7. Pakistan

Pakistan is officially known as the Islamic Republic of Pakistan. It has a coastline with the Arabic Sea and is bordered by Afghanistan, Iran, India, and China.

Figure 8*:* Map of Pakistan
Source: www.wikipedia.org; www.cia.gov

Pakistan had a steady GDP growth rate of about 7% for several years until the mid 2000s; however, with the recent downturn in the economy it has dropped to 4.7% in 2008. The economic structure of Pakistan has changed from an agriculture-based economy to a strong service-based economy. Agriculture now accounts for roughly 20% of the GDP, whereas service sector accounts for 53% of the GDP.

Some of the key demographic and economic indicators are given as follows:

Table 20: Key Demographic and Economic Indicators - Pakistan

Parameter	Value	Year
Population	163,902,000	2007
Gross domestic growth (million US $)	163,290	2007
GDP per capita (US $)	996.3	2007
Human development index ranking	141/182	2009
Population below poverty line	24%	2005

Source: http://unstats.un.org; www.cia.gov; http://hdr.undp.org

7.1. Background

Pakistan follows a decentralized system of education administration with all academic institutions being under the purview of respective provincial administrations while the Federal government has the responsibility of developing the overall policy framework, curriculum, accreditation, and financial support for select research activities. Education reform has been high on the government's agenda and the review process for the National Education Policy 1998–2010 was initiated in 2005, with the setting up of the policy review team to undertake the revision exercise. The new Education Policy 2009 is a culmination of that process. The policy recognizes several key constraints in the current education system including weak governance of the system, low resource commitment, and the lack of a uniform national education system resulting in uneven quality and parallel systems of education that are not available equally to all strata of society. The policy also stresses the importance of leveraging ICT to improve quality and access at all levels. Pakistan is one of the few countries in the South Asian region to formulate a specific National ICT Strategy for Education in 2005, which will be discussed in detail in the next section

However, educational attainments are low with an adult literacy rate of only 54% (female literacy at 40%), and schools plagued with problems of weak infrastructure, geographical disparity, and uneven quality resulting in a high incidence of dropouts at all levels, with only 2.9% of the relevant age group entering the University system. Some of the key education indicators for the country are given as follows:

Table 21: Education Parameters - Pakistan

Education parameter		Value	Year
Adult literacy rate	Male	63	2000–2007
	Female	36	2000–2007
Youth literacy rate	Male	80	2000–2007
	Female	60	2000–2007
Gross enrollment ratio (%): Primary education	Male	94	2000–2007
	Female	74	2000–2007
Gross enrollment ratio (%): Secondary education	Male	34	2000–2007
	Female	26	2000–2007
Expenditure on education (% of GDP)		2.6	2003–2006

Source: UNICEF, www.unicef.org; CIA Fact book www.cia.gov

Pakistan like other developing countries in the region has witnessed significant growth in the ICT sector. ICT is seen as a key potential driver of socioeconomic development, wealth generation and redistribution, and creation of new jobs. A separate Ministry of Information Technology was created in November 2002, with the aim of building Pakistan's information technology competency in the 21st century. Previously, all IT- and telecom-related issues were the responsibility of the Information Technology and Telecommunications division under the Ministry of Science & Technology. The major objectives of the Ministry of IT are to enable transformation to Electronic Government, provide impetus for the development of a Software Industry, build a state-of-art

Infrastructure and develop, a high qualitative pool of Human Resource. Some of the key ICT-related indicators for the country are as follows:

Table 22: ICT Indicators - Pakistan

ICT parameters	Value	Year
Internet users (per 100)	10.4	2008
Internet subscribers (per 100)	2.09	2008
Broadband subscribers (per 100)	0.09	2008
Mobile coverage (%)	90	2007
Mobile subscribers (per 100)	38.7	2007
Personal computers (per 100)	0.46	2006–2007
Internet affordability (US $/month)	9.4	2007
Mobile affordability (US$/month)	2.4	2007
Radio subscribers (per 1000)	83.1	
Households with TV (%)	46.5	

Source: www.itu.int; www.mdgs.un.org; World Development Indicators Database; www.cia.gov

7.2. Policy Framework and Delivery Mechanism

With literacy and enrollment rates being low in Pakistan, the government saw the need to adopt a more innovative, scalable, and cost-effective solution in meeting Pakistan's educational goals set out in the National Education Policy. In this regard, the MoE, in collaboration with the Educational Sector Reform Assistance (ESRA) programme by the United States Agency for International Development (USAID), the ministry of Information Technology (MoIT), and the provincial education departments formulated the "National Information and Communications Technology (NICTE) Strategy for Education in Pakistan." The elements/polices outlined in the NICTE strategy and its action recommendations are given in the following:

Use ICT to Extend the Reach of Educational Opportunities

The government proposes to use ICT where educational opportunities are limited due to geophysical problems, lack of schools, Context-Based Differences (children with special needs), and other differences such as gender, age, financial status, and so on. The following approaches are proposed

- Enhance ODL by equipping community centers with televisions and computers having Internet facilities.
- Establish viewing centers with televisions where they are otherwise not widely available and combine the hardware with ODL approaches to ensure that educational programmes are available in remote areas in the form of video-based training.
- Use Interactive Radio Instruction (IRI), which combines radio broadcasts with active learning techniques for students where qualified teachers are not available. IRI can also be used to aid teachers practice interactive and innovative techniques in classrooms.

- Computer-Assisted Instruction (CAI): Offer computer-based training either in ODL format or locally, via standalone applications. CAI can be used to allow teachers and students to network and learn from peers in different geographic locations.
- Integrate ICT tools, which will help students with special needs, into all public and private schools. ICT tools should also be used to overcome gender bias, age, financial status, and other social or cultural factors, which impede access to quality educational services.

Apply ICT to Strengthen the Quality of Teaching and Educational Management

The government proposes to use ICT to enhance teaching quality by supporting and reinforcing the use of innovative teaching practices. Teachers will learn ICT skills as well as how to integrate it into the teaching system. To enforce this, the government will take the following steps:

- Facilitate an environment for continuous learning by providing teachers with access to ongoing professional development through IRI, ODL, and online resources
- Support teachers in applying technology in a learner-centered context by modeling lessons in live classroom situations that other educators can hear or observe via radio or through taped/broadcasted television modules.
- Provide content knowledge and curriculum support by providing Internet access/CD ROM-based software to schools, professional development centers, and teacher training institutions to help pre-and in-service teachers expand their content knowledge.
- Provide teachers and educators with ICT tools that enable them to produce their own materials in local or regional languages.
- Use ICT for professional networking, mentoring, and monitoring by supporting teachers to create an archived body of knowledge that others can access.

Employ ICT to Enhance Student Learning

The government envisages that ICT can enable teachers to improve pedagogy by providing the framework to create a constructivist learner-centered environment. It can also help students' access self-paced learning. The following methodology will be implemented:

- Upgrade the current curricula to integrate ICT in primary, secondary, and vocational education
- Use ICT to supplement, enhance, or provide access to content particularly when textbooks and supplementary materials are scarce. This can be ensured by providing CD ROM-based content and Web-based activities to access digital resources and online collections that might otherwise be unavailable. Also by providing radio/audio and TV/video programs to present content in an interactive manner
- Use ICT to adopt more authentic ways to evaluate students work
- Use ICT to change pedagogical methods by giving students freedom to interact with ICT in ways that promotes creativity and problem-solving

Element 4: Develop Complementary Approaches to Using ICT in Education

The government believes that to achieve the strategic goal of mainstreaming ICT into the educational system, ICT should not only be used in service of educational goals but should also be treated as a school subject. To develop skills required to use ICT tools effectively the government will take the following steps:

- Support students to become technically literate; they must learn how to use ICT to find, create, present, and communicate information
- Integrate ICT tools into classrooms so that their use becomes part of the learning process in all subject areas

Build on the Current Experience of Existing and Successful ICT Programmes

The government proposes to keep abreast with current developments in ICT for education on an ongoing basis. The models of success in developing countries with an infrastructure comparable to that of Pakistan would be of particular importance. The following strategy is proposed:

- Take a systematic approach to researching models of ICT use in education, both in terms of success stories and problems encountered.
- To study, expand upon, or partner with the numerous ongoing ICT in education efforts such as Pakistan Education and Research Network (PERN), Adult Basic Education Society (ABES) et cetera.
- Foster a progressive attitude toward pilot-testing new ideas. Support innovation, seek opportunities to expand, and replicate existing projects. Also support schools and community centers by providing grants to upscale current projects.

Develop Capacity at the Federal and Provincial Department of Educational Levels

The government envisages the need to ensure proper planning, management, support and monitoring, and evaluation of ICT initiatives by organizing ongoing efforts to ensure capacity building at the Federal and Provincial Levels and creating an external body which advises the MoE on the cause of ICT in education.

- Establish a Technical Implementation Unit (TIU) for ICT in education. The TIU will develop the technical planning, monitoring and evaluation capacity of policy-makers, planners and administrators at national, provincial, district, and school levels. It will also liaise with teacher training institutes, oversee the implementation of the NCIT Strategy, and support the overall monitoring of education through the national EMIS
- Establish a National ICT in Education council to assist the nation's efforts to leverage technology for improving education.

The Ministry of IT in Pakistan has taken several measures to promote the development of the ICT sector. In 2000, the National IT Policy of Pakistan was formulated, which places emphasis on the need to develop adequate IT and telecom infrastructure, a robust software and hardware industry, as well as qualified human resources to provide a spurt to this sector. The National Policy on IT in

Pakistan has emphasized the importance of IT vis-à-vis education; some of the relevant provisions made in the Policy with respect to education are:

- Launch a scheme for providing low-priced computers and Internet connectivity to universities, colleges, and schools through a public-private sector initiative.
- Network all universities, engineering and medical colleges, and institutions of higher learning in the country for improved quality of education.
- Set up electronic libraries to ensure economical and equitable access to world information.
- Encourage educational facilities to computerize their registration, examinations, accounting, and other activities.
- Encourage educational facilities to adopt computer assisted learning and other IT tools to aid in the teaching process.
- Establish virtual classroom education programs, using online, Internet and/or video facilities, to provide distance learning to a large number of individuals.
- Establish a national educational intranet (linked to the Internet) to enable sharing, among educational institutions, of electronic libraries of teaching and research materials and faculty.

In 2008, the Government of Pakistan initiated a broad-based consultative process to revise the national IT policy for the next five years. In addition about PKR 2.36 billion (approximately USD 27 million) of Universal Service Fund (USOF) have been committed for rural telecom and broadband projects in un-served areas of Pakistan. The USOF has agreements with leading service providers to provide telephony and broadband services to remote areas. Under the agreement in the Rural Telecom project, telephony services will be provided to 648 un-served Mauzas to serve a population of around half a million and in the Broadband project, broadband connections will be provided in 11 districts (38 small towns) of Southern Punjab, in addition to establishing 27 Educational Broadband Centers in high schools, colleges, and libraries plus 121 Community Broadband Centers. The Government of Pakistan has also committed to set aside a certain portion of the revenues generated through the expansion of the telecom sector mainly toward research and development in the field of ICT and to enable that a National ICT R&D Fund has been created. The ICT R&D Fund has undertaken initiatives in R&D through Industry-Academia partnerships, human resource development through scholarships and training programs, development of e-learning and evaluation systems, and promoting of local content development activities. Thus a robust policy framework is emerging in Pakistan for the sustained application of ICTs in the education sector.

7.3. Initiatives

Several major initiatives have been undertaken by the Government, and international agencies. These initiatives have had varying levels of success. Some of the key initiatives are outlined in the following**:**

Allama Iqbal Open University

Allama Iqbal Open University (AIOU) as a distance education provider has been able to supplement traditional methods of teaching with the use of ICT to reach a larger section of the population. While the University is part of the MoE and Higher Education Commission system, and follows the

prescribed curriculum, the differentiator for AIOU is its teaching methodology and its ability to reach out to a large potential student base. It does so by leveraging information communication technology tools by way of quality audio and video programs, which are regularly broadcast on the radio and television and also sent to students in the form of audio and video cassettes. The University is also in the process of leveraging satellite and Internet technology to improve distance education.

These achievements are reflected in the increased enrollments; AIOU is the largest university in the country with a course enrollment of 1,806,214 (2004–05); it offers about 950 courses (2004–05) and functions through 9 regional campuses, 23 regional centers, and 90 part-time regional coordinating offices. Very significantly AIOU is also the largest teacher education institution in Pakistan with an average enrollment of one million students. It has a fully functional student database with networking facilities for exchange of data and information between the main campus and regional centers. Further, the AIOU has planned several ICT-focused initiatives as part of its future strategy; some of these are as follows:

- Technology delivered Distance Education (Japan International Cooperation Agency (JICA)-Supported Projects)
- Center for National Curriculum Studies
  - 24 English Language Teaching Programs for Radio/TV delivery sponsored by USAID.
  - Science/Computer Science, Web-delivered Courses.
- FM Radio Broadcast License granted by Pakistan Electronic Media Regulatory Authority (PEMRA). Frequency allocation and procurement of equipment under process.
- Information and Communication Technology (ICT) in education

(The initiative is covered in more detail in the Pakistan Case Study)

Pakistan Education and Research Network

PERN is a dedicated research and education network funded by the Government of Pakistan in collaboration with PTCL (Pakistan Telecommunication Company Limited). The network aims to connect all premier research and education institutions in the country, with a focus on collaborative research, knowledge sharing, resource sharing, and distance learning through the use of intranet and Internet resources. PERN aims at being an integral part of the overall education system of the country by providing state of the art telecommunication infrastructure and services to educational and research institutions. For doing so it provides a research-based network with a digital library of online resources to serve as a model for collecting and distributing educational resources. It provides interconnectivity between universities, institutes, and other educational networks worldwide to foster data collection and upgrading of teaching learning skills. It also provides access to Distance Learning and Video Conferencing facilities. In the first phase of PERN, 56 educational institutions have been connected; the second phase, PERN II, which was recently inaugurated not only connects the remaining 59 Higher Education Commission (HEC) recognized universities in

Pakistan but enables educational institutions in Pakistan to connect to the global research community through a high-speed link.

Virtual University

Pakistan's Virtual University is a not-for-profit institution established by the government to provide affordable education to the students of Pakistan. It uses a combination of free-to-air satellite television broadcasts and the Internet. The Virtual University uses television for broadcasting its lectures. It operates its own television channels Virtual Television-1 and Virtual Television-2. Lectures are recorded in the form of slides or movie clips, which are then broadcast using free-to-air television or made available through multimedia CD-ROMS. Interaction between students and tutors takes place over the Internet. Virtual University Web servers have a Learning Management System (LMS), which is accessible over the Internet. LMS provides comprehensive learning material/lecture notes and e-mail facility for students to interact with the Virtual University community. LMS also has a "Moderated Discussion Board" which is a Question and Answer board where the VU faculty provides answers to questions posed by the students. *(This initiative is covered in more detail in the Pakistan Case Study)*

Punjab IT Lab Project

Punjab IT Labs project is one of the first "ICT in Education" projects in Pakistan. It was initiated by the government in 2008 primarily to overcome the digital divide between the public and private sector schools. The project was completed in November 2009, equipping over 4,286 schools with 3 desktop PCs and 12 virtual desktops each. Software was licensed by Microsoft and hardware solutions were provided by companies such as Inbox, Siemens, PEL, NComputing, PTCL, and New Horizon. Microsoft has also provided training for master trainers in the schools in an effort to enhance the teaching methodology adopted by teachers, so as to meet international standards. Efforts are ongoing to ensure that internet connectivity is provided in all the schools covered under this initiative. As it is still in its early phase of implementation, the impact of the initiative is yet to be ascertained.

(http://punjabitlabs.edu.pk/)

The International Education and Research Network

The International Education and Resource Network (iEARN) is a nonprofit global telecommunications community consisting of more than 35,000 primary and secondary schools and youth organizations in more than 125 countries. The objective of iEARN is to enable young people to use the Internet and other technologies to engage in collaborative projects and enhance learning. iEARN's Pakistan center is dedicated to providing teachers and students in primary and secondary schools with a platform to participate in online curriculum-based telecommunications projects. iEARN-PK (iEARN Pakistan) also provides members resources and tools for effective implementation of school-based ICT initiatives and a range of educational programs and learning

materials. Working under the Society for International Education, it has organized many workshops for students and teachers supporting the use of online curriculum-based projects; it has also published teaching resources for technology in education and project-based learning. Most of these programs involve development and participation of students in Internet-based collaborative projects, curriculum development, teacher training, and students and teacher participation in exchange and study programs. It has also launched initiatives like the Achay Dost (Good Friends) in collaboration with UNICEF, Sindh. Under this project an FM radio program is created that addresses children's issues such as gender-based discrimination, corporal punishment, and child abuse, in order to creating awareness in society about these issues. The radio program is developed and presented by youth and goes on air at specific time slots every week.

Aga Khan Education Services

Aga Khan Education Services (AKES) aims to provide quality education pre, primary, secondary, and higher secondary schools in select countries. One of its major initiatives is the introduction of computers and distance learning to supplement teaching and improve learning methods. In Pakistan, it operates in 187 schools and 5 hostels serving 37,000 students mainly in rural parts of the country. On average, Aga Khan Schools possess 20 computers per schools. AKES is also attempting to help teachers use ICT for more learner centered approaches (MoE).

Beaconhouse School System

The Beaconhouse School system has a network 141 schools across Pakistan. The Beaconhouse schools have done pioneering work in integrating ICTs in the teaching learning process at all levels in their schools. The distinct advantage of the Beaconhouse approach lies in the fact that they have moved away from an IT curriculum based approach to mainstreaming ICTs in teaching learning processes in all subjects and disciplines. Therefore their IT program has been re-designated as Emerging Technologies Across the Curriculum (ETAC). Students and teachers at Beaconhouse use ICT tools like power point, mind maps, and other suitable software for preparing projects, doing coursework and preparing for exams and revising their work. In addition to computer labs in each school, computers are also provided in resource rooms and libraries for both students and teachers to do their research. The Beaconhouse Schools have an in-house training programme in collaboration with several UK universities to train teachers in order to provide a unique advantage in ensuring teachers have training of the highest standard.

http://www.beaconhouse.edu.pk/bssgroup/southasia/cms.php?id=14

Intel Teach Program

The Intel Teach Program is a professional development program that helps classroom teachers integrate technology to enhance student learning. In Pakistan, it has trained more than 20,000 in-service and pre-service teachers. The in-service program was launched in 2002 in collaboration with the MoE; the program aims to enhance the capacity of teachers in Pakistan by training them on

how to use technology in the classroom. The pre-service program was introduced in 2005 under which the Intel Education team works with the universities and affiliated colleges to integrate ICT in the Instructional Technology or Computers in Education courses at the universities. To date approximately 28,000 pre-service faculty and student teachers have been trained in Pakistan. *(This initiative is covered in more detail in the Pakistan Case Study.)*

Development of Education Management Information System

Recognizing the significance of timely information, data and statistics for effective planning in the Education, the Academy of Education Planning and Management has been working on the establishment of an EMIS, in order to collect and consolidate educational statistics and information. The Academy has acquired micro computers and personal computers to access educational data which will be available on computer files. EMIS has been developed for the provinces of Punjab, Sindh, Northwest Frontier Province, Balochistan as well as the Islamabad Capital Territory and the FATA region. According to the recently revised Education Policy 2009, the Provincial and Area EMIS would cater to the data needs of all tiers of the local governments and further would also provide data to the National Education Management Information System for national aggregation on a regular basis

Educational Television

Various viewing centers are established with televisions and combined with the hardware with ODL approaches. This ensures the availability of educational programmes in remote areas, in the form of video-based training (via Internet, satellite, VCR/television, or DVDs). This initiative had helped in providing an impetus to the learners to learn through setting up a virtual classroom.

Interactive Radio Instruction:

Radio has by far the highest penetration in Pakistan compared to any other mass communication medium. IRI has facilitated instruction for students in remote areas and for those without access to extensive educational resources and qualified teachers. Recently, USAID launched a new interactive radio program, the "Time for English" series. The program aims to provide English-language lessons for primary students of classes 1 and 2. The series includes 102 half-hour taped lessons based on the national curriculum which rely on games and group and individual activities to engage students and improve their learning levels. All activities are guided in the classroom by the teacher. USAID has also provided teacher training to 132 teachers, as well as other learning resources such as guides and educational posters. The program is now running in 66 rural schools of the Federal Directorate of Education.

7.4. Constraints

Literacy levels in Pakistan, particularly female literacy, are extremely low compared with other countries in the region. Though the “National Information and Communications Technology (NCIT) Strategy for Education in Pakistan” was formulated keeping in mind the broad principles of ICT integration in the education sector, the policy articulation was not supported by detailed

implementation strategy and has not been the driving force behind any major initiative using ICTs in the education space in Pakistan. Some of the other significant challenges are:

Quality and Competency Level of Teachers: The extreme dearth of quality teachers is a major constraining factor for the successful implementation of ICT based teaching-learning. One of the major reasons is the low level of qualification required to become a primary school teacher. Another reason relates to the quality of teacher certification programs, little emphasis is laid on teaching practice and there is no proper support or monitoring system for teachers.

Expensive Internet Access: Pakistan's broadband market has been slow, as a result internet access to rural areas becomes an expensive undertaking. With internet access being limited to only the affluent there is little scope to use it to increase literacy levels in these underprivileged areas.

Linguistic Constraints: Developing software for the local languages will be another challenge for implementing ICT in the education sector.

7.5. Insights

In Pakistan, fiber availability is relatively high and therefore even though at present connectivity is a constraint, this can be overcome. Further, the Universal Service Obligation Fund (USOF) is committed to providing broadband to underserved areas. In terms of infrastructure, it was understood that low levels of electrification, posed a more significant challenge for integrating ICTs in the education space than low levels of connectivity.

The most important aspect in ensuring that ICT investments yield results would be to ensure that ICT usage is promoted in a way such that ICTs are used as tools to enhance the teaching learning process itself and not merely to familiarize students with the hardware and software. ICT usage in government schools is extremely low and as efforts are beginning to get underway to provide government schools with ICT facilities, it is important to that ICTs are integrated as tools for improving teaching learning rather than focusing exclusively on a specific IT curriculum-based approach. On the other hand private schools systems in Pakistan such as the Beaconhouse School system have been making effective use of advanced ICT tools to enhance their teaching learning practices. However, given the relatively high fee structure in these private institutions cost of ICTs is met by the school and students themselves, which is not a viable option for government schools.

Distance education in Pakistan is well established at the higher education level. Both AIOU and the Virtual University are achieving important milestones in ICT-enabled learning at the higher education level. However, Open Schooling has not yet been established for the K 12 level and given the expertise in the country in distance learning systems, it could be an avenue worth exploring.

Another key aspect that needs to be addressed is the gender disparity in educational attainments and access to ICTs. Initiatives to promote educational attainments in girls and women using ICTs should be encouraged. Further, awareness among women and girls about specific opportunities using ICTs should also be increased.

7.6. Select Bibliography

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Links to Initiatives

Government Links

- Electronic Government Directorate: www.e-government.gov.pk/
- National Telecommunication Corporation: www.ntc.net.pk/
- Pakistan Computer Bureau: www.pcb.gov.pk/
- Pakistan Council for Science and Technology: www.pcst.org.pk/
- Punjab IT Labs Project: www.punjabitlabs.edu.pk/

Schools and Education Institutions

- Allama Iqbal Open University (AIOU): www.aiou.edu.pk/
- Virtual University (VU) of Pakistan: www.vu.edu.pk/

Private Companies

- Intel Education Initiative: www.intel.com/cd/corporate/education/APAC/ENG/pk/266519.htm

Non Government Organizations

- International Education and Research Network (iEARN): www.iearn.org

Other Important Links

- Pakistan Education and Research Network (PERN): www.pern.edu.pk/
- Aga Khan Education Services (AKES): www.akdn.org/akes