

Chapter 16

Information and Communication Technologies

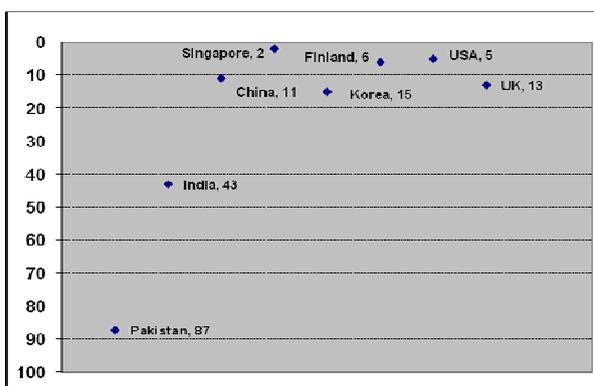
16.1 Information Technology (IT)

Information Technology is now recognized as an important vehicle for accelerated development and uplift of the people in many countries of the world. This in turn is facilitating the worldwide exchange and sharing of experience, knowledge and services. In the recent past, global recession has slowed down the economies, but information technology is showing the way to recovery of the businesses and economies through innovative and smarter solutions.

Pakistan's economy has been under tremendous pressure during the year. This has also adversely affected the IT Sector. The growth has slowed down with no significant and sizeable investments coming during the current year 2009-10 into the country. Despite this slow-down, the IT Sector is still vibrant enough and is envisaged to pick-up by the end of next year 2010-11. Several global IT companies such as NCR, IBM and Oracle use Pakistan as a regional hub for South Asia and Middle East.

The current year 2009-10 saw slight improvement in the network readiness index rankings. It increased from 98 in last year to 87 in the current year, showing the potential of Information and Communication Technology (ICT) sector to perform well. In spite of this, Pakistan still ranks much lower than our regional competitors. A comparison of Networked Readiness Index (NRI) ranking of selected countries is shown in Figure 16.1.1.

Figure 16.1.1: Network Readiness Index Rankings



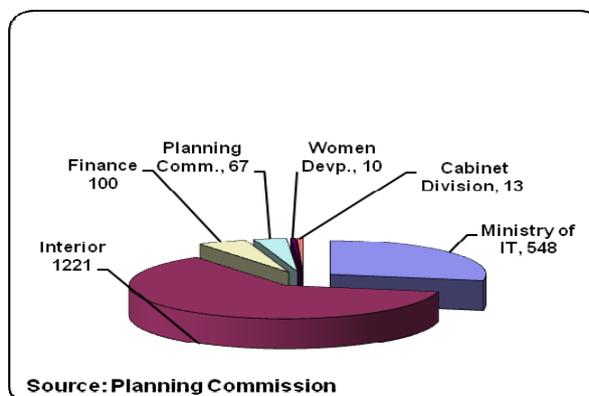
Source: Global Information Technology Report 2009-10

Review of 2009-10

Financial

In the PSDP 2009-10, an amount of approximately Rs 2.0 billion was allocated for information technology sector for 65 projects costing Rs. 16 billion. These projects were executed by various Ministries/ Divisions. The graph 16.1.1 shows the distribution of PSDP allocation among the Ministries/ Divisions. As per the revised estimates, the utilization for 2009-10 will be 63% of allocated funds.

Graph 16.1.1 PSDP 2009-10
Information Technology Sector (Rs million)



Source: Planning Commission

Physical

The major achievements for 2009-10 are delineated below:

Human Resource Development: The educated and highly skilled human resource is imperative for the growth of information technology. Pakistan has to equip not only its educational institutions at all levels with the information technology facilities but also it has to establish new vocational training centers throughout the country which focus on providing training to convert the latent human resource available into a highly skilled IT workforce that is competitive at the world level. To address the shortage of highly skilled workforce in ICT, the Government has been focusing on both short term and long term initiatives.

Major projects executed during 2009-10 for human resource development include:

- **National ICT Scholarship Program** approved at a cost of Rs 2,414.8 million was launched. The Scholarship Programme provides opportunity for students of non-metropolitan areas to have access to quality IT/Computer Science education in the country. About 7,300 students received foundation training from this programme and about 500 successful students qualified for scholarships for 4-years Bachelors degree programme in various universities country wide. The overall target of the project was to award 4-years Bachelors degree scholarship to about 3,500 students.
- **Pilot Project for End-Users and System Administrators – Training on Open Source Software** was conducted to raise the skills in the use of open source softwares. More than 3,100 people were trained in the different professional courses and administration of Linux Operating System.
- **Basic Information Technology Training** aims at improving the IT literacy and skills of Government employees to carry out office work and training was imparted to about 3,000 Government employees.

Information Technology Industry Development: It is expected that IT exports in 2009-10 will reach US\$ 250 million approximately against a target of US\$ 280 million. This under-achieved status is mainly attributed to the overall uncertain situation that prevailed during the year 2009-10, which made the international investors reluctant to invest and undertake business in Pakistan and many local companies in expanding initiatives within the country. In order to strengthen the local information technology industry to compete in the international markets, following projects were executed during the year 2009-10:

- **Purchase of Land in Karachi and Lahore for Establishment of IT Parks** was approved for capacity building of IT industry. This project will boost the information technology infrastructure and facilitate more companies to establish their business in Pakistan.
- **IT Parks Construction projects consultancy** for both Karachi and Lahore airports was launched during the year. These parks will facilitate more IT firms to establish their businesses in the country.
- **Standardization of Pakistani Software Industry Program** was initiated to obtain internationally recognized certifications by local companies. As a result, the number of Capability Maturity Model Integration (CMMI)

assessed companies has increased. Currently CMMI certified companies according to their level include, two CMMI Level-5, three CMMI Level-3 and sixteen CMMI Level-2 companies. Also, now there are 110 ISO-9000 certified. ISO 27001 consultancy and audit of ten IT companies has been completed this year.

- **Automation of Domestic Industry on Open Source Systems.** This project was initiated to encourage the local companies to develop expertise in open source arena as well as to provide automation at low cost for domestic industry.

E-Government

Government continues to pursue its policy of improving its efficiency and facilitating its citizens through Information Technology. The e-government program covered computerization of Ministries as well as extending its services to the public. However, due to pressures on the development budget, new major initiatives in this area could not be taken and emphasis was only laid on completing the existing projects. The major e-government projects executed during 2009-10 included the following:

- **Machine Readable Passport/ Machine Readable Visa Project (MRP/MRV) Phase-II** was approved at a cost of Rs. 3,562.540 million for deployment of MRP/MRV System. Through this project, the MRP/MRV System was deployed at 5 Regional Passport Offices (RPOs) and one Foreign Mission in 2009-10.
- **E-enablement of Islamabad Police** has established automated police headquarter and its connectivity with 13 police stations through Wi-Max. Till date 4,012 e-FIRS, 220,418 computerized driving licenses, and digitization of complete human resource record has been completed. The project has greatly helped in the improvement of services to the people by the police.
- **E-Services for Interior Division** has automated Visa issuance, Visa extensions, NOC certificate issuance, renewal and management of arms licenses etc. Software applications for these e-enabled processes have been developed and deployed at Ministry of Interior for user testing. By the end of this fiscal year, these shall be rolled out.
- **Online Access to Statutory and Case Laws** for the honorable judges of high courts and Supreme Court. Under the scope of these projects necessary IT infrastructure has been deployed at High Courts and Supreme Court. Also, online access to PLD cases has been provided at 250 locations in Punjab, NWFP, and Federal Capital, Islamabad, via the internet.
- **Automated Fingerprint Identification System (Phase-I)** was completed in February, 2010 and Phase-II of the project is being implemented for online comparison/ identification of criminals through fingerprints to combat terrorism and crimes.

Challenges and Recommendations

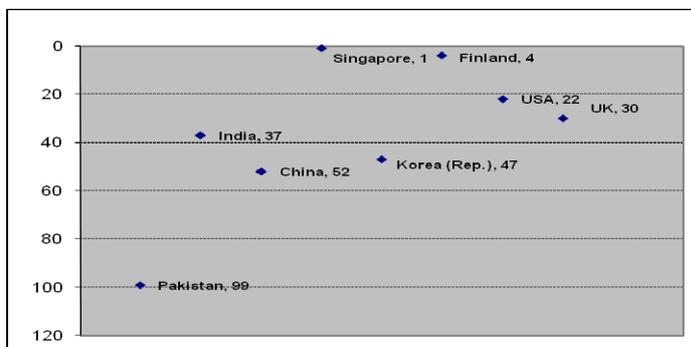
Education & Human Resource Development: The most important factor in sustainable growth of information technology in any country is the human resource. A strong focus on quality IT education will be very helpful for not only meeting the

domestic demand but also to cater for the international requirements since the trained human resource is an excellent source of foreign remittances.

The quality of Pakistani educational system is the main reason of under-achieved IT development. Pakistan's

ranking for **“Quality of the Educational System”** during the current has improved slightly as compared to the last year and it currently stands at 99 (Figure 16.1.2). However, this is well below India (37) and China (52). Therefore, a lot of room exists for improvement and to become competitive at the world level.

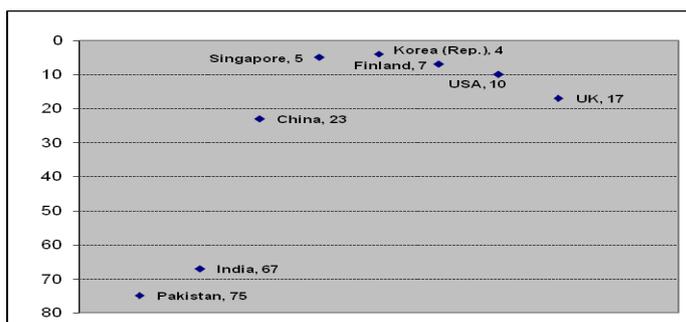
Figure 16.1.2: Quality of Educational System



Source: Global Information Technology Report 2009-10

Furthermore, internet access in schools needs to be enhanced along with computer education to improve Pakistan's internet access in schools ranking. As per the ranking of Global Information Technology Report 2009-2010 (Figure 16.1.3), Pakistan is ranked as 75 for **“Internet Access in Schools”**, slightly up from the last year's ranking of 81. This year Korea is ranked at 4, Singapore at 5, Finland at 7, while China is ranked 23 and India as 67 (Figure 16.1.3).

Figure 16.1.3: Internet Access in Schools



Source: Global Information Technology Report 2009-10

Pakistan needs to rapidly and consistently increase the base of primary, secondary and tertiary education in terms of quantity as well as quality. An efficient and focused educational system needs to be put in place in which thinking; innovation and creativity is encouraged and promoted. For inculcating these traits in the students, teachers must be trained in the latest teaching methodologies as well. Also, incentives in the shape of scholarships need to be offered to the talented students for promoting IT education. The initiative like National ICT Scholarship program being sponsored by Ministry of IT is a step in the right direction.

Establishment of training centers for developing skills in human resource is required for meeting the requirements but some mechanism for quality control of the training institutes needs to be put in place. Also, the projects for improving IT skills with increased outreach of IT institutions need to be implemented.

In order to provide overseas employment to the trained IT professionals, IT Placement Centers can play a pivotal role. Therefore, placement centers should be established specifically for exporting IT manpower seeking overseas opportunities. The recommendations to develop HRD in IT sector are briefly presented in Box 16.1.1.

Box 16.1.1 Recommendations for Human Resource Development

- Establishing a chain of ICT Vocational Training Centers through Public Private Partnership with emphasis on international certifications (e.g. PMP, PRINCE2, CCSP, MCSD, DBA, etc.) and development of key competencies.
- Providing computing infrastructure in secondary schools and colleges along with internet access.
- Upgrading teaching skills of IT teachers.
- Scholarships for IT education.
- Establishing Centers of Excellence for IT Training.
- Implementing projects for upgrading IT skills with increased outreach of IT institutions.
- Establishing IT Placement Centers for exporting trained IT manpower.

Information Technology Exports: For 2010-11, the estimated IT exports are targeted at US\$ 350 million, which is very low as compared with the IT exports of other countries. For example, Korea's IT exports were US\$97 billion, Ireland's IT exports reached US\$24 billion and India's IT exports are estimated to reach US\$48 billion in year 2008-09. For increasing the software and IT exports, besides attracting large multinational businesses in the country, local entrepreneurs and investors in large numbers should be attracted through incentives and infrastructure support to give impetus to the sector. For this purpose, development of IT incubators to establish IT companies and venture capital funds will be encouraged by providing them with 'one-window-facilitation' to start their business. A government-backed program to establish IT incubators will be designed.

To attract large international businesses, the local IT companies need to complement their expertise as well as augment their capacity through clustering as well as mergers/acquisitions on successful business propositions. The mergers, acquisitions and joint ventures with foreign software houses will help in the promotion of software development, software business and transfer of technology. A proper mechanism to incentivize the system will be put in place by the Government. This will enable the local companies to transform into world-class companies.

The international businesses now focus on adopting best practices to ensure delivery of quality services and products. The local IT companies should be encouraged in this direction. For this purpose, incentives such as tax concessions/ rebates/support shall also be given to local IT companies for achieving higher CMMI Level certification, opening offices overseas and for earning foreign exchange from software exports.

Silicon Valley, USA, Multimedia Corridor in Malaysia, and Internet City in Dubai are examples that have led to the growth of IT industry in the respective countries. A Multimedia/ Internet City and Knowledge Village in Pakistan on similar lines will help to attract large software companies and multinationals to build their offices locally. These places would be treated as Tax Free Zones. Further, this will act as a hub for value-added activities such as multimedia content development, animation, computer games, knowledge creation, etc. Initiatives for development of IT industry and exports, in brief, are presented in Box 16.1.2.

Box 16.1.2 Initiatives for Development of I.T. Industry

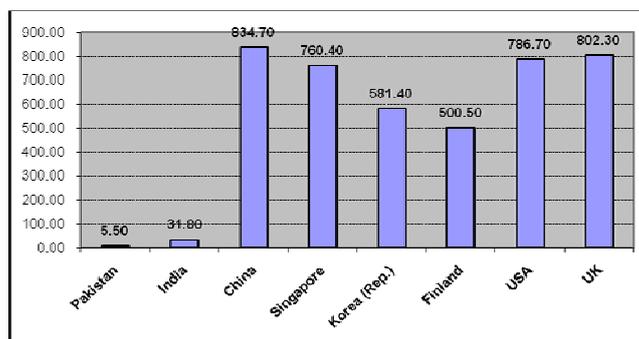
- Incentives for achieving higher CMMI Levels and other International Certifications such as ISO 27001, ISO20000, ISO 9001, ITIL.
- Encouraging development of I.T. incubators
- Mergers, acquisitions, joint ventures with foreign software houses to build world-class companies.
- Incentives for remitting earning in the shape of foreign exchange.
- Establishing Internet City and Knowledge Village to achieve critical mass of high technology companies.
- Encourage domestic consumption of indigenously made software products and ITeS.
- Encourage availability of content, applications and services in Urdu and other local languages.
- Developing computer hardware industry and encouraging transfer of technology.
- Abolition of Sales Tax on computer hardware equipment and software.

E-commerce: E-commerce is the main pillar on which the knowledge-based economy stands. In Pakistan, e-commerce is still a long way to be seen at a recognizable level. In this regard, many issues will be addressed that include expansion in connectivity infrastructure, introduction of Public Key Infrastructure (PKI), implementation of laws related to electronic transactions, data protection and cyber crimes so that confidence is built up for doing business using this medium.

Computer Hardware Industry:

Pakistan’s computer hardware industry requires more attention to make it a vibrant sub-sector of the overall IT industry. For this purpose, a level playing field shall be ensured by providing equal treatment to import of components and finished computer equipment. Also, there will be tax concessions/package programmed for OEMs companies and manufacturers of computer hardware components (e.g. storage media, networking equipment, keyboards, etc.) for a period of next 15-20 years.

Figure 16.1.4: Personal Computers (Per 1,000 Persons)

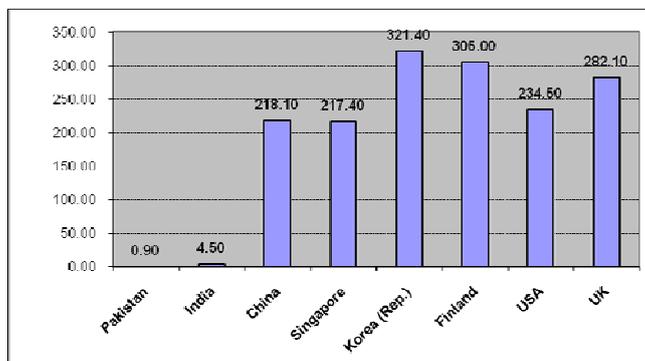


Source: Global Information Technology Report 2009-10

In order to promote this, computer hardware firms equipped with after-sales maintenance/ repair workshops/ labs employing qualified IT professionals and having country-wide presence shall be preferred for the award of large Government contracts.

Similarly, concessions in the sales tax on computer and allied equipment are planned to provide impetus to rapid growth of information

Figure 16.1.5: Broad Band Subscribers (Per 1,000 Persons)



Source: Global Information Technology Report 2009-10

technology and services. It will also help in broadening the ownership of PCs and broadband subscribers, as currently, Pakistan has a very small base of PCs and broadband penetration as compared to other countries (Figure 16.1.4 & Figure 16.1.5).

E-Government: The emphasis on e-government initiative continues since the year 2000 when M/o IT was established. As compared to last year the E-Readiness score for Pakistan has increased, from 3.79 to 4.10 showing that a continuous effort is being made. However, this initiative being in developmental stage requires a concerted effort and continuous ownership at the highest level to make it successful.

Box 16.1.3: Recommendations for Sustainability of E-Government Initiative

- Replication of already matured e-government initiatives to avoid duplication of efforts
- Proper IT Sections in each Ministry inducting qualified IT professionals.
- Development of IT Cadre at competitive salaries based upon performance.
- Sharing of government software applications with other government entities including Provinces.

Currently, Pakistan's position is almost sluggish with respect to e-government initiative. These initiatives have not yet been completed. The major issue in the sustainability of e-government projects is the retention of IT professionals in the longer run as the private sector is offering very lucrative packages for the same skills and experience level. To attract IT professionals in the public sector, development of an IT Cadre at competitive salaries based upon the performance is essential. This will help in motivating IT professionals to join public service and adopt it as a long-term career. Recommendations, in brief, for sustainability of e-government initiatives and cadre are presented in Box 16.1.3.

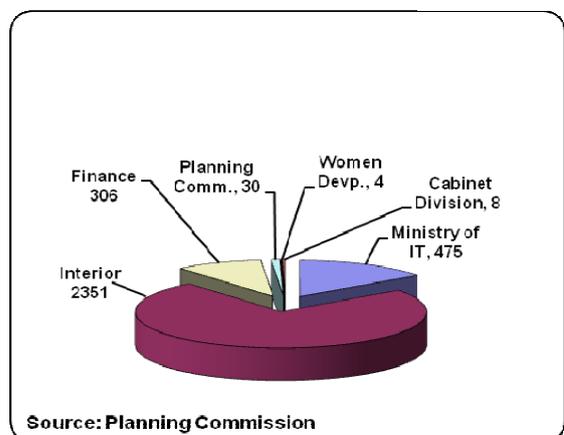
For the e-government initiative to take its roots within the government offices, proper IT Sections in each Ministry are required to be established. These IT Sections would cater to the requirements of maintenance/updation of websites, network management, hardware maintenance, IT training and business process re-engineering. The IT Sections of each Ministry should have IT professionals with appropriate educational background and skills to handle these tasks and rewarded as per market conditions. The existing IT Departments working under the Ministry of IT also need to be reorganized and re-oriented to accelerate the pace of implementation and address the enhanced IT requirements of the Government.

Annual Plan 2010-11

Financial

In the PSDP 2010-11, an amount of Rs 3.2 billion has been earmarked for IT sector for 71 projects costing Rs 14 billion. Allocations against major ministries/Divisions are presented in Graph 16.1.2.

Graph 16.1.2 Proposed PSDP 2010-11 Information Technology Sector (Rs million)



Physical

The PSDP earmarked for 2010-11 will further enhance the human resource development, IT industry development, e-Government, infrastructure development and will create employment opportunities in the IT sector. Major thrust in IT for the 2010-11 will be as follows:

Human Resource Development: In 2010-11, focus on human resource development related projects will continue to be on provision of IT training to government employees and the Public. Following are the main projects included in PSDP 2010-11:

- **National ICT Scholarship Program.** This five-year program launched last year will continue to provide opportunities to the students of rural and lesser developed areas to get access to best quality ICT education in Pakistani universities. The target for the year is to provide foundation training to about 9,000 students. About 700 successful students from this foundation training will get scholarships for 4-years Bachelor's degree programme in various national universities.
- **IT Training for Elected Lady Representatives (PHASE-II)** launched for providing basic computer education to elected lady councilors will be re-oriented to include lady teachers of the public girls secondary schools of rural areas so that the prime objective of providing information technology access to female population is adhered. The lady teachers will be imparted training until the operationalization of local bodies system. In the next year, approximately 400 public school teachers in 15 Districts of the country will benefit from this training program. The project will be completed in March 2014.
- **Pakistan Computer Bureau (PCB)** plans to provide basic IT training to 5,000 Government employees. Training on Open Source Software will be conducted to raise the skills in the use of open source software for more than 6,000 users. Also, more than 1100 people will benefit from different professional courses.

Information Technology Industry Development: In PSDP 2010-11, emphasis on improving the IT infrastructure will continue so that more international IT companies are attracted to undertake business in Pakistan alongside the domestic IT companies. In this regard, some of the important projects included in PSDP 2010-11 are:

- **Phase-II of Standardization of Pakistani IT Industry** will further strengthen the capacity of IT industry to attract international business. The target for the year is to support at least fifteen companies to attain CMMI level 2, seven companies CMMI level 3 and one company to attain CMMI level 5.
- **Next Phase of Strengthening of Pakistani IT Industry** through International Certifications will offer opportunity to Pakistani companies of achieving twenty certifications of both ISO 20000 and ISO 27001.

E-Government: E-governance projects will continue to be the center-piece of information technology initiative. The major e-government projects in 2010-11 include:

- **Machine Readable Passport/ Machine Readable Visa Project (MRP/MRV) Phase-II** is being implemented for deployment of MRP/MRV System. The MRP/MRV System will be deployed at 7 RPOs and 30 Foreign Missions in the year 2010-11.
- **Health Management Information System (HMIS)** at Jinnah Post Medical Graduate Complex (JPMC), Karachi is planned to be implemented in the next year while the implementation of HMIS is also underway at Sheikh Zyed Medical Complex and will be completed in the next year. In 2010-11,

EGD has planned to operationalize the HMIS (already deployed at PIMS) at Children Hospital Islamabad. Procurement of necessary hardware e.g. PCs, Servers, and LAN are already underway.

- **Online Recruitment System for FPSC** has already been deployed to enable online management of applications for the positions advertised by FPSC for General Recruitment and CSS exams. The system automatically receives online applications, allocates seats according to the quota system keeps record of candidates' results, post interview schedules online. The e-enablement features helped organization to reduce cycle time from weeks to hours for activities like compilation of results, preparation of exam papers and management of interview schedules. The project is expected to be completed in the next year.
- **GIS-Based System** for capturing and analyzing the data for infrastructure, education, health, and population welfare has been developed. At present the data has been collected and incorporated for model districts including Nawabshah, Kotli, and Batagram. Efforts are underway to complete the survey work for remaining two districts as per approved scope of project. In next year (2010-11), the aforesaid work will be completed
- **Automation of Central Directorate of National Savings (CDNS)** will facilitate its investors and improve public service at the National Savings Centers and the Head Office. Plans are also underway to provide value added services including ATM, Internet and Mobile Banking etc. to the clients of CDNS in future.

16.2 Telecommunications

Telecommunication sector in Pakistan has shown tremendous growth during the last few years. It is now entering into the next stage of consolidation and value addition in the services. For services and infrastructure providers, this will bring even bigger challenges and opportunities. The broadband services are now gaining more ground and this year has been very encouraging for the broadband service providers. The slow-down in the growth of mobile connections/ subscribers during the early part of the year is now over and the turnaround is expected to be more visible from the next year.

Review of 2009-10

Currently, there are two telecommunication organizations working under the government umbrella namely National Telecommunication Corporation (NTC) and Special Communication Organization (SCO). During the process of privatization of PTCL, NTC was created to take care of the Government's telecom needs. NTC at the moment operates about 114 exchanges in the country and total working connections are 116,717. SCO presently operates 157 exchanges and has 79,692 working connections and 666 WLL cell sites with 49,026 connections. For Telecommunication projects, Rs 448.4 million will be invested by the Federal Government.

The important projects executed by **NTC** as well as **SCO** during the year are as follows:

National Telecommunication Corporation (NTC)

- **Establishment of Video Conferencing Facility for GOP.** The cost of project is Rs 35.1 million where NTC is providing video conferencing facility

between various Federal Ministries and Provincial Government Departments.

- **Hosting of GoP Portal and Government Websites.** The cost of project is Rs 20.6 million where NTC has to provide portal & Government Websites for it's official customers.

Special Communications Organization (SCO)

- **Laying of Optical Fibre Cable (OFC) to connect remote areas of Gilgit-Baltistan and AJK.** The project is worth Rs 460 million and would provide instant worldwide access at affordable price creating an opportunity for local and global connectivity. The project would provide self healing rings for guaranteed communication in AJK & Gilgit-Baltistan and meet the needs of Defence Forces / Government Departments in the area.
- **Re-location of already laid SCO's telecom assets due to up-gradation of KKH from Raikot to Khunjab.** The project cost is Rs 199.3 million for laying 335 Km OFC and repair communication assets of SCO along the KKH which were damaged due to the expansion of KKH.
- **Gilgit-Baltistan Terrestrial Link Microwave.** The project involves laying of 450 Km OFC from Mansehra to Gilgit and 390 Km OFC between Gilgit and Skardu. Expansion would also be done on 25 Satellite Exchanges and laying of 440 Km OFC for inter connection of transit exchanges. 218,000 new digital lines including GSM would also be added. Cost of the project is Rs 490 Million.
- **Interconnect Billing and Customer Support for AJK.** The system will automate preparation of bills for 500,000 subscribers. The cost of the project is Rs 580 Million.

Performance of Private Companies in 2009-10

Presently, there are 6 large private companies operating in the country namely Mobilink, Telenor, Warid, PTCL, U-Fone and Zong. Following Tables 16.2.1 and 16.2.2 and Figure 16.2.1 show the number of connections as reported by Pakistan Telecom Authority (PTA).

**Table 16.2.1: Number of Fixed+WLL Telecom Connections
(2009 and 2010)**

(Millions)				
No	Item	As of March 2009	As of Feb 2010	Growth (%)
1	PTCL Fixed Lines	3.4	3.4	0.0
2	Other Fixed Lines	0.1	0.1	0.0
3	PTCL WLL	1.2	1.2	0.0
4	Other WLL	1.2	1.4	16.7
	Total Fixed+WLL	5.9	6.1	3.4

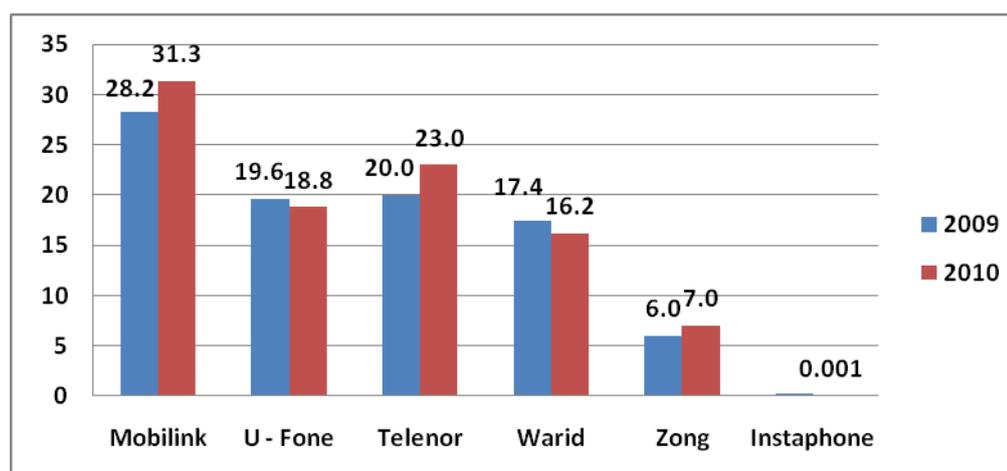
**Table 16.2.2: Number of Mobile Telecom Connections
(2009 and 2010)**

(Millions)

No	Company Name	As of March 2009	As of Feb 2010	Growth (%)
1	Mobilink	28.2	31.3	10.99
2	U – Fone	19.6	18.8	-4.08
3	Telenor	20.0	23.0	15.00
4	Warid	17.4	16.2	-6.90
5	Zong	6.0	7.0	16.67
6	Instaphone	0.2	0.01	-95.00
	Total Mobile	91.4	96.31	5.37
	Grand Total : (Fixed + Mobile)	97.6	102.5	5.02

Source: Pakistan Telecom Authority

Figure 14.2.1: Number of Subscribers of Mobile Companies (As of Feb., 2010)



Source: Pakistan Telecom Authority

Status of Net Increase

As of March, 2009 the tele-density in Pakistan stood at 60.6 (fixed + mobile), whereas the tele-density in Feb, 2010 stands at 62.4 (fixed + mobile). This indicates an increase of 2.97% in tele-density in the country. The broadband connections increased from 170K in April 2009 to 688K in January, 2010. This increase is mainly attributed to aggressive launching of triple-play services at affordable prices. Besides broadband, WiMAX services have also been launched during the year by telecom companies namely PTCL, Wateen and Wi-tribe wireless broadband services.

Annual Plan 2010 - 11

In PSDP 2010-11, Rs 2.522 billion have been earmarked for SUPARCO, SCO and NTC to execute 33 approved projects worth Rs 28.5 billion. Following are some of the important SUPARCO projects:

SUPARCO

- **Pakistan Communication Satellite System (PAKSAT-1R).** The project envisages to design, develop and launch a geo-stationary communication satellite (PAKSAT-1R) by 2011 to replace the leased communication satellite PAKSAT-1. The cost of the project is Rs 17.5 billion.
- **Development of CFIs to fly on-board Communication Satellite PAKSAT-1R.** The project is worth Rs 388.8 million and aims to achieve capability of indigenous manufacturing of space hardware, i.e., On-board Data Handling Subsystem, Telemetry Subsystem, Telecommand Subsystem and Power Conditioning and Distribution Unit.
- **Development of Logistic Support Facilities for National Satellite Development Program.** The cost of the project is Rs 333.3 million This is an infrastructure development project to support and facilitate activities related to the National Satellite Development Program which would also incorporate development and launch of communication satellite PAKSAT-1R.
- **Development of Various Laboratories for National Satellite Development Program in Lahore.** The project is worth Rs 426 million where 12 labs would be constructed in Lahore to develop various subsystems of communication satellite for the National Satellite Development Program.
- **Human Resource Development for National Satellite Development Programme (NSDP).** The project aims at building capacity of SUPARCO Engineers and Technicians by providing practical training and experience of operations so that they become useful for the NSDP project. The cost of project is Rs 357.0 million.
- **Development of a compact Antenna Test Range (CATR).** The project is worth Rs. 499.8 million in which compact antenna for satellites would be developed at SUPARCO Centre in Lahore. The project is very useful for development of satellite technology in the country.
- **Satellite Bus Development Facility (Phase – I).** In the project Satellite Bus Development Facility would be constructed in Karachi at a cost of Rs 439.8 million where various components of satellites would be developed and tested.
- **Up gradation of Precision Machine Shop.** The cost of the project is Rs 178 million where the existing Precision Machine Shop at Karachi is being upgraded to produce various components of satellites.