NATIONAL IT POLICY (REVISED 2010) DRAFT

Foreword

The importance of Information Technology as a service industry in itself as well as a critical support element for other service industries has remained and continues to be the subject of high level policy formulation the World over.

Recognizing the importance and the potential of Information and Technology (IT) in the development of a country, the Government took the initiative and tasked the IT & Telecom Division with the responsibility to formulate a National IT Policy in the year 2000. Nevertheless, publication of the National IT policy (revised) is the result of collaborative effort of several people from Government, private sector and civil society, including members and non-members of the National ICT Consultative Committee. The activities that have led to this publication served to further highlight the value of partnership, sharing of information and resources between various stakeholders.

The publication of the National IT Policy (revised) sets the founding stone required for the development of a comprehensive National IT Action Plan, which will be the roadmap to guide IT development in this country.

I am therefore confident that each and everyone involved will rise up to the challenge that emerging IT presents and contribute to the creation of a conducive environment and making provision of appropriate IT tools for social, economic and cultural development in the fulfillment of the aspirations of the people of Pakistan.

Naguibullah Malik (Secretary IT)
Ministry of Information Technology

1. Introduction

Information Technology (IT) has been a major growth driver for the Pakistani economy in the past. In the last decade the industry showed tremendous progress and grew quite rapidly. Even though it has registered tremendous growth, Pakistan based IT industry still forms a very small part of the global IT. It has a significant potential for growth in the coming years.

The rapid pace of technological progress, the increasing integration of global commodity and financial markets, the emergence of new low cost competitor countries, the strengthening of major trading blocs, the likely erosion of market preferences under the WTO regime, all require innovative, flexible and determined response.

Confronted with the economic challenges of the 21st Century, the vision of the Government of Pakistan is to make the IT sector the main pillar of the economy and to transform Pakistan into a regional Information & Communication Technology (ICT) hub. Government indeed wishes to position Pakistan as a major destination in the region for investments in the IT sector, and, in order to achieve this, Pakistan will have to leverage its investments in IT in order to move towards becoming both an Information–based Economy and an Information Society.

The implementation of the policy is dependent on the National IT Action Plan, which will set out the different programs and projects to be initiated to realize the vision of Government.

2. Vision

A country that will be globally competitive with a modern Information Technology (IT) Enabled Economy and a knowledge-based Information Society where strong, efficient and sustainable improvements in society, economy, culture, regional integration and good governance are achieved through a robust IT infrastructure and effective IT applications

3. Mission

Improve the quality of life of citizens to the highest attainable levels by ensuring availability of accessible, universal, affordable, modern and high quality IT facilities and services within the country.

4. Goals

4.1.   Improved Productivity of the National Economy

IT will be utilized to increase the overall efficiency, transparency and productivity of both the public and the private sectors.

4.2.   Local and International Investments

The establishment of world-class high capacity IT infrastructure and enabling provision of services across the country to attract increased investments, with a particular focus on IT related businesses and services.

4.3.   Support for all sectors

The Government of Pakistan is committed to using IT as a key enabler to develop all sectors including health, education, tourism, security and agriculture etc. Information & Communication Technologies (ICTs) will also be used to strengthen National Security through information databases and IT enablement of law enforcement agencies. Focus will be on to the creation of a corruption free, educated and knowledge based society capable of leveraging the cumulative benefits of IT to achieve competitiveness.

5. Core Policy Areas

To achieve the above mentioned goals the Government of Pakistan would endeavor to:

5.1.   Modernize the country's IT Infrastructure

5.2.   Institute E-Government

5.3.   Provide Extensive Citizen Services in the order of priority

5.4.   Develop High Quality Human Resource

5.5.   Improve Research & Development

5.6.   Switch to Open Source Software

5.7.   Develop and strengthen IT Industry

5.8.   Increase Capacity Building

5.9.   Bridge the Digital Divide

5.10.   Develop Local Content

5.11.   Better Internet Governance and Management

Any IT related incentives provided in other policies and under other directives of the Federal Government would continue and sustain as mandated in those policies or directives.

6. Policy Framework

The policy framework deals with the core areas identified in section 4. Each core area will be strengthened by its associated program that will be covered under the National IT Action Plan (NITAP). The NITAP would focus on grass root interventions in the core areas covered under this policy and build a sustainability model. The National IT Action Plan would be assessed annually in order to review the existing program for compliance with the policy, performance evaluation and identify any new programs to address deficiencies that would emerge in the core areas elaborated in the following sections:

6.1. IT Infrastructure

IT infrastructure would address areas which provide an enabling platform for IT interventions and enablement of IT services in all core areas. This would include Hardware, Broadband, Payment Systems, and Information Highways etc.

6.1.1. Area Significance

IT infrastructure is a strategic resource; efficient deployment of World Class IT infrastructure is important to accelerate provision of public and private e-services and seamless connectivity.

6.1.2. Area Objective

Develop World Class IT infrastructure and promote provision of affordable, reliable, modern and high quality IT facilities and services that will enable IT to contribute towards achieving National development goals.

6.1.3. Area Policy Statements

6.1.3.1. Area Element - Central Repository

The Government of Pakistan would develop National Data Center (NDC); the NDC would be a Secure Central Repository. The Federal Government would encourage provincial governments, departments and private sector to establish their own Data Centers. The Government would promote data centers on joint equity basis. Government would also promote offshore Data Hosting Services through private and public sectors investments which also includes public-private partnership (PPP).

6.1.3.2. Area Element - Internet Connectivity

The Government of Pakistan would pursue an aggressive plan to connect rural and urban areas to internet. The Government will take all possible steps to provide

internet connectivity with a minimum data rate of 1 Mega bits per second (Mbps) to every citizen at the door step and while traveling.

6.1.3.3. Area Element - New Technologies

The Government of Pakistan would encourage continued infrastructure up gradation and investment in new IT technologies in order to maintain and improve IT deployment and usage.

6.1.3.4. Area Element – Information Highway and Wide Area Networks

The Government of Pakistan would establish a secure information highway infrastructure in the country. Provincial governments and other governments would connect districts via State Wide Area Networks (WAN). Each district will have a point of presence for connections and eventual creation of a National WAN.

6.1.3.5. Area Element – Hardware Manufacturing

The Government of Pakistan would take steps to promote hardware manufacturing in Pakistan. The Government would provide incentives so that small & medium size hardware manufacturing industry could be set up in the country. The government would take steps to develop skilled human resource in this field. The Government would create opportunities for engineers and scientists to research, develop and design such IT hardware. Government of Pakistan would promote and open local manufacturing to foreign market.

6.2. E-Government

6.2.1. Area Significance

E-government focuses on applications aimed at innovating and promoting transparency in public administrations and democratic processes, improving efficiency and strengthening relations with citizens.

6.2.2. Area Objective

Develop national e-government initiatives and services, at all levels, adapted to the needs of citizens and businesses, to achieve a more efficient allocation of resources and public goods. This would enhance transparency, accountability and efficiency at all levels of government

6.2.3. Area Policy Statements

6.2.3.1. Area Element –Public Procurement

Information Technology will be used to help simplify purchasing procedures of the Government purchases and public procurement through electronic advertising, qualification, tendering, selection and payment.

6.2.3.2. Area Element –Debt Management

IT will be used to co-ordinate the processes of borrowing and debt repayment transactions with the various bilateral and multilateral creditors in order to improve the efficiency and transparency in the use of foreign capital and avoid problems, such as excessive debt burdens.

6.2.3.3. Area Element – Agriculture Development and Food Security

IT will be used to to improve Pakistan's agricultural production and marketing practices. Under the policy information systems will be developed to monitor water and land resources, food transportation and storage and crop-diseases control. Video and radio-conferences between buyers and sellers, growers and extension officers, can also play important roles in stimulating internal and external trade and improving agricultural practices and productivity.

6.2.3.4. Area Element – Environmental Management

Pakistan continues to experience serious floods, and other natural disasters-with adverse effects on both humans and the environment. To better manage the environment IT systems would be leveraged to provide timely and accurate data on socio-economic and demographic trends, weather patterns and natural disasters, and the availability and use of both renewable and non-renewable resources. Geographic information systems will be deployed to improve assessment and monitoring of natural-resource endowments.

6.2.3.5. Area Element – Common Software applications for the Government

Government of Pakistan would take steps to develop common software applications to be implemented in its departments. These software applications would be based on open source paradigm.

6.3. Citizen Services

6.3.1. Area Significance

It is undeniable that all forms of public utilities and services in Pakistan can be significantly improved and expanded by embracing IT. The use of IT as part of the service delivery channel can lead to qualitative improvements for the direct benefit of citizens. Government of Pakistan will take steps to build Citizen Services Centers in order to provide citizen services under one roof.

6.3.2. Area Objective

To ensure provision of IT enabled services that are most commonly used by the citizens at a minimal cost on 'anywhere', 'anytime' basis.

6.3.3. Area Policy Statements

6.3.3.1. Area Element – Mission Mode Projects

The World Bank funded a feasibility study in 2006 to identify the most used citizen services in Pakistan. The study identified that a total of twenty services were the most widely used. Under this policy Government of Pakistan would endeavor to provide an enabling environment as a first step to help achieve internet based provisioning or delivery of these services. The Ministry of IT would involve all the relevant ministries and other stakeholders which are the owners of these services to develop an implementation roadmap. Interface to the citizens would be in Pakistani languages and English. The most widely used services are as follows:

    I. Payment of electricity bills
    II. Payment of telephone bills
    III. Payment of water bills
    IV. Payment of gas bills
    V. Healthcare services
    VI. School Enrollment
    VII. Issuance of National ID card
    VIII. Passport Services
    IX. Domicile Certificates
    X. Driving Licenses
    XI. Birth / Death Certificates
    XII. Land Revenue Services
    XIII. Payment of traffic related offences
    XIV. Property Taxes
    XV. Motor Vehicle Related Taxes
    XVI. Postal Services.
    XVII. Rail ticketing
    XVIII. Public Health / Immunization Services
    XIX. Government Jobs

XX. Distribution of Zakat

6.3.3.2.   Area Element – Common Service Centers

Common Service Centers would be built in every Tehsil headquarter of the country where citizens can access government portals and apply for various IT enabled citizen services. The district point of presence will play a central role in delivering these services through the common service centers.

6.3.3.3.   Area Element – eHealth

Under this policy a nationwide eHealth system would be developed and deployed that will enable connectivity between all tiers of medical support systems, seamless interchange of medical records of populace and statistical analysis.

6.3.3.4.   Area Element – Biomedical Informatics

Biomedical Informatics is an emerging discipline that is defined as the study, invention, and implementation of structures and algorithms to improve communication, understanding and management of medical information. Under this policy, use and promotion of biomedical informatics discipline would be encouraged by Government of Pakistan.

6.3.3.5.   Area Element – eEducation

Government of Pakistan would promote the use of IT in education sector and encourage activities relating to lifelong learning through the use of IT by all educational, scientific & research institutions, libraries, archives and museums etc. Software applications to be d by accessing signed on specific educational topics for population with low literacy levels.

6.3.3.6.   Area Element – eTourism

Under this policy a comprehensive eTourism system would be developed with the involvement of relevant stakeholders. eTourism will not only be restricted to the

developing portals for tourism industry but will also focus on development of an information system that would help tourists in obtaining different services.

6.3.3.7. Area Element – eCommerce

Government of Pakistan would develop and deploy a National E-Payment Gateway to promote eCommerce. The information highway would be leveraged to implement a fully functional eCommerce System with in the country. SMEs would be offered financial incentives to use e-Commerce Platforms for financial transactions.

6.4. Human Resource Development

6.4.1. Area Significance

The growth of software industry in the recent years has generated a huge demand for highly skilled Information Technology manpower. Human capital constitutes the single most important resource in the Information Technology industry.

6.4.2. Area Objective

Ensure high quality and affordable IT Education and Training on international standards and certifications with the aim to build core IT competencies in our human resource. This would allow us to sustain our IT growth and also export human resource. Under this policy, the Government would also take initiatives to bridge the gap between Academia and Industry.

6.4.3. Policy Statements

6.4.3.1. Area Element – IT Training

Under this policy the Government would provide basic IT education to every student in schools and colleges. The Government of Pakistan would also encourage and support such institutes to adopt internationally acceptable standards of examination and certification of IT training programs. Moreover, trainings material, content and expertise would be developed to impart training on the focus areas and other elements covered in this Policy.

6.4.3.2. Area Element – World Class Institutions & Universities

The Government of Pakistan would provide requisite resources, including land and other necessary infrastructure, for establishing World class IT Institutes and Universities. To obtain innovative and high quality research results from its students, Universities and IT Institutes would be encouraged to establish World Class

infrastructure for Research and Development. Pakistani Nationals who are foreign qualified experts would be encouraged to teach and supervise Pakistani students for their research in Pakistani Institutes and Universities during the summer term.

6.4.3.3. Area Element – IT Curriculum

The Government of Pakistan, in order to produce IT engineers rather than technicians, would develop a uniform modern IT syllabus for Universities based on international standards and in consultation with academia and other stakeholders from the public and private sectors.

6.4.3.4. Area Element – Outreach Programs

Government of Pakistan would develop extensive outreach programs of IT education and training to citizens of the country.

6.4.3.5. Area Element – Attract and Retain Skilled IT Professionals

Government of Pakistan would develop programs to attract and retain skilled professionals in the economy and ensure that opportunities exist for their gainful employment. Continuing education program would be developed for the workforce already employed in the Industry.

6.5. Research & Development

6.5.1. Area Significance

For Pakistan to become more competitive there is an urgent need for focused attention on IT Research, Innovation and Development. This will help to meet local demand by the local industry.

6.5.2. Area Objective

Establishment of a framework to support IT Research and Development geared towards National priorities.

6.5.3.   Area Policy Statements

6.5.3.1.   Area Element – New Developments

The Government of Pakistan would provide support for IT Research, Innovation and Development organizations and create a fund to support deployment of local IT innovations. Government of Pakistan would also encourage collaboration among local and regional experts and research institutions.

6.5.3.2.   Area Element – Hardware & Software

Government of Pakistan would provide incentives to software, hardware and IT systems development sector for Research, Innovation and Development in order to compete for local and foreign market shares with new and innovative products. Steps will be taken by Government to formulate integrated web hybrid structures (Mash ups).

6.5.3.3.   Area Element - Standards

The Government of Pakistan would encourage establishment of centers of excellence that can spearhead the process of developing standards for hardware, software and IT system developments.

6.6. Open Source Software

6.6.1. Area Significance

The movement towards adopting and implementing Free and Open Source Software (FOSS) has reached a scale, which is challenging the domain of proprietary software product. FOSS is being widely deployed and massive commercial business opportunities exist around the FOSS paradigm.

6.6.2. Area Objective

Develop and sustain a large group of professionals who can contribute, develop and implement FOSS across multiple domains and offer end-users a choice to move away from proprietary software to FOSS.

6.6.3. Area Policy Statements

6.6.3.1. Area Element – Free Software Mirrors

Under the Policy, steps would be taken to establish Free and Open Source Software (FOSS) mirrors for free and easy access to open source software resources.

6.6.3.2. Area Element – Entrepreneurship Development in FOSS

Government would provide funding to promote and develop FOSS based ERPs and specific FOSS applications for industries of high significance to the economy of Pakistan.

6.6.3.3. Area Element – Develop and Deploy FOSS in Pakistani Languages

Government would support FOSS localization initiatives for a wider IT impact and inclusion of the non English speaking population on the IT bandwagon. In this regard

Open Source Resource Center – a project of this Ministry would be further strengthened. Measures would be instituted to make it a sustainable and permanent structure under the Ministry.

6.7. IT Industry Development

6.7.1. Area Significance

Pakistan's success in the export of Information Technology (IT) Software and Related Services over the past decade is well known. Further growth in this sector would lead to tremendous pay-offs in terms of wealth creation and generation of high end employment. With a view of making Pakistan a preferred destination for IT business and industry, Government will take an integrated approach to bolster export of software and IT enabled services from Pakistan. Software and computing technology can tremendously increase the efficiency of public and private sectors of the country. The recent gains in productivity improvement in EU and North America are largely attributed to increased use of software and Information Technology to cut cost, reduce inventories, offer better service to consumers and do more with less. The use of software in local economy will be promoted through capacity building of local software companies to solve problems relevant to local economy. Private enterprise and government procurement policies will be tailored to incentivize the use of indigenously produced software. Given the significant challenges the country faces in educating the masses, upgrading agricultural skill set of rural population and providing health care to all, the software industry can play a significant role in solving these problems. While the youth of this country is exposed to TV, videos, games and web content produced from across the globe, local content generation based on local languages, local value system and local educational needs is essential to keep the local culture intact.

6.7.2. Area Objective

Develop a favorable climate in the Country to promote export of IT Products, services (including Business Process Outsourcing) and knowledge-based industries with a view to generate employment through promotion of a vibrant and growing economy. Create an environment where software and Information Technology companies can enhance the productivity of local public and private sector. Put in place incentives and capacity building measures so that locally deployed software and information systems are made to international standards and procured from indigenous software industry. Develop a robust local language content generation

industry protected by intellectual property rights and facilitated by cost efficient on-line payment mechanisms.

While the first decade of 21st century saw an unprecedented growth in the telecommunication sector of the country where teledensity in Pakistan is approaching one of the highest in the developing world, the next generation of content and services built on top of the basic voice and data connection is the logical next step for evolution of the industry. This will also be very beneficial for the telecommunication companies which have declining margins on pure voice, text and data connections as this segment of the industry is maturing. Looking at trends and how the global ICT industry has evolved, a close linkage between content, software, information technology and telecommunication is essential to put forth next generation of content rich software applications and services. Such content and application can be entertainment in nature, for example, localized casual games, trivia and ipTV. Other applications and content can be aimed at increasing personal productivity, for example, maps and location based services including driving directions. E-Learning, telemedicine and information dissemination are other areas where content rich applications bundled with high speed voice and data networks can be very beneficial.

6.7.3. Area Policy Statements

6.7.3.1. Area Element – Close cooperation between IT and Telecom sector for a concerted effort to develop ICT industry

Government of Pakistan would foster close cooperation between IT and Telecom industry to ensure that value add products and services are introduced beyond the basic voice, data and text connection. With technologies like 3G, 3.5G and beyond are at our doorsteps, there is a great opportunity to enrich the lives of ordinary citizens to educate and entertain themselves and live an efficient life aided by ICT technologies. Due to unmatched size and varying evolution of IT and Telecom industries, a conscious effort needs to be made to ensure that IT and Telcom sector work in close cooperation to deploy robust ICT based solutions for the development of the country and facilitate exports. The IT sector must catch up with the growth of Telecom sector to ensure that true benefits of ICT technologies accrue to the masses

of Pakistan. The Telecom sector must realize that to sustain consistent growth, it must start to offer next generation of products and services driven by high speed data access on the handset. There is a great opportunity to use indigenously developed solutions pertinent to local problems and context to deliver advanced government services. An example best illustrate this point. Given the high workload of government offices and court of laws, many a times people from rural area travel to the city only to find out that the scheduled time of case hearing has changed or the court has adjourned the hearing to another date. The travel to a government office or a court of law can amount to hundreds sometimes thousands of rupees for a distant villager travelling to Tehsil/District headquarters. A system which sends an SMS to the concerned persons a day in advance of travel confirming or adjourning the hearing date will save precious resources of middle income/poor families, reduce waste in transportation and lodging facilities, save citizen's time for other productive pursuits, increase the peace of mind and above all increase the overall national productivity. Such a system could only be deployed by merging a software system (which intelligently schedules work) with a communication system (which sends the SMS in a reliable and secure way). It is quite unlikely that such a system will be available from a Western software vendor, this being a unique solution relevant to our particular context.

6.7.3.2. Area Element – International Marketing and Business Development

Market access is one of the major areas of concern for Pakistani IT companies. Government of Pakistan will institute various policy measures and programs to make it easy for Pakistani IT industry to export its products and services, build alliances with overseas partners and establish long term relationships with global IT players. The following measures will be taken to facilitate international marketing and business development for Pakistani IT industry.

I. Develop marketing programs that promote promising and established vertical markets, for example, financial services, mobile software and others.

II. Establish business development initiatives that are targeted, produce quantifiable results and are specific for a particular technology, market or geography.

III. Establish linkages between Pakistani companies and global marquee industry players to establish joint ventures in Pakistan.

IV. Convince global marquee players like Microsoft, Oracle, SAP and others to establish development and support centers in Pakistan. Establishing support centers for Mid East and wider EMEA market will be a good start.

V. Establish cost efficient overseas trade offices for direct market access for Pakistani IT industry. Such trade offices must be manned by sales force native to the target economy. The sales force should largely be compensated through globally accepted base plus commission type compensation. In some cases these trade offices will act as local point of presence for small to medium size Pakistani IT companies doing business in the target economy or an economy one hop away from the trade office.

VI. Effectively use the web and social media to build a positive image of Pakistani IT industry through effective digital marketing.

VII. Build effective and long lasting relationships with Pakistani IT Diaspora to establish trade linkages, get business referrals for Pakistani companies and establish trust to invest in Pakistani IT industry. Programs should be initiated to effectively commit motivated Pakistani IT expatriates to act as brand ambassadors for Pakistani IT industry.

6.7.3.3. Area Element – Increase the use of indigenously produced software and services

Government of Pakistan would take measure to provide a **level playing field** to Pakistani IT companies for government and private sector adoption of indigenously produced yet globally competitive software. Local software companies are hampered not because they can't produce world class software but because they don't have the brand, market cache, influence and aggressive marketing practiced by global industry giants. Measures to promote local IT industry will include educating the consumers of IT products and services about competitive Pakistani products and ensuring that global players don't abuse their marketing power and influence. Government will also consider giving tax breaks and other incentives to private enterprises to use indigenously produced software.

In the event that local software is not available for a particular use, the global software players should be mandated to farm out part of the work to local IT companies. Complex software systems involve tailoring to particular customer needs and such tailoring should be done locally. This would enable local IT players to develop skills to become system integrators. Competitive point IT solutions (a solution that solves a very specific hard problem in a narrow area) developed locally should be encouraged to be integrated with end to end suites of large software vendors including SAP, Oracle, Microsoft and others. These large vendors already have third party integration programs and they will be actively mandated to use a competitive local third party solution when such a solution is available from a local IT firm.

6.7.3.4. Area Element – Establish World Class Cost Effective IT Parks

Government of Pakistan will implement a cost effective IT parks policy that is compatible with the needs of the majority of the IT companies in the country. A consultative approach with IT industry will ensure that the IT parks cost structures are compatible with the needs of the local industry while maintaining high standards prevalent in Silicon Valley and Cambridge Technology Corridor in UK. Instead of a one size fits all approach, in the first phase, IT parks will be built to cater to the unique operational requirements of certain IT industry segments (call centers, 24x7 operations). In the second phase, certain facilities could be tailored/built for multi-

nationals that are willing to establish meaningful presence in the country employing software engineering talent (as contrasted with establishing merely a sales office).

6.7.3.5. Area Element – Capacity Building of IT Companies

Government of Pakistan would take multiple measures to ensure that IT companies have all the tools and skillset to become world class companies. These measures will include;

I. Strengthening internships and apprenticeship programs where part of the compensation for recent graduates employed by IT companies is borne through various government initiatives. This helps bridge the gap between what Tier 2 engineering and computer science schools are producing and the skill set the industry needs from day 1. Such programs will be continued to both support the IT industry and increase employment rate in the country till the point where Tier 2 schools start producing graduates that match the needs of IT companies without any additional on the job training. These programs will aim to improve the skill set of recent graduates and develop a talent pool with expertise in priority areas for IT industry development.

II. Provide support to IT companies to get internationally recognized certifications including ISO 27001, CMMI and others. Due to high cost of these certifications, a rigorous ROI (return on investment) calculation will be periodically carried out to decide the investment level for these programs. Local training companies will be encouraged to develop training modules and equivalent certifications but at a much lower cost.

III. As software industry has grown with a substantial number of mid size companies, the scarcity of middle managers is affecting industry growth. Programs will

be instituted to train the middle managers especially in improving English communication skills, managing teams and sales and business development training. These programs will continue till the balance is achieved in this area.

IV. To compete in today's world, high end technical training is essential for companies to leapfrog international competitors. An example best showcases this. While a simple web-site is easy to build, skills to put together a complex scalable web application along the lines of Yahoo mail or Google Gmail is something that is not addressed in an academic settings. Certain complex tools and technologies (large scale software testing, for example) are only prevalent in the industry and not available at even prestigious foreign universities. High end training will shorten the time to increase the technical depth of Pakistani IT industry in a short amount of time. Centers of excellence will be established to achieve this goal.

V. Focus will be given to provide specialized marketing and sales training for IT companies. These trainings will be vertical in nature catering to unique requirements of a particular IT industry segment.

6.7.3.6. Area Element – Capacity Building through cross discipline cooperation

State of the art technologies are almost always cross disciplinary. Emerging areas like mobile gaming exists at the nexus of software engineering, digital art and effective story telling. Efforts will be made to increase the cooperation between various disciplines, academic institutions, research initiatives, overseas centers of excellence and local software industry to build cross disciplinary products and services and explore new high potential emerging trends.

Special consideration will be given to hardware/software systems including embedded systems. Due to historical strength of Electrical engineering education in Pakistan, hardware driven by embedded software can become a key growth area for Pakistan. Similarly the strength of art education at world class institutions like National College of Arts can be heavily leveraged by the nascent mobile and social gaming industry in Pakistan. Other such areas of strength will be identified to develop key niche skill segments.

6.7.3.7. Area Element – Capacity Building through COEs (Center of Excellence)

Efforts will be undertaken to establish one or more centers of excellence to implement capacity building programs through a formal mechanism. Such center of excellence could be established at the crossroads of academia, industry and research institutions. This will ensure continuity of capacity building programs on a long term basis.

These centers will also become the basis for forming cross discipline teams to work on emerging opportunities and collect relevant data for policy fine tuning. These centers of excellence could also own other capacity building programs mentioned in this policy document including but not limited to middle management training and building high end technical competence of IT industry.

The centers of excellence will especially focus on emerging areas. This initial list of emerging area could include content development, cloud computing, mobile gaming and applications and SEO among others. The list of emerging areas strategic to Pakistani IT industry will be updated on an annual basis. The emerging areas will be supported through developing strategic insights, collecting market intelligence, understanding legal and regulatory framework and business environment and addressing funding challenges of emerging areas.

6.7.3.8. Area Element – Enabling environment for Content Development

A high growth area for local software and IT industry is content development that has a local cultural context, is developed in national and regional languages and promotes Pakistani and Islamic culture and value system. This is a very important area which transcends just the IT policy but needs to be taken up as an important national cause. Today's school going youth spends considerable time in front of a computer screen socializing on Facebook, watching YouTube content and consuming foreign TV programs. While *Harry Potter* is known to many Pakistani youth, it is lamentable that *Arabian Nights*, *Umrro Ayyar*, *Dastan-e-Ameer-Hamza* and other classics have not been digitized to form the basis of movies, games and digital content. This must change if Pakistan is to maintain its unique culture and value system. Sweeping programs must be initiated to provide an enabling environment including funding, legal protection, electronic payments through the web and establishing viable publishing models. The following concrete measures need to be taken,

I. Start to establish an Intellectual Property Regime driven by local needs protecting local content development.

II. Establish a local e-payment mechanism equivalent to PayPal and credit card processing which is available to small companies on a cost efficient basis.

III. Establish publishing models beyond multi-nationals supporting content generation mainly as part of their marketing campaigns to highlight/accentuate their product brand and image. While these attempts are laudable they don't scale enough to fit the larger purpose and opportunity.

IV. Encouraging IT industry to work closely with communication companies for mobile and e-content generation for the benefit of both industries. 3G and 3.5 technologies are all about value add content and both industries must work together to leverage the opportunity.

6.7.3.9. Area Element – Laws compatible with emerging technology paradigms and business models

Computing technology and trends are fast evolving. Virtual computing is fast changing to cloud computing where data and processing power is remotely available on demand through high speed Internet connection. In a very short amount of time, the computing technology paradigm will shift so quickly to a Utility model that new software will only be available on a cloud. In such an environment data protection laws, privacy laws and cyber crime laws will become essential. Special effort will be made to keep the body of law compatible with these emerging trends and needs. Without these laws the software export industry will greatly suffer and work may not be outsourced to Pakistan anymore because of absence of legal cover to protect private data transmitted over public Internet and possible bad reputation accrued from increased cyber crimes that go unpunished. This absence of relevant laws will also constrain electronic banking, global trading of Pakistani stocks and advanced linkages with global financial institutions. The development of a local cost efficient electronic payment mechanism along the lines of PayPal will also be severely hampered in the absence of relevant laws.

6.7.3.10. Area Element – Foster Entrepreneurship and new business formation

Government of Pakistan will take special measures to foster Entrepreneurship and new business formation centered on IT industry. This will include,

I.   Supporting a VC fund based on public private partnership where government is a limited partner and risk is shared between private and public sector.
II.   Developing appropriate body of law through SECP to establish VC funds in Pakistan.
III. Leveraging existing funding mechanisms, for example ICTRDF, to allocate part of funds to promote establishment of new IT companies. Such allocation will be made through a rigorous, merit based, transparent and conflict of interest free mechanism promoting only deserving new IT companies and concepts.
IV.   Helping emerging companies market their products and services across the world.

V. Working with academia and other not-for-profit private entities to establish programs that promote entrepreneurship in the country.

VI. Institute a program where a fraction (at least 20%) of every large government ICT project is allocated to small IT companies. This will encourage cooperation between SMEs and large IT players, increase the pace of IT innovation and lead to mergers and acquisitions strengthening the IT industry.

6.7.3.11. Area Element – Promote High Potential Emerging Areas

Government of Pakistan will facilitate a formal mechanism where high potential emerging areas are identified and promoted. This task could be undertaken under one of the centers of excellence. Emerging areas will be identified and selected as priority areas on a bi-yearly basis through a panel of experts from Industry, Academia and the government helped by expatriate Pakistani community.

6.7.3.12. Area Element – Strengthen IT industry Trade Bodies

Government of Pakistan would increase the effectiveness of its programs by closely working with officially recognized IT industry trade bodies to fine tune programs and initiatives to ensure that real needs of IT industry are identified, prioritized and addressed.

6.7.3.13. Area Element – Engage IT industry to do R&D on problems of national significance

It is envisioned that the Government will institute a cross sectoral task force consisting of MoIT, Ministry of Science and Technology, Water and Power and other ministries that need technical capability development in the country. Other members of the task force will be from academia and private sector. The charter of this task force would be to identify cross functional R&D projects of national significance that involved multiple technologies. For example, solar power if generated through solar

cells involves precise alignment and movement of solar arrays with the Sun as it moves across the horizon. Building such a system involves developing an embedded Sun tracker control sub-system consisting of electronic and electric hardware and embedded software. The overall project may be owned by the Ministry of Science and Technology but one of the components could be provided by the IT industry. The task force would not only identify key R&D projects but assign them to respective private sector companies related to different ministries to ensure R&D projects can be completed in a cost efficient manner in the least amount of time.

6.7.3.14. Area Element – Using reliable Quantitative data gathering and market research techniques for effective Policy Tuning

For a dynamic fast moving industry like IT, quick periodic adjustment to policies must be undertaken to keep pace with changing trends and emerging opportunities. An example is mobile phone software market nonexistent 3 years ago but a multi-billion dollar industry today. Data must be gathered constantly about the state of the IT industry, employment numbers, export revenue and growth in new technology areas to fine tune and adjust policy implementation mechanisms. A formal periodic policy review process aided by quantifiable market research and data will ensure efficient achievement of policy goals by fine-tuning and readjusting existing programs or launching new initiatives.

As part of this measure a cross functional task force consisting of academia, industry representatives, industry trade body and the relevant government quarters will be established to review the program design and features to implement the national IT policy goals. Te programs will be readjusted based on pressing national needs or emerging technological and global trends. This readjustment will be driven by reliable data collection followed by developing insights through data analysis. The resulting output will be fed into the policy fine-tuning apparatus and the program design process that implements national IT policy.

6.8. Capacity Building

6.8.1. Area Significance

Considering the nature and scale of Government initiatives, Capacity Building of Government and Education sectors has been identified as one of the prominent factors for promotion and implementation of IT in the country.

6.8.2. Area Objective

Capacity building across the country for successful implementation and execution of IT in Government and educational sectors.

6.8.3. Area Policy Statements

6.8.3.1. Area Element – Capacity building of Government

Government of Pakistan would endeavor to improve the capacity of Government sector to undertake and execute projects, induct IT manpower with in Government, and training of government servants. Government of Pakistan would take steps to accelerate enablement of e-Government in its departments and organizations; where-in back end data bases for agency specific and common applications will be developed, deployed and implement in the whole of government.

6.8.3.2. Area Element - Capacity building in the Education Sector

Government of Pakistan would also endeavor to develop capacity of the education sector. Universities would be encouraged to establish IT R&D Labs with the participation of faculty and students. Government shall take up intensive IT training of teachers with the aim that all teachers in all schools to have an IT acquaintanceship by 2011-14.

6.9. Digital Divide

6.9.1. Area Significance

There is a dire need to build a people-centered, inclusive and development-oriented Information Society, where everyone can create, access, utilize and share information and knowledge, enabling individuals, communities and people to achieve their full potential in promoting sustainable development and improving their quality of life. Steps to reduce digital divide will enhance the delivery of public services, transform the way businesses operate, stimulate communications infrastructure to be ready for remote areas.

6.9.2. Area Objective

Bridging the digital divide and creating a socially inclusive Information Society.

6.9.3. Area Policy Statements

6.9.3.1. Area Element – Technology City

The Government of Pakistan shall set up at least one Technology City, following the example of Cyber Jaya in Malaysia, in the South of New Islamabad Airport. Businesses falling in the Technology domain, Universities, Academies, Private institutions as well as other seats of research and development / higher learning would be located in the City. It would also create IT parks for Hardware/Software which will accommodate IT service providers and ITES providers and provide space for office and residential accommodation.

6.9.3.2. Area Element – IT Promotion and Awareness

Government of Pakistan would take actions to promote IT and develop awareness of IT in remote areas.

6.9.3.3. Area Element – Access to Information

Government of Pakistan would also take actions to develop infrastructure where everyone can create, access, utilize and share information and knowledge.

6.9.3.4. Area Element – Localization of IT

Government of Pakistan would take actions to facilitate development of localized Hardware and Software to reduce digital divide so that everyone can create, access, utilize and share information and knowledge.

6.10. Local Content Development

6.10.1. Area Significance

There are many Pakistani websites and most of them are in English. There are a few websites which are in Pakistani Languages. Recognizing that Pakistan has a low level of English literacy therefore, measures that encourage creation of Local Content to enable Pakistani populace to participate meaningfully in the knowledge-based economy will be taken under this Policy.

6.10.2. Area Objective

Under this Policy, Government of Pakistan would support creation of local content and development of ICT applications and multi-media content to facilitate social interactions, cultural interchange and entertainment.

6.10.3. Area Policy Statements

6.10.3.1. Area Element – Digitization of Archives

To promote electronic publishing of localized content, the Government would encourage development of multi media based local content that would augment the information available on the internet with content useful to our specific needs and would be in line with our religious values. The Government also would allow appropriate access to its archives and other information sources as a basis for developing local content.

Government also would provide incentives to develop standards and tools that would help citizens access and generate online content in their local Pakistani languages.

6.10.3.2. Area Element – Cultural Promotion

The Government of Pakistan would encourage cultural and Lok Virsa organizations in developing local content in order to promote traditions, cultures, indigenous

knowledge, and traditional arts. The Government would not allow inappropriate use of web that is detrimental to our religious and cultural values, ethics, mores, morality and violate any law. All measures with in the bounds of Pakistani laws would be taken to prevent inappropriate use.

6.11. Internet Governance and Management

6.11.1. Area Significance

Internet has emerged as a key global resource which is shared by all countries. Both the public and private sectors depend on the Internet services to one degree or another. Therefore, the Government of Pakistan must have an explicit policy for Internet Governance.

6.11.2. Area Objective

Pakistani users should have open access to information and the private sector should be able to exploit the business potential of this technology within the framework of National laws. Internet technology should not promote violation of Cultural, Social, and Religious boundaries. It should not be a threat to National Security.

6.11.3. Policy Statements

6.11.3.1. Area Element – Global Governance

Pakistan, like various other countries, believes that Internet Governance should be more democratic and sovereign governments should have a role in policy making. The Principles of World Summit on Information Society, from both phases of the Summit in 2003 and 2005, were endorsed by Pakistan. These Principles encompass the role of National Governments in the management and control of Internet in the context of the respective country.

6.11.3.2. Area Element – Cc TLD Ownership

ICANN, which is private sector non-profit company, in the US, controls the Internet Domains and manages the Internet through private sector companies. Historically, even the domain ownership of country code Top Level Domains was given to qualifying private sector companies. The Ownership of the Country Code Top Level Domain (ccTLD) for Pakistan, .pk , is also with a private sector company. In the recent years ICANN has recognized the role of the National Governments and has

made provision for Governments to influence the allocation of the ccTLD. In particular, a National Government can file an application for review of the current ownership. Pakistan will monitor the performance of the Registrar for .pk and take corrective measures as necessary.

6.11.3.3. Area Element – IDN cc TLD Ownership

Pakistan has applied for the string "Pakistan" in Urdu as the Internationalized Domain Name Country Code Top Level Domain (IDN ccTLD) for Pakistan. The Registry will be set up under government control initially but could be transitioned to a public-private partnership later. Even under the control of government, the governing body would have membership from Academia and Private Sector to ensure that the evolution of IDN cc TLD in Pakistan takes into account the views of multiple stakeholders.

6.11.3.4. Area Element – Access to Information

Free flow of information is supported and the government would encourage the users to share divergent views and promote dialogue. However, in situations where the content poses a security risk or violates Religious, Social or Cultural values then the government would take steps to block such traffic.

6.11.3.5. Area Element – Legislation

Necessary legislation would be enacted, as necessary, to support the aforementioned goals

6.11.3.6. Area Element – Other Policy Matters

Pakistan would continue to participate in International forums like, Internet Governance Forum, Government Advisory Committee to ICANN to deliberate on new policy issues as and when they arise. Government would ensure its presence for IDNgTLDss in international forums and guidelines would be followed for implementation of IDNgTLDS.

GLOSSARY

Broadcasting – A term referring to the distribution of information using radio, television, Internet and intranet or web casting.

Digital Divide – The technological gap between countries that have fully exploited ICT and those that have not. The digital divide is often associated with the resulting gap in terms of economic development.

e-Commerce / Electronic Commerce – Business activities involving consumers, manufacturers, suppliers, service providers and intermediaries using computer networks such as the Internet.

Free and Open Source Software (FOSS) – is software that is liberally licensed to grant the right of users to use, study, change, and improve its design through the availability of its source code.

Information and Communication Technologies (ICT) – Is a generic term used to express the convergence of information technology, broadcasting and communications. One prominent example is the Internet.

Information Based Economy (IBE) - A country or region where ICT is used to develop economic foundation and market transactions.

Information Society (IS) – A country or region where information technology has been fully exploited and is part of everyday life as an enabler of information sharing, communication and diffusion.

Information Technology (IT) – Embraces the use of computers, telecommunications and office systems technologies for the collection, processing, storing, packaging and dissemination of information.

Internet Service Provider (ISP) – Also known as Internet Access Providers – Is a company that provides infrastructure for access to the Internet or for interconnecting other ISPs and content-based or application-based services on the Internet.

Knowledge Based Economy (KBE) – A country or region where ICT is extensively used to enhance knowledge so that higher human capital brings further improvement to the economy.

Local Area Network (LAN) – A computer network that spans a relatively small area. Most LANs are confined to a single building or group of buildings. However, one LAN can be connected to other LANs over any distance via telephone lines and radio waves.

Mission Mode Projects (MMP) – Mission Mode Projects(MMPs) are time bound Projects clearly spelling out all important aspects like services, target beneficiaries, service levels, project implementation team, proposed project reengineering, project implementation and management plan with specific time lines.

Mission Mode Projects are owned and spearheaded by various line Ministries which can be categorized as Federal Government, Provincial Government and Integrated projects.

Open Source – refers to any program whose source code is made available for use or modification as users or other developers see fit. Open source software is usually developed as a public collaboration and made freely available.

Open Source Resource Center (OSRC)– OSRC's mandate is to serve the public by helping to identify the "common technical needs" within government agencies and bring to bear the resources, applications and expertise of the IT industry and independent open source development communities to meet these needs.

Small and Medium Enterprise (SME)– SME LD;FMDL DLFDL .

Teledensity - The number of telephones per 100 people in a region.

Voice over Internet Protocol (VoIP) – Also known as Voice over Internet, IP Telephony or Internet Telephony – refers to telephone services provided over the Internet as the transmission medium.

Wide Area Network (WAN) – A computer network that spans a relatively large geographical area. Typically, a WAN consists of two or more local-area networks (LANs). Computers connected to a wide-area network are often connected through public networks, such as the telephone system. They can also be connected through leased lines or satellites. The largest WAN in existence is the Internet.