

A paper evaluating Pakistani eReadiness Initiatives

Digital Opportunity Initiative: For Pakistan

*Dated : Sunday, July 22, 2001
By Yousaf Haroon Mujahid*

*Assistant Director
COMSATS Internet Services
Islamabad
paperking@hotmail.com
111 700 800*

Currently

*Assistant Professor
National Post Graduate Institute of Telecommunications & Informatics, PTCL
IT&Telecom Division, Ministry of Science & Technology*

*Contact: House 45, Category 1, I-8/1, Islamabad44000
Pakistan. Res: +92-51-9290117 Mobile: +92-303-7759811*

Executive Summary

As mankind starts its journey into the new millennium we notice the two major forces shaping up the future of this world, reducing geographic boundaries, bringing cultures and societies closer to each other — are Globalization and Information Communication and Technology (ICT) — creating a paradox of wealth and poverty; bridging gap between individuals and isolating them at the same time; creating simultaneously the information haves and information have-nots; empowering people contribute and restricting communities to participate.

DIGITAL DIVIDE: Broadening a gap between civilizations

On one hand, despite many steps forward in social and economic conditions around the world in recent decades, there remain huge disparities in the quality of human existence. We are now at a critical juncture of time and place where unprecedented global flows in information, products, people, capital and ideas offer great potential for radical improvements in human development, but left unabated, they may also serve to worsen and entrench the spiral of poverty which already exists in many communities and countries limiting people to unleash the prowess of ICT revolution and creating a serious gap of information disparity called the Digital Divide.

The digital divide means more than just a lack of computers and connections. Technology means nothing if it is not used where the people who could benefit the most are not using information technologies to address the problems they face, not only because they lack the training, but also because government policies often hinder affordable and accessible technology implementation.

DIGITAL OPPORTUNITY INITIATIVE: Bridging the gap

On the other hand, without the sheer scale and pace of Information and Communications Technology (ICT) it would not be possible to connect vast networks of individuals across geographic boundaries at negligible marginal cost.

This is why decisions about the use of ICT will be critical in determining which road we go down, to wider development or greater inequality. The old debate, about choosing between ICT and other development imperatives, has shifted from one of trade-offs to one of complementarity. The Digital Opportunity Initiative (DOI) aims to provide some fresh answers for this new reality.

The DOI aims to help mobilize, focus and coordinate action by developing a strategic approach to harnessing the benefits of ICT for sustainable economic and social development. DOI focus on lessons learned to date about the value of ICT for achieving development goals, and will offer an analytical framework that how developing countries like Pakistan and the international community can use as a guide for designing and implementing a more strategic approach to the use of ICT for development.

The Role of ICT In Economic & Social Development

As the very phenomenon of globalization is the aftermath of ICT revolution where the current debate on the importance of access to ICT and its value in addressing global development disparities is part of this wider discussion on the potential benefits and risks of globalization.

The answer to the very problem to bridge the gap of digital divide is lies in the adoption of pragmatic ICT policy because ICT is itself a key enabler of globalization: the level and pace of global flows in physical and intangible assets have been dramatically boosted by the ability to connect vast networks of individuals across geographic boundaries, at negligible marginal cost. This relationship between ICT and globalization makes ICT interventions critical to development policy.

ICT can play a dramatic role in creating economic and social development acting as a Production Sector for economic growth and an Enabler for Social Development.

Pakistan: The Case Study

Under the dynamic leadership of the Ministry for Science and Technology, Dr Atta ur Rehman Pakistan has charted out a robust roadmap for ICT policy in the country. The digital opportunity initiatives include attracting foreign investment in IT sector;

pragmatic and market-driven regulatory framework, establishing venture capital funds, creation of Virtual Universities and IT Centers, bringing up new technology-based infrastructure, promotion of IT education through International Certification Programs, Telemedicine, Voice of IP Initiative — and a number of other important fundamentals creating a greenhouse for nurturing ICT-driven development and economic initiatives which promise to capitulate the digital divide both for the Pakistan society at large and accelerating the pace of business and industry in particular.

Digital Opportunity Initiative for Pakistan

"People lack many things: jobs, shelter, food, health care and drinkable water. Today, being cut off from basic telecommunications services is a hardship almost as acute as these other deprivations, and may indeed reduce the chances of finding remedies to them".

By these remarks at Telecom 99 in Geneva, Switzerland, UN Secretary General Kofi Anan warned of the danger of excluding the world's poor from the information revolution. Although the world has seen exponential progress in terms of artificial intelligence, biotechnology, genetic engineering, neural networks, neuro-linguistic programming, information technology management, telematics and infonomics, trade liberalization, space exploration — but on ground the very pace and velocity of knowledge-driven growth has left a giant crevice between the information haves and the information have-nots, giving birth to a nomenclature called – the Digital Divide.

Today information has become the most vibrant force and factor of production in the *new economy* contrary to the four traditional factors of production. Information has become the most important source of economic activity and the link which drives the info-hungry entrepreneurs to utilize the four factors of production in the optimal manner. Not land, not labor, not capital has done for an entrepreneur which the information alone has done. The world has seen a paradigm shift from scarce economic resources to the *Age of Abundance* — where plenty of information is available!

In an age of ICT (Information, Communication and Technology) the digital divide, means more than just a lack of computers and connections. Technology means nothing if it is not used. There are a number of obstacles which refrain unleashing the prowess of ICT. There remain huge disparities in quality of human existence despite the fact many steps have been taken to improve the social economic conditions of the societies at large around the world. At this important crossroads, where ICT is facilitating unprecedented global flows in information, products, people, capital and ideas the potential of sustainable human development dream remains unfulfilled.

Although, many current efforts are playing catch-up, bringing the previous generations of technology to developing countries and underserved communities yet technology must also be integrated into society and supported by policy reform. From early 1980s specifically speaking, the developed countries began adopting national ICT policies which involve both expanding telecommunications infrastructure and started investing in computer appliances and applications both hardware and software. The emergence of global network economy in the 1990's fueled by the digitalization of telecommunications and later by expansion of the internet, created an additional impetus for a wider variety of ICT initiatives and number of developing countries to adopt national ICT policy frameworks.

The Digital Opportunity Initiative (DOI) for Pakistan — is a compendium to improvise digital divide through economic and development initiatives — aims to unveil the new realities of use of ICT with a prowess to deliver beyond the geographic boundaries of the real world through their sheer pace and scale, and their ability to connect vast networks of individuals at minimal cost.

There are a number of national objectives to be fulfilled: political stability to be achieved; physical infrastructure to be in place; basic literacy and basic healthcare to be achieved; employment to be provided; business opportunities to be created; to boost exports etc. Surely, ICT is no answer to these development problems faced. Anyhow, ICT can play a dramatic role in achievement of development and economic goals and can have a major impact honing up national development strategies to be more realistic and achievable.

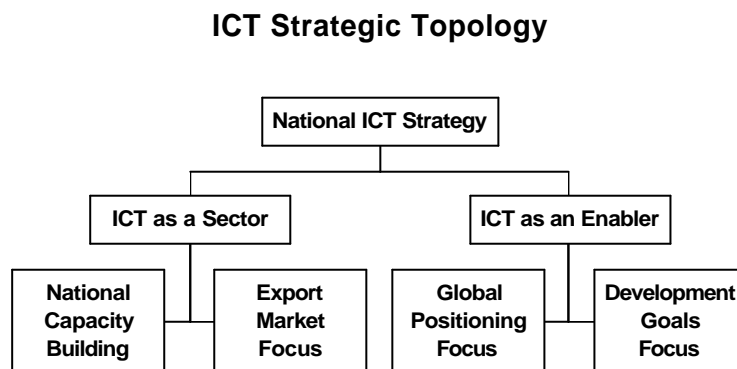
Therefore, the real benefits do not lie in the provision of technology, rather in its application to create powerful social and economic networks by radically improving communication and the exchange of information.

The role assigned to ICT can be broadly characterized in two ways:

ICT as a Production Sector which involves role of ICT in the economy strengthening of ICT-related industries such as computer hardware, software, telecommunications and ICT enabled services. In general this involves commercial use of ICT and its contribution to the national economy at large.

ICT as an Enabler of Socio-Economic Development involving the application of ICT strategies which aim to harness wider development objectives.

The further elaboration of role of ICT strategies can be understood by the following figure:



The very phenomenon of globalization is a result of ICT revolution, the level and pace of global flows in tangible and intangible assets has been dramatically boosted by the availability to connect vast networks. This relationship between ICT and globalization makes ICT interventions critical to national strategies to be formulated accounting for both ICT as a sector for economic growth, and an enabler of socio-economic development.

Let us now see how ICT Strategic Matrix implies for the economic and development dimensions of Pakistan and what are the steps Pakistan has taken to integrate ICT strategy with its broader national goals.

ICT as a Sector

NATIONAL CAPACITY BUILDING:

Pakistan's national policies have been consistently focused on the development of a domestic ICT sector and market earlier (1980-1990s) the focus was on the creation on a diversified industrial sector and development of technical capabilities. Recently, the emphasis has shifted to liberalization of economy and building up ICT infrastructure — changing strategy to support domestic capacity from protection to promotion.

With persistence of large fiscal and current account deficits and the build up of public and foreign debt have been major source of macroeconomic imbalances during 1990s in Pakistan. Failures in enhancing expenditure requirements on one hand, and stagnation in exports on the other exacerbated economic difficulties. A number of economic measures are taken to control the helm of affairs which are: Tax Reforms; Trade & Tariff Reforms; Deregulation & Privatization; Fiscal Sector Reform; Good Governance Initiative; Fiscal Transparency Initiatives; Poverty Alleviation Program are most noticeable.

Since August 2000, the Government has announced an integrated policy on Information Technology (IT), which has been a welcome step towards modernization and globalization. The vision of this IT policy is to harness the potential of ICT to country's sustainable development and national capacity building. The policy focuses on

- i. Human Resource Development
- ii. Infrastructure Development
- iii. Software Industry Development
- iv. Hardware Industry Development
- v. Wider access and use of Internet
- vi. IT Promotion and awareness

The Telegraph and Telephone (T&T) Department was converted into Pakistan Telecommunication Corporation on 15th December 1990 by delegating the powers to the Board of Directors for better functioning of the telecommunication system in the country. Thereafter, on 1st January 1996, the said system was reorganized by establishing Pakistan Telecommunication Authority (PTA), the National Telecommunication Corporation (NTC) and Frequency Allocation Board and Pakistan Telecommunication Company Limited (PTCL). Government is further committed to deregulate and liberalize telecommunications industry through privatization of state-owned monopoly i.e., Pakistan Telecommunications Company Limited (PTCL) under ITU and WTO Agreements by 2002 opening up the telecom sector for private sector and international competition.

In response to government's policy, the per capita internet prevalence is growing in an exponential manner. Since the introduction of internet in 1996 its usage has grown at more than 50% per annum and has progressed from a humble start of 10,000 users in 1998 to 1.3 million internet users in year 2000. Universal Internet Access has reached 379 cities by PTCL and it is expected to exceed 400 cities by June 2001. A reduction from US\$60,000 to US\$6,000 per month/2Mbs in internet bandwidth costs was initiated for software companies, educational institutions and call centers.

For strengthening and capacity building 29 universities all over Pakistan and scholarships and Qarz-e-Hasna for IT HR development Rs. 975 million were approved.

A number of projects are in pipeline including: Establishment of *Data Network Centers* at STPs with Integrated Video Conferencing Centers and Educational Network; Establishment of *National Testing and Accreditation Service* Community; Venture Capital Seed Fund; E-Commerce Network; *E-Governance Project*; and Government Online are some of the high profile digital initiatives.

EXPORT MARKET FOCUS:

Like many other Asian economies Pakistan has focused on developing its export sector and increasing Foreign Direct Investment (FDI) as means of generating employment and

foreign exchange. Due to the significant erosion of Pak Rupee value by devaluation, huge foreign debt, influx of imports, ever increasing demand for dollar and low foreign reserves ICT sector is identified as the key contributor to lax these pressures. Government of Pakistan has chalked out a pragmatic program to become an export-oriented economy.

A number of initiatives include encouraging local in entrepreneurs to tap foreign markets are advised and guided by SMEDA (Small and Medium Enterprise Development Authority) and EPB (Export Promotion Bureau). EBP will be providing online export leads to the potential exporters.

Addition to this business incubator is established in Singapore and IT Marketing Offices will be opened up in USA. In a recent IT Exhibition – IT Commerce Network Asia 2001 MOU's worth US\$300 million where signed between foreign companies and local counterparts.

The Pakistan Software Export Board (PSEB) is an organization which has been established by the Government of Pakistan to ensure development and implementation of a national policy framework for software and related services industry in Pakistan, promotion of software exports, and match making between local and foreign software companies. A special focus was on developing and executing the "*Software Technology Parks (STP)*". The Software Technology Parks (STPs) for Islamabad, Karachi and Lahore have been conceived as one-stop-shop for all software houses which seek working conditions conducive to creative inexhaustible bandwidth and power supply, "high-IQ" (or not just intelligent) buildings, minimum regulatory overheads, maximum flexibility in the choice and use of space and minimal costs. The project companies which will build and administer these STPs will ensure that all these facilities are available with the barest minimum hassle to the software houses themselves. Currently a number of renowned IT and software development companies are housed in Software Technology Parks contributing a great deal in the government vision to for exporting IT products and services.

The following are some investment-policy measures which the government has undertaken to ensure robust market environment for ICT sector in the country:

- Software and Hardware Development has been declared as industry and are placed within Hi-Tech Category, which enjoys zero rate of custom duty on import of equipment and 90% of PME cost as First Year Allowance (FYA).
- Income tax exemption is available on income from export of software
- State Bank of Pakistan has allowed opening of *Internet Merchant Account* within Pakistan to promote E-commerce.
- IT ordinance 2000 is under advance stage of preparation to give legal protection/recognition to digital signature, electronic documentation and Intellectual Property Rights (IPRs).
- SECP has prepared draft set of rules for Venture Capital Companies & Funds - and are in the process of fine-tuning.
- Pak-Libya Holding has already successfully conducted a nation-wide *IT Talent Hunt Program* - to have a ready base for Pakistan Venture Capital
- Looking forward to \$ 1 billion FDI up to 2005-06 in IT & Telecom Sector (\$ 670 million committed)

With all such investment incentives to ICT sector the government aims to see the IT sector as a major contributor to the national economic growth of the country, with a significant contribution to software exports.

A critical element of Pakistan's approach has been focus on education. Pakistan has developed high-level of awareness of quality IT education which highlights a great deal that education institutions, both private and public, can produce appropriately skilled knowledge workers and professionals in conformity with the current needs of ICT age. Given the limited number of engineers and technology workers, both the government and private sector have earmarked on an aggressive campaign to transform the knowledge base of the country in alignment with the requirements of high-tech sector. The National University of Science & Technology (NUST) and COMSATS Institute of Information Technology ((CIIT), and Foundation for Advancement of Science & Technology (FAST) are some leading education providers in ICT. Besides a large number of private and public universities are providing bachelors and masters degrees in Information Technology Management, Computer Sciences and Multimedia. Above all, government

has planned to launch a *Virtual University* for Distance Learning and an Education Portal integrating all the related information about all the education institutions in the country.

ICT as an Enabler

GLOBAL POSITIONING FOCUS:

There is an advance stage of ICT penetration in the country which brings the whole universe of both public and private activities and translates them into digital initiatives to the extent that they become benchmarks to be replicated by others. For instance Malaysia has earmarked its Multimedia Super Corridor program imitating the Silicon Valley model.

Malaysia's **Multimedia Super Corridor** (MSC), for example, has been a high-tech environment and infrastructure effort that has the potential to attract national and international investors alike and it has the ability to create spillover effects in the rest of Malaysian economy — allowing it to leapfrog its neighbors to become Southeast Asia's leader in information technology. This replica of Silicon Valley model is a US\$40 billion initiative, serving as a backbone for country's information superhighway. The network is supported by high-speed link (10 Gb/s network), which connects the MSC to Japan, ASEAN, the US and Europe. The Malaysian government provides attractive taxation incentives for world-class technology companies to participate in MSC initiative. The country also aims to establish an infrastructure with 25 Internet Access Points, 25 mobile phones, and 50 fixed lines for every 100 people within the next 5 years.

In addition, to address skilled labor shortages in all industries, education institutions such as the National Institute of Public Administration (NITA) and Multimedia University are developing curriculums to better prepare the Malaysian workforce for the e-economy.

In Pakistan, though the information technology initiatives are not as aggressive as our Malaysian counterparts are aiming towards but the objectives to be achieved within the country are dynamic and impressive. As earlier pointed out, Pakistan has achieved an internet penetration of 1.3 million users where universal internet access is near 400 cities

within the country where internet bandwidth cost have been reduced dramatically for software companies, educational institutions and call centers. Pakistan hopes to achieve 230 Mbits internet backbone bandwidth by end of 2001 as compared to India's 325 Mbits at present. DSL deployment in local loop for broadband Inter access-project has been rolled out. The government is also establishing *Pakistan Internet Exchange*. Educational Internet License has been granted to a well-known company FLAG for providing additional and alternate international bandwidth. Due to conscious efforts to adopt emerging ICT technologies the current infrastructure for information technology and Internet Service Providers (ISP) is being deployed by PRIs and Digital Cross Connect. *Voice over IP* (VOIP) project is in final stages to be launched. Establishing of business offices and Incubators in London, Tokyo, Sydney, San Francisco and Washington DC are also in the pipeline. Internet Kiosks at airports, petrol pumps, and other public places are also scheduled to establish through private-PTCL partnership where PTCL will be providing the internet connectivity.

PTCL public switched network consists of 90% digital switching system exchanges, optic fiber cable backbone, digital radio systems, satellite communications and international gateway exchanges at Karachi and Islamabad. Recently, PTCL has got an Internet backbone of 155Mbps. PTCL is the provider of infrastructure for connectivity for ISPs, data-network operators, software exporters, educational institutions, universities and corporate clients. PTCL has launched Calling Party Pays (CPP) and Pre-paid Calling Card Service (Domestic & International) in the country. Besides CPP, Wireless Local Loop (WLL) has also been finalized to extend mobile services throughout the country and both private partners like WorldCall have planed to invest US\$300 million

For enhancing the human resource capacity within the country a number of projects have been launched in the education sector. A number of private and public educational programs are taking place to promote IT education in the country. COMSATS Institute of Information Technology (CIIT) Abbotabad, Cisco Certified Training, Java Certification Program, Medical Transcription and Legal Transcription training, Oracle Certification programs, Microsoft Certification programs and IBM-ACE programs are

launched besides a number of public and private sector initiatives. Government hopes to establish seven (7) IT Universities in the country.

The government is providing lucrative tax relaxations like 15 years income tax holiday for software exporters and bank loans for software exports without collateral. The government has abolished custom duties on computer and networking equipment. Software exporters in addition, are allowed to retain 35% of their foreign exchange earnings and contracts are accepted as collateral for export finance facility.

With the governments commitment to encourage ICT growth and investment a number of private enterprises have shown their expression of interest. Align Tech has established the first call center (100 agents) in Lahore alone. Cisco, Lockheed Martin, Microsoft and Oracle are ready to open regional offices in Pakistan. Oracle will be investing US\$20 million in training in Sindh, whereas, Spura Group of Malaysia is going to invest US\$86 million for setting up 1,000 Kiosks-ATMs based networks for utility bills collection. Akhtar Group of UK with the government is taking up a Telehousing Project of US\$10 million. Huawei Technologies and Motorola will be investing US\$2.5 million in IT Center and US\$150 million in expanding cellular network, respectively.

Besides, venture capital fund rules have been approved and VC funds are granted seven (7) years tax holiday, whereas, five (5) major VC funds are launched in private sector. A US\$50 million VC fund has been floated. Securities and Exchange Commission (SECP) rules for IPO (Initial Public Offering) are set in place.

In a nutshell Pakistan is in a go-go for information technology revolution!

DEVELOPMENT GOALS FOCUS:

The most intensive debate regarding the effectiveness of use of ICT is to achieve development goals as a powerful tool, because the very characteristics of information technology has an amazing potential to mobilize social-development initiatives both at the micro and national levels like enhancing good governance and lowering the cost of service delivery. Although ICT is not the panacea for the developing world's problems

yet development imperatives such as health, education, economic opportunity, empowerment and participation, environment can be effectively addressed using the modern tools of information technology. Similarly, factors such as political stability, good governance, transparency, accountability, and literacy can partially bring wonders if linked with the overall ICT strategic targets. Integration of ICT into overall national development strategies can facilitate implementation, expansion of scope and coverage, and improve the results to be achieved for the most of the aforesaid factors.

As a powerful development enabler of development objectives it is necessary that we should categorize the unique characteristics of ICT through which developing countries like Pakistan can dramatically improve communication and the exchange of information to strengthen and create new economic and social networks:

- ICT is pervasive and cross-cutting where it can be applied to full range of human activity from personal use to business and government.
- ICT is a key enabler in the creation of networks
- ICT foster the dissemination of information and knowledge
- ICT allows new meaning to delivery of services and products due to its virtual and digital nature bringing costs to minimum near to a zero
- ICTs prowess to process and share information provides substantive efficiency gains
- With the use of effective business models based on ICT technologies a new economy is created very electronic in existence
- Use of ICT technologies marginalizes intermediation and makes it possible for users to acquire products and services directly from the original provider.
- The very global nature of ICT brings a number of individual and groups to single access point of interaction without any discrimination of class, creed, nationality, color or prejudice

1) ICT for Health:

One of the most promising and clearly demonstrated applications for ICT in development are in the improvement of healthcare delivery. ICT is being used by many developing countries and communities to facilitate remote consultation, diagnosis and treatment, and

collaboration among physicians. A most familiar use of ICT is in the innovative field of Telemedicine. It is important to note that telemedicine technology is not a replacement of traditional medical practice; rather it will be a tool to augment existing health resources of that area. Telemedicine technology can be applied to chronic conditions, routine consultations, preventive medicine, public health, in-patient education. In addition to gaining improved access to cure for patient, referring physicians may benefit from increased contact with their colleagues and greater opportunities for continued medical education.

Telemedicine has proliferated through out much of the industrialized world reflecting the most effective means of converging health to information technology. Telemedicine covers a range of technologies including telephone, modem, Internet. It can be conducted in real times with transmission of text or graphic data auditory and verbal information, still images, short video clips and full motion videos. Computer hardware and software have become fast, easy to use and affordable. Compressible high-resolution images can be enhanced and manipulated. Every specialty can use this technology in some way but dermatology, cardiology, psychiatry and public health can be most actively involved in Tele Medicine.

TelMedPak (www.telmedpak.com) is envisioned to act as a repository of health information with particular reference to Pakistan. It contains information for the doctors, medical students and general public. This is the first health related portal in Pakistan, which contains topics related to our country and has been made keeping the local perspective in mind. And it is a purely Pakistani *Telemedicine* initiative sponsored by Elixir Technologies to provide low cost access to healthcare information in the country using internet. The services include Telemedicine training , Online Tele-Consultation, Tele-Surgery, Tele-Cardiology and Tele-Health education.

TelMedPak, a non profitable organization and Allahtuwakkal Network (ATN) Group, have joined hand for the establishment of 50 telemedicine centers in rural areas of Pakistan to provide quality healthcare services to the people of remote areas in cost-effective and time efficient manner through the use of tele-communications.

Taxilla Telehealth Project :

To assess the applicability of Telemedicine and Tele-health in Pakistan, a prototype was setup in a hospital (Ali Family Hospital) located in Taxilla, a small town 20 km from Islamabad. This hospital was equipped with a PC having Internet access and a scanner. The hospital was to e-mail case reports of patients that required expert medical opinion to an advanced medical facility in Islamabad. Any reports or images were to be scanned and sent along the case report. Then the concerned specialist was to study these case report and reply back to the hospital. The complete record of the patients was kept strictly confidential, with limited number of people having access to the records. This project proved to be very successful, thus implying that Telemedicine does have wide ranging implementations in almost every medical specialty.

The same model is also being applied to interlink Gilgit with the main network, Phase II of Tele Medicine. Gilgit at a distance of 15 hours hard drive from main city of Islamabad, with population of 250 thousand people having limited health facilities and severe climatic conditions is the ideal place where Telemedicine can help the population by reducing travel time and cost to the patient. COMSATS Internet Services (CIS) here has proven its worth by becoming the first ISP to take a lead in participating and encouraging this Telemedicine project.

Besides Telmedpak provides public health messages and disease prevention techniques in Urdu; First Aid information; links to local and overseas pharmaceutical companies, information dissemination and sharing a large resource of medical knowledge.

Pakmedinet (www.pakmedinet) is another enthusiastic initiative of a group of doctors from Rawalpindi to create and maintain the largest databank and redirection portal in the country – making it one of the largest databank for Pakistani medical journals.

2) ICT for Education

The importance of education for human resource development does not need any elucidation. Although government of Pakistan accepts education as the fundamental right

for its citizens, yet it has an unimpressive track record of provision of literacy at the grassroots level. The current National Education Policy has envisaged to achieve 55% literacy rate by 2003 and by 70% in 2010.

Among all the development sectors education sector is predominantly the remained the most focused sector harnessing to improve the efficiency, accessibility and quality of the learning process in the developing countries and Pakistan.

One of the most clearly demonstrated applications is distance education which has been a particular successful model in Pakistan where affordability and geography have been real barriers to access. Allama Iqbal Open University (AIOU) has been the prime source of distance learning in Pakistan and it was the first distance learning initiative in Asia. Currently the AIOU offers more than 700 courses and it establishes over 1400 study-centers and 60 model-study-centers country-wide serving almost one million students all over Pakistan and even in Middle East.

Besides Ministry of Science & Technology (MOST) aims at establishing first ever Virtual IT University along with establishing seven (7) IT universities throughout the country. MOST also plans to establish *Accreditation Council* to ensure quality IT education and training. The Council will be responsible for collecting data on educational institutions, rating the institutions, and disseminating information about the institutions. The Council will also establish curricula, testing guidelines and services for IT education and training. The council will consist of leading academics and IT experts and will be linked to provincial IT Boards. A National Educational Extranet (linked to the Internet) is also proposed to enable sharing, among educational institutions, of electronic libraries of teaching and research materials and faculty.

In addition to this, government is encouraging private sector to setup vocational training institutes to promote information technology skills. For this purpose a number of public and private sector initiatives are taken to train people in Medical and Legal Transcription; Programming Languages like Java; Internetwork Training Programs by obtaining

international certifications with IT training partners like Microsoft, CISCO, IBM, Oracle, Sun etc

COMSATS Internet Services (CIS) is an **Authorized Cisco Training Partner** providing Cisco Certifications at subsidized rates where a major portion of the training fee is paid by the government and the prospective student has only to pay a part of it.

(www.cnt.com.pk)

The development of *Learning Networks* on a national basis, usually over the internet is also helping to empower indigenous education, and promoting research and development in countries like Pakistan. One such digital learning initiative is ApnaFuture.

ApnaFuture is dedicated to help students learn more using the World Wide Web. Initially designed to collect Education related information today is the best resource to search for educational information in Pakistan. With over 5000 visitors per day, ApnaFuture provides a number of learning skills like tips for building up vocabulary, overcoming spelling mistakes, notes for students and downloads for improving programming skills, and much more.

As more and more developing countries are adopting ICT technologies into mainstream of their strategic goals there is an increasing need for development of world-class human resource which can handle the local technological needs and can also compete with the other nations in the international markets both in terms of quality of work and cost-effectiveness. Keeping this view IT-Track a US-based subsidiary in Pakistan has started *Virtual Skill Testing* initiative

IT-TRACK, was established on 8th November, 1999, as a subsidiary, InterSouth Inc. USA a software development and consulting firm integrating diverse business solutions worldwide for organizations. IT-TRACK'S establishment here in Karachi Pakistan has come about with two specific objectives in mind. Firstly, to bridge the technical educational gap between academic education and modern job roles. Secondly, to provide

a practically oriented state-of-the-art platform, for professionals to groom on and to equip them with the practical knowledge of latest tools and emerging technologies.

U2Test (www.u2test.com) provides online interactive training and tests skills from a wide variety of most-wanted IT skills. Both objectives are destined to be met through a combination of interactive learning and professional exposure provided to the users.

Delivery of technical and vocational training is another rapidly growing area of ICT mediated learning because ICT can facilitate sophisticated and customized performance simulation at low marginal cost like we have seen in the case of U2Test and Cisco Networking Training.

ICT for Economic Opportunity:

ICT can contribute to income generation and poverty alleviation. It enables people and enterprises to capture economic opportunities by increasing process efficiency, promoting participation in economic activities and networks, and creating more opportunities for employment and business.

There are a number of ways ICT is supporting rural productivity through market information sharing via communication networks helping farmers to make decisions about what crops to plant and how to plant in the most effective manner; provides information to the rural stakeholders and farmers of timely weather forecast, agriculture issues, government incentives and promotion measures; information about the advance scientific tips and tricks to improve per hectare yield and discussion forums.

Pakissan (www.pakissan.com) is the first Agriculture Portal of its kind providing comprehensive information about the Agriculture Sector of Pakistan both in English and Urdu languages. Information on corps, livestock, orchards, fisheries, horticulture and forestry is available. From Government policies to World Agriculture news; region-wise weather forecast. It also maintains special Report Center and Advisory bringing latest information about corp updates, Canal-wise water status, and controlling pesticides and diseases.

For business promotion and opportunity Pakissan provides latest news on Model framing and Corporate farming techniques, marketing techniques and export inquires.

Pakissan hopes to launch online AgriExchange where a number of leads to buy and sell will be available for the farmers and rural stakeholders.

With the use of ICT businesses can reduce the marketing and promotion costs, and can marginalize operational costs by decreasing material, procurement and transaction costs resulting in lower prices for intermediate and finished goods, on one end and providing global access and scalability on the other. Due to the global connectivity prowess of ICT it results in new ways of creating and delivering products and bringing sellers and buyers together. The ability of ICT to create new and innovate business models and market configurations further develop new business process outsourcing channels, value chain integrations and disintermediations, providing access to new markets and new sources of competitive advantage from which to drive income growth.

SMEDA (www.smeda.org.pk) Small & Medium Enterprise Development Authority, has been established to function as the apex policy-formulation body for the Small and Medium Enterprises (SME). SMEs have been the backbone of Pakistan economy by employing 80% of the industrial labor force and contributing 40% to the GDP.

Today SMEDA *e-Market* initiative is the most comprehensive business and export opportunity *Virtual Exchange* in the country providing over 50,000 business leads giving access to 202 countries & territories.

There are significant benefits for everyone if the people of developing and emerging nations are able to take full advantage of the Internet and other information technologies for improving their lives. Many countries lack sufficient technology infrastructure. But now there are many initiatives to bring networks and access to people in developing and emerging countries. Even though the technology is increasingly available, people do not use it because they do not understand it, they are uncomfortable using it, they cannot afford it, or they cannot see its utility. For them the digital divide means a lost opportunity: no chance to use information tools to bring medical applications to rural

villages, to offer better educational tools and courseware to schoolchildren, to give local people access to global markets, or to make enable people getting better employment opportunities.

Similarly, ICT can very effectively contribute to the better employment opportunities in developing countries with large reserve of skilled manpower available. Using electronic job marketplaces, employers and employees can match labor skills and availability to satisfy their demands. Pakistan with current population of 140.5 million people is the 7th most populous country in the world with 2.3% of the total world population. Out of 140.5 million the total labour force is around 41.2 million as of mid-year 2001. During the year 2000 almost one (1) million people have gone overseas, an increase of 36% than of 1999 most of them IT professionals. Seeing the increasing demand of IT professionals the world over the government and private sector have undertaken a number of electronic employment initiatives.

Overseas Employment Corporation (OEC) is a limited company fully owned by Government of Pakistan has mandated to promote employment of professionals, highly skilled, skilled, semi-skilled and un-skilled manpower in foreign countries.

Currently OEC is the largest electronic employment place with a large database of job opportunities for Pakistani professionals and skilled human resource presently housing a databank of 25,000 Pakistanis. The Corporation has so far provided more than 1,20,000 personnel to foreign firms in the public and private sector.

(www.oec.gov.pk)

ICT For Empowerment and Participation:

ICT can play a dominant role in nurturing empowerment and participation both a the public and private levels and making governments more efficient and transparent by encouraging communication and information-sharing among its people and organizations and most importantly with in itself.

Using ICT governments can revolutionize the lifestyles of its citizens by bringing more convenient and cost-effective solutions to the public at large by improving the quality and responsiveness of the services, outreach and accessibility of the services and public infrastructure. One area is developing *E-Government* initiatives to empower people and to increase participation bring innovative solutions to the public services.

Electronic Government (eGovt) program is charted out by the Ministry of Science and Technology of Pakistan (MOST) is one such example to improve the efficiency, quality, transparency and functioning of the Government. The program will enable the citizens to digitally or electronically interact with the government, use public services and it will create transparent processes ensuring good governance best practices are not compromised at any level.

(www.most.gov.pk)

With the formulation of e-government Inter-Ministerial Group and e-government task force a number of pilot projects are to be initiated during the year 2001.

E-Government Master Plan is ready to for the approval from the Cabinet and Chief Executive Office which include setting up of 1,000 kiosks-ATMs based network for utility bills collection; establishing Accreditation and Quality Testing Councils; developing online taxation systems; automation of Narcotics Division, case Laws of Supreme Court and High Courts of Pakistan; Common Office Environment-Common Document Management System (CPE-EDMS); public e-Procurement System; and public Human Resource Management Information System. For documentation of the economy a *Digital Tax Management Initiative* is a prime example providing instant access to the public empowering them to stay updated about government policy measurers.

Central Board of Revenue (CBR) with the help of Pakistan Revenue Automation Ltd (PRAL) provides digital revenue automation solutions to the general public through electronic information dissemination by providing complete access to all the tax notifications, circulars and SROs online attracting almost 35,000 users a month.

The site also contains all-important policy documents which are necessary like the Finance Act, Budget, Tax Ordinance etc keeping public empowered with information.

It has further plans to extend its services by conducting online tax assessments, tax surveys, and public feedback.

(www.cbr.gov.pk)

Besides connecting government, ICT connects individuals and communities with information and resources beyond their geographic boundaries, encouraging information dissemination, information exchange, information flow and communication. Citizens are encouraged to in online discussion forums and bulletin boards by participating in public discussions.

Shadighar (www.shadighar.com) is a community based digital initiative to empower families and individuals to find a better and most suitable match for themselves or their kith and kin. Shadighar provides bilingual support both in English and Urdu with powerful search capabilities to dig deep into the database of the most suitable match for you searching on the basis of a number of suitable preferences once can choose from to optimize the database search option.

This is especially relevant to the communities and groups who can share and exchange information of mutual interest, strengthen their collective power and shape their own development solutions. Organizations in developing countries also find information sharing exercise to be very useful as it increases participation, strengthens governance.

ICT for the Environment

Environmental problems are a matter of both national and global concern. Problems associated with pollution of land, air and water have been intensified due to mismanagement of resources, injudicious utilization of energy, and ill planned urban and industrial expansion.

Here ICT can make valuable contribution to sustainable environmental management by improving monitoring and response systems, facilitating environmental activism. ICT enables a better understanding if used to collect, process and disseminate information on issues like climate change and biodiversity helping to monitor ecological conditions.

Sustainable Development Networking Program (SDNP) in Pakistan (www.sdn.org.pk) provides comprehensive information on social development issues for sustainability specially focusing at the environment at the core.

SDNPK (edu.sdn.org) provides comprehensive training and education about biodiversity and environment to teachers and children at the same time.

The power of ICT as an information and networking medium can also enable citizens to act as enforcement agents alerting decision makers to compliance infringements and leveraging the power to reach public and influence opinion. Even governments can make advantage of ICT by creating awareness and educating the citizens about the various issues related to environment and biodiversity by providing more useful metrics and information.

Sind Wildlife (www.sindwildlife.com) is a brilliant digital awareness initiative of Sind Wildlife Department, Province of Sind, to preserve and nourish wildlife and natural habitat. It provides complete details of the protection laws, protected wildlife and protected areas in the Sind especially the wetlands.

CONCLUSION: Lessons learnt

This comprehensive analysis of *Digital Opportunity Initiative for Pakistan* demonstrates that ICT and its application has become a reality having powerful and direct impact on achieving specific economic and development goals in a developing country like Pakistan though the scope or scale of influence is initially marginal or seems to be so which has

prevented them from achieving even greater impact since, as stand-alone initiatives both at the public and private ends.

There can be no denial from the fact that with in a short-time and limited availability of resources ICT in Pakistan has revolutionized the traditional way of thinking, and the means they use to access and retrieve information both for using a public service or utilizing a business lead.

The role of government invariably becomes the centerpiece of bringing ICT initiatives into reality by creating favorable environment, grooming human capacity, developing and upgrading infrastructure, harbingering a robust and transparent ICT policy. To develop national and global linkages national strategies should be able to use ICT effectively of economic and development goals by making public-private partnerships.

In a nut-shell it is learnt that development policy and economic aspirations have strong linkages between direct ICT interventions. In order to translate the fulfillment of these strategic dimensions of national policy a framework is required to prioritize ICT interventions and synergies to maximize the impact and to tap new opportunities and challenges of the global network economy.