

ICTs and Socio-Economic Development: Linking Pakistan's Future

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Acronyms

ATMs:	Automatic Teller Machines
CDA:	Capital Development Authority
CEOs:	Chief Executive Officers
FIR:	First Information Report
GPT:	General Purpose Technology
GDP:	Gross Domestic Product
ICT:	Information and Communication Technology
ICT R&D:	ICT Research & Development
IPO:	Intellectual Property Organization
ISPs:	Internet Service Providers
IT:	Information Technology
ITU:	International Telecommunication Union
KPK:	Khyber Pakhtunkhwa
MGDs:	Millennium Development Goals
MoIT:	Ministry of Information and Technology
NADRA:	National Database and Registration Authority
OECD:	Organisation for Economic Co-operation and Development
PERN:	Pakistan Education and Research Network
SMS:	Short Message Service
PBC:	Pakistan Broadcasting Corporation
PTCL:	Pakistan Telecom Company
PTV:	Pakistan Television
UNESCO:	United Nations Educational, Scientific and Cultural Organization
USF:	Universal Service Fund
VU:	Virtual University
WSIS:	World Summit on the Information Society

Abstract

Policy makers across the globe are realizing the significance of Information and Communication Technologies (ICTs), and considering it a 'public good' alongside other municipal services. The impact of ICTs has multiplied several times with the advent of Broadband Internet, which makes ICTs available everywhere. This study r attempts to analyze the importance of ICTs/broadband as a 'public good' and their role in socio-economic development with the help of examples and studies that have been carried out all over the world with special emphasis on economy, governance, health care, and education. It then goes on to describe where we, in Pakistan, stand with respect to ICTs in the above-mentioned sectors. It traces the status of ICTs development in the country in recent years and attempts to identify the challenges being faced by the ICT sector of Pakistan. In the end, the study makes recommendations about how ICTs, with the help of broadband, can be promoted so that these could contribute more meaningfully and productively to the country's socio-economic development.

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INTRODUCTION

To understand the link between socio-economic development and ICTs, one will have to start from September 2000, when representatives from across the world sat together and agreed to put their energies and efforts in pursuit of some defined goals so that economic well-being of all could be achieved. The resulting eight Millennium Development Goals (MDGs) touch every aspect of human life. This was the time when the extent of ICTs, thanks to high speed (broadband) internet, was leading to what we now call the ‘information society’. Therefore, the UN General Assembly endorsed holding the World Summit on the Information Society (WSIS) to discuss opportunities and challenges related to the United Nations Millennium Declaration so as to facilitate the achievement of the MDGs. Two World Summits on Information Society were held in 2003 and in 2005 respectively, where leaders resolved to set ICT related targets to help meet the MGDs. Later in 2010, International Telecommunication Union (ITU) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) took another step forward and in response to UN Secretary-General Ban Ki-moon’s call to step up UN efforts to meet MDGs, decided to set up a ‘Broadband Commission for Digital Development, to promote the deployment of high-speed broadband internet as an essential part of modern infrastructure. The Commission believes that progress towards the achievement of the MDGs can be significantly accelerated by using broadband networks to improve the delivery of services across a huge range of social and business sectors, irrespective of the distance.

Broadband enables improved performance of ICTs. It is a General Purpose Technology (GPT) that fundamentally alters how and where economic activity is organized. Electricity and steam technologies are considered older examples of GPTs. In these older technologies, the largest growth effects occurred a long time after the technologies were first introduced. However, Broadband is already transforming the way in which businesses, consumers, and governments interact and ultimately impact growth. After trying to introduce broadband in rural/semi-urban areas, and to people not familiar with modern technologies, it has been found that the mere introduction of broadband is not enough, unless something is done to improve the eco-system. According to Katz and Suter (2009, p. 28), ‘...it is critical to deploy initiatives aimed at the creation of jobs enabled by broadband technology.’

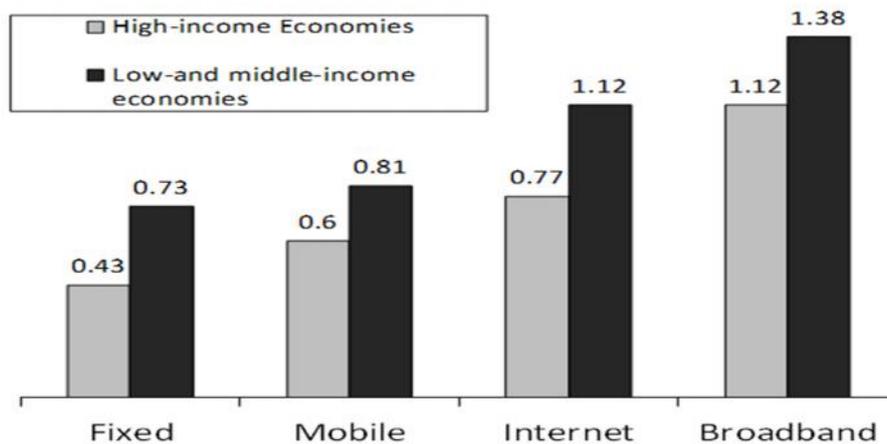
Information and Communication Technology helps us perform various activities more efficiently, using computers. Whereas broadband internet (or simply ‘broadband’) makes it possible for the ICTs to be used practically everywhere – whether the computers are physically available there or not. All one needs is a so-called transmission media. In order to make use of ICTs and broadband, there are certain prerequisites related to humans that need to be fulfilled, like availability, awareness, training, content in local languages, etc., and what is commonly referred to as the ‘broadband eco-system’. This study explores the impact of ICT/broadband internet on economy, health, education, and governance in general and the status of ICTs in Pakistan in particular.

1. ICT Impact

1.1. The Economy

According to the World Bank (2009), for every 10 percentage points increase in broadband penetration in low and middle-income economies, there is an increase in economic growth of 1.38 percentage points (Figure 1).

Figure 1: Impact of ICTs on Economic Growth



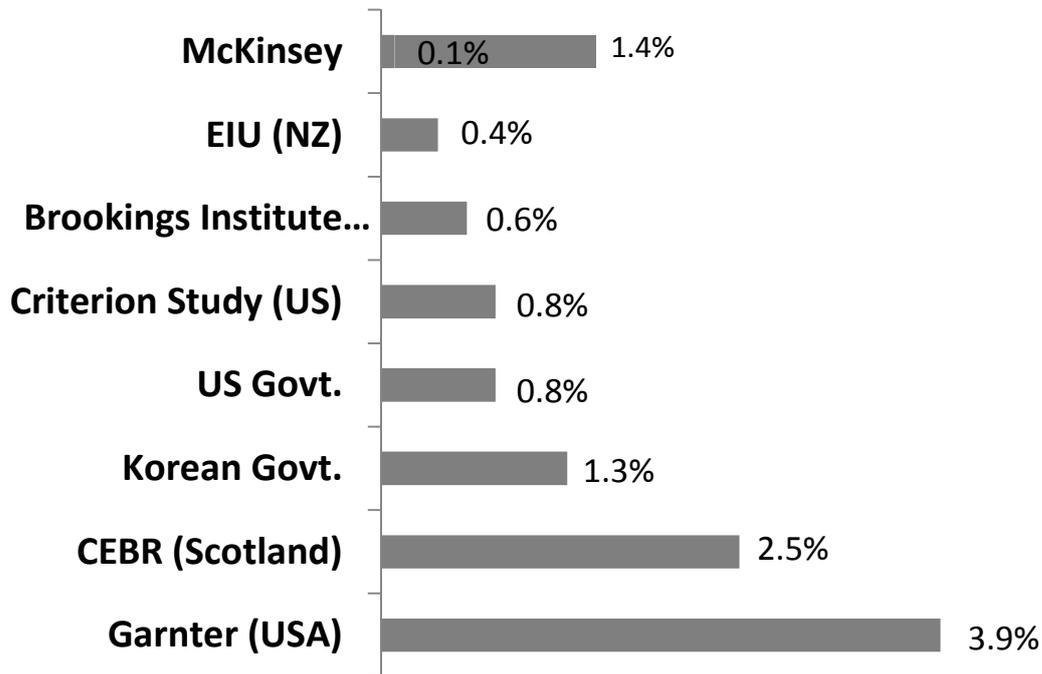
Source: World Bank 2009.

Figure 1 shows that in case of high income economies, in general, the impact does not appear to be as dramatic as in the low income economies. There are numerous other studies that confirm these results. Czernich et al. (2009, p. 29) demonstrates that ‘an increase in the broadband penetration rate by 10 percentage points raises annual growth in per-capita GDP by 0.9 to 1.5 percentage points’ even though the broadband of 2009 was not faster than 256 kilobits per second, as against today’s several megabits per second. A study based on data collected during 2002-07 claimed that for every 10% increase in broadband penetration, there is an increase in GDP of 0.25% (Koutroumpis 2009).

Friedrich et al. (2009), in a study of 20 OECD countries, points out that there is a difference of 2.2% in GDP growth of countries with high broadband penetration versus low broadband penetration.

Other studies, with varying magnitudes establish that average economic impact of broadband is 1.46% of the GDP (Figure 2).

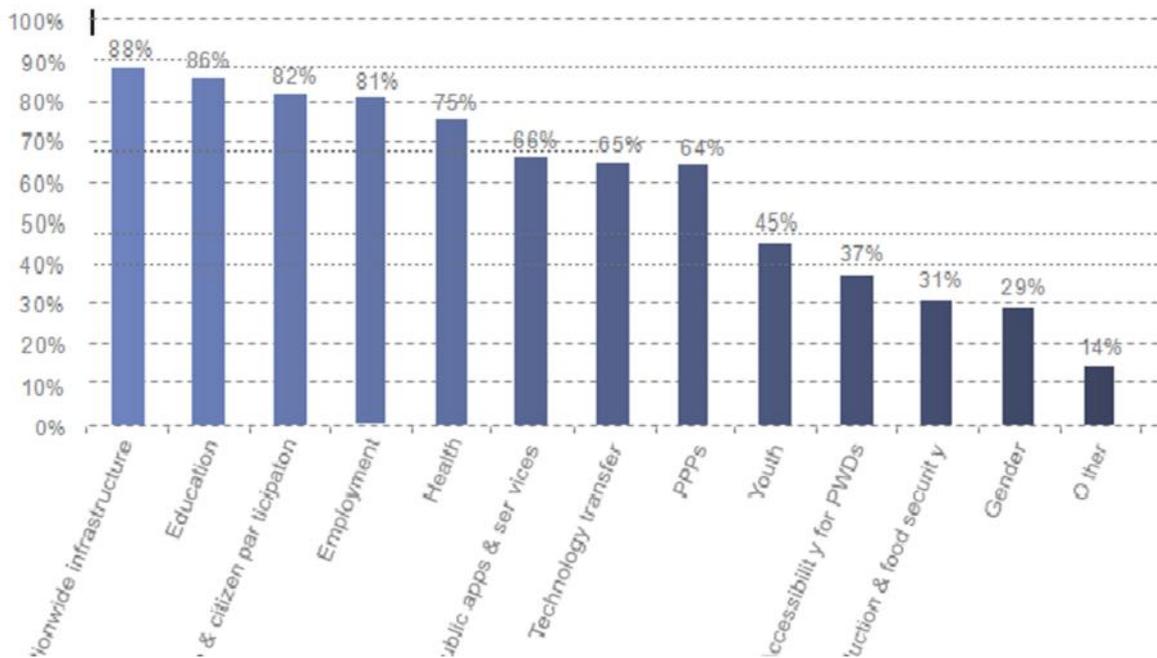
Figure 2: Studies Estimating Average Economic Impact



Source:

There is one element of research regarding the impact of ICT on the economy that cannot be forgotten – the so-called ‘critical mass’ effect, which means that the impact starts becoming significant only once the adoption of ICT reaches a certain level of penetration. On the other hand, Gillett et al. (2006, p. 10) contend that ‘broadband will be adopted (...) first by those who get the greatest benefit (while) late adopters (...) will realize a lesser benefit.’ Therefore, it can be argued that the impact of broadband on the economy starts showing right from the beginning although it may not be as significant after it has reached a certain critical mass. Many countries are convinced that in order to increase the penetration of broadband, it helps to have some form of a National Broadband Plan. Most countries start their national broadband plans with a large pallet of targets, but their top priorities are always related to education (86%), governance (82%), employment (81%) and health (75%) (Figure 3).

Figure 3: Focus of National Broadband Plans



Source: ITU/UNESCO Broadband Commission for Digital Development as cited in ITU and UNESCO 2013, p.25.

1.2. Education

There are two ways in which ICTs can impact education: (a) outside the classroom, and (b) inside the classroom. Outside the classroom, ICTs provide learning anywhere/anytime – for which the students need their own devices (tablets/laptops) plus ubiquitous broadband connectivity. But, this may not be possible for most students of developing countries like Pakistan, at least not in the near future. Inside the classroom, ICTs are not supposed to take the place of vital teacher-student relationship, or replace ‘in-person’ instructions. However, ICTs are increasingly being used as tools to augment curricula and teaching methods, offering a variety of learning opportunities beyond the physical space of school as follows:

1. Augmenting class instruction with animated videos and other audio-video material to improve the understanding of students so that they may learn, instead of memorizing. As students get the chance to improve their learning, rather than memorizing, their academic records improve.
2. ‘Providing distance learning for students to enroll in elective or specialty coursework that is not offered on-site. Enabling students to attend top quality lectures and seminars remotely.
3. Connecting multiple college campuses simultaneously to maximize research, experimental testing and laboratory work’ (MOBroadbandnow n.d.).
4. Giving opportunities to teachers to enhance their own knowledge and understanding.
5. Allowing parents to stay informed, and participate in student progress.

There are a number of programmes in many countries providing broadband connectivity to schools. For instance, Enlaces is a Chilean educational programme that has provided broadband to more than 92% of public schools (Wikipedia 2013b). A particularly relevant example is that of the BridgeIT programme in Tanzania, similar to text-based programme called 'Text2Teach' in the Philippines (Medina 2012). In the latter programme, educational videos are downloaded, through a 3G network, and then projected on the wall for the class to see. The project complements local teaching with high quality educational content with integrated teacher training. Teacher training sessions focus on the teaching practices, lessons, and classroom activities that teachers need so they can use the downloaded videos (Pearson Foundation n.d.).

Generally what is learned from such programmes is that firstly, the content itself is extremely important; secondly, the content should be in synch with the curricula; thirdly it must be available in local/regional languages; fourthly, proper training of teachers must be carried out; and fifthly, providing connectivity to internet, with its innumerable sources of knowledge, is the most important component.

In almost all countries where broadband is being deployed in rural areas through USF subsidies, schools are one of the first 'Anchor Customers'¹. At all such places, the lesson appears to be that unless the whole eco-system is addressed, mere provision of PCs (personal computers) to schools is not enough. Thanks to ICTs, no matter what their backgrounds or financial resources, students can make use of the same opportunities as their more privileged peers. In this respect, ICT/broadband is also a great 'social equaliser'.

1.3. Health care

There are numerous examples of ICTs over broadband being used for remote consultations between patients and physicians, carrying out of remote diagnosis (sometimes even treatment), data

¹ When a Broadband Service Provider is given incentive/subsidy to provide service in a new area, he granted it to certain customers for a certain period of time so that he finds it easy to recover his operational costs. Such customers are called 'anchor customers'.

collection for research and diagnostic purposes, real-time collaboration between physicians and health researchers in different regions of the world, improving the speed and effectiveness with which nations and health care organisations respond to epidemics, and generally streamlining and improving health care services (MOBroadbandnow n.d.).

ICTs over broadband are being used to transform health care mainly through actions such as:

Providing hospitals, emergency rooms and health clinics the ability to transmit and interpret large health records including outputs of MRIs, CT Scans, ultrasound machines, ECGs and X-rays, etc.

Enabling health information to be preserved and retrieved securely, lowering the incidence of administering improper treatment and medication, as well as quick diagnosis irrespective of where the patient falls ill.

Allowing patients the ability to communicate with medical professionals sitting remotely/at-home, reducing inconvenience and delays of travel and waiting.

Providing real-time data to the health care staff from health monitoring devices worn by the patient, especially those with chronic or critical conditions (Ibid.)

1.4. Governance

There are several developing countries that have understood the significance of connectivity for development, and have introduced e-Government. The fundamental concept of e-Government is that the needs of citizens and businesses are kept at the centre. Given below are some of the benefits/uses of an e-Government:

1. To deliver public services on citizens' doorsteps: With growing population and rising awareness about citizens' rights (thanks to independent media), it is becoming increasingly difficult (perhaps impossible) for the governments of developing countries to serve all the citizens, particularly those living far away from the major cities. ICT provides the necessary vehicle, as well as platform, through which governments can serve their citizens, wherever they are. Some examples of such government services are land records, police reporting, court cases, e-filing of tax returns, applying for passports, driving licenses, identity cards, birth certificates, visas, etc. All these services can be provided via ICTs conveniently without the citizen having to go to one of the big cities and stand in queues.
2. To bring transparency in governmental affairs: ICT networks make it possible for governments to improve transparency/accountability, and access to information, for example, information about government procurements can be provided through ICTs. This not only promotes good governance, but also improves the utilization of nation's precious resources. The amount of information that can be placed on government websites, and thus made visible to the citizens, is unlimited.
3. To formulate/change policies by making use of the data produced by citizens, and collected by the government: Most C2G (Citizen-to-Government) interactions over broadband internet generate a huge amount of data/information. Efficiently managing this information

and using it as government's feedback, helps governments to respond to the aspirations of citizens. In some countries (e.g. Indonesia²) governments have been using data generated by the citizens' twitter feeds to bring improvements in policies. Nowadays, stakeholder consultations during formulation of policies are almost always done over the net.

The United Nation's 'Global Pulse Research is exploring innovative methods and frameworks for combining types of digital data with traditional indicators to track global development real time' (United Nations Global Pulse Research 2014). This is to find ways to allow citizens to communicate with the government to give feedback and provide accountability on issues of concern to the citizens: The feedback provided by the citizens in response can then be utilized to bring improvements in governance related matters.

Wherever these concepts have been applied and tested, a shift in emphasis to the next level is noticed -- from efficiency gains and delivery of policy outcomes to improving services.

2. Status of ICTs in Pakistan

Having discussed briefly some of the impacts of ICTs and broadband in general, the status of ICTs in Pakistan, with respect to the areas outlined earlier are discussed below:

2.1. Economy

A fairly comprehensive Broadband Policy was formulated by the Government of Pakistan in 2004, which should have been updated in 2009. The same was not done, which has acted as an obstacle in accruing the benefits of broadband in these fields. Although it is a common occurrence that technological progress is so fast that policy makers find it difficult to keep pace (an ITU and UNESCO 2013 study found that the average lifespan for superseded plans is 8.4 years). However, despite a gap of more than ten years between policies in Pakistan, there has been a steady evolution of broadband-based ICT applications, mainly in the private sector. Some notable examples are:

- Ubiquitous Automatic Teller Machines (ATMs), used to withdraw cash out of the bank accounts at any time of day or night, which are now taken for granted, are only possible with

² United Nations Global Pulse Research

<http://www.unglobalpulse.org/social-media-social-protection-indonesia>

the help of ICTs and broadband. ATMs encourage people to keep their cash in the banks, which helps the economy grow enormously.

- Internet banking is getting increasingly popular in Pakistan since it makes it easier to carry out business transactions irrespective of one's location. Payments through internet banking are not only fast and efficient, these payments also become part of the documented economy.
- Online payments of utility and other kinds of bills/dues have proven to be an extremely useful application of ICTs, as they have eliminated the need of consumers going to banks and waiting in long queues (a familiar sight a few years back). Although there has not been any study in this regard, this ICT application alone is likely saving countless productive hours of citizens.
- Online stock trading offered by stock-exchanges in Pakistan³ (as in much of the world) is another ICT-enabled service that has made it simpler and convenient to make investments by buying and selling shares of listed firms. This promotes legitimate corporate business, the segment which is one of the main tax payers in the country.
- International online trading remotely connects small and medium businesses across the globe through ICTs, helping growth of international trade (example: Tradekey⁴). Owing to its ease of handling, it enables more and more people to participate and help international trade grow.
- Similarly, online shopping makes it possible to buy/sell goods and services all over the country, irrespective of location. Even for those shoppers, who do not actually buy online, ICT helps them in 'comparison shopping, generating 'consumer surplus'⁵ and thus helping the economy, although it does not show in the GDP. Websites like <Pakwheels.com>; <zameen.com>; <tcsconnect.com>; <OLX.com>; are being used by a large number of people, particularly the youth.
- Online employment exchanges (like <Brightspyre.com>; <rozee.com.pk>) are making it possible for firms to reach the right job-seekers for relevant jobs and vice versa. This is a huge leap from the times when job applications used to be sent by post and the follow-up by job seekers had to be in person - from one office to the other.
- Many other tasks that can be done online with the help of ICTs (like reservation of airline and railway tickets) are helping save productive hours that used to be wasted in visiting travel agents and other offices.

³ Such as Karachi Stock Exchange: <<http://www.kse.org.pk/index.shtml>>; KASB Direct: <<http://www.kasbdirect.com/>>; AKD Trade: <<http://www.akdtrade.com/>>.

⁴ TradeKey.com is the world's leading and fastest growing online business-to-business (B2B) marketplace.

⁵ The monetary gain obtained by consumers because they are able to purchase a product for a price that is less than the highest price that they would be willing to pay.

2.2. Education

So far, the impact of ICTs on provision of education to the citizens of Pakistan has been limited, but there are a few positive examples as given below:

- Probably the best example of an ICT impact-creating initiative in Pakistan is the Virtual University (VU). The Virtual University is providing affordable world class education through remotely located 'virtual campuses' in over 60 cities of Pakistan, irrespective of students' physical location (even overseas Pakistanis benefit from it). VU addresses the problem of shortage of quality professors, which is particularly relevant for smaller cities. More than 100,000 students are enrolled at a time in Virtual University.
- Universities and research institutes are linked with high speed data networks, mainly with optic fibre cables. For example, the Pakistan Education and Research Network (PERN)-an ICT network, managed by the Higher Education Commission (HEC)- is connected to the internet, linking global network universities and other seats of higher learning. It provides, among others, facilities of video conferencing. A bi-product of PERN is the National Digital Library programme, which provides researchers access to international scholarly literature electronically. The students can access 50,000 e-Books via PERN.
- Allama Iqbal Open University, one of the biggest open universities in the world (Wikipedia 2013a), in addition to its postal-based courses, is in the process of introducing ICT-based online courses called Olive, to increase access and impact.⁶
- More than 1000 schools in small towns were provided free broadband connectivity (each with 5 PCs, one-year usage fees, Uninterruptible Power Supplies, and basic training of 2 teachers) using Universal Service Fund in the years 2008-2011.
- Many more schools have been provided PCs and laptops by the provincial governments and by domestic and global private sector initiatives (e.g. Intel's World Ahead programme). Computer labs now exist in most of the schools across the country. However, in majority of the schools emphasis is on education about ICTs, but not on providing education through ICTs. The exceptions are few students (mostly in upscale private schools), who take the help of information available on the net, while doing their school assignments.

However, no effort appears to have been made towards a comprehensive eco-system approach, involving creation and provision of relevant content and applications and a school portal/network.

2.3. Health care

Pakistan is not only a low doctor-to-patient ratio country especially in rural context but its number of hospital beds with respect to population is also amongst the lowest. On top of that, the poor state

⁶ Allama Iqbal Open University website can be viewed on <<http://olive.aiou.edu.pk/>>.

of physical communication infrastructure — road network, public transport etc. — make it difficult for people to move from rural areas to hospitals and clinics in the cities. Therefore, when a rural patient braves the difficulties of travelling to the nearest city for consultation with a specialist, he/she returns even sicker. In order to bridge the distances, there is a real need to utilize ICTs for health care in Pakistan. Some of the examples where this is being attempted are given hereunder:

With a pilot project, USF Pakistan made an effort to demonstrate that the ICT broadband network that was being set up with USF subsidies, could be used to establish a workable tele-medicine system in the country (due to several issues within MoIT, the project could not be completed, but can still be done).

The Punjab province has done very well using ICTs to identify areas needing interventions to control the spread of Dengue fever. During the 2012 rainy season, an app was developed and loaded onto 1,500 Android smartphones, and given to fieldworkers, asking them to upload geo-tagged photos of their mosquito mitigation efforts. This way not only is the supervision of mitigation efforts made more effective, but also a lot of useful data is being collected. The same system has now been modified to identify the existence of other diseases, through daily SMSs so that appropriate steps may be taken to control diseases in a timely manner.

Similar efforts are being made by the other provinces, notably KPK and Sindh.

Some medical labs do not require the patients to come back for results of their medical tests, by offering to email such results to them as soon as those are ready.

2.4. Pakistan ICT status: Governance

Like many developing countries with rapidly increasing population, in Pakistan it is becoming impossible for the government to provide citizens services. The only answer seems to be the technology that can transcend distances – like ICTs. However, a lot needs to be done to get there. Examples of some initiatives, where ICTs are being effectively utilized to deliver services in Pakistan, are:

NADRA has done work that touches entire lifespan of a citizen – from the birth of a child and his registration as a citizen, to his/her death. All citizens are allotted unique identities that are stored in a large database, along with their biometric data. This data is used for issuing each citizen his/her Computerized National Identity Card (CNIC), which is then used in all kinds of applications requiring authentic verification of the individual citizen, like passport, driving license, eligibility for BISP (Benazir Income Support Programme), property deeds, etc. The information about the citizen can be checked/verified from any location where it is needed through ICT connectivity.

Some other services that have been provided by NADRA in the last couple of years are quite unprecedented, e.g. voter assistance through SMS, assisting in Electronic Motorway-Toll-Collection, Mobile-phone SIM verification, online utility bills payment, etc. The recently introduced Smart CNIC provides immense opportunities to use as a base for e-Governance programmes - National Health Insurance, crop insurance, etc. are applications waiting to be launched.

Flow of information from the relevant authorities to the citizens has improved manifold ever since the useful information is being made available on some of the government websites, which any citizen can access through ICTs, e.g. websites of Pakistan Agricultural Research Council, Pakistan Census Organization, Islamabad Traffic Police, CDA, etc.

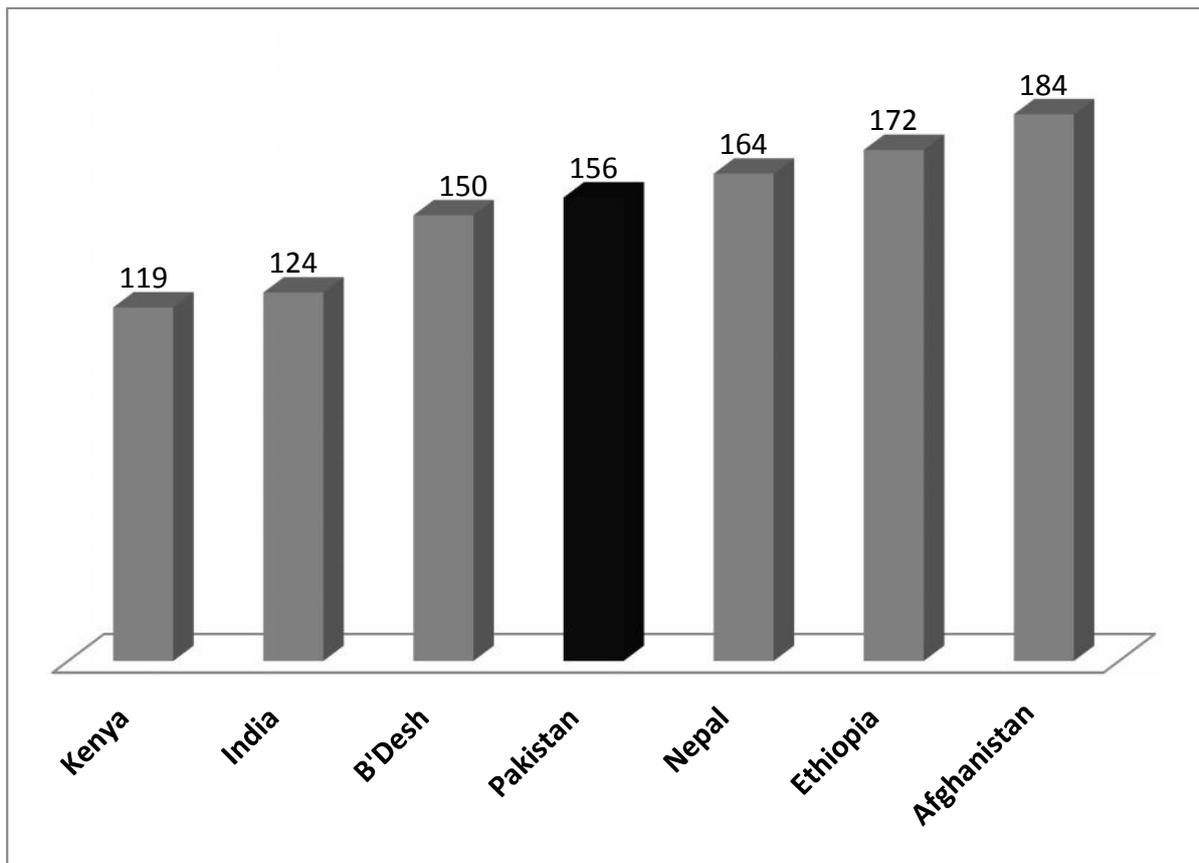
As already stated, citizens and stakeholders are often involved in public consultations on policy formulation by making available draft policies on websites soliciting comments. Even for the existing ICT policy that was launched in 2004, stakeholders' comments were sought through the website of Ministry of Information Technology.

Online registration of FIRs by Khyber Pakhtunkhwa is the latest example of how ICTs can be used for the benefit of citizens.

Recently, the Federal Government has also launched an e-Office programme attempting to convert paper based system into a paperless one. The programme is not entirely new as it was originally started in 2006, but got dropped with the change of government in 2008.

The examples of ICT-based services described above are not part of any comprehensive e-Government Plan, implemented in a holistic manner. That is why Pakistan's present e-Government ranking is very low (see below).

Figure 6: Pakistan E-Government Rankings



Source: UNPACS 2013.

3. Challenges Faced by ICT Sector in Pakistan

Telecommunication infrastructure/services in fixed, mobile and satellite communication networks grew tremendously in the early part of the millennium. By 2008, Pakistan's Telecom platform had five domestic nation-wide optic-fibre rings, four undersea optic-fibre landings, own domestic satellite (in addition to share in the Intelsat Satellite system), and five booming cellular networks, in addition to the incumbent fixed-line telecom services provider PTCL. It is because of these that Pakistan government has been earning handsome revenues in terms of taxes, despite otherwise difficult economic conditions.

However, currently there has been stagnation in Pakistan's ICT sector. This also shows in the Global Information Technology Report 2014 (p. 203) of World Economic Forum where Pakistan is placed in the 111th position among 148 economies that have been compared (World Economic Forum 2014). Below is an analysis of the unsatisfactory progress in the ICT, which has faced multiple challenges in the last five years mainly:

Outdated policies: The last IT/Telecom policies were formulated in the year 2004. For a fast developing sector like Information Technology, 10 years is too long a period for non-renewal of the policy. The policies should have been revised at the latest four years ago.

Ad-hoc leadership: There was no full-fledged Minister of IT for more than 5 years – from February 2008 to June 2013. A sector that is considered an engine of growth in these times of knowledge, the lack of leadership seriously hampered its development.

Delays/restrictions in release of spectrum: After the spectrum auction of 2002, it was foreseen that the next spectrum auction would take place in 2008. Between 2005 and 2014 spectrum auctions of the so-called 3G wireless broadband were held in most of the countries of the world, but not in Pakistan.⁷ Pakistan is entering the world of wireless broadband behind every country of the world, only because permission to use spectrum was lacking. Even now the free spectrum is too less.

Very high taxation on ICTs: ICT is a heavily taxed sector in Pakistan, where Telecom services related taxes are second highest in the world (after Turkey).⁸ As an example the taxes on cellular calls exceed 30%. This does not include other taxes that are paid to local governments, etc.

Governance issues in USF and ICTR&D: Governing Boards of both the Funds appear dysfunctional. The governance model of Universal Service Fund (USF) Pakistan is often cited in world ICT forums as an example of how governments and private sector telcos could work together to bring ICTs to unserved/underserved areas. However, for the last few years the model is not being followed in letter and spirit, for which the blame must be equally shared by the industry nominees on the Board. USF failing to deliver anything significant during this time period resulted in unnecessary accumulation of the Fund, which led the government taking away the accumulated funds for use elsewhere. It has also resulted in interrupting USF's march towards improving penetration of optic

⁷ The spectrum auction held in May 2014 was successful but still failed to dispose one of the bands due to stringent bidding conditions. Need is to free much more spectrum under liberal/easy conditions.

⁸ Despite the recent meagre respite given in the 2014-2015 budget.

fibres and broadband in the country. Similar is the situation in ICT R&D Fund, where several CEOs have come and gone during the last four years.

Issues of Intellectual Property Rights, Cyber Laws, etc.: The developed world learned it as far back as late nineteenth century that without protection of intellectual property, there can be no progress in the industrial era – especially in sectors requiring strong intellectual inputs. Although IPO Pakistan exists since 2005, one of the reasons why development of ICT has been hampered in Pakistan is inadequate legislation – and enforcement of whatever legislation that is there - regarding Intellectual Property Rights and Cyber Crimes.

Lack of incentives by local governments: Instead of incentivizing, the local governments actually discourage telcos from expanding in their jurisdictions by charging unreasonable amounts as right-of-way fees (e.g.: for the right of way for cables and base stations). Similarly, there are no incentives in legislation/regulation for infrastructure sharing.

Lack of use of ICTs by the governments themselves: Wherever ICTs have flourished, governments (federal/provincial/local) are found to be the biggest users of ICTs, not only for their own working (using applications like eOffice, eFiling etc.), but also for delivering citizens' services. In Pakistan, there have been some efforts by NADRA and the provincial governments, but to-date there is no comprehensive plan available. Consequently, the efforts are sporadic, with no sharing of experiences/practices and duplications leading to wastages of resources.

Neglect of 'demand side' of ICTs: Services like eEducation, eHealth, and eAgriculture, etc. are some of those where ICTs could be effectively used to stimulate the demand and thus accelerate the pace of overall ICT development.

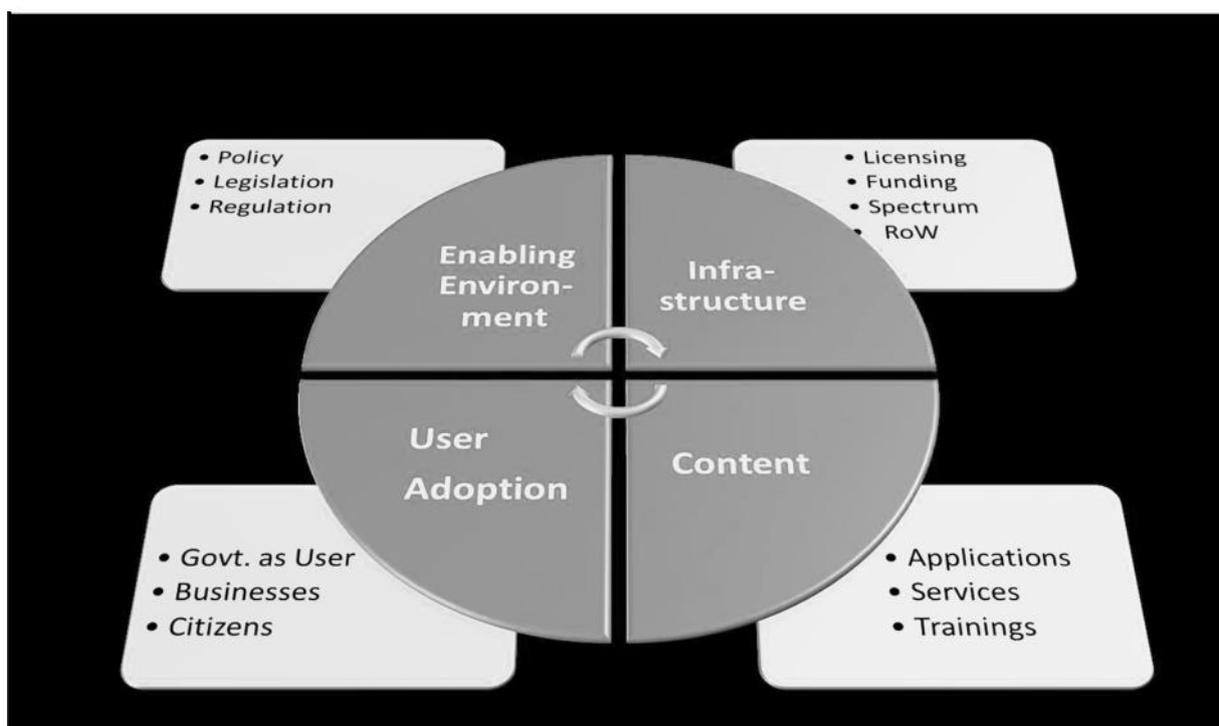
There is a strong need for developing strategies/plans for the complete eco system.

4. ICT/Broadband Eco-System

It must be understood that unlike voice telephony, broadband internet does not work as a stand-alone entity as it is not simply talking into a device with another human being on the other side. Rather broadband needs a complete eco-system of which a significant impact is not created with a piecemeal approach, rather a synchronized approach geared to stimulate the whole ecosystem is required to realize the true potential of ICT/broadband internet.

Broadband eco-system has two sides, – the supply side and the demand side.

Figure 7: A pictorial representation of Broadband Eco-System.



The Supply side encompasses everything that pushes the ICT services and applications towards the users, i.e. (a) Enabling environment, encompassing policy, legislation, regulation, etc., and (b) the necessary infrastructure typically funded and provided by the private sector, once the enabling environment is in place (necessary permissions/licenses and right-of-way, etc.). The exceptions are those areas (usually rural and remote) where the private sector operators do not find a business case. For such places private sector operators contribute in one form or the other in a Universal Service Fund.

The Demand side includes everything that makes people use the ICT services, mainly: (a) Content (applications and services) that run over the provided infrastructure and (b) Users' ability to use, or adopt (requiring awareness, training, etc.). Unless the users are able to use the services and applications in public and private sector offices and businesses, as well in the households, no benefit would obviously accrue and no growth would take place. It helps immensely if the government takes the lead and becomes the biggest user of the ICT/broadband itself, making it easier for others to follow.

It may be summarized as follows: once an enabling environment is created, the private sector and the government invest in laying the necessary infrastructure and also develop content and applications to run on that infrastructure, while at the same time preparing and encouraging the people to make use of eServices and other applications, and thus step into the modern world of education, governance, health care, commerce and a vast range of other areas.

5. Recommendations

In order to bring Pakistan’s ICT sector out of its present stagnation and converting it into an engine of growth, and at the same time reaping the fruits of technology in terms of development in education, health care, and governance, planning and execution of a comprehensive ICT/broadband development programme is needed. The above described four segments of broadband eco-system and the challenges faced by ICT sector in Pakistan have been taken separately and mapped against the eco-system chart described earlier. Out of this mapping, four corresponding sets of recommendations have been derived:

<p>Improve the Enabling Environment by:</p>	<p>Updating long overdue out-dated policies, following due process of public consultations</p> <p>Substantially reducing/rationalizing taxes on ICTs in Pakistan</p> <p>Formulating cyber laws and creating enforcement mechanisms along with improving capacity of judicial system to settle ICT related disputes and improving effectiveness of intellectual property protection mechanisms</p> <p>Releasing more Spectrum for use by telecom operators</p>
<p>Improve Infrastructure by:</p>	<p>Expanding reach of optic fibre up to Union Councils, providing equal access to all those who would like to make use of it</p> <p>Legislating to solve right-of-way issues together with provincial/local governments</p> <p>Promoting infrastructure sharing among telcos</p> <p>Devising and implementing mechanism for sharing international and national bandwidth</p> <p>Developing new data centres and offering usage to ICT players</p>
<p>Promote development of local content:</p>	<p>Governments should commission software developing companies to develop local language content & applications for E-Governance services; E-Education (which should be in sync with school curricula; E-Health; E-Agriculture.</p>

Encourage User Adoption by:	<p>Transforming government processes in such a way that they become ICT-enabled, along with building the capacities of public sector officials in ICT usage</p> <p>Improving digital literacy in the country through targeted efforts particularly in villages and small towns</p> <p>Providing public access points to the bottom of pyramid</p> <p>Providing broadband access to all educational institutions, together with training for teachers in ICT, and teaching with ICT.</p> <p>Financing computers/tablets for youth</p>
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In order to achieve all of the above in a coordinated and planned manner a National Broadband Plan should be formulated by setting up two types of bodies:

1. A High-level Steering Committee – The level of the steering committee matters a lot, since several ministries, both federal and provincial, will be involved, making it extremely difficult for IT Ministry – or any other coordinating ministry – to make all of them participate and work in a timely manner. In several countries which took similar initiatives seriously, such bodies were headed by someone very high – like US Vice President Al Gore. Therefore, it is recommended that the prime minister, or someone from very high level nominated by him, should head such a steering committee.
2. Two Working Groups: Supply Side (Enabling Environment; Infrastructure) and Demand Side (Content; User Adoption). In these Working Groups, all stakeholders must be represented. Such as in the Supply side (Ministries of IT, Finance, and Development-Planning; Pakistan Telecom Authority; USF and ICT R&D Funds); and in the Demand side group (Federal/Provincial Ministries of IT, Education, Health, Agriculture, Women Development; Content developers; ISPs, Telecom Operators, Vendors, ICT Training institutions like PCB; media channels like PTV, PBC; and civil society).

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