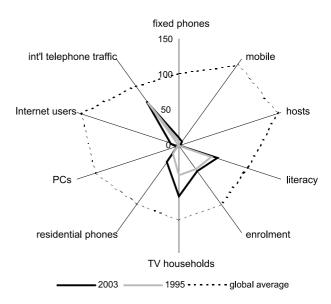—— 2003 —— 1995 • • • • • global average

Overview

A number of initiatives have been introduced in the ICT sector after a new government took office in November 2002. The new government has continued to give the sector high priority for development. It has been supporting ICT development via a two-pronged strategy. The first part of the strategy aims at generating work for the local ICT industry, which is still reeling from the 2001–2002 economic downturn. The second part sets out to help small and medium enterprises embrace ICT to enhance their performance and competitiveness. At the same time, these enterprises, as well as public sector organisations, have come to appreciate that ICT can enhance productivity. Some of these companies have set up office LANs and websites and adopted ICT applications.

The Internet has become an essential tool for business communication. The use of broadband services has started to grow in homes and offices located in major cities. This trend is expected to accelerate. Efforts to network the country continue, and so far over 1,800 towns and cities have been plugged into the Internet backbone.

The telecommunications sector remained the focus of attention during much of 2004. The growth of cellular networks accelerated during the year resulting in a doubling of subscribers. Cellular phone subscribers are expected to surpass fixed-line phone users before the end of 2004. The year has been rightly regarded as the "telecommunications policy year" as it saw key policy changes taking effect. The fixed-line telecommunications deregulation policy was announced, formally bringing to an end the incumbent operator's monopoly and setting the stage for the opening up of the sector to major investors. Two new cellular licences were awarded in April 2004.

The initiatives to develop local online content and promote the use of local languages online also gained momentum. Local-language newspapers continue to lead in developing local-language online content as well as introducing innovative services such as online news delivery via cellular phones.

The year also saw some revival of the ICT industry, specially the outsourcing segment. The companies that survived the downturn have emerged more focused, having learnt from their past experiences. New firms have also sprouted to capitalise on the new opportunities in outsourcing. A number of them set up call-centre operations to provide back-office services to foreign-based companies. This segment of the ICT services market is expected to grow in the years ahead because of favourable fundamentals.

Looking back at the early efforts to promote the ICT sector, it is found that they have not been able to achieve their objectives. In fact, the sector appeared to have shrunk during the first half of 2004 when a number of ICT companies folded. This was due primarily to the latent effects of the global dotcom crash and to geopolitical insecurity. The e-commerce and e-government initiatives, which represented the core of the ICT industry development strategy in 2000–2001, were not able to achieve any visible success either, owing to the inertia in revamping official processes and systems. Nonetheless, the pilot programmes started in these critical areas are likely to act as agents of change for the future.

Meanwhile, the Human Resource Development Initiative has achieved mixed results. Universities and other educational institutions have been upgraded, and a critical mass of students has been trained in various facets of ICT. However, the downturn, coupled with the delay in providing assistance to the industry is creating a growing mass of unemployed ICT workers.

Online services

Although the government continues to be the leading enabler of online services, the private sector has also begun to provide services online. These services include online banking and stock trading, which have emerged as successful examples of e-commerce.

E-government

The official government portal (*http://www.pakistan. gov.pk*) was launched to provide citizens with information on the government, its activities and its services. It currently offers about 400 Mb of information from various official sources and is expected to grow at the rate of 100 Mb per month.

The portal was followed by the launch of *http://www. forms.gov.pk*, from which about 500 official forms can at present be downloaded. More forms will be made available over time. At present, the system does not allow online submission of digitally signed forms, but plans are underway to make this possible in future.

The government is also in the process of making its land and property record management system accessible online. People living in rural areas, and often even urban residents as well, have long faced a multitude of problems in the transfer and inheritance of land and property. Disputes relating to land and property records have multiplied in the past 25 years and now account for almost half of all court cases relating to land and property ownership and transfer. The situation is due to the archaic land record management system, which was first implemented in the 18th century during British rule. The old manual system is cumbersome and prone to manipulation, corruption and extortion by functionaries. It also fails to provide the government with meaningful data for planning purposes. The system could not be improved in the past despite repeated attempts to reform it because of various reasons, including the lack of ownership of the process, inadequate technology and a lack of foresight.

A new system has now been developed and is undergoing trials in the province of Punjab. Early results from the trials indicate that it is likely to revolutionise the way land records are managed. The software is based on a standard Urdu interface. The new system mimics the administrative processes of the manual record-keeping system currently in use, thereby making it user-friendly to the revenue officers who will be operating it. Successful implementation of this system will likely emerge as the most effective indigenous application of ICT addressing one of the biggest administrative problems in the country. It is hoped that it will also help to bring about transparency and efficiency and to reduce corruption throughout the country in matters relating to land and property.

Meanwhile, the tax department, capitalising on the potential of ICT in data management, has mandated that certain tax information be filed electronically. Plans are also underway to roll out a public key infrastructure following the establishment of the Certification Council in 2004.

E-commerce and e-business

E-commerce is an area that has lagged behind. Despite various enabling measures being taken, such as the implementation of the Electronic Transactions Ordinance 2002 and the establishment of the banking data communication network, significant large-scale e-commerce activities are still lacking.

The stock market boom, however, has facilitated online stock trading activities after a number of stockbroking firms developed their own systems for online trading. This service has received enthusiastic response across the country. Its success has led to the development of other innovative applications, such as the provision of online stock market information on GPRS cellular phones, mobile commerce applications for bill payment, and inventory and salesforce management using PDAs.

Banks and other financial institutions have also found ICT helpful in upgrading their delivery of services to customers. All banks are now connected to one of the two national ATM backbones.

Habib Bank, the largest state-owned (now partially privatised) commercial bank in the country, operates more than 1,100 branches throughout the country. Some of the branches are located in areas that lack basic telecommunications infrastructure. The bank has faced the perpetual challenge of collecting banking data from these remote

Online stock trading takes off

The Karachi Stock Exchange introduced in 2003 AKDTrade.com, the country's first online stock trading system. Industry observers were at first sceptical about the system given the lack of an e-commerce infrastructure and limited reach of the Internet in the country. However, the system has proven to be remarkably successful; and since its launch, two billion shares have been traded online, exceeding Rs 100 billion (US$1.7 billion) in total value. This initiative is a clear demonstration of the immense potential that e-commerce has even in a country with an underdeveloped telecommunications infrastructure. AKDTrade has also introduced Pocket Stocks, a cellular phone application that provides live stock quotes to Ufone cellular subscribers.

The popularity of AKDTrade has prompted other companies to launch online stock trading services. At least five companies have done so, and more are in the pipeline. This success has given e-commerce activities in the country a major boost.

branches and updating their records in a timely manner. Capitalising on the expanded Internet connectivity in the country, the bank developed an innovative system called SIMEX (Secure Internet/Intranet Managing Exchange) to gather data on a daily basis from its branches throughout the country. This new system also helps in the intelligent consolidation of data gathered at the head office of the bank and in the secure transfer of information between the branches and the head office via VPN connections protected by public and private key encryption. The system has built-in intelligence that does not allow the branches to send data to the central repository until the branch accounts are balanced at the end of the day, thereby minimising errors in data entry, reporting and transmission to the head office. This innovative system has helped to improve the efficiency of the bank's operations. A project of this magnitude would have been inconceivable even two years ago. Its success has now encouraged numerous other organisations that operate branches in various parts of the country to consider similarly innovative systems to improve their operations.

Distance education and e-learning

E-learning has also lagged behind in terms of the level of enrolment. The downturn in the ICT industry and the corresponding decline in employment opportunities have affected enrolment for IT education across the board, including distance education programmes.

Industries

The ICT sector was perceived as a major driver of Pakistan's economic growth at the turn of the millennium. It was expected that businesses would capitalise on the boom in outsourcing and, consequently, the telecommunications market would expand. However, the sector has not lived up to expectations. The effects of the economic downturn and deflation of 2001–2002 have lingered right through 2004. Fortunately, some specialised ICT companies survived and, after restructuring, began growing again in the second half of 2003.

The offshore call-centre industry was active throughout 2004, with at least 15 new centres of various sizes set up primarily to provide back-office services to companies based in Western Europe and North America. Although this sector is still in the early stages of development, the timing seems to be right, as an increasing number of multinational companies are considering offshoring their back-office functions in order to trim their operating costs. The government has also been forthcoming with support for the industry and readily addressed key problems such as unreliable connections and office space shortage. Pakistan is now perhaps the only country in the region where the incumbent telecommunications operator is mandated to

Virtual university's take-off delayed

The launch of the Virtual University was considered a major milestone in the field of ICT-related higher education. The project envisioned a modern platform for distance education using broadcast media and the Internet to deliver high-quality education throughout the country and build a critical mass of ICT professionals.

The Virtual University potentially addresses the critical shortage of ICT expertise in the country with the innovative concept of bringing scattered teaching resources onto a single platform and then making them available to students across the country, as well as to students overseas, all at a very affordable cost. Students interact primarily through the Internet with faculty members and learning resources while lectures are delivered through television broadcasts or video recordings.

The futuristic vision of the Virtual University will take time to realise as it has yet to generate the required momentum. Its enrolment is less than a third of what was projected for 2004. This is attributed to a number of factors. Firstly, the global downturn in the ICT sector and the resulting reduction in the number of jobs in the industry has not motivated students to enrol in the numbers originally anticipated. Secondly, the student support system of the Virtual University needs to be refined in terms of improved interaction with faculty members and local coaching arrangements where students are able to interact face-to-face with faculty members or tutors. Other barriers include course structures which do not allow professionals to sign up for its programmes and possibly undergraduate programmes that are not suited for implementation in a distance learning mode.

The project therefore has not yet achieved the desired level of success in the short time since it rolled out its programmes. In light of the changed circumstances of the global ICT market, the Virtual University of Pakistan is already reorienting its goals and objectives. A number of degree programmes in the liberal arts have been started and the overall project targets are being revised.

provide service-level agreements for international connectivity to call-centre operators as well as free back-up connectivity on satellite and submarine fibre optic networks.

The call centres are also encouraged to locate in special-purpose technology parks set up in all the major cities where they only have to pay for utility usage. This sector is expected to undergo major expansion in 2005–2006.

The telecommunications industry has continued to expand, and local companies are increasing their role as providers of products and services to not only local customers but also companies abroad. Some local manufacturers have begun to export products such as microwave radios, fibre optic cable, and payphones. Companies are eyeing the deregulated telecommunications market, as they will have a much larger clientele for both equipment and services.

Key national initiatives

Although English is the official language of business in Pakistan, only a small section of the population is well versed in it. Thus, the use of only English on the government portal means that most citizens will not benefit from it. The task of converting the content on the government portal and elsewhere on the Web to Urdu, the language commonly understood all over Pakistan, is enormous and difficult to accomplish.

To help tackle this challenge, the Centre for Research in Urdu Language Processing (CRULP) was established at the National University of Computer and Emerging Sciences in Lahore to undertake R&D activities related to the use of Urdu and the regional languages of Pakistan in computing. It is working on areas such as speech processing, computational linguistics and script processing. It is developing a machine translation system which takes English text on the Web and converts and displays it in Urdu at the click of a button. This will enable most Pakistanis to have access to English-language material on the Internet. The key components of this project include the development of an Urdu lexicon, an online Urdu dictionary, an online English-to-Urdu machine text translator, and an Urdu email and website reader. Another major component is a text-to-speech converter, which will be available to content developers to incorporate in their automatic voice response systems. CRULP has also led initiatives to develop flexible and compatible Urdu fonts for use in modern operating systems. The initiatives undertaken at CRULP are recognised by organisations such as IDRC and Microsoft. The centre is supported by government and IDRC grants.

The government has also been improving and modernising the citizens' registration system over the past years in order to gather data for economic planning, resource distribution, governance and social development purposes. These efforts include the computerisation of the records of citizens and upgrading to state-of-the-art national identity cards. After a number of attempts, the national data management initiative has been streamlined and has started to show results. A citizens' database and national data warehouse has been developed by the specialised agency set up for this purpose called the National Database and Registration Authority (NADRA, *http://www.nadra.gov.pk*). It has taken NADRA approximately three years to put the processes and systems in place to enable systematic inputs, computerisation of citizens' records and the subsequent integration of the records. One of the most prominent features of the database is that it is designed with Urdu support and also multilingual capabilities to support the various languages of Pakistan. This project has also proven to be a trend-setter in the development of Urdu standards on large-scale systems. To its credit, NADRA has issued 35 million computerised identity cards to citizens and also created a GIS resource complete with maps, statistics and a geographical profile of the entire country. The NADRA system is likely to emerge as the most valuable repository of national information for supporting national development plans.

Another significant initiative of national importance is the plan to provide district courts around the country with online access to the latest statutes and case laws. A problem perpetually faced by ordinary citizens is access to justice in a timely and prudent manner. Ordinary citizens cannot afford expensive lawyers with extensive resources and are therefore limited to lawyers who lack the resources to competently defend their clients. Even judges face the same predicament, as some district courts, especially those in the remote areas of the country, do not have well-stocked legal libraries containing up-to-date statutory and case laws or enough research material to aid the judges in their decision-making. In order to solve this problem, the expanded Internet infrastructure has been used to provide members of the legal community, even at the remotest location, with access to a digital library of statutory and case laws over the Web. The process of accurately digitising the case laws and statutes, which were developed over decades, has been long-drawn and challenging. This task has been largely completed, and authentication of the online data is now underway. The availability of this online library is expected to significantly improve access of both urban and rural communities to the judicial process. It also has the potential to change the nature of the long-drawn conventional legal processes across the country.

On the education front, ICT laboratories are being set up in 2,000 schools across the country to impart ICT skills to the young generation. The plan envisages the introduction of ICT education in all the 8,000 secondary and higher secondary schools in the country.

The Pakistan Education and Research Network is an important national initiative to develop a data communication infrastructure interconnecting all local universities on a fibre optic backbone. So far, 50 universities in all the major cities have been connected. The aim is to increase collaboration among the universities and allow them to share resources.

Enabling policies

Despite delays, the telecommunications deregulation policy was finally approved, opening up the fixed-line telecommunications sector to full competition in July 2003. The policy was generally welcomed by investors for its open nature, which facilitates entry into the market of local and long-distance telecommunications service providers. Some critics, however, object to the performance obligations on long-distance operators, which were developed with the view of preventing deflation of the market and inefficient entry of operators. Nonetheless, the policy has been successfully implemented. Bidding for the WLL frequency alone has generated revenue in excess of US$200 million for the government. Additionally, 12 long-distance and international operators have been licensed. A second round of licensing has been announced by the Pakistan Telecommunication Authority.

The other major development was the formulation of a policy for the cellular mobile sector which will enable the entry of two new cellular operators through an open auction process. This policy was necessitated by the rapid development of the sector and the continued shortage of supply from existing operators, which forced the government to act in the interest of consumers. Leading international operators bid for the new licences, and two new cellular operators have been licensed at bids of US$291 million each. They are expected to launch their services after March 2005.

Regulatory environment

Convergence and network security are two areas that are gaining increasing attention. The implementation of e-government has raised concerns that it will expose the national networks and computer systems to attacks and other criminal activities. The national Internet infrastructure has already fallen victim to denial-of-service attacks on government websites, which paralysed the entire network.

The government's major focus during 2004 was on developing legislation for electronic crime, and a draft bill is being deliberated by stakeholders. The formulation of this draft bill raised many interesting issues. The nature of electronic crime – borderless and capable of extensive and widespread damage – challenges existing national and international laws and their enforcement. The draft Electronic Crimes Bill, developed along the lines of similar legislation of many other countries, covers the extent, commencement, territorial scope and interpretation of the offences committed. It defines offences ranging from unauthorised access to waging cyber war and stipulates appropriate punishments. There are provisions relating to international cooperation, investigations and related issues.

Open source movement

Pakistan can potentially benefit from the large-scale adoption of open source software. The government has supported open source for a long time, but little progress is evident in terms of its use and development. The government has embarked on the establishment of an open source resource centre as well as an initiative to automate processes in the local industries using open source solutions. The resource centre has the mandate to develop and support R&D activities throughout the country and to identify suitable open source products and standards.

Trends

Both the government and the private sector are committed to developing the two vital sectors of ICT and telecommunications in the country. The opening up of the latter to full competition will make this sector one of the most active. International companies were drawn to bid for the new cellular licences, and a similarly active interest is expected in the fixed-line domain once tenders are invited.

The development of the Internet infrastructure has already started to pay dividends. The provision of broadband Internet access via DSL to homes and small offices is likely to expand.

E-commerce has been slow in development, but activities may soon pick up following the success of online stock trading services.

The open source movement is likely to develop further in the years ahead with strong official support. Meanwhile, efforts to develop the use of local languages in digital media have borne fruit. Applications and tools with Urdu interfaces are now available for publishing, web authoring, training, accounting, management information systems, and database packages. The next logical step is for developers to make available content and applications in the local languages to meet the information needs of a large segment of the population who is not conversant with English.