

# **An Overview on ICT Development in Turkey, Pakistan, Middle East and Africa**

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## **Abstract**

Information and Communication Technology (ICT) can play pivotal role in developing economies to deal with a wide range of socioeconomic, cultural, educational, and governance problems. Developing countries realized the importance of ICT for growth, a decade before the end of the 20th century. Every country tried its best to develop infrastructure, human resources to implement ICT for achieving development goals such as poverty alleviation, combating serious disease, high literacy rate, gender equality and the most important transparent governance. With the help of ICT, dream to achieve 100 percent literacy rate can become a reality, with the right implementation of E-Learning technologies masses can get quality education in a very cost effective manner, on the other hand E-government technologies are offering such governance framework that will eventually eradicate corruption which is a big stumbling block for developing economies. This research presents an overview of progress, seriousness and determination of world's four important regions Eurasia, Africa, Middle East and South Asia, with particular focus on Turkey, Africa, Middle East, and Pakistan.

## **Keywords**

ICT, E-government, E-Learning, Development

## **Introduction**

ICT's stands for information and communication technologies and are defined, as a "diverse set of technological tools and resources used to communicate, produce, disseminate, accumulate, and manage information." (Blurton 2012) These technologies include computers, the Internet, broadcasting technologies (radio and television), fixed line telephony and mobile communication. Studies have shown that the rate of IT diffusion is correlated to the general level of socioeconomic development (Hargittai 1999). A most recent finding is that ICT plays a vital role in advancing economic growth achieving a better literacy rate and ultimately reducing poverty. A survey of firms carried out in 56 developing countries finds that firms that use ICT grow faster, invest more, and are more productive and profitable than those that do not.

We live in an incredible time in human history – a time of immense transition, of profound risks, but also of great opportunities. Since the economic crises most

countries have realized that ICT is one of the best helping hand for overcoming social, health, and socioeconomic issues. The aim of this study is to discuss different ICT parameters which are used in measuring the presence of ICT in a society.

- ▲ Use of Internet
- ▲ E-government projects
- ▲ E-learning
- ▲ Mobile Subscription
- ▲ Internet affordability
- ▲ E-government web measure index

We are not using any tool or methodology to find out the statistics of any of the above parameters, rather we are using resources from other authors and organizations whom have already worked in different regions. Our study is to bring a distance closer, by gathering the different regional ICT development data in Africa, South Asia (Pakistan), Middle East (UAE and Palestine), and Turkey. A little introduction about ICT in said four regions are given below paragraphs.

There is a great deal of variance in ICT policies for education among the African countries. South Africa clearly is unique in terms of being able to move its ICT agenda forward. Several countries of North Africa that have both resources and high bandwidth connectivity with Europe have also been able to make excellent progress implementing ICT, i.e. Mauritius, Ghana, and Botswana, are steadily moving toward sustainable economies.

UAE emerged as a global hub for modern businesses in general and particularly in ICT. Dubai city is a leader in the adoption and development of new technologies in the region. ICT created employment opportunities, absorbed manpower from other countries especially from South Asian countries for transforming their public services by incorporating modern technologies. Other Middle Eastern countries also getting inspiration from the global hub and they are putting effort to develop their own ICT sector.

Government of Pakistan has adopted a comprehensive strategy for ICT covering all the short term and long-term growth objectives (Mujahid 2002). The government approach focuses on developing the country's economy by using IT as an industrial sector, developing human resources in a short period of time as inputs and development of public and private sector markets to absorb and fully utilize the developed human resources. Both of these issues were addressed through numerous strategies and policies for industry promotion, incentives for investors, training and development of human resources. A separate Ministry of Information Technology was created in November 2002, with the aim of building Pakistan's information technology competency in the 21st century.

This paper will provide ICT development information based on the above mentioned indicators.

### ***ICT in Africa***

Developments in ICT have given Africa access to the global market. The growth in African ICT infrastructure had been led by their immense need for development. The increase was led by Nigeria, which alone added 10.9 million new Internet users

between 2000 and 2008, 38 per cent of the total additions in Africa in that period. Kenya also contributed remarkably, with 3.3 million new Internet users (ITU 2009). Internet access in Nigeria is set to triple in the next two years. Table 1 gives a picture of ICT developments in a few African countries with respect to Internet users, Internet affordability, mobile cellular subscription and E-Government web measure index.

Table 1: ICT Indicators in African region

Parameters	Internet Users % of Population		Fixed Broad Internet Affordability USD/M		Cellular Users % of Population		E-government Web measure index
	2000	2009	2000	2009	2000	2009	
<b>Year/Countries</b>	<b>2000</b>	<b>2009</b>	<b>2000</b>	<b>2009</b>	<b>2000</b>	<b>2009</b>	<b>2009</b>
<b>Nigeria</b>	0.1	28.4	--	105	0	47.2	0.22
<b>Egypt</b>	0.6	20.0	--	8.2	1.9	66.7	0.61
<b>South Africa</b>	5.5	9	--	26.9	19.0	94.2	0.55
<b>Burundi</b>	0.1	0.8	--	--	0.3	10.1	0.01
<b>Uganda</b>	0.2	9.8	--	194.4	0.5	28.7	0.27
<b>Botswana</b>	2.9	6.2	--	62.2	12.9	96.1	0.22
<b>Morocco</b>	0.7	32	--	16.8	8.1	79.1	0.21

Source: (World Bank, ICT At-a-Glance)

ICT is at its extreme end within the urban areas of Africa, having access to everything, International business investments and access to global markets. Over the last ten years, mobile cellular phones In Africa have achieved a steady and remarkable growth. Yet rural farmers in remote villages cannot afford ICT facilities to enhance their productivity. The distribution of ICT in Africa is not uniform a notable difference exists between East, West and Southern Africa. The geographical partitions of Africa by cardinal direction / compass direction are: Central Africa, East Africa, North Africa, Southern Africa, and West Africa. The complication of the inherited governance in the African continent has contributed to the cultural segmentation.

## ICT in African Education and Teaching

ICT improves the efficiency of our education system. ICT is vital in accessing, using and disseminating information hence the relationship between ICT and literacy and ICT Literacy among students in the whole equation of ICT use in schools. African schools have a high dropout rate for them, online schools and distance learning programs can be a solution. In fact, the question amongst the proponents of ICT use in education is no longer “if” but rather “which” and “how” these technologies can be effectively implemented and achieve the best from it. Sixteen African countries have signed MoUs with the NEPAD e-Africa programme and consortia of private sector companies to participate in the NEPAD e-Schools demo project (NEPAD 2012). The World Bank and UNESCO are among leading organizations that are supporting Africa to prepare its teachers for the information age.

The achievements in African primary education are raising the aspirations of parents and expectations of young people for better skills development. Government support to increase individual expenditure as recorded in 2010, expenditure per student in

Burundi was \$1,950.4, Cameroon was \$641.3, Central Africa was \$757.1, Chad was \$3,823.5, Ethiopia was \$297.2, Congo was \$5,748.0, Ghana was \$2,901.8, Niger was \$3,194.5, Senegal was \$3,612.3, Uganda was \$1,222.5 (UNESCO, 2010). The NEPAD e-schools initiative is a collective response to the challenges of secondary education in Africa by leveraging the potential of ICTs. Generally, the development and application of ICT infrastructure to educational development is considered essential to the achievement of long-term sustainable socioeconomic development in African.

## **ICT in African Higher Education**

It is difficult to determine the precise extent to which ICTs are integrated into the operations and teaching functions of universities without visiting the institutions. Some African Universities like; Makerere University in Uganda, the faculty of computing and IT has earned an excellent reputation in the field of ICT, the Faculty currently has 3,000 computers and an assortment of other ICT equipment installed specifically to facilitate student teaching (Joseph 2009). The African Virtual University (AVU) is an innovative education institution based in Nairobi, Kenya, that services 57 learning centers in 27 African countries. The AVU works with universities based in Africa and other countries such as the US and Australia to provide academic programs and short courses. The Distance Learning Institute has increased enrollment of students from 1,000 in 2005 to 17,000 in 2011, through the deployment of ICT-driven open distance learning (ODL) mode of delivery at significantly reduced cost when compared to the traditional classroom model (John 2011).

## **E-Government**

Transforming government to achieve rapid increases in capacity is one of the biggest challenges facing African leaders who want to achieve the Millennium Development Goals or make other significant improvements in delivering services and improving the lives of their citizens. Strengthening Parliaments' Information System in Africa; Initially implemented in ten African Parliaments, in 2006 the project has evolved and expanded into a full Africa i-Parliaments Action Plan, a continental challenge embraced by the majority of African assemblies under the auspices of the Pan African Parliament. (UNPAN 2010). In 2000, the Government of Burundi formed a National ICT committee tasked with overseeing and organizing ICT implementation in MDAs and with developing a comprehensive and coordinated ICT strategy. In 2002 the Cabinet adopted a national strategy for information and communication technologies.

E-Government offers numerous opportunities to resolve some administrative problems; the main problems are the failure to observe the existing rules and regulations in place, inadequate monitoring and failure to impose sanctions for violations of the rules in practice. All these problems could be reduced with the use of ICT and e-governance applied at all stages of the procurement process.

## **Private Sectors Contribution**

African leaders have given maximum support for foreign investors to invest in different sectors, by improving the business environment through cutting the cost of investing in Africa. Private sector's critical role in the NEPAD's implementation is well

acknowledged by the leaders both of African countries and of the private sector itself (United Nations 2006). Agribusiness is of the success agriculture achieved through ICT in developed and developing countries. DrumNet, the project's promise is that, information on the market is one of the key elements that keep farmers from getting the full market value of their products (Mhlanga, 2010).

**ICT Application Areas**

African ICTs Applications are categorized based on different areas of use such as Public Administration, Urban and Rural Development, Transportation, Education, Agriculture, Manufacturing, E-Commerce, Travel and Tourism. The long-term objective of United Nation Public Administration Network (UNPAN) is to build the capacity of these regional and national institutions, so that they can access, process and disseminate relevant information by means of ICT for the promotion of better public administration (UNPAN 2012). Each country is putting more effort to achieve a harmonized public administration. There are a number of areas where ICT is being applied in small-scale agriculture in Africa including: - GIS, decision support systems, precision farming, market information system, distance learning, databases, land use planning, public access facilities, mobile applications, restructuring of extension and personal digital assistants (PDAs).

**ICT Budget Allocations**

The mission of the African ICT for the Millennium developments had led to increase in the ICT budget as reported, more than half of CIOs in sub-Saharan Africa report that their ICT budgets have increased in 2011 (Biztech Africa, 2011). Also in the 3<sup>rd</sup> EU-Africa Business forum 2009, Dr. Chasia concluded his presentation by asking the governments to prioritize the implementation and integration of ICT in 3 years in the educational system of 16 countries in the coming 3 years in 16 countries and to empower the National Implementation Agencies (NIAs). The budget for such a global plan is estimated at \$70 million (Ken Kwakun 2009). ICT budgetary summary of Africa's priority programs and projects from NEPAD are listed table 2 below.

**Table 2: ICT Budget Allocations**

<b>Priority Program</b>	<b>Resources Required Million USD</b>	<b>African Commitments Million USD</b>
ICT	33.2	22
NEPAD e-Schools	52	15
ICT Broadband	28	20.5

**Source:** The Foundation for the Development of Africa

**ICT in Middle East**

Broadly speaking, the Middle East is an oil enriched area, but the development indicators are significantly different in each country. This difference is pertinent in ICT sector also. We will consider United Arab Emirates (UAE) as a developed country and Palestine as developing country under the specific situation. Table 3 below has the comparison of Palestine and UAE with respect to economy and Table 4 Palestine and UAE with respect to government.

**Table 3: Economic Comparison of UAE and Palestine**

Factor	Palestine	UAE
<b>GDP Billions USD</b>	6.641	252
<b>GDP Growth Rate</b>	7%	3.5%
<b>Natural Resources</b>	Not Explored	Oil and natural gas
<b>Exports 2009, Millions USD</b>	518	265300
<b>Budget (2011) Billion USD</b>	3.23	102.9

Source: CIA Fact book

**Table 4: Type of Government in UAE and Palestine**

Factor	Palestine	UAE
<b>Type</b>	Authority	Federation
<b>Independence</b>	Under Occupation	December 2, 1971
<b>Administrative</b>	West Bank and Gaza Strip	Seven largely self-governing emirates

## ICT in Palestine and UAE

Palestine case is very complicated and long history influenced by many regional factors. The Palestinian dependence on Israel has serious ramifications for ICT use. Israel acts the controller for Palestinian accesses to the internet which means that any attempt to improve telecommunication infrastructure is contingent on Israeli approval and control. The United Arab Emirate (UAE) is one of the developed countries in ICT fields because it has an open economy with a high per capital income and a sizable annual trade surplus. Since 1973, The UAE has transformed from a small desert into a modern country with a high standard of living.

IT in particular has become a thriving sector for growth in the UAE. The regional hub in Dubai is leading the adoption and development of new technologies in the region. The ICT tools are used in creating employment, in absorbing manpower from other countries and in transforming their public services by increasingly taking advantage of new technologies. The vicinity of the Dubai hub to less developed countries provides a magnet for the development of the ICT sector. Table 5 below gives the percentage of internet users, mobile cellular subscriptions and broadband Internet access in Palestine and UAE.

**Table 5: ICT Indicators in UAE and Palestine**

Parameters	Internet Users % of Population		Fixed Broad Internet Affordability USD/M		Cellular Users % of Population		E-government Web measure index
	2000	2009	2000	2009	2000	2009	
<b>Year/Countries</b>	<b>2000</b>	<b>2009</b>	<b>2000</b>	<b>2009</b>	<b>2000</b>	<b>2009</b>	<b>2009</b>
<b>Palestine</b>	1.2	8.8	--	--	5.9	30.3	--
<b>UAE</b>	23.6	82.2	--	40.6	44.1	232.1	0.72

Source: (World Bank, ICT At-a-Glance)

## ICT in Palestine Education

The number of students enrolled in the Palestinian educational system is about one million; 90 percent of whom are enrolled in the basic education sector. ICT advocates

in Palestine, based on worldwide literature, believe that ICT can play a critical role in enabling the educational system to better meet the developmental needs of the Palestinian society. (A.M. Qattan Foundation). Since the Palestinian Ministry of Education take the decision of introducing new curriculum in 2000, ICT teaching and learning become easier. The new introduced curriculum addresses many ICT topics throughout grades 5 to 10; also English is introduced from the first grade. The new technology curriculum developed by the Palestinian Curriculum Development Center starting in 2000 culminated in the creation of separate subject textbooks for grades 5 to 10 to be taught for one to two classes (each class 45 minutes) per week depending on the level. (A.M. Qattan Foundation). The new technology curriculum subjects generally concerned with general computer skills including usage of Windows and Microsoft Office Package, while programming skills (C++, Visual Basic, Algorithms, Web Design, and Databases) are given at higher levels starting from 11 to 12 grades.

### **Higher Education in Palestine and UAE**

Out of 21 universities 9 are located in the Gaza Strip while the remaining 12 located in West Bank. Most of the Palestinian universities are offering different degree and diplomas in IT and related fields. Their aim is to provide students with career-oriented programs of study in selected Information Technology disciplines consistent with the current and future needs of Palestinian society. Universities also established IT Centers of Excellence which focuses on providing training to students, teachers, university professors and employees from different companies. These centers operate at local and national levels to provide quality training for students as well as practitioners.

The systematic educational system started in the country in 1972. Since that time education has been developed and expanded to provide international education standards for schools and universities. Schools, colleges and universities are separated according to gender with strong focus on computer literacy and English language teaching in higher education to equip young Emirates with the necessary skills (Ministry of Education 2003).

The UAE government has started some of useful projects in the education sector that would be integrating ICT in education by increasing the knowledge of teachers and the knowledge of students. They have been promoted as a platform that provides opportunities for learning and training as well as support interaction and exchanging of knowledge. Learning support through technologies is suggested to bring people of different gender, place, and background without time and space barriers. Therefore, educational institutions strive to embrace pioneering strategies to integrate ICTs technologies in education. The Vision 2020 program is one of the reform projects launched by the Ministry of Education in 1998-1999 to improve education in the country. The project underlined strategies to provide schools with the latest instructional technologies and educational resources to promote self-learning with the latest instructional technologies and educational resources to promote self-learning and continues education programs (Ministry of Education and Youth 2004).

## **ICT in Palestinian Private Sector**

Palestine has low cost ICT facilities in the region than most of the developed countries. The number of companies that works in the ICT sector are increasing in Palestine, providing services which include Applications Developments and Managements, Web Developments, Design, Testing and Call Centre services. The ICT sector major players are:

- ▲ Palestine Telecommunication Company.
- ▲ Wataniya Telecom the second mobile operator.
- ▲ Palestinian Information Technology Association of Companies.
- ▲ Palestine Information and Communication Technology Incubator.
- ▲ The Palestine Chapter of the global Internet Society.

Recent independent research has shown that over 15,000 ICT professional working in the region has a graduate degree or above. Additionally there are 11 universities that run ICT degrees and over 2500 new graduates come to the market each year, providing a rich stream of new talent (Outsource to Palestine 2009).

## **ICT in UAE's Private Sector**

The private sector in the UAE makes intensive use of ICT in their business operations with 97 percent of private sector establishments having computer, 81 percent of employees use a computer at work. About 82 percent of establishments have a website. Meanwhile, 26 per cent of businesses have made online sales, while 29 per cent have made online purchases, the survey revealed (Emirates 24/7 Business 2010). The market in the UAE bounced back from the 2009 recession to record 15 per cent growth last year and is expected to post almost 17 per cent growth in 2011, says the IDC analyst Stephen Minton. Strongest growth last year was in outsourcing services, smartphones, disk storage and midrange-volume servers. The rapid growth of the IT market in the UAE will present significant commercial opportunities for job growth. IT outsourcing is already a major area of work creation and is predicted to expand rapidly over the next few years.

## **E-Government Project in Palestine and UAE**

November 2010, the Palestinian E-Government Academy has been launched with the help of different parties. The Palestinian e-Government academy is being registered as a legal entity. It is an output (sustainability action) for the E-Government Lifelong Learning Consortium (Pal-Gov). The project aims to empower the Palestinian society with the know-how for implementing e-services, in particular e-government services. The project aims at capacity building in three main areas (interoperability, security and legal informatics) which are the main challenges when implementing e-service in general and e-government in particular (The Palestinian e-Government Academy )

According to World Bank data provided in ICT indicator table, UAE possess a pretty high 0.72 E-Government web measure index. Emirates E-Government has received 34 applications from 21 federal and local government entities (United Nation Public Administration Network). In the category of Best e-Service, Emirates e-Government received 12 applications. These are from the Ministry of Economy, the Ministry of

Social Affairs, the Ministry of Public Works, Dubai Courts, General Directorate of Residency and Foreigners Affairs-Dubai (DNRD), the Ministry of Foreign Affairs, Zakat Fund, Roads and Transport Authority Dubai (RTA), Dubai Municipality and Dubai Electricity and Water Authority (DEWA).

In the category of Best e-Content, Emirates e-Government received nine applications. These are from Securities and Commodities Authority, Dubai Chamber, the Ministry of Economy, Dubai e-Government, the Ministry of Public Works, Dubai Health Authority (DHA), Dubai Electricity and Water Authority (DEWA), General Authority of Islamic Affairs and Endowments, and Dubai Municipality. In the category of Best G2G project, Emirates e-Government received 10 applications. These are from the Dubai Statistics Center (DSC), Securities and Commodities Authority, Ministry of Labor, Dubai e-Government, Roads and Transport Authority Dubai, Emirates Identity Authority, Abu Dhabi Western Region Municipality, General Civil Aviation Authority and Abu Dhabi Systems and Information Centre. In the category of Best Portal in Development Sector, Emirates e-Government received three applications. These are from Securities and Commodities Authority, Abu Dhabi Systems and Information Centre and General Civil Aviation Authority.

***ICT in Pakistan***

Before describing Information and Communication Technologies (ICT) in Pakistan we would take the privilege to write a little about geography and socioeconomic situation of Pakistan. A country located in South Asia, having borders with India, China, Iran and Afghanistan, with 1050 KM coastal lines with the Arabian Sea. Table 6 given below provide brief information about the economic situation of Pakistan.

Table 6: Economic indicators of Pakistan

Parameter	Value	Year
Population	180 Million	2010
Gross Domestic Product	\$201 Billion	2011
Per Capita Income	\$2800	2011
Human Development Ranking	145/187	2011
Population Below Poverty Line	22.3%	2006

Source: (UNDP, CIA)

History of computer and communication technologies started in Pakistan way back in 1960 when an IBM Mainframe Computer was installed in Pakistan International Airlines for passenger’s flight reservations. But the computer education could not be started earlier than 1967 when a Fortran Programming course was started by the UET, Lahore in 1967-69. Table 7 gives a picture of ICT developments in South Asia with respect to internet users, internet affordability, mobile cellular subscription and E-Government web measure index.

Table 7: ICT Indicators in South Asian region

Parameters	Internet Users per 100 (South Asia = 5.5)			Internet Affordability (USD/Month) (South Asia = 14.6)		Mobile Cellular User (per 100 people) (South Asia = 45.5)			E-government Web measure index
	2000	2009	2011	2009	2011	2000	2009	2011	
Year/ Countries									2009
Pakistan	1.4	12.0	15.5	14.6	13	0.2	60.7	66.5	0.42
India	0.5	5.3	10.2	5.2	--	0.4	45.4	76	0.48
Bangladesh	0.1	0.4	3.70	50.4	--	0.2	31.1	58.5	0.35
Sri Lanka	0.6	8.7	12	4.4	--	2.3	69.4	80.9	0.39

Source: (World Bank, ICT At-a-Glance, PTA)

## Education

Pakistan's commitment to ICT for education is summarized in its 2005 National ICT Strategy for Education (Ministry of Education 2005). The national strategy recognized the importance of technology as both a subject and an instructional aid. However, implementation is a challenge in a country where only 54 percent of adults are considered literate.

Pakistan like other neighboring developing countries has witnessed significant growth in the ICT sector. ICT is seen as a key potential driver for socioeconomic development, wealth generation and redistribution. A separate Ministry of Information Technology was created in November 2002, with the aim of building Pakistan's information technology competency in the 21st century.

## Primary and Secondary Education

In public sector schools up to middle level classes there are no enough facilities and lab equipment for computer education, but in private schools such facilities are provided to some extent. In high schools computer science is introduced as an elective subject for Grades IX through X. Students can specialize in science, humanities, or technical streams. Compulsory subjects for all are English, Urdu, Islamiyat, Pakistan studies and mathematics. In addition, students study the following subjects within the different streams (NORRIC 2006).

- ▲ Science stream: Physics, chemistry and biology/computer science
- ▲ Humanities stream: General science and two elective subjects
- ▲ Technical stream: General science and two technical subjects

## Higher Education

The Higher Education Commission (HEC), formerly the University Grant Commission, is the primary regulator of higher education in Pakistan. In Pakistan, until 2002, Universities were recognized by the University Grants Commission (UGC) which draws its powers from The University Grants Commission Act, 1974. The Act was repealed in 2002 by the Higher Education Commission Ordinance (Higher

Education Commission 2002) and since then, HEC is responsible for higher education policy, quality assurance, and degree recognition, development of new institutions and uplift of existing institutions in Pakistan. It also facilitated the development of the higher educational system in Pakistan. Its main purpose was to upgrade universities in Pakistan to be centers of education, research and development.

## **Pakistan Education and Research Network (PERN)**

Pakistan Education & Research Network is a nationwide educational Intranet, connecting premier educational and research institutions of the country. PERN focuses on collaborative research, knowledge sharing, resource sharing, and distance learning by connecting people through the use of Intranet and Internet resources. This technology was used to overcome the faculty shortage, the cost of traveling for education and collaborative research and provide access to remote areas hence lessening the digital divide (PERN 2002).

Although it is a fully funded project by HEC of Pakistan but considerable advice and ideas are drawn from international research and education networks. Also, collaboration for research and development with international partners is one of the core on-going activities of the PERN. The infrastructure of the said network is as follows:

- ▲ Three Points of Presence in major cities of Pakistan
  - ▲ 155Mbps International Bandwidth
  - ▲ Core intranet backbone connectivity between seven cities on 10 Gbps.
  - ▲ All existing universities on PERN are connected with Fiber Optic
- Inter-University Video Lecturing/Streaming
  - Digital Library
  - Collaboration between researchers

It is fully operational now with 60 sites connected including all 59 Public Sector Universities. IP-based Video Conferencing facilities at 19 universities for lectures from prestigious local and foreign institutions have been launched in the year 2006.

Digital Library of Pakistan is a project of Higher Education Commission of Pakistan initiated in February 2004 providing free of cost access to the latest R&D publications and materials to the researchers and university students in Pakistan. This is not a unique idea but to the extent that probably for the first time National Level Access to the full text references in indexed journals has been negotiated and obtained under special agreements with international partners and publishing houses (Digital Library 2006).

Virtual University (VU) is a public sector nonprofit institution established in 2002 by the government to provide education at affordable cost, best quality and the best teachers. It uses a combination of free-to-air satellite television broadcasts and the Internet. The VU uses television for broadcasting its lectures. It operates its own two satellite television channels. The lectures are recorded in a proper recording studio in the form of slides or movie clips, which are then broadcasted using free-to-air television or made available through multimedia CD-ROMS and at YouTube also.

Learning between students and tutors takes place over the Internet. VU has developed an in-house Learning Management System (LMS) which provides comprehensive learning material/lecture notes and e-mail facility for students to interact with the Virtual University (VU 2002).

## **E-Government**

The first step toward establishment of E-Government was the creation of National Database and Registration Authority (NADRA). NADRA is maintaining one of the largest centralized databases in the world and the largest Biometric database in the world, which remains a dream for any developing country; only the developed nations can afford a huge, precise and comprehensive database system, in this regard Pakistan is way ahead of the United States and India which are in very early stage of such implementations (NADRA 2000).

In October 2002 the Electronic Government Directorate (EGD) was established in pursuance of a decision of the federal cabinet. Converting the former Information Technology Commission, the Government formed the EGD as a cell within the Ministry of Information Technology. The main purpose of this department was to start implanting e-governance technologies in the country. Pakistan has the highest E-Government web measure index in the region (World Bank). There is a long list of e-government projects which are already implemented and many are under implementation (EGD 2002). A few are listed below:

1. Online Processing of Hajj Application and Status Tracking for arrangements for Hujjaj
2. Automation of Prime Minister Secretariat, Islamabad
3. E-Enabled Senate and National assembly of Pakistan
4. Development of Urdu Lexicon Machine Translation and Text to Speech software for Urdu Language
5. Automation of Patient office Karachi
6. Federal Government Data Center and Intranet

## **Private Sector Activities**

Pakistan Software Export Board (PSEB) was established by the Ministry of Communication, Government of Pakistan in September 1997. Since then Pakistan has become the destination choice for a significant number of international IT companies looking to relocate their operations offshore because of the ready availability of skilled professionals, appropriate IT infrastructure, and affordable rates for connectivity result in considerable time and cost-savings for entrepreneurs (PSEB, 2012).

- ▲ Pakistan's IT industry's global share is estimated at US\$2. 8 billion, including global sales revenue of US\$1. 6 billion.
- ▲ A skilled workforce of 110,000 English-speaking IT professionals in the economy, of which 24,000 are engaged in exports.
- ▲ Nearly 1500 companies.
- ▲ Nine STPs offering around 700,000 square feet of IT-enabled office space.
- ▲ A strong telecom sector supports the IT industry's development.

## Budget Allocated for ICT

Budget for Information technology and communication technologies which we can consider as ICT budget was around \$12.3 Million in 2010, it then drastically decreased in 2011 around \$3.4 Million, but for the current fiscal year there is increased by the government at substantial \$8.81 Million. The table 8 gives information of government spending on education and ICT in Pakistan.

*Table 8: Budget Allocations for ICT and Education*

<b>Last three Years Budget for education and ICT Million USD</b>			
<b>Budget in Million USD</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>
<b>Education Budget Total</b>	351	450	439
<b>Primary Education</b>	33	36	46
<b>Secondary Education</b>	42	50	54
<b>Higher Education</b>	250	168	155
<b>Science and Tech R&amp;D</b>	35	7	13
<b>IT and Telecom</b>	13	3.4	9

Source (Ministry of Finance)

Figures given in Table 8 are taken from an actual budget document and converted into USD from Pak Rupees at the current exchange rate. This data shows that current governments has neglected education and ICT sector, budgets allocated for higher education, ICT, research and development through the Public Sector Development Program is decreasing.

## ***ICT in Turkey***

The ICT sector has an increasing share in the GDP of developed countries, with the increase in productivity to the economy in general, innovative structure with high added and value low capital investment. The information technology sector and particularly the software development and services play a key role in the process of Turkey's transformation into an information society.

With the development of IT companies and increasing productivity is providing a foundation for growth in local markets as well as in foreign markets. Increase in computer literacy promotes growth in the industry size, while the increased demand in domestic market increases financial value. In addition, the public private partnership for project-oriented services in the field of IT contributes to develop local companies to be able to get access to foreign markets. This has placed significant stress on government that have come to rely on public private partnership as important means for the delivery of long term infrastructure assets and related services. Table 9 gives a picture of ICT developments in Turkey and neighboring countries with respect to Internet users, Internet affordability, mobile cellular subscription and E-Government web measure index.

**Table 9: ICT Indicators in Turkey and Neighbours**

Parameters	Internet Users % of Population		Fixed Broad Internet Affordability USD/M		Cellular Users % of Population		E-government Web measure index	
	2000	2009	2000	2009	2000	2009	2000	2009
Country/Year								
Turkey	3.8	35.3	-	12.8	24.3	83.9	-	0.42
Syrian Arab Republic	0.2	18.7	0.1	3.7	0.2	46	-	0.24
Greece	9.2	44.1	2.5	17.5	54.3	117.8	-	0.41
Georgia	0.5	30.5	0.1	21	4.1	66.6	-	0.35
Bulgaria	4.5	11	0.1	11.2	9.2	140	-	0.48
Armenia	1.3	6.8	0.4	2.9	0.6	85	-	0.27

Source: (World Bank, ICT At-a-Glance)

## Education and Teaching

Many are predicting that IT will bring about several benefits to the students and teachers. The current information age, enabled us to information sharing between millions of individuals connected through internet. With the use of internet in education teacher-student interaction concept has totally changed. The learning experience of students is different than the conventional classroom environment; more learning is being done outside the classroom. The internet has facilitated education in many ways; students have access to authentic and current resources which was never possible before such technologies.

Some studies have been made to find the ways to teach information technologies in primary schools. They also examined the result of similar studies made by the European countries (Kaya, 1998). Ministry of National Education has been very effective in ICT applications in primary schools such as Fatih Project.

- ▲ Administrative Services Provided through IT
- ▲ Computer lab in Every School
- ▲ IT in the classroom
- ▲ E-book for each student (tablet PC)

At the present provision of e-book phase is under implementation. According to a study conducted in February 2012, Fatih Project is implemented in 169 schools in 17 cities and 52 educational intuitions, 2259 teachers, 9435 students in total 11863 people are part of this project (Ministry of Education 2011). Table 10 provides the information about availability of computer for students in different provinces of Turkey.

Table 10: ICT Presence in Schools of turkey

Seq. No	Primary Schools		Secondary Schools	
	Name of Province	Number of students per computer	Name of Province	Number of students per computer
1	Tunceli	10.4	Tunceli	8.6
2	Artvin	11.9	Sinop	9.4
3	Bayburt	12.6	Bilecik	10.1
4	Burdur	13.9	Gümüşhane	10.1
5	Gümüşhane	14.8	Artvin	10.3
..	..	..	..	..
77	İstanbul	41.1	Diyarbakır	47.9
78	Antalya	41.4	Şanlıurfa	48.3
79	Şanlıurfa	44.7	Gaziantep	53.4
80	Bursa	49.5	Batman	56.7
81	Gaziantep	51.9	İstanbul	65.3

Source: Turkish Prime Ministry State Planning Organization

Turkey's Information Society Strategy Plan report which published in 2011 by the State Planning Organization defines objectives to achieve by the year 2013 by providing ICT facilities in classrooms and implementation of IT-assisted education. According to the Information Society Strategy Plan Ministry of Education is trying to eliminate infrastructure disparities in different regions of Turkey by the end of 2014.

Demand for the use of information technology in higher education was immense, because higher education requires collaboration between international higher education institutions (Şahin 2004). With the use of ICT in higher education institution students are able to make a positive contribution in international research activities. IT has revolutionized distance learning and transformed it into e-learning. IT is bridging the gap between conventional studies and distance learning speeding up learning and communication process.

## E-Government Projects

Electronic government, which refers to the use of ICT in the provision of public services, enables the creation of a participatory, transparent, and accountable government structure, where users can access public services provided in electronic form in a reliable manner, from a single point of access. With this structure, e-government is one of the most important devices in achieving a more efficient and effective public administration (State Planning Organization).

Many government institutions are trying to implement single user name and password so that all these e-government services can be accessed through [www.turkiye.gov.tr](http://www.turkiye.gov.tr) address, the system provides management with a common login aims to provide ease to the users. There is a long list of services that can be accessed through e-government Portal, below are few of them:

- ▲ Ministry of Justice
- ▲ Premiership
- ▲ Information Technologies and Communications Authority

- ▲ Presidency
- ▲ Ministry of Labor and Social Security
- ▲ General Directorate of Tea Enterprises
- ▲ General Directorate of State Meteorology Affairs
- ▲ Foreign Office
- ▲ General Directorate of Security
- ▲ Revenue Administration
- ▲ Customs and the Ministry of Commerce
- ▲ Ministry of Interior
- ▲ Turkey Job Agency
- ▲ Directorate General of Coastal Safety

E-Government applications and services are implemented through ICT investments made by public agencies. The ICT investments of central government agencies have been regularly monitored since 2002. An approximately 4-fold increase took place in central government ICT investments within a period of 10 years. ICT investments have displayed a continuous increase compared to previous years. Especially the projects in the education sector have had a major influence in the rapid increase experience in 2011. In the year 2011 total 4.9 Billion TL was allocated for 210 projects (State Planning Organization).

### **ICT in Private Sector**

Today, the prevalence of ICT has caused significant and permanent transformations in the business world. Rapid penetration of these technologies into all aspects of the business processes makes serious structural transformations necessary for enterprises. The abilities of enterprises to acquire, develop, and manage information have become the main component of economic growth, productivity, and competitiveness. In this respect, effective adoption of ICT by businesses has crucial importance in terms of the economy becoming information based, generating higher added value, and creating new fields of business. The results of the Enterprise Use of Information Technologies Survey carried out by TURKSTAT provide a basis for the efforts to determine the prevalence and scope of ICT usage by the enterprises in Turkey in all areas of their respective business processes and to examine the increases or decreases that might be seen in their productivity levels (State Planning Organization). A summary of yearly ICT allocated budget is given in table 11.

Table 11: ICT Budget allocations last 4 years

Item	2007	2008	2009	2010
Market size of the ICT sector (billion USD)	22.24	24.88	23.96	25.05
Communication Technologies	16.31	18.92	17.30	17.48
Information Technologies	5.93	5.96	6.66	7.57
Hardware	4.8	4.72	5.44	6.08
Software	0.49	0.52	0.51	0.58
Services	0.64	0.72	0.71	0.91
Market growth of the ICT sector (percentage)	-	11.87	-3.7	4.55
Communication Technologies	-	16.00	-8.56	1.04
Information Technologies	-	0.51	11.74	13.66
Hardware	-	-1.69	13.24	10.53
Software	-	5.77	-1.96	12.07
Services	-	11.11	-1.41	21.98
GDP (billion US Dollars)	648.8	742.1	614.6	736.7
Share of the ICT sector in GDP (percentage)	3.43	3.35	3.9	3.4
Communication Technologies	2.51	2.55	2.82	2.37
Information Technologies	0.91	0.8	1.08	1.03
Hardware	0.74	0.64	0.89	0.83
Software	0.08	0.07	0.08	0.08
Services	0.1	0.1	0.12	0.12

Source: Turkish Prime Ministry State Planning Organization

## Discussion

The study has shown that, advancement brought by ICT implementation in all the studied regions within the last ten years play a major part in reducing the poverty and improving literacy rates in all the regions. It is also an ICT success that those regions are more productive and profitable than when ICT implementation was not in their agenda. We can make the statement that; the achievement through the use of ICT in all the studied countries which effectively contributed to most of their needs has non compare to it, in those regions.

Furthermore, this study has found that, the most steady and remarkable growth over the last ten years happen to be ICT sector, the use of the Internet and mobile cellular phones in all the regions. In Africa Kenya alone added 3.3 million and Nigeria added 10.9 million new Internet users between 2000 and 2008. The use of the Internet in Palestine which we are not able to reach a conclusion, with the fact that Palestine Internet access is through Israel, their Internet and mobile subscription have to be approved by the Israeli Government, which definitely hinder the growth. Pakistan and Turkey have all experienced significant increase in both mobile phone and Internet subscription, even though the medium of interacting with ICT in those two countries lead to slow but steady diffusion of the ICT compared to some of the African countries whose second language happen to be English. We found that, Pakistan and Turkey have considered ICT long before some of the African countries whom speaks English as their second language, but when those countries consider ICT as a catalyst for their socioeconomic development, the rate of their ICT diffusion is far beyond the non-Native speakers of English such as Pakistan and Turkey within the

past few years. This indicates that, the rate of ICT diffusion is related to a medium of communication.

E-Government and the studied countries, Turkey in particular was found to be the best in e-Governance among all the studied countries, to the extents that most of the government institutions have implemented a single user login, where a citizen can use their national ID number and password to get access of the government portal through a single entry port [www.turkiye.gov.tr](http://www.turkiye.gov.tr). The next to our study was Pakistan which also achieved a success in e-Government with a considerable web measure index and a huge National Database Registration Authority that has non compare to it. We also looked at Africa with a few countries in mind which are South Africa, Sudan, Ghana and Nigeria. In all those countries non compare to Turkey and Pakistan in e-Governance, though South Africa can compete with them in other way round. We found Africa I-Parliaments, a continental challenge embraced by the majority of African assemblies. We believe that the problems of the failure to observe the existing rules and regulations in place, inadequate monitoring and failure to impose sanctions for violations of the rules in practice, could be reduced with the use of ICT and e-governance applied at all stages of the procurement process in all the studied countries especially Africa. We have stated that, UAE is considered as developed country in the study, we give more emphases to Palestine, but also been it under Israel vigilance not as an independent country we have no much to present with regard to e-Governance rather than an E-Government Academy launched in the year 2010 to empower the Palestinian society with the implementation of e-government services.

This paper has given an insight to four regional ICT achievement, with the increase in mobile phones and Internet users, decrease in literacy rate and decrease in the poverty rate. All the values obtained from all the countries are different, which you may ask why? To what we observed as stated by Hargittai “Studies have shown that the rate of IT diffusion is correlated to the general level of socioeconomic development” which apply to all our studied regions. We also observed that, even though ICT is at its peak level in the cities of the studied countries, yet there rural areas are still lagging behind in terms of ICT infrastructure and afford-ability, which has effects in Agribusiness and Agro-Industries. The rural farmers should have access to market information so as to what they should produce more and what not to produce. For these, consideration should be given to that as they can play a vital role to the society.

## **Conclusion**

Last decade can surely be designated as the era of ICT implementations which is known to be as Digital Divide, ICT4D, Digital Economy, Transparent Governance, E-Government, People Centered Government, E-Learning, and Student Centered Learning. These terms attracted governments of developing countries to find solution to their development challenges. From mid-nineties they started legislation and fund allocation for infrastructure development. Our study shows that ICT presence increased exponentially from year 2000 and 2009 in each developing country i.e. Cell phone users in Nigeria were up to 47% of the population, and this ratio is more or less same in all countries discussed in this paper. Though Palestine is unfortunately far behind because it is an occupied country. In-spite of that Palestine is doing the

best to develop herself to keep in touch with the latest technology compared to other regions under consideration. Africa has high cost of Internet and cell phone facilities, the cost is so high that (Uganda 194 USD/Month While in Pakistan and Turkey 13USD/Month), people living in villages cannot afford to take benefit from technology even though they are English literate. Particularly in Africa it is necessary to make an effort to reduce the cost of ICT. For countries like Pakistan and Turkey the reason for less penetration of ICT in villages is the lack of education especially of the English language, the Government needs to focus on education through ICT which will bring IT literacy and the use of ICT for socioeconomic development. AVU in Africa and VU in Pakistan is pioneer in E-learning. Said universities are providing Bachelor and Master level studies but it is necessary that the government should use these technologies at primary and secondary level. On the other hand Fatih Project in Turkey is an excellent example of providing ICT facilities at school level and trying to eradicate differences of facilities at regional level. Immolating the Fatih project by other countries can contribute a lot, by the provision of ICT infrastructures with respect to population.

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