NATIONAL ICT POLICY

PAKISTAN PSEB SOFTWARE EXPORT BOARD

Ministry of Information Technology
Government of Pakistan

P@SHA
Pakistan Software Houses Association for IT & ITES

Foreword

Over the last eleven years a number of initiatives have been undertaken to develop a National IT Policy by individuals and groups sponsored by Ministry of IT (MOIT), by the state (the Planning Commission), local and expatriate Pakistanis and the Pakistan technology industry association (P@SHA). Within the list of above initiative policy documents have been developed keeping in view long term national goals, vision and outlook; by initiating and documenting stakeholders conversations; by surveying industry groups and their customers; by comparing our efforts with regional initiatives and finally by reviewing the current state of the IT industry in Pakistan and where Pakistan needs to be in the future.

This National IT Policy document contains actionable milestones and fundable projects, reflecting the point of views of primary stakeholders and the technology industry. This Policy document focuses on driving primary pillars and principles based on the interventions required in each sector affected by technology in Pakistan.

This policy document will be reviewed annually to assess the impact of the document at that stage as well as the effectiveness of the recommended intervention programs.

In the preparation of this Policy Document, a number of stakeholders have been involved: the Pakistan Software Houses Association for IT & ITES (P@SHA), members of civil society, the technology industry in general, the telecommunication community, the services sector, academia, media and socio-political activists as well as various government entities. This document was then selectively presented for initial feedback and reactions and the feedback was incorporated after discussion. As a final step the document is being presented in Islamabad to key stakeholders for a final round of discussion before its release.

_____ (Secretary IT)
Ministry of Information Technology

Contents

1. Introduction

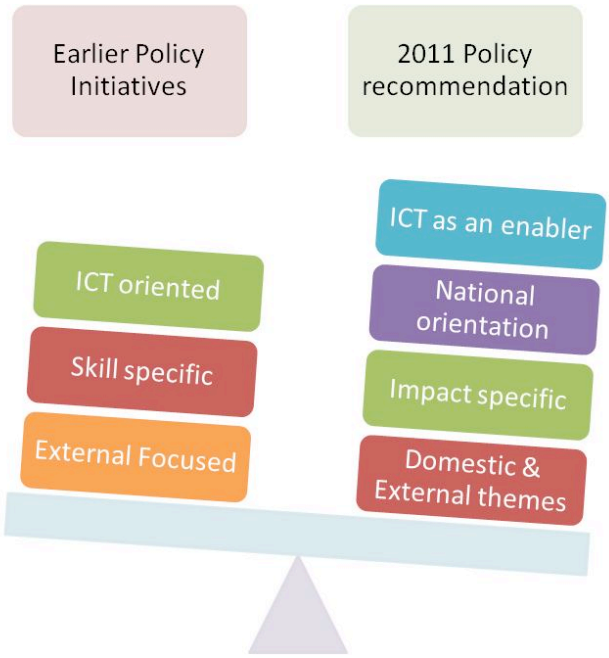
Information Technology (IT) has been a major growth driver for the Pakistani economy in the past. In the last decade the industry showed tremendous progress and grew quite rapidly. Even though it has registered tremendous growth, Pakistan based IT industry still forms a very small part of the global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

The 2012 National ICT Policy will be national in its focus and emphasis. While software exports have grown at an impressive rate over the last decade the domestic technology consumption figure is now just as significant and almost half as large, if not more, than our total international contribution. More importantly, both contribution figures (exports, domestic consumption) ignore the enabler impact of technology on other related sectors such as banking, insurance, government, manufacturing, media, education, defence and agriculture.

Beyond technology, ICT and ITES play a significant role in national development and GDP growth. This Policy Document is therefore both domestic and external focused, driving specific impacts within the Pakistani economy and driving ICT as an enabler within the different socioeconomic domains in the country.



The focus will be on tapping into economic opportunities within Pakistan through IT as an enabler to drive the local economy.

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.

Overarching Principles used

Promote Accessibility
Preserve National Security, Confidentiality & Integrity
Promote Innovation
Proportionality
Conformity with international best practice
Transparency
Openness
Inclusive Policy Making
Promote market forces
Holistic stakeholder participation
Light regulation where necessary and possible
Gender Positive
Promote Youth
Multilingualism

In addition to this the **P@SHA CIPE Business Agenda for Pakistan IT & ITES Sector recommendations for 2009** identified a number a gaps in the areas of:

a) Human Resources
b) Finance
c) Infrastructure and
d) Legislation

Internationally we can also look at the **Diplo Foundation's analysis of the Internet Governance Forum's themes**:

1. Data protection and privacy
2. Capacity Building
3. Awareness building on Open Standards
4. Internet Access and Connectivity
5. Human Rights
6. Multilingualism
7. Access to Knowledge
8. Freedom of Expression
9. Gender Issues in Access and Representation
10. Access Improvement for Persons with Disabilities
11. Legislative (Regulatory) Framework for Internet Access and Use
12. Child Online Safety
13. Awareness Building on Climate Change
14. Content Diversity on the Internet
15. Critical Internet Resources
16. Cyber Crime
17. Internet Governance

As well as the **EU Digital Agenda** it directly links economic policy with social policy[1]
Pillar 1: A vibrant digital single market
Pillar 2: Interoperability and standards
Pillar 3: Trust and security
Pillar 4: Fast and ultra-fast Internet access
Pillar 5: Research and innovation
Pillar 6: Enhancing digital literacy, skills and inclusion

The original national ICT policy paper presented and implemented between 2000 and 2011 was prepared with a yearlong coordinated national effort. From a structure, action plan and focus point of view did a great job of building consensus as well as setting national direction for technology industry and initiatives in Pakistan. At the end of the policy document was a list of 20 projects that together were expected to change the technological landscape of the country. While work was done on some of these initiatives, others couldn't receive funding or failed in the execution and implementation stages.
At a high level the 2000 national ICT policy effort focused on the following intervention areas:

1. Human Resource Development
2. Infrastructure Development
3. Software Industry Development
4. Hardware Industry Development

[1] http://ec.europa.eu/information_society/digital-agenda/scoreboard/pillars/index_en.htm

5. Internet
6. Incentives
7. IT Promotion and Awareness
8. IT usage
9. Legislation
10. Regulation

The biggest contribution of the National ICT Policy initiative was the generation of a decade of policy implementation experience. While in certain areas clear policy initiatives were taken (skill based training, access to new markets via participation in international industry exhibitions and events, establishment of the national ICT R&D fund, capacity building initiatives, national internship schemes, national scholarship scheme) in other areas policy level discussions continued for a number of years without any measurable or visible impact.

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, human resources, infrastructure, legislation, 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. Accelerate digital literacy and integration in Pakistan, built on facilitating access, awareness, security, trust and fostering research and innovation.

4. Goals

ICT as a driver and enabler for all socioeconomic sectors

The Government of Pakistan is committed to using IT as a key enabler to drive development across all sectors, with focus on six key sectors. The national theme answers one simple question for each area of focus. What can technology, technology enabled services and telecommunication do to solve a big problem in an area of focus within the next five years. The question is asked for the following macro level sectors: Education, Agriculture, Health, Governance, Entrepreneurship and Empowerment. This list is crucial to development in Pakistan as solving a large problem in any of these areas creates a new domestic market for Pakistani companies and allows the creation of real growth and prosperity using ICT and ITES as an enabling tool.

The following measurable goals have been set forth by this Policy Document to be achieved over the next decade of implementation:

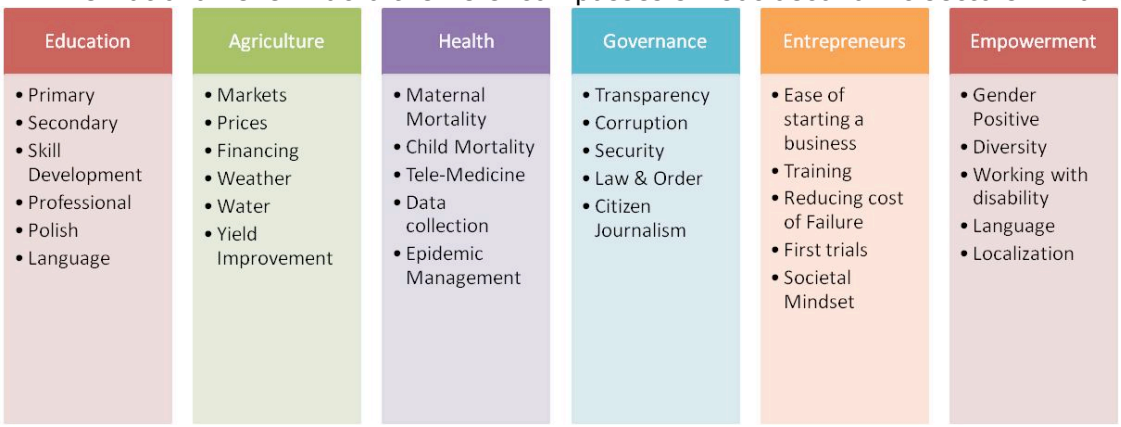
a) Create 5,000,000 new jobs across Pakistan linked to the ICT and ITES sector.
b) Increase enrollment and quality of graduating students from Computer Science schools in Pakistan. Measure this increase in quality by improving the percentage of employable computer science candidates from the current 10% to 80%.
c) Increase exposure of children in schools and high schools to applications of Computer Science at an early age.
d) Quadruple the percentage of women participation in the ICT and ITES workforce from the current 13%.
e) Double the effective adult literacy rate across all demographic segments with special attention to rural areas and socially disadvantaged segments.
f) Double the GDP per capita by improving agricultural yields using ICT and ITES, leveraging the cellular phone network for education and access to information, localization of content and broad based growth of the ICT and ITES sector.
g) Reduce child and maternal mortality by 75% using ICT, ITES and Tele-medicine services.

5. Core Policy Areas

This ICT Policy Document has two themes: a National level theme encompassing key sectors where ICT intervention is required, and an industry level theme that focuses on issues critical to the long term development of the ICT and ITES enabled industry in Pakistan.

A. National Theme

The National level macro theme encompasses six socioeconomic sectors in Pakistan:

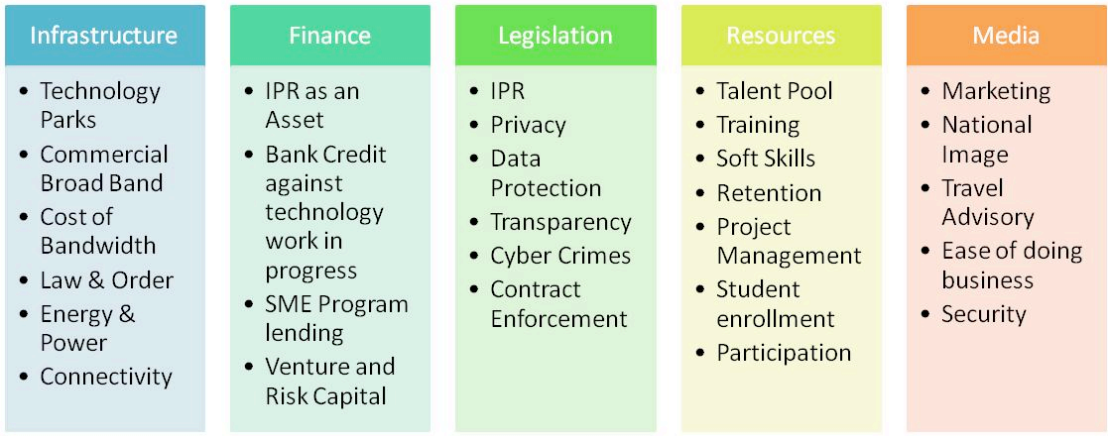


The national theme answers one simple question for each area of focus. What can technology, technology enabled services and telecommunication do to solve a big problem in an area of focus within the next five years.

B. Industry Theme

The second theme in this National IT Policy Document is an industry specific theme that side by side with national elements focuses on issues critical to the long term development of the ICT and ITES enabled industry in Pakistan.

Of the list that follows, only one deals with the hardware (Infrastructure) of development while the rest deal with software (resources, skills, environment) of development.



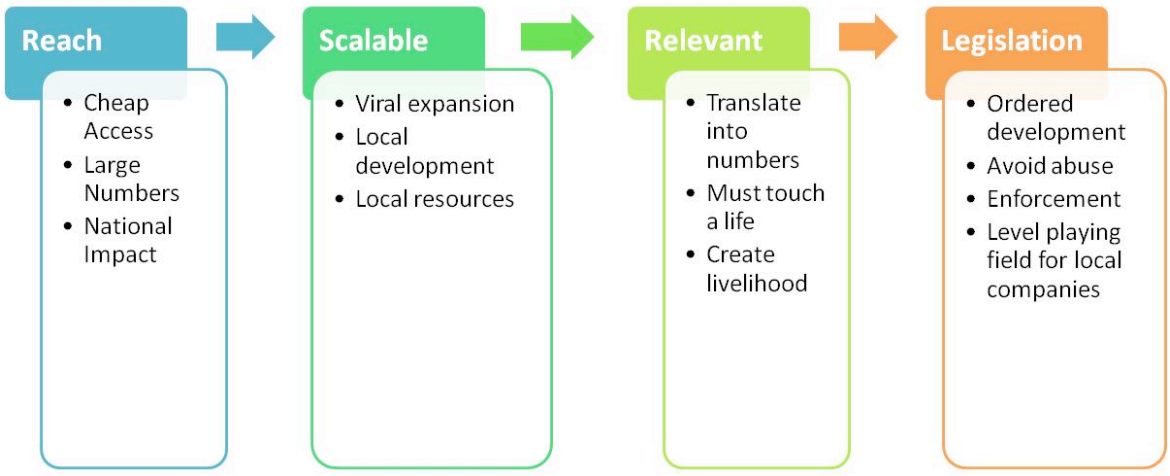
At a broad level, like all other industries in Pakistan, the IT sector needs affordable, functional space, competitively priced electricity and power, always on connectivity (without interruptions and disruptions), access to finance, a client, investor and business friendly legislative framework, a growing pool of talented professionals and a positive media image.

6. Policy Framework

The policy framework deals with the core areas identified in section 5. 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.

The following policy framework pillars encompass two macro and micro level themes of this Policy Document:

1. Reach
2. Scalability
3. Relevance
4. Legislation



Having seen multiple shifts in search, mobile applications, development paradigms, architecture, payment and business models and usability over the last 5 years, there are as many views and versions of what the future holds as there are technologists.

With this specific context in mind, this Policy Document employs an approach agnostic to any specific opinion about what the future would hold in a technological, skill, development platform and market context and instead focuses more on an approach that used technology to upgrade our national GDP, standard of living and quality of life.

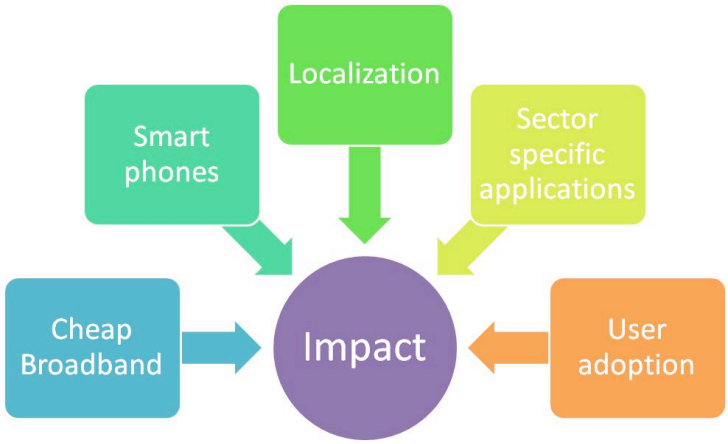
At an industry specific level, in addition to the above, the selected policy initiatives must:

a) Make it easier for new ventures to be formed, incubated and launched

b) Improve the quality and depth of our resource and talent pool in one specific area – problem solving abilities

c) Create a industry wide knowledge dissemination resource for sharing minimum standards, benchmarks and best practices for developing products, enterprise applications, contracts, pricing, packaging and marketing.

6.1 Reach



Reach is defined as the combined effect of 5 elements working together to create impact.

1. **Faster Internet Access:** Cheap broadband internet access which makes it viable to use the internet as a delivery medium for content and technology. This Policy Document recommends that internet broadband rates decline at a wholesale level and subsequently at a retail level within the next 2 years. These rates can be further reduced by benchmarking data rates quoted by PTCL and Transworld to international and regional rates for similar products and services. This document recommends establishing direct-to-home services: open access policies for cable networks and any other initiatives that can reduce the cost of distributing information to any part of civil society in Pakistan through any information medium, such as a cell phone, a set top box, a TV, a computer or a tele-services center.

2. **Make Smart Phones Affordable:** As the cost of smart phones has been dropping, it is predicted that it will continue to drop to a point where they will be the only available handset within the next few years.

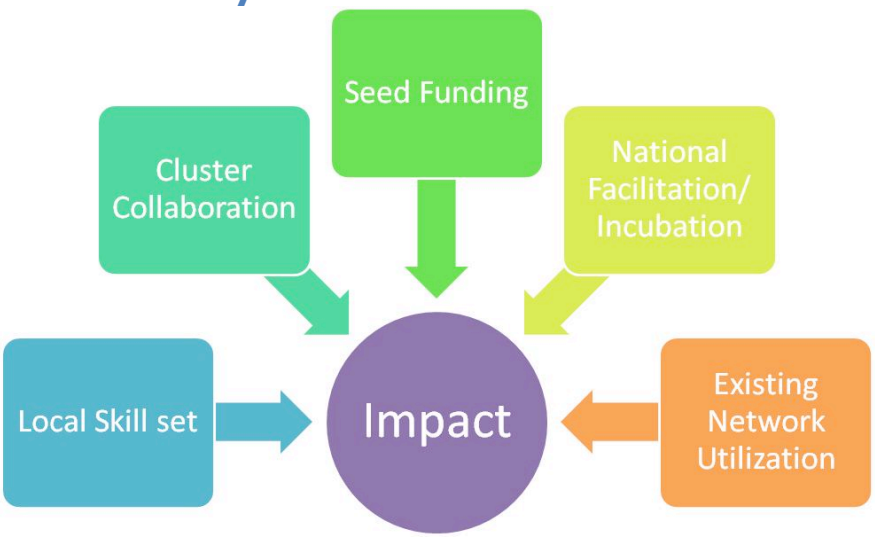
3. **Localization of Content:** with respect to languages, context and national themes.

4. **Creation of Sector Specific Applications:** for agriculture, education, security and media.

5. **Adoption of sector specific applications:** by their intended users.

While the first two elements are driven by market forces, competition and over capacity, the last three (localization, sector specific applications, user adoption) require a policy response. When all 5 are in perfect alignment it is possible for **anyone with a handset** to learn a skill, educate himself, participate in a geographic location specific market (Mandi), benefit from relevant price impacting information, look up weather and water distribution trends, access citizen services and more; basically use technology and the communication network to improve his or her overall quality of life and standard of living.

6.2 Scalability

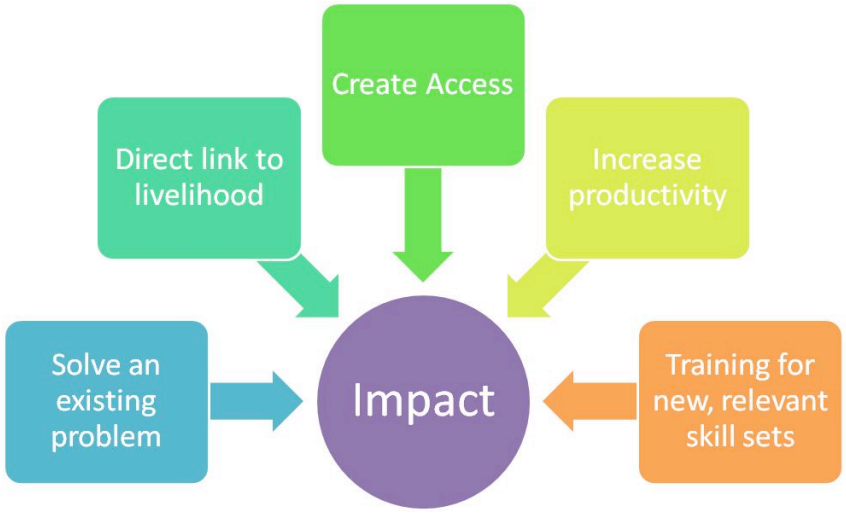


Scalability entails:

a) **Enhancing local skill set:** Using the existing skills or retraining existing pool on new required relevant skills
b) **Cluster Collaboration:** Creating clusters of collaboration in required areas to share best practices, knowledge as well as reduce distribution and publishing costs
c) **Provision of seed funding:** Provide seed funding to pilot proof of concept projects to encourage localization, content creation and user adoption. This entails the provision of small amount of risk capital that fills in the gap that experienced entrepreneurs face when it comes to initial funding
d) **National Facilitation:** Use the technology industry network and goodwill to promote exposure and provide access to decision makers at large local customers
e) **Existing Network Utilization:** Use existing established communication and financial services distribution networks to reach out to new customers

This Policy aims to integrate Reach and Scalability to drive outreach campaigns for powerful products focused on solving large problems around macro and micro themes identified above. The aim is that this facilitation can initiate a domestic ICT and ITES product and services market in Pakistan. Such a market would allow local companies to use their home ground as a test bed and launch platform for more significant regional and international contracts.

6.3 Relevance



Relevance is defined as the criteria to select the relevant product and services that benefit from the intervention process described above in reach and scalability. An idea selected and promoted by intervention must:

a) Solve a large existing problem at the national level

b) Link the solution to improving the livelihood of the person being impacted

c) Provide or create access to markets that was not possible before

d) Increase productivity

e) Create opportunities for acquiring a new relevant skill set that address (a), (b), (c) or (d) above

6.4 Legislation

The lack of IT legislation creates rejection of foreign investment in local IT companies. This IT Policy Document recommends significant improvement in the IT legal framework in Pakistan in the areas of:

a) Registration and protection of Intellectual Property Rights,
b) Data protection and transportation of sensitive and confidential information across international borders,
c) Privacy, transparency and security of customer data sets,
d) A framework for classifying, documenting, penalizing and punishing cyber crimes and
e) A framework for managing the environmental impact of obsolete IT products by legislating the need for recycling centers for PCBs, plastics, monitors and used cables.
f) Enforcement of local and cross border contracts similar to the progress made by the banking industry by establishing banking courts.
g) Access to information and the rights of an ordinary Pakistani citizen under freedom of speech, and freedom of expression as guaranteed under the Constitution of Pakistan.

ICTs can also be a powerful force for economic development and regeneration for Pakistan. This Policy Document identifies the following list of laws where legislative intervention is immediately needed for the promotion and development of the ICT sector at a national level. These laws include:

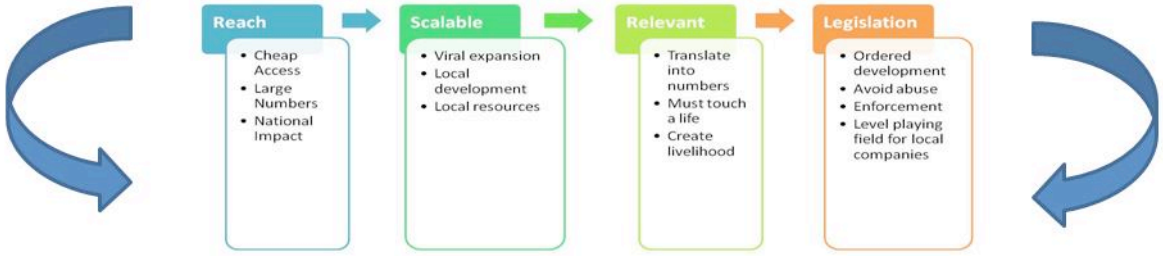
a) Individual Privacy and Data Protection
b) Cyber Crimes
c) Review of registration process for Intellectual Property Rights
d) Review of the Copyright Ordinance 1962
e) Cross Border data transmission
f) Access to financial and banking records
g) Voice over IP
h) Open Access

7 National Policy Snapshot

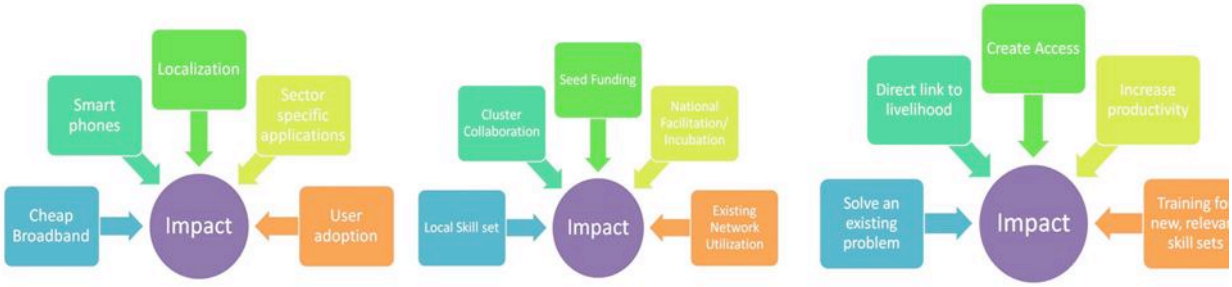
This snapshot captures the national and industry specific themes, applies the policy pillars and builds a roadmap for projects, intervention and action plans for each theme. The next section presents an initial draft for an intervention road map using the described process.

National Themes

Industry Themes



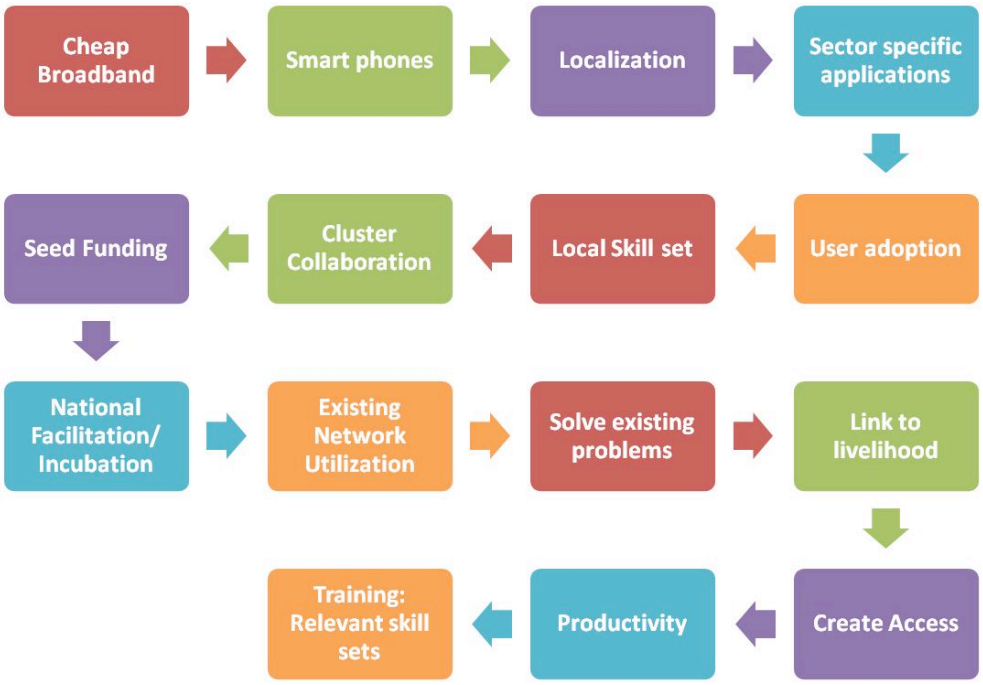
Policy Pillars



Pillar specific roadmap

8 Implementation and Intervention models: National ICT Themes

The National ICT Policy recommendations are categorized under the following heads:



Education

- Primary
- Secondary
- Skill Development
- Professional
- Polish
- Language

8.1 Education

Initiatives in the area of education focus on improving the quality and reach of primary and secondary education and basic computer science exposure at a national level using technology.

The initiative also focuses on creating curriculum and best practices materials in an easy to download and accessible form for young professionals, undergraduate and graduate students. While the content is aimed and meant for all professionals, the thrust of this effort is on reaching out to student communities outside primary urban and commercial centers who do not necessarily get exposure to main stream speakers and professional development opportunities.

This requires an additional element of localizing content by translating and dubbing it in national and regional languages.

Intervention model

a) The Government will provide seed funding to select pilot projects in the areas of primary, secondary, professional and skill development education that use a combination of audio and video based delivery using hand held devices as the primary delivery medium[2].
b) The Government, using its network and influence, and in collaboration with technology industry associations and stakeholders, will help promote the products produced by the seed funding initiative at national as well regional forums.
c) The Government will facilitate the establishment of a Center (forum or portal) for language (linguistic) support and translation that would bring providers of translation and dubbing services together with companies producing content in non-local languages as well as companies with existing inventories of applicable content that can be translated and licensed to distributors of that content.
d) The Government, in collaboration with local technology associations, will facilitate the sharing of existing and future audio and video based content to encourage promotion of local content and localization of relevant content.
e) The Government will facilitate technology associations and stakeholders to raise funding to create, support and manage a best practices and standardization program for current and prospective employees of local companies that would enable them to hit the ground running in their jobs by providing supplementary training resources for technical, personal and professional polish. The program would serve as a knowledge dissemination center that would cross pollinate ideas and support the natural evolution of industry specific standards by routinely

[2] The objective here is to take a first step via an organization that understands technology, education, content, bandwidth and convergence and then expand the initiative as more multistakeholder organizations join the initiative.

bringing together experts and industry leaders with young professionals and managers.

Industry Academia Gap

A gap exists between industry expectations and the actual quality and level of Computer Science graduates being produced by our Academic resources. The absence of basic polishing and job relevant training makes a large pool of talent being trained by the education system irrelevant for employers. There is need for bridging the industry academia gap for the development of the IT industry as well as for making job opportunities more accessible and reachable for a IT/Computer Science graduates.

While there are exceptions, most Computer Science graduates need 3 to 6 months of training before they can be relied upon to independently deliver quality work. There is a need for a program to improve the skill set of the computer science graduates in the following specific areas:

1. Logic building 1
    a. Ability to write good sorting & searching algorithms with the knowledge of how each algorithm is superior or inferior to the other. What are the tradeoffs?
    b. Why is recursion important? Where can we use it?
2. Logic building 2 (compiler writing, lexical analyzer (grammar parsing))
    a. Ability to parse regular expressions
    b. Ability to parse a programming language grammar (lexical analysis)
3. Problem Solving
    a. IQ - The ability to recognize patterns and break down large problems into smaller solvable ones
    b. Creative thinking
    c. Basic design principles and practice
4. Query writing
    a. Basic SQL queries
    b. The concept of Joins, outer joins and views
    c. Sub-queries
    d. Performance issues and tradeoffs
5. Entity Relationship Diagrams (ERD)
    a. Basics about normalization and why we use it?
    b. How to build an ERD
    c. Resolving many to many relationships
    d. Some database design recommendations
6. How to collect high quality requirements?
7. Software Architecture / Class Diagrams
    a. Common design patterns like MVC
    b. What are the recent recommendation by the Gurus
    c. What is YAGNI (You Ain't Gonna Need It)
    d. How to balance a big upfront design against a lightweight upfront design
8. Why is version control, documentation and change management so important
9. Organizing your workday and time management
10. What is Unit Testing? Why must we write unit tests
11. Soft skills

    a. Communication skills
    b. Presentation skills
    c. 360 degree leaders
    d. Conflict management
    e. How to disagree in an agreeable way
12. Thoughts around ethics, honesty and integrity
13. How much effort does it take to succeed? How does hard work and diligence always lead to success?
14. Becoming a developer for a sourceforge.net project?
15. Evaluating available platforms and solutions from the point of view of building upon foundations that already exists versus developing everything from zero
16. Propagation of existing platforms for networking (Linkedin, Twitter), learning (MIT and Stanford OCW projects), sharing (Facebook, Google+) and building (OpenSource tools and platforms, Forums, communities) that codify existing knowledge and best practices across the student and academic universe.

8.2 Agriculture

Within the agriculture sector, primary areas of intervention deal with productivity, wastage, conservation of water and power, long term storage, access to markets, liquidity and financing. ICT and ITES can play a role in improving the existing environment in some of these areas.

Intervention model

The Government will facilitate the building of a collaborative eco system that:

a) Creates opportunities for producing local content in local languages that help improve agricultural yields by distributing and applying research being performed at agricultural universities. Further, this local content should be sharable by handsets and through media
b) On a sustainable and commercial basis, collects and distribute price, volume and demand data from agricultural commodity markets across local districts and makes it available as a location based service on handsets so that small farmers are able to get better pricing for their crops.
c) Collects and distributes weather, water, temperature, pest infestation and crop diseases data on a similar basis.
d) Collects and distributes concepts and product ideas around high value produce and value addition to agricultural communities such as drip irrigation, pipe farming, high value, out of season crop cycles, reducing wastage of dairy products by converting milk into longer shelf life products such as cheese.

8.3 Health and Disaster Relief Management

ICT and ITES services play a significant role in resolving health, nutritional and epidemic crisis resulting from natural or manmade disasters.

Intervention Model

The Government will facilitate the building of a collaborative eco system that:

a) Publicly shares Information around preventive care with prevalent and dominant disease groups across all ages and genders using local languages and handsets
b) Tracks and reproduces vaccination schedules of infants to reduce rates of childhood mortality from preventable diseases on account of non-vaccination or awareness.
c) Makes it easy to collect health, disease and epidemic data and trends in both normal as well as crisis mode
d) Tracks long-term effectiveness of a health intervention strategy aimed at geographic locations and disease groups
e) Ranks availability, access and quality of care available based on statistics generated by the above models and share that information publicly to create incentives for improvement as well as intervention
f) Leverages access to qualified professionals by building networks of Para-medical staff working directly and/or remotely with experienced physicians and specialists using technology

Disaster relief management

There are also elements of social policy which are hindered by a lack of effective ICT policy. For example, the flooding in many areas of Pakistan in 2010 continues to affect and even threaten the lives of millions of people in remote and rural areas. Aid efforts are hampered not just by lack of resources and physical infrastructure, but also critically by the lack of cheap, ubiquitous and effective ways to communicate with, inform and educate those affected. There is therefore a need for:

a) An infrastructure set up for any / all form of disaster management including incidence reporting, disease management, location specific relief needs and tracking relief camp population demographics for better coordinated resource allocation
b) Emphasis on integration with mobile cell phone companies leveraging the outreach of the cell phone networks
c) A national committee that is trained in the disaster management protocol (from earthquake, tsunamis, Floods, Terrorist attack, to war)
d) Technologies ready and enabled to be available at the flick of a switch when the national government declares a disaster
e) Provincial authorities enabled and ready to help the national disaster and relief management infrastructure
f) Autonomy of the national and provincial disaster management cells
g) Coordination across all bureaucracies during the times of disaster

8.4 Governance

The governance section possibly has the most dimensions that can have the biggest impact on the success or eventual failure of a national ICT policy.
Starting with keeping a dialogue open with the industry to making it possible to upgrade the regulatory infrastructure in line with technological developments in the world; from helping local technology companies putting their best foot forward internationally to providing an environment to them locally that allows them to operate on a sustainable and competitive basis. There is a great deal that the governance dimension can do with technology and for technology; not just for the industry but also for the nation.

Intervention Model

a) Expansion of citizen services and e-government using technology solutions and platform with a focus on **service and governance** rather than **computerization and automation**.
b) Create a continuous dialogue between the industry and the legislative arm of the government to ensure that gaps in the legislative environment are identified and addressed as they arise ensuring that the competitive landscape provides a level playing field for local companies.
c) Other than exports, create incentives and initiatives for import substitution by helping the domestic ICT and ITES industry build upon its success in traditional sectors of strength including banking, insurance, health and telecommunication applications.

At a broader national level, the IT policy aims to enable future governments to better serve the people in that it must:

a) Create mechanism and tools for tracking performance and score cards of local and provincial governments at District and Tehsil levels.
b) Highlight technologies to empower the parliamentarians from the Senate to National Assembly to the Provincial Assemblies
c) Help good governance policy implementation in a transparent manner
d) Help local bureaucracies with the use of efficient open source technologies to serve the people of Pakistan.

Entrepreneurs

- Ease of starting a business
- Training
- Reducing cost of Failure
- First trials
- Societal Mindset

8.5 Entrepreneurship

Entrepreneurship is not limited to starting up one or two man new ventures from a room but also applies to a framework that can be used by smaller companies to expand and scale up into larger, more profitable, productive versions of themselves.

The entrepreneurial process and spirit performs the necessary function of creative self destruction by which existing players move from dying markets and niches to richer and strategic opportunities more suitable to their growth curve. This cannot happen unless it is easier for new ventures to form and existing ventures to grow.

In addition, the other big hurdle is the perceived cost of failure – which can be addressed by education as well as building national platforms for marketing, sales and distributions. These shared platforms reduce the cost of accessing new markets, launching new products and ultimately failure by reducing the time and cost to market for a small business by directly shortening the time to first customer trials (sales and exposure).

Intervention Model

a) The Government will facilitate the reduction of pain of starting and scaling up by enabling the creation of materials that fast track the build, launch, release, scale cycle for any idea. This can be achieved by combining training, mentoring, incubation initiatives with fast track road maps that help young companies avoid the mistakes made by their predecessors in launching ideas, recruiting, marketing, contracting, pricing, pitching and expanding internationally.
b) In addition to live training, the Government will make as many remote and online resources as possible available for students, practitioners and managers. This will incorporate entrepreneurial, product development and sales training as a mandatory subject in all undergraduate and graduate curriculum.
c) The Government, in collaboration with technology associations and stakeholders, will facilitate the creation of an accessible mentoring network with generalist and specialist members that can be reached directly or remotely by all member companies.
d) The Government, in collaboration with technology associations and stakeholders, will create mechanisms for local companies to compete and benchmark themselves against international and regional players and competitors.
e) The Government, in collaboration with technology associations and stakeholders, will build a platform of events that new ideas, products and services can use to launch, expose and market themselves effectively to their target segments, investors and potential acquirers in Pakistan as well as in the region.
f) The Government, in collaboration with technology associations and stakeholders, will build a platform of international distribution and exposure that allows new

companies and idea to quickly tap and test their product potential in international markets.

g) The Government, in collaboration with technology associations and stakeholders, will provide support through legislation, the banking and judicial systems for a clearly defined road map to failure for failing businesses that reduces the cost of catastrophic failure.

Empowerment

- Gender Positive
- Diversity
- Working with disability
- Language
- Localization

8.6 Empowerment

This Policy Document advocates the ability to earn a living in alignment with one's competence.

The national ICT policy addresses access and inclusion and links empowerment to livelihood that allows one to rise out of social disadvantage. One's ability to earn a living, the quality and meaning of work and the economic opportunity must not be linked to gender, disability, deformity, ethnicity or religious belief.

Intervention model

a) Starting from the top, the biggest reason disadvantaged groups are kept out of the work force is on account of the flexibility required to accommodate them. This Policy Document will empower and facilitate working mothers who need flexible timing, disabled professionals who require special assistance and minority groups who require a chance to prove their abilities. Organizations will be enabled to create flexibility on account of either enlightenment, prior personal or professional experience or will be provided incentives to do the same.

b) The ICT policy explores the viability of a tax credit made available to a company incorporated in Pakistan that employs full time and part time professionals from a socially disadvantaged group. The incentives work at two levels. They make visible a group of resources that has always been available but ignored and at the same time create new employment opportunities for the said group.

c) The other main reason why a disadvantaged group stays disadvantaged is the denial of education, awareness and knowledge. On the inclusion front, access and language are two big issues that promote denial of education to the disadvantaged. The Government will enable the creation and sharing of necessary content and applications available on a smart phone, and enable the disadvantaged group to gain access to and education on the usage of this content and technology.

d) Preferential access to the national distribution, collaboration and support networks that we have touched upon in the policy pillar of scalability complete the intervention circle.

Gender Perspective

This Policy Document observes gender in a wider and broader perspective as we have witnessed the inherited prevalence of patriarchal structures has commonly led to a gender digital divide that disadvantages many girls and women in comparison with boys and men within the same societies. If ICTs are to exert a balancing function between genders, therefore, it is clear that particular public policies will be required to achieve this.

1. Equal opportunities for women and girls to study and work in the ICT sector and to develop their own ICT businesses.
2. Need to examine that how jobs have been created as a result of the growth in ICTs, or within ICT industry and how the opportunities can be engendered.
3. Need to examine the gender stereotyping in respect of ICT education, training and work, resulting in limited work benefits and career opportunities for women. Measures and recommendations around these issues needs to be addressed as these issues have relevance across the educational and employment fields, and the ICT sector therefore needs to be considered in that wider perspective.
4. Attention also needs to be paid to the gender impact of access strategies if we are to ensure that access becomes available in ways that are inclusive of women and girls. For example e services like e health, e education and e government should be in the reach of women and girls of the rural and undeserved areas where the gender digital divide puts women at a disadvantage.
5. Access points (Women Tele-centres): Affordable and easily accessible access points should be there for example this need to be located in areas where women can go without physical risk, where they are socially welcome and comfortable. Even though access to Internet via smart phones will diminish the need of such centres but still useful for the women who are with limited skill set or literacy level.
6. ICT training should be provided at access points, as at other centres of education, should offer diverse opportunities for appropriation and acculturation, so that women can make use of ICTs in ways that are most meaningful and useful for them.
7. Gender-sensitive statistics are important when planning technology policy and deployment. Statistics can help dispel some of the myths and assumptions that have accumulated around technology deployment.
8. Physical access to infrastructure: If the technology isn't there, you can't use it. Infrastructure is a gender issue as well. We need to address this huge gender gap which exists in access to communications in rural areas.

Elsewhere, disadvantaged and persecuted social groups such as victims of domestic abuse, or those who suffer ethnic or sexual discrimination, forfeit their right to participate in Pakistan's society because their voices cannot be heard. Again, ICT can provide the means to give these people a voice and a role in society.

8.7 Multilingualism and Localization of content

If effectively leveraged, ICTs have promise to reform all sectors of development, including agriculture, health, education, rural development, governance, women empowerment and youth affairs. It is essential for achieving the millennium development goals, and to promote innovation in our society.

However, to promote the essential social and commercial use of ICTs within Pakistan, it must address existing barriers to access to this technology. Currently less than 10% of Pakistanis can communicate in English. To allow the other 90% of the Pakistanis to access the ICTs, the technology must be enabled in local languages these communities speak. In addition to language barrier, more that 45% Pakistanis are currently illiterate. Thus, development of speech enabled dialogue bases systems must also be actively pursued to allow these people to benefit from the ICTs. Computers and internet have very limited penetration in Pakistan, with access limited only to 10% of the population. Compared to this, 60% people in Pakistanis have access to mobile phones. Thus to fully leverage the potential, mobile based local language computing solutions must be developed and deployed. This must be done across all sectors.
There are multifaceted challenges to achieving this, which include the following objectives:

(i) Develop human resource capacity to undertake R&D in language computing
   a. Commercial solutions
   b. High end academic R&D

(ii) Develop language computing technology
   a. Basic localization for other languages (fonts, KB, locales, interface, collation; for computing and mobile platforms)
   b. Advanced localization, through coordinated frameworks (MT within Pakistani languages; MT between Pakistani languages and English; Text to speech and speech recognition; dialogue based systems with integration with mobile platform, etc.)

(iii) Enable language computing use
   a. Develop training material in local languages
   b. Develop sustainable mechanism to train various user groups

(iv) Enable local language content development
   a. Require top down content development
   b. Facilitate bottom up participatory content development

This may be achieved through developing policy to achieve the following detailed objectives:

(i) Develop Speech and language computing R&D programs in collaboration with HEC at least two universities in each province

(ii) Hold training programs for faculty development in this area, with collaboration with foreign organizations to address short term needs

(iii) Create specific national and international scholarships for MS and PhD work in speech and language processing. National scholarships through the R&D centers for local language computing

(iv) Enable basic localization for all languages with more than one million speakers on open source and proprietary platforms

(v) Enable advanced applications in all languages with more than 10 million speakers, including ASR, TTS, Lexicon, OCR and MT

(vi) Promote government as a supplier of open and free content for language computing research in Pakistani languages, including text and speech corpora. Encourage industry, especially media and publishing industry to support the development of open linguistic resources for R&D in speech, script and language processing

(vii) Develop a MT system which translates among Pakistani languages to facilitate free flow of information within Pakistan for better provincial harmony

(viii) Enable basic localization for at least 25% of less-spoken languages, with open licenses for commercial and non-commercial use

(ix) Have at least one R&D center supported by a graduate program in each province for speech and language processing, with capacity to do mobile localization and local language application development

(x) Develop a vibrant open source localization community to support current and further localization needs

(xi) Require local language computing training in government training courses

(xii) Require language computing literacy in at least one local language for government service recruitment exams at national and provincial levels

(xiii) Develop training courses in local language computing for vocational training institutes

(xiv) Work with other ministries to develop ICT training courses in local languages for other cadres in the field e.g. health (community mid-wives, lady health workers, nurses, doctors), educations (teachers, officers), agriculture and livestock (extension workers and officers)

(xv) Develop certification programs in local language computing for general public, including women and youth

(xvi) Require government ministries and departments to maintain website in Urdu and one regional language, at provincial and national levels. Require hiring of web developers at these departments for this purpose. Give central space for hosting web pages inside Pakistan for this purpose

(xvii) Give incentives to businesses to develop local language content online; work with chambers of commerce for this purpose, e.g. allow tax break to support one webmaster per business for this purpose, if the business actively maintains a local language website

(xviii) Hold website development competitions to encourage public participation on themes in all domains, promoting local culture and information on various topics related to health, agriculture, livestock, women, youth and rural development.

(xix) Work with SMEDA to develop small business feasibility around local language computing training and content development

(xx) Work with other ministries to integrate local language based services using computers and mobile for citizens in health, agriculture, livestock, women, youth, rural development, etc.

(xxi) Develop a Center for Excellence for Development and Promotion of Computing and Content in Pakistani Languages

(xxii) Work with language authorities and academies to finalize computing standards

(xxiii) Work with Computer Society of Pakistan and other vendors to make relevant hardware available for use, including keyboards in local languages, keypads in local languages on mobile phones, key pads on ATM machines, etc.

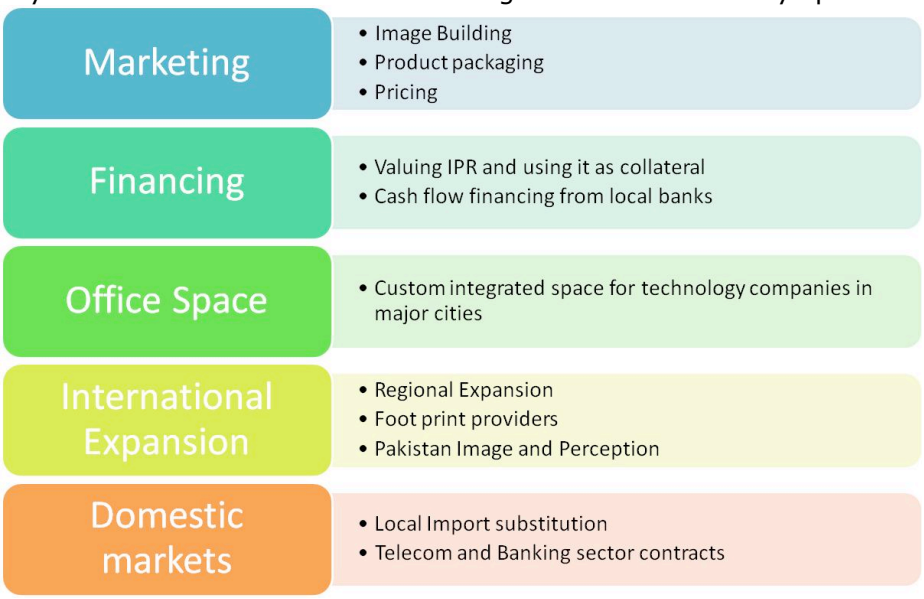
(xxiv) Develop IDN program and registry and subsidize domain registration in local languages for at least five years for at least first 30,000 domains to encourage local content

(xxv) Subsidize domain registration for less spoken languages and for rural areas

(xxvi) Define indicators to set baseline and measure use and impact of local language computing; initiate studies to measure them

9. Implementation and Intervention models: Industry ICT Themes

This Policy Document addresses the following micro-level industry specific themes:



9.1 Marketing

- India' success in targeting North America and Europe; Malaysia ability to capture the electronics manufacturing niche; Jordan and Egypt success within Middle East and Europe for their technologies companies.

Marketing - recommendations

a) Allocate and consistently fund a program for highlighting and promoting local successes in the region by making it possible for local companies to compete, present and win in regional ICT and ITES competitions, events, and conferences.

b) Support a national marketing and branding campaign with funding that produces well thought out quality content for onward distribution in local and international media.

c) Build national and sector specific online portals that make it easier for regional and international customers to locate, identify and reach vendors and partners in Pakistan.

9.2 Financing

– The successful use of cash flow financing, recognition of technology projects as work in progress and using portions of export proceeds to enhance eligible and available financing by India; Pro active use of venture capital funding and incubation programs by Malaysia and Jordan to provide risk capital to early stage and late stage ventures.

Financing - recommendations

After engaging the financial services sector for the last 5 years to provide consistent funding for the technology industry and reviewing India's progress in the same arena, it is quite apparent that no progress in this direction can be made without active support and guidance by the State Bank of Pakistan.

a) Work with State Bank of Pakistan to issue guidelines and framework for the local banks to provide cash flow financing of up to 10 million rupees in the form of two

year term loans to local technology companies with documented export proceeds of 5 million rupees and above.

b) Work with State Bank of Pakistan to issue guidelines and framework for the local banks to provide work in progress financing of up to 50% of the value of a local technology project or contract for a locally incorporated technology company with 2 years or more of operating history.

c) Work with State Bank of Pakistan to create a seed and incubation fund that provides risk capital to early stage companies in the form of grants, business plan competitions, equity funding and or soft loans.

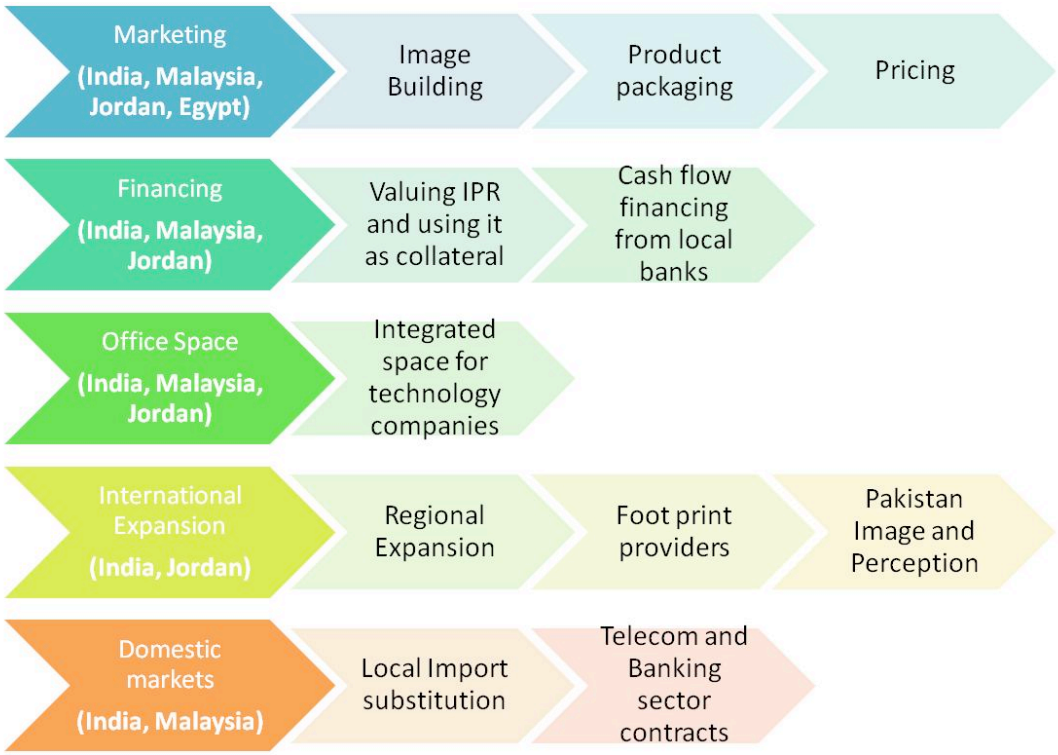
d) Work with SECP and FBR to amend the tax treatment of the acquisition of a local company by a local or international buyer.

e) Fast track initiative that either provides fully built up facilities for local companies, provides land at deeply discounted rates to local technology companies to build software technology parks and provide funding to do one or both.

9.3 Office Space – Software Technology Parks, Special Economic and Incubation and the Multimedia Super Corridor initiatives by India, Malaysia and Jordan.

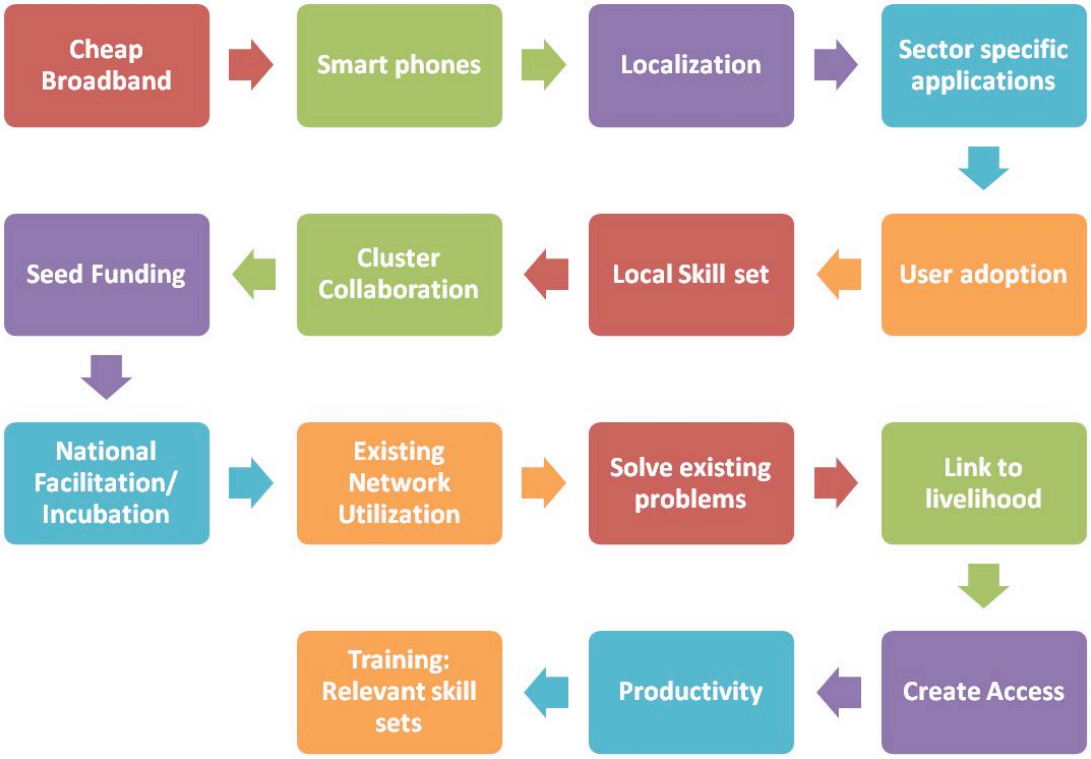
9.4 International Expansion – The active use of foot print providers by Malaysia and Singapore

9.5 Domestic Demand – The work done by India and Malaysia to strengthen domestic demand including the creative use of tax incentives by Malaysia to support the local technology industry.



These successes became the basis for the Policy Document recommendations. These recommendations are in addition to the intervention models discussed as part of policy pillars and national themes.

10. Conclusions



The initial recommendation draft has one primary objective: To introduce a framework for ICT Policy with a set of recommendations that can be used as a starting point for discussion within the industry, with stakeholders, partners and customers. This discussion can then be used to add new recommendations, revamp existing suggestions and tweak the frame work.

Our initial discussions have already identified a number of significant policy elements (please see the image above). More importantly a number of these policy elements are within the reach of private sector with some external funding.

Our hope is that over the next few months using this document as a starting point we will be able to craft and finalize a richer set of policy recommendations that will help propel Pakistan and the ICT and ITES community together into a new era of prosperity, growth, job creation and recognition.