ECONOMIC AND SOCIAL COMMISSION FOR WESTERN ASIA (ESCWA)

NATIONAL PROFILE OF THE INFORMATION SOCIETY
IN EGYPT

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ABBREVIATIONS

ADSL	Asymmetric Digital Subscriber Line
CAPMAS	Central Agency for Public Mobilization and Statistics
CMMI	Capability Maturity Model Integration
EELU	Egyptian E-learning University
eLCC	e Learning Competence Centre
FMCG	Fast Moving Consumer Goods
GAFI	General Authority for Investment
GALAE	General Authority for Literacy and Adult Education
GIS	Geographic Information Systems
GOE	Government of Egypt
ICT	Information and Communication Technology
IP	Internet protocol
ISDN	Integrated Services Digital Network
ITI	Information Technology Institute
ITIDA	Information Technology Industry Development Authority
MCIT	Ministry of Communication and Information Technology
MCSD	Microsoft Certified Solution Developer
MCSE	Microsoft Certified Systems Engineer
MDG	Millennium Development Goals
MOED	Ministry of Economic Development
MOHP	Ministry of Health and Population,
MOI	Ministry of Interior
NTRA	National Telecommunications Regulatory Authority
PKI	Public Key Infrastructure
PSP	Personal Software Process
SADP	Software Application Development Program
SCAMPI	Standard CMMI Appraisal Method for Process Improvement
SECC	Software Engineering Competence Center
TE	Telecom Egypt
TSP	Team Software Process
UNDP	United Nations Development Program

I. THE ROLE OF GOVERNMENT AND ALL STAKEHOLDERS

A. NATIONAL INFORMATION SOCIETY POLICIES AND E-STRATEGIES

As a step towards consolidating and determining Egypt ICT plans, a national ICT strategy document was developed in 2007[1] to encompass the vision for restructuring Egypt's ICT sector, maximizing the benefits of ICT for development nurturing innovation to support industry development, as well as making use of local, regional and global partnerships. The strategy was developed to continue development of state-of-the-art ICT infrastructure that provides an enabling environment for government and businesses throughout Egypt. It also links it globally, to create a vibrant and export-oriented ICT industry to leverage public-private partnerships as an implementation mechanism of different ICT initiatives. The strategy was designed to enable society to absorb and benefit from expanding sources of information, create a learning community with equitable access for its members, support the development of the skills required by the ICT industry, and finally support research and innovation in the field of ICT. Efforts exerted so far has lead to high sectoral growth rates compared to the whole economy where the sector's growth rate surpassed 19 per cent in Q4 2008 compared to 4.1 per cent for the whole economy. The private sector contributed with the biggest share of the sector's real GDP EGP 5.2 billion constituting 67 per cent of the total ICT GDP during Q4 2008.

MCIT is working on achieving its goals through three main tracks:

1. *ICT Sector Restructuring*

Reform measures undertaken by the Government of Egypt (GoE) have played a key role in improving the outlook for local and foreign investment, as well as instigating and sustaining high levels of growth and employment creation. As a result, the sector continues to grow steadily contributing 0.67 percentage points of the total GDP growth rate of the Egyptian reached 4.1 per cent in Q4 2008. Levels of ICT employment have been increasing reaching 175 thousand employees during Q4 2008 at an annual growth rate of 7.7 per cent. This figure represents only direct employment in the ICT sector; however, the number for indirect employment is even double this figure. A policy framework promoting open markets, competition and public-private partnerships were successfully put in place to enhance overall efficiency and lay the foundation for the implementation of several related programs and policies. The sound institutional framework that is already in place will bring more deregulation during the years ahead to the benefit of all stakeholders, especially consumers and investors. A set of strategies had been in place to improve regional and international connectivity, foster deployment of broadband technologies, promote convergence services and address cyber security.

2. *ICT for Development*

In today's ICT-driven economy, it is not only the technical dimensions of ICT that need to be considered but the social aspects related to education, health, labor markets, intellectual content and other areas. Egypt's ongoing strategy to increase e-access, implemented in partnership with the private sector, is providing easy and affordable access to ICT to an increasing segment of the population. The government has also facilitated the emergence of a network of IT Clubs in underserved areas, while new initiatives, such as Egypt PC 2010 –Nation Online– an initiative aiming at providing PCs at affordable prices to Egyptian households with focus on low-income brackets[2] - will further increase access and improve the quality of public services. The Ministry of Communications and Information Technology (MCIT) aims at reaching a target of 25 per cent of Egyptian households owning a PC by 2010.

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[1] http://www.mcit.gov.eg/Brochures/Egypt-ICT-Strategy.pdf

[2] http://www.mcit.gov.eg/ict_access.aspx#Nation

3. *Innovation and ICT industry Development*

Technology is increasingly becoming a major driver of competitiveness. Since new technologies benefit all activities, rapid access to such technologies in the form of new products and knowledge is vital to Egypt's development. This in turn requires developing strong local capabilities, which raises numerous market and institutional challenges.

The government's approach to ICT industry development is based on facilitating the establishment of effective and strategic partnerships in three key areas:

(a) Inter- and intra-industry partnerships that promote better linkages, alliances, networking and the formation of industry clusters to promote complementary business activity, knowledge sharing and joint ventures;

(b) Partnerships between the education sector and the ICT industry to meet industry needs for expertise and to increase capacity for innovation and research;

(c) Collaboration between the government and multinationals to promote greater cooperation in the planning and funding of ICT industry development and infrastructure initiatives.

B. PUBLIC PRIVATE PARTNERSHIP OR MULTI-SECTOR PARTNERSHIPS

The ICT sector has successfully witnessed a number of applications of the Public Private Partnership (PPP) model. In designing and implementing policies for development and renovation in Egypt, the involvement of the private sector was important in renewing and enriching the development capacity of the ICT sector enhancing overall efficiency. In this context, the Government of Egypt's approach to ICT industry development is based on facilitating the establishment of effective and strategic partnerships in:

(a) The areas of inter and intra industry partnerships that promote better linkages, alliances, networking and the formation of industry clusters;

(b) Partnerships between the education sector and ICT industry to meet industry needs; and

(c) Collaboration between the government and multinationals to promote greater cooperation in the planning and funding of ICT industry development and infrastructure initiatives.

For example, Egypt's Free Internet Initiative is a partnership between Telecom Egypt (TE) and the country's 140 ISPs to provide access to the Internet, implementing a revenue sharing scheme between ISPs and TE, to provide everyone nationwide with easy and affordable access to the Internet at the cost of a local call and with no additional subscription fees. The Free Internet Initiative represents a success story of public-private-partnership, which has resulted in higher quality and reduced prices of Internet dial-up services in Egypt, to the best interest of the Egyptian citizen. Increasing the number of online users, their usage patterns and boosting the infrastructure as a whole are building the base for future e-Government projects in Egypt.[3]

C. ROLE OF NON GOVERNMENTAL ORGANIZATIONS

The NGOs are playing an effective role in building the Information Society in Egypt. There is a number of active organizations that work in close cooperation with the Ministry of Communications and Information Technology (MCIT) for the interest of the sector in Egypt.

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[3] http://www.ictregulationtoolkit.org/en/PracticeNote.3160.html

In these endeavors, Non Governmental Organizations (NGOs) have been engaged as major stakeholders to stimulate more e-Access projects based on community ideas. Local NGOs formed central access points where a Knowledge and Information Officer is present to orient visitors and guide them to use ICT tools and the Internet. Guidance is also available regarding their needs to information such as employment, health, agriculture, and education. These local NGOs are also encouraged to undertake a continuing market research in ICT for Development to accurately satisfy community needs. Activities such as seminars, workshops, and meetings raise local community awareness about the potential of the projects.

The activities of the NGOs vary as they cooperate with MCIT and with ITIDA. In light of their cooperation with MCIT they play an important role in the ICT for Illiteracy Eradication program where they enhance the influence in local communities and assist in distributing the curriculum CDs. Another activity has been in the context of the community development portal (CDP), which enables groups of citizens in cities and rural areas to use IT tools to get the knowledge necessary to improve their lives. Communities, including NGOs provide the content on the portal to address local needs.

Mutual cooperation between ITIDA and NGO's representing the ICT industry also exists. The NGOs, often positioned as "think-tanks", helping ITIDA to shape its strategy and identify the needs as well as challenges facing the industry, in turn helping ITIDA to shape its strategy for growth and development.

II. ICT INFRASTRUCTURE

A. INFRASTRUCTURE

Telecom Egypt (TE) is the national landline provider and its network is composed of several major components, including access, transmission, switching, and signaling service intelligence to support the voice services.

The TE switching network includes at least one national gateway in each governorate to serve long distance calls. Each of Cairo and Alexandria has one international gateway as well as two mobile gateways. Launched in 1988, Egyptnet, the packet data network owned by Telecom Egypt, was the first packet switching network in the country to offer data services to the public. Currently Egyptnet services include X.25 dial-up services and direct lines with access rates up to 256 Kbps. Also provided are Frame Relay services with access rates up to 2 Mbps, and digital leased lines with access rates up to 2 Mbps. This overlay data network provides basic services for business customers and is a backbone for sophisticated and ever growing needs of different economic activities that is mainly related to high-level information technology infrastructure.

Egypt enjoys competitive prices for fixed telephony services according to the World Bank price basket methodology where the monthly cost for a fixed line in Q4 2008 was $4.34.

Figure 1 shows that fixed exchange capacity have grown significantly, where the total exchange capacity increased by 124 per cent from 6.4 million in 1999 to 14.32 million by December 2008.

Figure 1. Total exchange capacity (2005-2008)
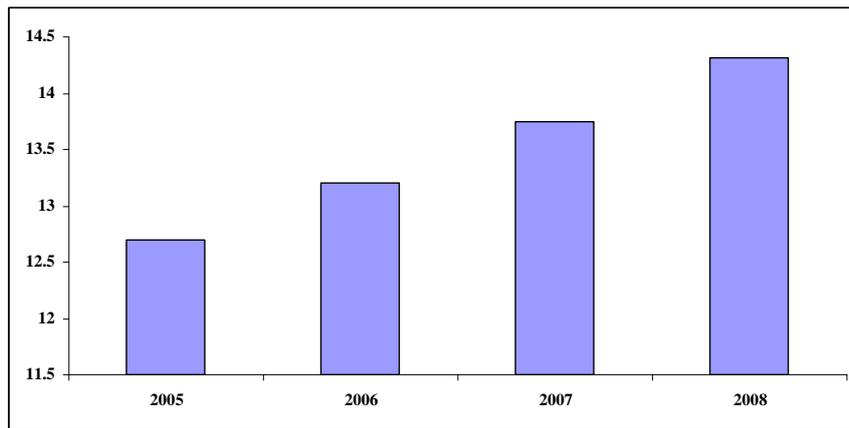
Source: MCIT, 2009

As for the mobile industry, Egypt currently has three mobile operators; Mobinil, Vodafone and Etisalat Misr with respective market shares 48.7 per cent, 42.7 per cent and 8.6 per cent as of the fourth quarter of 2008.[4] The cost of mobile service in Egypt is considered internationally competitive. According to the World Bank price basket methodology, the monthly cost of mobile services in Egypt decreased from $4.57 in the fourth quarter of 2007 to $3.62 in the fourth quarter of 2008.[5]

The mobile operators provide a wide spectrum of services including 3G services, value added services and Internet services and the three of them have signed the national roaming agreement. Competition in the market has lead, not only to price reductions, but also to introducing a variety of packages that accommodate different needs, usage patterns and affordability.

Figure 2. Growth in Fixed and Mobile phone subscribers, 1998-2008
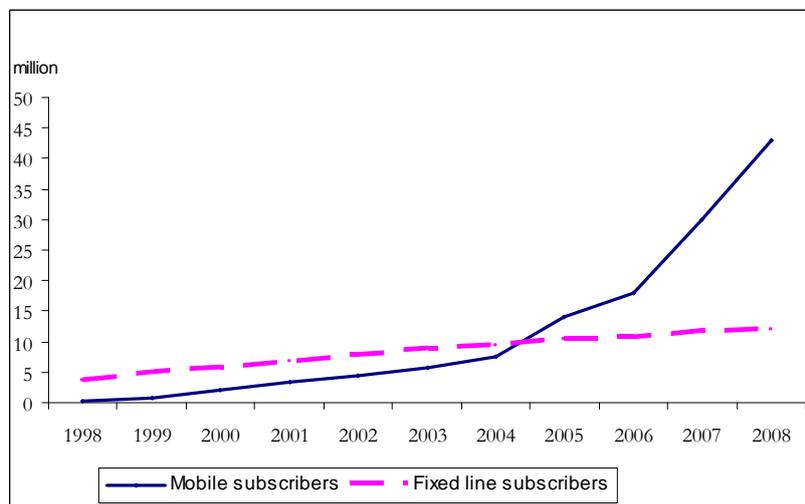
Source: MCIT, 2009

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[4] http://www.ntra.gov.eg/english/DPages_DPagesDetails.asp?ID=352&Menu=3

[5] http://www.mcit.gov.eg/IndicatorsPDF/ICT_Indicators_Bulletin_Q4_08_Eng.pdf

Figure 2 shows that the growth rate of mobile subscribers is increasing on average by 58 per cent annually compared to 12 per cent annually for fixed lines during the period (2000-2008). The steep growth in mobile subscribers reflects a growing appetite for mobile services consumption and makes room for investment opportunities in that sub-sector. Monthly increments of mobile subscribers are estimated at an average of 1 million subscribers. The total number of mobile subscribers was 53.2 million –of which 96 per cent are prepaid customers at the end of the fourth quarter of 2008. By the end of the fourth quarter of 2008, the mobile penetration rate reached 54.8 per cent at an annual growth rate of 14.2 per cent while the fixed line penetration reached 15.7 per cent at a modest annual growth rate of 0.6 per cent.

Egypt has adopted many strategies to increase availability and use of the Internet, including the launch of several initiatives among which are the free Internet initiative, the PC for Every Home Initiative and the broadband initiative. The Subscription Free Internet Initiative lead to boosting internet use and the development of localized Arabic content on the Web. Similarly, the PC For Every Home Initiative, launched by the MCIT end of 2002, to increase computer penetration rates in households, implemented in partnership with Telecom Egypt and 17 private sector computer manufacturers is a model for publ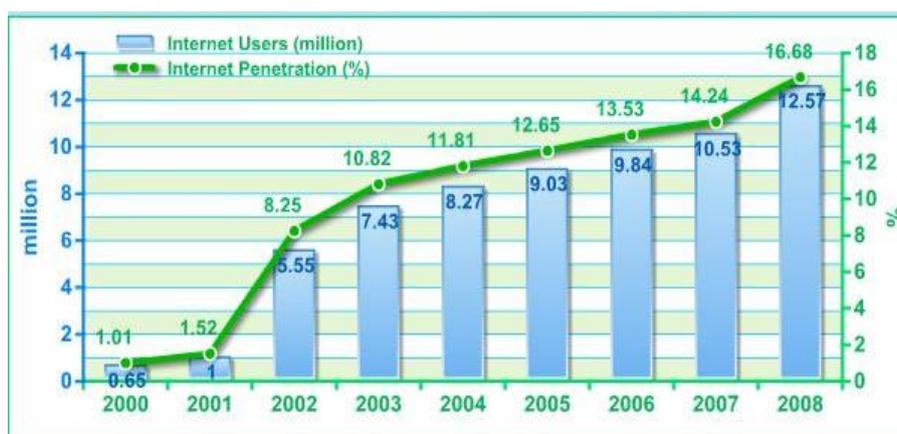ic-private partnership. It offers affordable, internet-enabled family computer on installments, with no collateral and no deposit required – the only guarantee needed being a fixed telephone line. Efforts of the government were reflected in the significant increase in Internet users from 0.65 million in 2000 to 12.57 million in 2008. Internet penetration in Egypt rose from 1.01 per cent in 2000 to 16.68 per cent in 2008 with growth rate of 15.7 per cent during the period.[6]

Egypt's broadband initiative[7] aims at reducing costs of broadband, which has already been halved. In addition, the Ministry has implemented an awareness campaign that will assist in the process. As a result, the number of broadband users in Egypt increased by 41 per cent between 2007 and 2008 to reach 7.03 million. ADSL is increasingly replacing dial-up access due to reduced monthly costs for the service, which is currently available from around $8. Broadband has also become the most prevalent modes of Internet connection for private businesses, as it is considered the best choice for any enterprises to ensure fast internet connection, while enterprises connected to the internet through analogue modems and ISDNs constitutes only 8.2 per cent and 3.6 per cent of the total enterprises using the internet respectively. Furthermore, a regulatory framework has been established for providing Broadband services especially High speed Packet Access (HSPA) which was encouraged by reducing custom tariffs of Basic Wireless equipment by 30 per cent.

Figure 3. Growth of Internet penetration, 2000-2008

Source: MCIT, 2009

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[6] http://www.mcit.gov.eg/FeatureDetailes.aspx?id=mdA4rk4Vo/4=

[7] http://www.mcit.gov.eg/FeatureDetailes.aspx?id=tZNPnpq/SyU=

Development has also taken place within the postal sector's infrastructure, where Egypt aims to develop an excellent postal service. MCIT worked with leading German firms to equip Egypt Post's printing houses with state-of-the-art digital printing facilities. Additionally, Egypt Post has entered into a twinning agreement with France's national postal operator and has signed a memorandum of understanding with the Italian national postal service. Postal offices have been upgraded to provide more than 700 electronic services and developing financial services has taken place through upgrading pension services and automating postal Remittances. By June 2008, 2880 Postal Offices had been automated. In addition, the number of postal offices increased to 3,699 by June 2009 causing average number of served citizens to reach 20.5 thousands.

B. INITIATIVES/PROJECTS FOR ICT INFRASTRUCTURE AND DEVELOPMENT OF NEW SERVICES

Technological development in Egypt is a highly promising and dynamic market. Accordingly, the government is continuously working on providing the optimum investment, legal, and administrative climate to further encourage investors in this field.

One of the major projects is the first Contact Center Park in Maadi which is the first equipped to cope with the country's fast development in ICT and to benefit from Egypt's exclusive and strategic advantages, namely the availability of qualified and multilingual workforce, excellent infrastructure, strategic location and political stability. The contact center park offers the latest call center technologies. In addition, investments in Smart Village have increased to 4 billion EGP as the 3rd phase of smart village was completed. A second Smart Village is to be built in Damietta.

On the other hand and in its continuous process of modernizing ICT infrastructure Telecom Egypt (TE) is seeking a strategic partner to modernize Egypt's core backbone. This three-year, $1 billion project will position the country as a regional telecommunications hub. TE is also soliciting private partners to deploy a fixed Wireless Local Loop nationwide and assist with the launch of its cellular phone network. TE has also installed a submarine cable named TE-North that will link Egypt with Asia and Europe of capacity Terabytes.

Other infrastructure investments include a License Award to build operate and maintain Cables Network and Infrastructure with a total investment value of $233.8 million. In addition to a License Award to a new submarine cable linking Egypt to France with a total investment value of $125 million which is considered to be the largest cable in Middle East consisting of 8 pairs of fiber optics.

Egypt was able to attract more foreign direct investment (FDI) over the past few years with an estimated figure of $1 billion annually,[8] a trend which is expected to continue with additional innovative incentives planned to be introduced in the years to come.

Egypt also aims to increase overall levels of private sector investment in the postal market. This has taken place through cooperation between MCIT & Egypt post to develop the sector's policies and regulations while defining the responsibilities of the regulator and the operators and encourage competition among companies and invite the private sector to participate in the market.

C. ICT CONNECTIVITY

A number of programs have been implemented in order to guarantee universal, easy, affordable and rapid access for all Egyptian citizens to ICT, and stimulating awareness of the potential uses and benefits of ICT. For example, the "Mobile Internet Unit"[9], a vehicle that is equipped with computers that travel to

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[8]http://www.mcit.gov.eg/Presentations/DrTarek_Presentation_French_ICT%20community_Dec%20200720071231144954.pdf

[9] http://www.mcit.gov.eg/ict_access.aspx

remote areas to provide access to technology and entrance to cyberspace. The unit is not merely equipment but it is a comprehensive program for members of the community to become equals with any metropolitan resident. Courses are offered for computer literacy, internet access, business skills, and more. Such a project has been able to act against the challenges posed by unbalanced infrastructure setup across Egypt.

Another example is the ICT for Illiteracy Eradication program, which produces electronic content for teaching Arabic letters and words and elementary mathematics based on the General Authority for Literacy and Adult Education (GALAE) curriculum for illiteracy eradication. The program has adopted a mixture of taught and self-study courses. MCIT established Training of Trainers programs in 15 governorates to serve growing demand for basic literacy training. Most of the training is run at IT Clubs but the CDs are available to all who need them at no charge.

All this effort has indeed resulted in higher ICT connectivity reflected by increased Internet access and usage among different social brackets and in all regions of the country. The proportion of localities with public Internet access centers (PIACs) stood at 41 per cent at the end of 2008, up from 39 per cent at the end of 2007. In general, the proportion of Egyptian households using the Internet increased to 15 per cent by January 2009, from 14.7 per cent in January 2008 and 12.9 per cent in June 2007. In addition, the proportion of Egyptian government entities using the Internet stood at 34 per cent in June 2008, up 11.5 percentage points from 22.5 per cent in June 2007.

Connectivity in the field of education also has increased. Around 87 per cent of Egyptian public schools using computers in 2008 were connected to the Internet, compared to 79.3 per cent in 2007. This percentage even increase to reach 88.9 per cent for private schools in Egypt.[10]

Figure 4. Public Internet Access Centers (PIACs) (2000-2008)
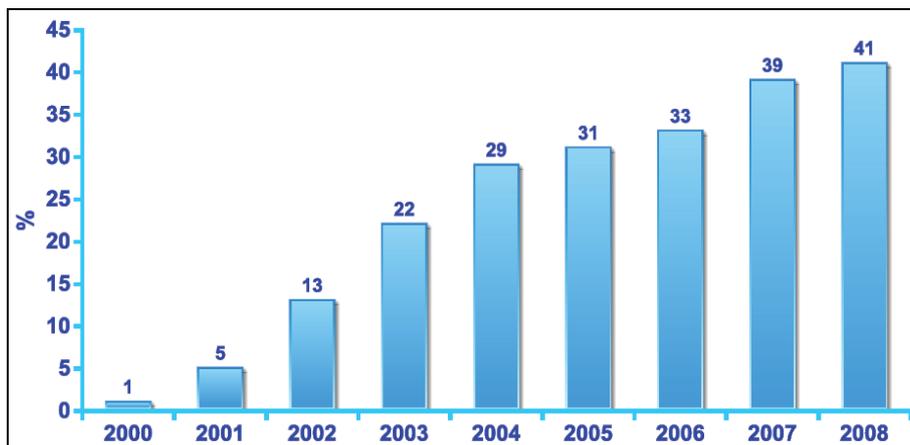
Source: MCIT, 2008

D. INTERNET INFRASTRUCTURE

While satellite networks played a leading role in the development of Internet services in Egypt in the mid-1990s as the upstream backbone connection, their role has subsided since the turn of the century due to the increasing demand for bandwidth that can only be provided through fiber optics. Successive reductions in the cost of bandwidth delivered through fiber optics provided a much more attractive solution for establishing backbones and delivery of services throughout Egypt. TE had previously signed with the Fibre Optic Link Around the Globe (FLAG) project an agreement, to build a local IP peering point for FLAG in

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[10] http://www.mcit.gov.eg/Brochures/SWF/PublicationsShow.aspx?file=The Future of the Internet Economy (Version II).swf

Egypt. The peering point located in Cairo, directly connects ISPs to FLAG IP backbone via an STM-4 link on FLAG cable. This agreement resulted in decreased prices for international Internet connectivity.

However, the need to take ICT services to rural areas where fiber-optic networks are impractical due to limited demand and rough terrain requires new solutions. Recent developments in satellite technology that have resulted in lower costs and higher throughputs now make it a more viable means to connect rural areas.

MCIT's broadband initiative relies on wireless access, to develop broadband services particularly in rural areas and new satellite cities where infrastructure may not be as developed as in urban areas. Broadband Fixed Wireless (BFW) access is another alternative that has gained increasing importance in Egypt during the last few years. With its ability to provide broadband services to rural areas especially where wired infrastructure is limited, it serves a double purpose. The first is cheap Public Switched Telephone Networks (PSTN) connection to new and far areas without the cost of extending wires to these areas. The second is high-speed Internet access that can serve as an alternative to ADSL, or where ADSL is not suitable due to the distance from the central office or old wirings. With respect to WiFi, the National Telecommunications Regulatory Authority (NTRA) has already set recommendations and guidelines for the establishment of public hotspots using WiFi. Initiating a WiMAX field trial is one short-term action that has been put on the broadband initiative's roadmap, and pursued by MCIT as a preliminary step toward a more profound broadband wireless program. The field trial took place at the Smart Village and lasted for six months ending in May 2005. Using WiMAX, the field trial connected five buildings within the Smart Village (20km outside of central Cairo) to the Internet and to MCIT offices down town Cairo. The trial connected two other remote locations using the same technology. Later, in May 2007, two WiMAX pilots were launched to establish trail WMANs in touristic areas of Luxor and Sharm El-Sheikh. The two pilots were carried out through partnership between MCIT, NTRA and ISPs in cooperation with USAID. Spectrum availed by NTRA for those trials and pilots were also used for other pilots by different vendors, to test broadband connectivity to selected schools and hospitals in rural areas. The scope of those trials was not only to test the technology with the applications running on top of it, but also to address the regulatory framework that is appropriate to the local market in Egypt as well as the viability of the business model so that commercial deployments of WiMax can begin at a much larger scale.

In an effort to enhance the development of the broadband market in Egypt and to continue its liberalization in infrastructure, MCIT in collaboration with the Ministry of Electricity and Energy MOEE in 2006 planned for deploying broadband over power lines technology in Egypt. This will make use of the privilege of the national power line grid, which covers more than 95 per cent of households with fibre optic core network. In order to fulfill the project requirement, MCIT and MOEE agreed on piloting a project on the power grid of MCIT buildings to test its features and capabilities in delivering triple play Data (Internet), Voice and Video with aggregated speed up to 200Mbps. The project will take place in the Egyptian Smart Village (five users buildings and three medium/low voltage distribution stations) over an area of one square kilometer.

Egypt's international Internet bandwidth witnessed steady growth between 2001 and 2008, with an average annual growth rate of 94 per cent. Egypt's total international Internet bandwidth reached 27,077 Mbps by the end of 2008, bringing per capita bandwidth to 359 Bps

Figure 5. International bandwidth capacity (2001-2008)
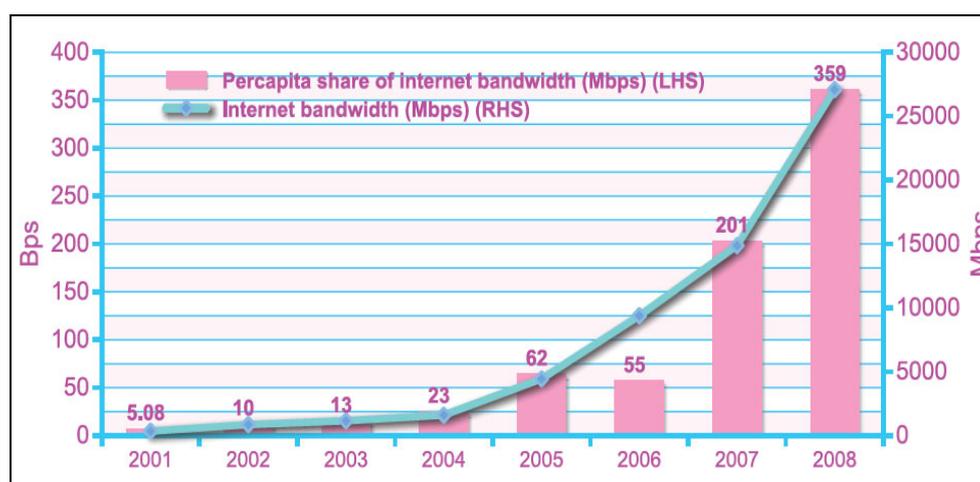
Source: MCIT, 2008

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III. ACCESS TO INFORMATION AND KNOWLEDGE

A. PUBLIC DOMAIN INFORMATION

Egypt places high regard in developing and distributing Arabic e-Content that forms the basis of intellectual and cultural inspiration for future generations. Accordingly, MCIT has led the way to the establishment of an e-content industry in Egypt through its Arabic e-content initiative. This initiative aims to enhance the competitiveness of the Egyptian e-content industry by supporting the production, use and distribution of Arabic digital content on global networks.

Today over 2000 Egyptian websites[11] are offering knowledge and information covering several subjects including travel and tourism, sports, news, art, education and business. For example, Egypt's Center for Documentation of Cultural and Natural Heritage (CULTNAT), is a website[12] that documents the various aspects of Egypt's tangible and intangible cultural heritage as well as its natural heritage using ICTs. Another example is "Egypt Memory Online Shop[13]" which is the first of its kind in the Middle East, where the portal offers a unique e-commerce model for cultural heritage that provides visitors and shoppers worldwide with a variety of cultural and heritage products like books, CDs, atlases and high-resolution images.

Digital Libraries and archives also provide rich information resources for the public. Examples of websites for Egyptian libraries are the New Library of Alexandria[14] (Bibliotheca Alexandrina) and the National Archives of Egypt.[15]

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[11] http://www.egyports.com/

[12] http://beta.cultnat.org/

[13] http://www.egyptmemory.com

[14] http://www.bibalex.org/English/index.aspx

[15] http://nationalarchives.gov.eg/nae/home.jsp

B. ACCESS TO INFORMATION AND PUBLIC INFORMATION

NTRA through Universal Service Fund is availing affordable Telecom services through 4 phases:

(a) Provision of basic telecom services to remote areas.

(b) Increasing penetration of telecom services by 20 per cent in each governorate.

(c) Availing Internet and data transfer services in remote areas starting with main villages to enable use of E-government services.

(d) Increasing household fixed teledensity to 100 per cent.

In May 2004, the "Broadband Initiative" was launched under the auspices of MCIT and in partnership with NTRA, TE and licensed data operators. The initiative focused on four main targeted objectives:

(a) Realizing affordability by reducing fees related to local loop sharing, as well as national and international capacities;

(b) Ensuring availability by introducing automation to ADSL roll-out systems both at the incumbent as well as at the private sector companies;

(c) Spreading awareness, by introducing effective call center support at both government and private sector levels initiating a strong awareness campaign to spread awareness among the public of the broadband and ADSL benefits;

(d) Establishing recommendations and guidelines.

The "Broadband Initiative" was reviewed twice in July 2006 and in July 2007 and both reviews were part of the continuous improvement and adjustment process, which has resulted in:

(a) Reductions in ADSL service prices;

(b) The introduction of new packages with higher speeds;

(c) The liberalization of broadband prices;

(d) Subsidizing, through the universal service fund, national capacities in areas with lower demand, to overcome the higher prices of service provisioning in those areas; and combating illegal sharing of ADSL lines.

C. MULTI-PURPOSE COMMUNITY PUBLIC ACCESS POINTS

The IT Clubs model offers a communal solution to problems of affordability, accessibility, and awareness. IT Clubs are an essential component of the country's national plan to familiarize people with computers and promote ICT awareness regardless of skills, gender, and income level. IT Clubs allow affordable Internet access throughout the country to those who cannot afford to own a PC. The price for access is around LE 1 (about $0.20) per hour.

The value of the IT Clubs project is in its availability to the mass population. Computer literacy has become second nature to many societies and individuals without which they find themselves isolated and excluded. The challenge is great in a country like Egypt due to the high illiteracy rate and the low incomes of many families.

In a survey done by MCIT and the Central Agency for Public Mobilization and Statistics (CAPMAS) on IT clubs, 70 per cent of the respondents mentioned that IT clubs have positively impacted them the most in the area of acquiring advanced computer and internet skills. On the other hand, 19 per cent pointed out that they benefited from services provided by IT clubs in getting better job opportunities.

Users receive guidance through instructors available in each club as well as training for basic skills, such as keyboarding, software applications, and Web design. The government provides all equipment and hardware necessary for each club's launch, including computers, printers, peripherals, Internet access, a network (LAN), and a server.

As of March 2009, there were 1846 IT clubs in Egypt. The number of clubs is expected to grow and will eventually reach every neighborhood in the country. The expansion is not only in the number of clubs but also in the activities and target groups within each club. MCIT is working on activities for those with special needs, and children who have dropped out from the schooling system.

D. USING DIFFERENT SOFTWARE MODELS

Even though there is a thriving community of open source contributors and practitioners in Egypt, there is very little actual use of open source technologies in the market. Commercial software vendors such as Microsoft, Oracle and IBM dominate the government and large enterprise market with their products, while the use of technology solutions in small and medium and the education sector is quite limited. We estimate that the local software and service market in Egypt is about $400 million yearly, with open source accounting for less than $2M of that.

IV. ICT CAPACITY BUILDING

A. BASIC LITERACY

MCIT has trained 50 literacy instructors and facilitators through the Illiteracy Eradication Initiative to help illiterate people when they are first using IT Club computers. This assistance can either be in the form of courses or self-study from CDs. MCIT has already established Training of Trainers program in fifteen governorates to meet rising demand.

The pilot schemes were selected based on local illiteracy rates, availability of IT Clubs, and supervisory representation in both rural and urban areas. The first CD was tested and evaluated during 2004, with pilots being organized by GALAE and the National Council of Women in Qalubiya and Fayoum. These were evaluated internally and by the Social Research Center of the American University in Cairo, and based on a comparison with six traditional illiteracy eradication classes in the same governorates it was apparent that retention rates were higher and learning was quicker by use of the CD based media Offered at no charge.

B. ICT IN EDUCATION AND TRAINING

The Egyptian Education Initiative (EEI) is a public-private partnership between the government of Egypt and the World Economic Forum's IT member's community to support Egypt's overall education reform efforts. IT companies working with the government of Egypt in the area of education have also contributed in the formulation of this initiative. The initiative's objectives are as follows:

(a) Improve the development and delivery of education for Egypt's citizens;

(b) Facilitate educational reform that will enhance the creativity of teachers and students through the effective use of ICT;

(c) Develop the capacity of the local IT industry to adopt innovative learning solutions in partnership with world-class firms;

(d) Upgrade channels of lifelong learning that foster socio-economic development through e-learning and delivery centers;

(e) Establish virtual learning communities that will enhance educational performance, remove limitations and create opportunities;

(f) Prepare all students in schools and universities to join the digital workforce;

(g) Leverage national government commitment and corporate citizenship in building a model of educational reform that can be exported and replicated throughout the Arab region.

The EEI is divided in two key tracks: Pre-university Education and Higher Education Track: The Pre-university education track will increase the capacity of education leaders and their scope to plan, monitor and implement policy-level decisions. It will also develop appropriate low-cost over time school technology models and accessible e-curricula for different subjects based on content. E-training will also be offered to teachers to build up management and leadership competencies, nurturing a culture of innovation and collaboration.

The Higher Education track will support the ICT infrastructure for both academic and research institutions and assist in the introduction of e-Learning in Egyptian universities. The work program will support management information and decision support systems for academic and research institutions and establish a system for monitoring quality assurance accreditation. The program will also support important initiatives to enhance the post-graduate studies and scientific researches for better creativity and innovation through the expansion of digital libraries and use of modern management systems.

The Egyptian Education Initiative (EEI) which aim to cover 2000 schools, has already finished by the end of Feb 2009 training 137,470 teachers on ICT usage and still in the process of improving the infrastructure of schools and providing them with computer labs and access to the internet. In addition, by the end of 2006, the initiative has succeeded to provide internet access to 26 universities and institutes and build 20 e-labs.

Figure 6. Percentage of universities connected to the Internet and PCs

Source: http://www.egyptictindicators.gov.eg
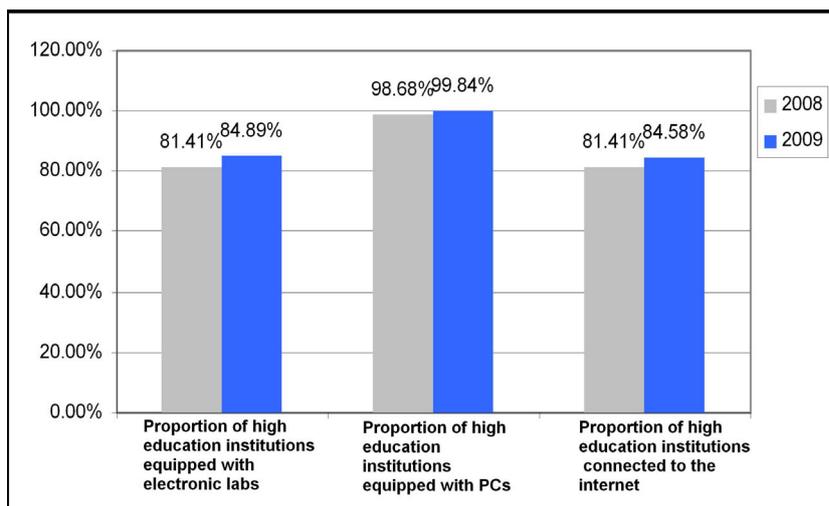
Besides the Egyptian Education Initiative, the e-Learning Competence Centre (ELCC) - a partnership between MCIT and Cisco - aims to develop Egypt's e-learning industry and lay down the necessary technical, academic and administrative foundation. The center develops e-learning and lifelong learning

curricula, creates technical delivering platforms (Learning Management Systems -LMS) and manages the programs' delivery. Training of trainers, content development, customization of Cisco materials, and development of the physical network of Academies are all coordinated at ELCC. The ELCC also has a Research and Development unit, which tackles issues such as interoperability between different platforms and is currently piloting a solution to overcome this problem between two universities. In efforts of developing Egypt's e-learning industry, 651 E-Learning centers were accredited during (2005-2009).

Figure 7. Percentage of schools connected to the Internet and PCs

Source: http://www.egyptictindicators.gov.eg
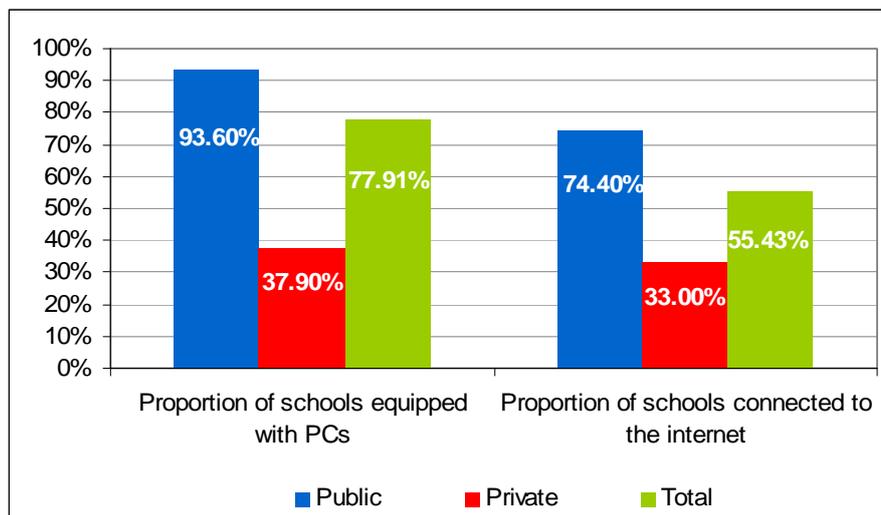
Another entity in that field is the Nile University (NU), which is a non-profit, privately owned and autonomously managed institution of higher learning. NU is committed to conduct, promote and nurture scientific research in areas of critical importance to the economies of both Egypt and the region as a whole. NU faculties launched the following three institutional research centers:

- Center for Wireless Intelligent Networks (WINC);
- Center for Informatics Science (CIS);
- Center for Innovation & Competitiveness (CIC).

The underlying intent of these centers is to: define the areas of focus of NU's major initiatives and in that sense define NU's research core capability, brand NU as a center of expertise in the areas selected, highlight Egypt's role as the region's intellectual hub, ensure linkage with business, industry, and government. The total number of enrolled students in different programs reached 250 students and the total number of graduates reached 50 students in June 2009.

C. TRAINING PROGRAMS FOR CAPACITY BUILDING IN THE USE OF ICT

Training programs are at the core of Egypt's effort to build its ICT capacity. Training is offered through many organizations public and private and in partnerships with international partners. Specialized Training Agencies like (ITI) are providing training programs in different tracks to respond to the market needs for qualified personnel in addition to accredited academic degrees. Programs include: CSADP, MCSD, MCSE, LAN Administrator, Linux Administrator, UNIX Administrator, Web Development, Programming Languages, and Soft Skills. Academic degrees include: MSc in IT, MSc in Electronic Commerce, MSc in System Dynamics, MSc in Mechatronics, and MSc in GIS. Another specialized training agency is the National Telecommunications Institute (NTI), which is a center for telecommunications systems, technologies, policies and management. NTI is considered a center of excellence, a leading training and

educational institution, and focal point for applied research activities in the field of telecommunications. The research and training facilities in all different departments together with a team of highly qualified researchers and technical staff enhance NTI capabilities to provide services and support for the telecommunications sector not only in Egypt but also in the rest of the Arab world and the whole region. Figures of MCIT show that the number of trainees at ITI and NTI by the end of March 2009 amounted to 36,946. The total number of trainees in the ICDL program reached 900,500 trainees at the end of March 2009, of which 168,400 had already gotten their license. In addition, MCIT contributes 80 per cent of training costs for university graduates to support them with soft skills and multilingual skills.

Another initiative is the ICT for Micro, Small and Medium Enterprises (M/SME)s project which was initiated in 2006 in partnership with Microsoft, Cisco and ELCC to provide ICT training programs to M/SMEs and Train of Trainer (ToT) programs to NGOs. The project focuses on three business sectors: agro-business (food production and textile), furniture and handicrafts. The project runs awareness programs to encourage the adoption of ICTs in addition to conducting competitions, creating applications for distribution of information via bi-directional mobile devices and managing a program for the impact assessment of ICT utilization by SMEs.

Also, as part of the Egyptian IT Industry's National Development Strategy, ITIDA launched its Enterprise Capacity Building Program "GrowIT" to increase the international competitiveness of 100 Egyptian IT companies that are either existing exporters or have export potential.

D. INNOVATION AND PATENTS

Under the earlier patent law, patent protection was available for chemical processes for foods and pharmaceuticals but not for resulting products. It also expanded the protection for undisclosed information. Expanding the usage of the Internet and the technological devices in addition to the increase of the counterfeit products in the global trade present new challenges for the enforcement officials, courts, and persons seeking the benefits of this expansion in legal protection may experience delays, as procedures are developed to address issues that are new to Egypt.

In addition to expanding the types of protection available in Egypt, Law 82/2002 strengthened the intellectual property system by mandating a full examination system for patents and industrial designs. Under the previous industrial designs law, the Industrial Designs Office lacked legal authority to refuse registration to any application, with the result that applications known to be legally insufficient were sometimes accorded registration.

Law 82/2002 also introduced specific provisions on enforcement, with an emphasis on conservatory measures such as seizure of goods to determine infringement and preserve evidence, and in some cases seizure of the implements of infringement and disposition of the infringing goods. In the past, injunctions have not been frequently granted in Egyptian courts, but judges have recently begun issuing injunctions in appropriate IP cases, and there have been a number of cases in which the courts imposed maximum penalties in criminal cases and issued commercially appropriate damage awards in civil cases.

In addition, under the Patents support program companies trying to register new patents are encouraged through a Subsidy of 15 Thousand EGP per patent.

V. BUILDING CONFIDENCE AND SECURITY IN THE USE OF ICT

A. USE OF ELECTRONIC TRANSACTIONS AND DOCUMENTS

An electronic signature law was issued in April 2004 and went into effect in May 2005. The law helped expand online banking services, gave legal force to electronic signatures and established the Information Technology Industry Development Agency, ITIDA; a self-sustainable agency that aims to promote, encourage and regulate the use of electronic dealing mechanisms by SMEs and to promote exports in telecommunications and IT. The e-signature law provides the support infrastructure for the authentication of electronic transactions, allowing for the development of e government services, electronic document exchange, and ecommerce amongst other benefits. To help roll out the e signature law efficiently, the government established the e signature Regulatory Authority within ITIDA to build and operate the Root Certificate Authority (ROOT CA) representing the trust anchor for all relevant parties within that domain. The trust center is established according to the latest international security specifications.

As the law puts the legal and regulatory infrastructure for e-business, it clarifies the borders and limits of electronic documentation and identifies relevant and irrelevant practices. Hence, it creates a transparent environment for doing business electronically in a way that protects different business stakeholders. This will help improve the efficiency of government services putting Egypt on an equal footing with global competitors in a world where e-signatures are becoming the norm.

B. ONLINE AND NETWORK SECURITY

Security is among the main pillars of the Information Society. It is vitally important that governments enhance user confidence, build trust, and protect both data and network integrity.

Egypt's Information Technology Industry Development Agency (ITIDA) is producing an Egyptian USB-based authentication token for multiple applications and network services by end of 2009, such as E-signatures, virtual private networks, intranet and extranet controls, and Internet access. The smart token, developed to international standards to support interoperability, can also be used in public key infrastructure (PKI) environments.

Type Approval is a major function of the National Telecommunications Regulatory Authority (NTRA) of Egypt. Part of the NTRA's mission is to regulate the ICT industry equipment market by ensuring that the equipment available in the local market complies with approved technical, health and safety standards to protect users and ensure interoperability with public networks. Type Approval regimes remain the most common method for regulating this activity; however, there has been a global move toward harmonized conformity assessment regimes. Developing an effective and efficient equipment certification process and ensuring adherence to global standards benefits both the industry and users, as it protects the integrity of the telecom networks, guarantees that consumers get standard equipments that works and prevents frequency spectrum interference.

In February 2009, the family e-safety kit was published. It provides guidance to Egyptian families with children aged between 6 and 12 years to the safe use of the Internet.

C. PRIVACY AND DATA PROTECTION

In order to enforcement the security of using electronic means of data exchange, a Cyber Protection Law is about to be issued before the end of 2009. The law will build up on the existing infrastructure that allows for the privacy and protection of data like the strict hierarchal architecture for implementing PKI where several governmental and private entities, including leading private banks and Egypt Post, are establishing PKI-enabled infrastructure.

D. COUNTERING MISUSE OF ICTs

The Egyptian government, in cooperation with the private sector, has initiated actions to prevent, detect and respond to cyber-crime and misuse of ICTs. These measures include developing legislation regarding investigation and prosecution for misuse; promoting effective mutual assistance efforts; strengthening institutional support at the international level for preventing, detecting and recovering from such incidents; and encouraging education and raising awareness. A national Computer Emergency Response Team (Egypt-CERT) has been formed and the team has already received international specialized training and are undergoing high-level exams allowing them to compete with international standards. The CERT will provide rescue to any data breaching that succeeds in breaking through the PKI especially in critical sectors such as the financial sector. In addition, a national Cyber Security Council and a Critical Information Infrastructure Protection Task Force are being established. It should be noted that the percentage of e-crimes in Egypt was lowered by 60 per cent.[16]

VI. ENABLING ENVIRONMENT

A. LEGAL AND REGULATORY ENVIRONMENT

The Telecommunications Act (Law 10/2003) calls for liberalizing the telecoms sector under the oversight of NTRA. The law aimed to bring Egypt into conformity with the World Trade Organization (WTO) Basic Telecommunications Agreement (BTA). The law called for the establishment of NTRA, which took place in 2003 as institutionally separated from MCIT. It is important to note that as part of the regular assessment of the policies to cater for the changes taking place in the telecom sector globally and to adapt to the local needs, the framework of the Telecommunications Regulation Act was later extended through a number of secondary legislations and ministerial decrees and based on the Egypt country analysis conducted as part of the EU New Approaches to Telecommunications Policy II (NATP II) in December 2006. NTRA is responsible for all aspects of licensing, numbering, interconnection, universal service, consumer rights, management of the frequency spectrum, regulation of imports and the manufacturing of telecom equipment. In the interim a number of new laws were passed to help develop a legal framework for liberalization, including the Investment Law (13/2004), the Electronic Signature Law (15/2004), the Tax Reform Law (91/2005) and the Antitrust Competition Law (3/2005). The Telecom law also called for an end to TE monopoly on fixed-line services by the end of 2005 and the Minister of CIT announced in May 2007 that a second fixed-telephone license would be to put an end to state-owned TE monopoly over the voice-telephony market, but the second license issuance was delayed due to the difficult nature of the current global economy.

Egypt has been applying protection for Patents since 1949 (under Law No. 132/1949) with the definition of patentability provided by the Convention of Paris. A new Egyptian legislation for protection of intellectual property rights was issued in 2002 (Law No. 82/2002). The law was issued in order to protect the rights of software companies and fight software piracy as it stated that every software company has to seek a license to Record & register original computer software and D/Bs. The government is currently enforcing the intellectual property law and is applying the jurisdictions of criminal law on violators in order to provide a fair and competitive setting for the industry. One recent market driver has been a significant fall in software piracy, with Egypt named by the World Bank as the top reformer in 2007. The Business Software Association found that the software piracy rate was down to 60 per cent in 2007 - below the global median piracy rating (61 per cent) for 2007 - from 63 per cent the previous year and 69 per cent in 2003. The progress is due largely to government deals with vendors to provide software for the public and the education sectors.

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[16] http://www.mcit.gov.eg/NewsDetails.aspx?id=7ibO9z3SNgQ=

Part of Egypt's ICT strategy is strengthening legislation and regulations supporting IT-enabled service export industries for which several measures has been taken like; establishing a unit in ITIDA for licensing certificate service providers (CSPs) & issuing electronic signatures and certificates to companies and individuals as well as establishing Intellectual Property Rights Office (IPR) in ITIDA to reinforce Intellectual Property Law introduced in June 2002 and launching the electronic signature law in October 2009.

B. DOMAIN NAME MANAGEMENT

The Supreme Council of Universities is the top-level domain authority in Egypt (.eg). The EUN provides its services for .edu.eg, .sci.eg, .eun.eg, and .org.eg sub domains. The Cabinet Information and decision Support Center (IDSC) provides its services for the .gov.eg domain and MCIT is responsible mainly for serving the sub domains under .gov.eg, while private sector gateways are providing connectivity services for the commercial sector. In total, Egypt has more than 4,640 website under top-level domain (.eg) in many fields or sub domains.

C. STANDARDIZATION IN ICT

The Software Engineering Competence Center (SECC) was established in 2001 as part of the efforts that support IT industry. Its main objective is to promote and support the development of IT industry to achieve strong presence in the international market through the adoption of international standards for software development. SECC also works on enhancing the capacities of software companies to comply with international standards. In 2006, SECC became a partner of the Software Engineering Institute of Carnegie Mellon University upon which it was authorized to deliver various programs that enhance the standards of local software like CMMI, PSP, TSP and SCAMPI. In February 2008, SECC became an ESI Center through the cooperation with the European Software Institute to promote a more competitive ICT industry in Egypt.

D. SUPPORTING MEASURES

The Egyptian government represented by the Ministry of Communications & Information Technology MCIT for the sector, has collaborated with other stakeholders in carrying several initiatives and projects to further develop the ICT sector in Egypt.

1. *Technology Development Fund*

TDF was founded in 2004 with the mandate of driving the growth of innovative Egyptian startups in the ICT fields through providing them with the most comprehensive set of venture capital financing and venture development services. In cooperation with MCIT, the fund organizes an annual business development plan competition within the framework of the technology incubators program. Three hundred projects are presented yearly to the contest, of which 15 are short-listed to be included in the technology incubators program at the Smart Village.

2. *Technology Incubation Program*

Technology incubation program (TIP) mission is to leverage innovation in Technology to create a new tier of seed companies & startups that contribute towards economic development, create wealthy job opportunities, increase Egypt patent recognition and as a result increase exports of ICT products. It aims at increasing awareness towards entrepreneurship within the ICT domain identifying potential innovations in ICT and qualifying candidates of potential for Incubation.

Egypt's IT sector is forecast to grow from $889 million in 2006, to $1.6 billion in 2011; expanding its already robust infrastructure to support startups and small to medium businesses on a national and international level. Owing to its tax, custom and financial sector reforms, Egypt is in a strong position to

provide outstanding incubation management to seed and startup IT companies and has set-up the Technology Incubation Program (TIP) to help support this development.

ITIDA supports incubators by providing furnished office space in Smart Village including PCs, laptops, and other office equipment. Incubators receive full training and consultation, focused on technical, project management, HR, financial, marketing, business development, and networking. The incentive packages also include payment of salaries based on a pre-defined salary scale. Following the approval of the Technology Incubation Management to hopeful candidates, ITIDA supports startup conferences and international exhibitions worldwide.

In total, there are nearly 50 employees in incubation management program of which 85 per cent are recent graduates. In addition to the role model incubator managed by TIP, there are four other projects representing first phase of the MUSCAT incubator co managed by ITIDA including two telecom projects and two software solutions.

Increasing our outreach to other governorates is in progress with Assiut University, Mansoura University as well as Cairo University all being our short to medium-term targets.

ITIDA supports incubators by providing furnished office space in Smart Village including PCs, laptops, and other office equipment. Incubators receive full training and consultation, focused on technical, project management, HR, financial, marketing, business development, and networking. The incentive packages also include payment of salaries of up to 25,000 Egyptian Pounds, based on the salary scale. Following the approval of the Technology Incubation Management to hopeful candidates, ITIDA supports startup conferences and international exhibitions worldwide. There are also plans to expand the project, reaching out to graduates and startups at Cairo University, Mansoura Governorate and Assiut Governorate.

3. *ICT Trust Fund*

The United Nations Development Program and MCIT have formed together in 2002 an agreement establishing a partnership to guide and manage Egypt's Information and Communication Technology (ICT) Trust Fund.

The Fund's main purpose is to utilize ICT to further development in Egypt by increasing awareness of its benefits, and by making information technology (IT) more accessible and affordable to all citizens. The Fund aims to contribute to poverty reduction and job creation in Egypt by introducing computers and IT into the daily lives of its citizens. The Fund will empower communities giving them access to the information they require at their fingertips – or the click of a mouse. The ICT Trust Fund will be financed by contributions from the Government of Egypt, private sector, bilateral and multi-lateral donors.

VII. ICT APPLICATIONS

A. E-GOVERNMENT

The e-government portal[17] is continuing its effective role in providing services for individuals, businesses, and foreigners. Currently the number of services is increasing and the type of service is witnessing remarkable improvements. A number of services are available on the Website with the provision of e-payment facility. In addition to this, the documents necessary for accomplishing Government services are available for download. In order to encourage citizens to use the Website, a new initiative by the government was to organize a contest between users that rewards them as they use the website more frequently. The services provided by the e-government include digital assets repository, land transportation

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[17] http://www.egypt.gov.eg

services, traffic attorney and vehicle licenses services, as well as online services for businesses like Qualified Industrial Zone services and environmental services. Further more the e-government offer online services to foreigners such as Egypt airline ticketing services and cultural services.

MCIT is taking a major role in facilitating e-Government as part of the Egyptian Information Society Initiative (EISI). One of the core objectives of the initiative is to modernize the way citizens interact with their government by introducing CITs to the internal operations of government departments and to their interface with the public.

E-Government Readiness Index is a composite index that indicates whether the governments are moving foreword in e-government development around the world or not. It is comprised of three sub indices: Web Measure Index, Telecommunication Infrastructure Index and the Human Capital Index. Egypt rank in the e-Government Readiness Index 79th position in 2008 rising 20 ranks from the 99th position in 2005. E-government solutions include:

1. *Automation of Authentication Offices Project*

Automation of Authentication Offices project is a joint collaboration between MCIT and Ministry of Justice in 2004. The pilot successfully demonstrated that the reengineered workflow and automation of the authentication cycle improved processing time by 80 per cent. Currently, the data center and 15 notarization offices are being automated and another 35 are in progress. It also includes establishing a decision support system and data-mining center affiliated to the Ministry of Justice and establishing a web portal to provide e-services to the public.

2. *Automation of Chambers of Commerce Project*

Automation of Chambers of Commerce Project is automating the workflow of the Chambers of Commerce and introducing decision support systems to the Federal Union for Chambers of Commerce in addition to laying down the necessary infrastructure (PCs – LAN – Internet connectivity). The project also provides training for employees in all the Chambers of Commerce on how to use the new systems.

3. *Enterprise Resource Planning (ERP) Systems*

Another group of activities in support of the EISI initiative on automation and re-engineering processes for e-Government that MCIT is executing is to procure and install Enterprise Resource Planning (ERP) systems in all ministries. The package that is currently being deployed includes payroll, accounting, budget, personnel, inventory and procurement systems, to be followed by document management and electronic archiving.

4. *Ministry of Finance*

The Ministry of Finance is aiming to automate 1,600 financial units nationwide by 2010, and connect major financial units with their affiliates. This project, which began in 2005, will increase efficiency and effectiveness through the provision of tools for calculating cash flows, and analyzing the speed of extracting the state's final balance.

5. *Central Agency for Public Mobilization and Statistics*

Other government upgrade projects, that include the development of databases, include a project with the Central Agency for Public Mobilization and Statistics (CAPMAS) to provide a database of industrial establishments and products, for the Administrative Supervisory Authority to update its network and information system.

6. *MFTI Economic Databases and Decision Support Services*

The Ministry of Foreign Trade and Industry (MFTI) is cooperating with MCIT and the Egyptian Public Authority for Standardization and Quality Control establish a database of standards specifications, with a backlog of data entries from Egyptian standards, drawing precedents, and quality control. Part of the project is to develop portals so that MFTI can offer its services online and manage specifications more efficiently. In a similar way, the Ministry of Supply and Domestic Trade is developing a supply card automation system, using advanced Smart Card technologies.

7. *The National Project for Automating Corporeal Land Registry*

Along the MCIT strategy to widespread the ICT in all fields, the national project for automating corporeal land registry establish a system for the electronic registration and the mechanization of the ownership transfer of agricultural land. The project aims to simplify procedures, improve services to citizens, and raise the efficiency and accuracy of reports and statistics on the performance of the registry offices. The project is divided into two major stages:

The first stage: construction of a specific database of records and another one for the geographical distribution of agricultural land and the integration between them. The second phase is to build a specific design of a system for automating the work and ensure quality and optimal use of the possibilities available for the real estate registry office. By the end of 2008, the first phase was finished and currently working on the second phase.

B. E-BUSINESS

While e-government applications facilitated the use of many government services that are related to business through the internet, it should be noted also that the Egyptian business community is increasing its reliance on ICT applications in business. This trend is growing over time while business people are witnessing the benefits of ICT applications in facilitating and increasing the value of their operations. Currently, about 65 per cent of large Egyptian businesses[18] have websites, which means they are likely to have a wider client base and more knowledge of market of their activities. Egyptian exporters are relying more on web portals to exhibit their products and access external markets.

According to the Information Center of MCIT, almost two thirds of the enterprises undertaking e-commerce receive and place orders via the Internet, selling and buying goods and services (67.6 per cent & 65.7& respectively). Around 61 per cent receive technical & financial offers, while more than half of the enterprises undertaking e-commerce (53.7 per cent) advertise their goods & services. The proportion of e-sales has reached 60 per cent of the total sales of private enterprises undertaking e-commerce in 2008, while that of e-purchases has reached 46 per cent. Sectors with the highest percentages are social services, financial intermediation, trade, construction & manufacturing. Ninety three per cent of the private enterprises connected to the internet in 2008 considered that the internet helped in speeding up operations, while around half of them (53 per cent) believed it increased customers' accessibility. Other benefits like reducing transaction costs and increasing security came later with 22 per cent and 15 per cent respectively.[19]

C. E-LEARNING

The existing telecommunications infrastructure, in terms of primary access lines, data circuit availability, ISPs and satellite communication capabilities, is adequate to support the distance and distributed learning initiatives that are being developed by the Egyptian government.

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[18] http://www.egyptictindicators.gov.eg/default.htm

[19] http://www.egyptictindicators.gov.eg/default.htm

The Information and Communication Technology Project (ICTP), one of the higher education enhancement projects dealing with improving higher education in Egypt, aimed primarily to implement efficient technology infrastructures and effective information systems, to provide excellent information services and access to information and quality technology resources, and to deliver support services to students, faculty, and staff. ICTP includes five sub- components at a wide level, as well as activities at the university level to address quality and efficiency related issues. These sub-components include: Network Infrastructure, Management Information System, (MIS), e-learning, Digital Libraries, and ICT training.

Throughout ICTP, the infrastructure of the universities information networks is upgraded to a deliver a variety of services, including data, video, and voice. The wide area network that connects all universities is upgraded from leased lines with star topology network into fiber optic network connecting all universities in MPLS cloud with Intra-network bandwidth 34 Mbps. The total Internet bandwidth dedicated for the universities is increased from 55 Mbps to 310 Mbps in addition to 34 Mbps for Internet 2 traffic and another 34 Mbps for EUMEDCONNECT. In addition, ICTP upgraded the data center in the Egyptian Universities Network (EUN) to a reliable content delivery network that satisfies universities' needs in terms of bandwidth and maintains the quality of value added services as well as the linkage between the Egyptian Universities and the outside world. The intra-network of the public universities has been enhanced by improving the links between the faculties and the university's information center, increasing the network nodes, and enhancing the security and management systems.

Most of the preparations for the e-learning curriculum (authoring, management and delivery systems) and technology infrastructure on which to run the life long learning track are handled by the e Learning Competence Centre (eLCC), a partnership between MCIT and Cisco. Training of trainers, content development, customization of Cisco materials, and development of the physical network of Academies were all coordinated at eLCC. The eLCC also has a R & D unit which tackles issues such as interoperability between different platforms and is currently piloting a solution to overcome this problem between two universities.

The creation of appropriate e content is a large task with many players and eLCC has a team of developers continuously creating Arabic courses. Currently the eLCC is focusing on IT for small and medium sized businesses and the schools and universities requirements but the center aims to deliver a wider range of e learning programs in the future, including e government and healthcare education. The small and medium business localization programs were finished towards the end of 2007.

On a national level, there are several programmes operating to address the issue of e-learning centres at the higher education level. There are different e-learning initiatives currently in Egypt.

1. *Arab Open University*

A branch of the Arab Open University (AOU) that offers distance learning, including e-learning, opened in Cairo in February 2003. The Arab Campus ELearning System (ACES) is a learning-management system that provides a virtual learning environment. It is built on a foundation of two key elements: computer technology and education. ACES tools fall within four broad categories: content-delivery tools, synchronous and asynchronous communication tools, assessment tools and course-management tools. It relies heavily on the tutoring process, which aims to promote a proactive environment of learning. Course lectures are laid out in a programmed and progressive mode via textbooks and supporting notes, and other supplementary forms of delivery media based on audio and video cassettes, CD-ROMs and online web sites. These various components work together to offer an environment of supported open learning. In co-ordination with UNESCO, the university is working on developing a telecommunications network linking all of its branches in the Arab countries. In addition to teleconferencing, this network will allow the AOU to transmit lectures delivered in any branch to all the other branches, where they can be shown concurrently or recorded for later viewing. Within this framework, the AOU also aims to set up a virtual library to allow

students to access electronic sources located at a number of Internet sites, providing a nucleus for back-up sources of electronic learning .

2. *Mediterranean Virtual University*

The Mediterranean Virtual University (MVU) brings top universities in the Mediterranean region together with two European Union universities – the University of Strathclyde (Scotland) and the University of Aalborg (Denmark). The MVU will establish a network of universities that collaboratively will build online courses and deliver them to students across the region. Initially, the courses will be in IT-related areas, defined in partnership with industry and relevant to its needs. They will be facilitated using live videoconferences with subject experts, streamed video lectures, online text-based discussions, online assessment, interactive courseware and simulations. The Faculty of Computer and Information Sciences at Ain Shams University in Egypt is one of the project partners.

3. *Avicenna Virtual Campus*

The AVICENNA project is dedicated to accelerating the adoption and best use of ICT-assisted Open Distance Learning (ODL) in 11 Mediterranean non-EU Member States (MNMS). Demand for ODL in the target Universities and societies already exist. The project aimed at establishing adequate local infrastructures and transferring best practice and professional expertise within target universities. The Faculty of Computer and Information at Cairo University in Egypt is one of the project partners.

4. *Egyptian E-learning University (EELU)*

EELU is a private non-profit University established in August 2008 to provide distance education through 24-hour online learning with a vision to be a leading university providing e-learning nationally, regionally, and internationally. EELU gives educational opportunity to learners who cannot attend a campus university. The scope of EELU is not only intended to cover Cairo but also can be extended to cover all the governorates in Egypt and some Arab countries and as a start point there are three learning centers located in Cairo, Delta (Tanta) and upper Egypt (Assiut). Students can access courses' materials, lectures, and any piece of information through both the EELU Intranet and the Internet. This type of learning permits collaboration between the students and the instructors and among the students themselves. In addition, students can learn remotely from different geographically distant locations. In this manner, EELU provides a virtual educational environment that reduces dependence on the concept of physical and geographical proximities between student and teacher and in the mean time provide maximum educational interactions, benefits and management.

D. E-HEALTH

There are many initiatives and programs that utilized ICT in health domain like the Women's Mobile Health Unit Project which was inaugurated in October 2007 in a joint collaboration between the Ministry of Health and Population (MoHP) and MCIT. This will help offer Egyptian women better health care, especially in remote areas through the effective utilization of e-health tools such as the hi-tech communications network, mobile units equipped with advanced medical equipment, fixed units, and a main center in Kasr Al-Aini hospital, staffed by specialists, to which data and images from all the units can be sent electronically, via satellites and high-speed lines.

Another important initiative is the Integrated Health Record System project which aims to build a complete record of the medical history of individuals that includes any diseases they suffered, treatment methods and medications received. Such information is recorded by specialists and service providers. The system consists of an information system enabling retrieval of all data, health indicators, consultations and medical opinions concerning the individual .The initiative aims at covering 400 medical units in 4 governorates (Alexandria, Sohag, Monofia, and Suez), it has already finished deploying 270 medical units

and training 950 doctors, nurses and technicians on ICT usage. In addition, the initiative aims to build information network for 700 hospitals, already 264 hospitals is under current development as part of the first phase.

An important initiative is Emergency Medical Service Call Center Ambulance Project, which was established to develop the Emergency Medical Service (EMS) system in the Greater Cairo area. The project will provide the Egyptian Ambulance Services Authority with a computerized ambulance dispatch system for the target area, and improve the speed and efficiency of service. The stage of support and developing the emergency services call center in great Cairo, Canal and Upper Egypt areas ended in December 2008.

In addition, 100 hospitals has been developed through deploying hospital management application software along with providing the necessary training for it and upgrading the computers and networks, a process that ended in December 2008. Moreover, the analysis phase of the Development of the health insurance clinics project ended in December 2008 and still working on the next phase of deploying and training on the software specially designed for this target.

E. E-EMPLOYMENT

Outsourcing is one of the main rising sectors that offer e-jobs as the business process outsourcing (BPO) and information technology outsourcing (ITO) are off shored jobs that are done at distance through international networks. In terms of direct jobs, outsourcing activities could create 300-450 thousand direct jobs for Egypt and 800-1200 thousand indirect jobs by year 2017.

VIII. CULTURAL DIVERSITY AND IDENTITY, LINGUISTIC DIVERSITY AND LOCAL CONTENT

A. USE OF ICT IN SUPPORT OF CULTURAL AND LINGUISTIC DIVERSITY

In order to maintain and protect the national heritage the National Archives of Egypt (NAE) Project was initiated as a partnership between MCIT, CULTNAT and various Egyptian IT companies. The main objective is to preserve the physical condition of national archives by producing watermarked, high-resolution digital images of 130,000 valuable documents, thereby reducing the need for physical access and to produce digital versions of the more than 90 million documents held by the NAE for inclusion in a database currently containing over 25 million records that can be searched and accessed via the NAE website.[20] The project was launched in 2005 and is scheduled to finish by the end of 2009.

B. LOCAL AND NATIONAL DIGITAL CONTENT DEVELOPMENT

The government has prioritized the development of Arabic content on the theory that it will entice more Egyptians to go online if. The e-content initiative, which was launched in May 2005, brings together the Federation of Egyptian Publishers and the e-Learning and Business Solutions Union to promote the creation of a web based Arabic content portal. The fund was established for targeting 2000 items and the creation of 300 software programs. The existence of the intellectual property right law helps the initiative to overcome any concerns from copyright infringement.

The e-content initiative contains projects such as CULTNAT, National Archives of Egypt, Fekr Rama Portal, Luxor Portal, Egynews Portal, Science and Technology Portal, Community Development Portals, Telecentre Network and the Egyptian Sign Language Dictionary CD. The initiative digitized 4600 book.[21]

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[20] http://www.nationalarchives.gov.eg

[21] http://www.mcit.gov.eg/ICT_e-Content.aspx

Fekr Rama is a new web portal[22] that provides rich Arabic content in the fields of culture, education, heritage, religion, sport and the arts for Arab and other audiences. A collaboration between MCIT, Al Azhar University, the Ministry of Culture, the Ministry of Information, the Egyptian Publishers Union and the e-Learning and Business Applications Union, the portal was launched in March 2008. Fekr Rama currently contains more than 6,000 titles, 3,000 of which are free to access. By 2009, some 20,000 titles will be available. The portal contains e-books, magazines, directories, news and audio files, as well as animation for children and programs that promote learning.

On the international level, Egypt won the first award in the e-Content Contest World Summit Award (WSA) 2007, in the category of e-learning with its leading CD program Hafs. Hafs program is developed to help users memorize and recite the Quranic verses using the relevant rules. Egypt also achieved recognition from the upper panel of industry experts for its e-government portal, which offers a comprehensive range of services to the public.

Egypt participated in the competition with eight practices namely bogzy.com in the e-business category, e-government portal[23] in the e-government, mazika.com in the e-entertainment, Kenanaonline community development portal[24] in the e-inclusion, the Unified Medical Dictionary in the e-health, Hafs in the e-learning and Egyptstandl portal[25] in the e-culture. Entrance of the Egyptian practices in the international competition was promoted and supported by ITIDA. Contestants from 160 countries portrayed more than 850 works distributed through eight practices in this year's competition. World Summit Award is a global initiative to select and promote the world's best e-Content, started in 2003 in the framework of the United Nations' World Summit on the Information Society (WSIS).[26]

C. ICT TTOLS AND R&D PROGRAMS

Egypt is driving the effort towards building a continuously developing ICT sector through research-based activities that are expected to add value to different ICT programs. The following are some important initiatives in this regard:

1. *Cairo Microsoft Innovation Center (CMIC)*

CMIC represent the Microsoft group interest in applied research and development initiatives in the Middle East and Africa. The project has five main programs: The Information Retrieval Program involves collecting and mining search log information and user feedback targeted towards Arabic searchers and conducting scientific user studies. This program is important to improve the effectiveness of content search in Arabic, and increasing the usefulness of research.

Image-Based Search Program pursue a research effort aiming at searching within digitized images of book pages. The Collaborative Environment Services Program is currently working on methods to support online learning communities create knowledge. These include enhancing the flow of content within this environment. The Digital Content Services (DCS) Program is a set of Services built to take advantage of the recent increase in digitized content and books through enabling users to easily discover information and extract knowledge from large digital content collections. The Multi Media Content Services Program aims at easing the browsing and searching of Multi Media content in domains such as education. The creation of these services can substantially increase online digital MM content, particularly in the Arab region.

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[22] http:// www.fekr-rama.com

[23] http://www.egypt.gov.eg

[24] http://www.kenanaonline.com

[25] http://www.egyptsandl.com

[26] http://www.wsis-award.org/index.wbp

2. *Centers of Excellence (CoE):*

The Centers of Excellence (CoE) program at ITIDA sponsors research centers constituted of experts in academia and industry, leading teams of researchers to produce top-quality products and services that have not only commercial value but also academic merit supported by prestigious publications and patents.

Currently the program supports one center of excellence: The Data Mining and Computer Modeling (DMCM) CoE that has three main tracks:

- Text Mining Track;
- Cross-Industry Data Mining Track;
- Outliers and Visualization Track.

Each of these tracks is run by a principal investigator (PI) responsible for defining the main lines of the track activities. Within each track, sub-tracks are led by professors or equivalent industry experts who guide junior researchers and engineers.

3. *Multilingual search engine*

In October 2008, the Minister of Communications and Information Technology Dr. Tarek Kamel witnessed the signing of a memorandum of understanding (MoU) between ITIDA and the Korean National Grid Inc. on building an international, multilingual search engine.The new search engine will cover an international ICT database and enable users to view the search output of multilingual international websites in the Arabic language. The project aims at enhancing the international competitiveness of Egyptian companies operating in the ICT field and offering new opportunities for diverse technological services like those related to the internet, content and advertising. The search engine is also equipped to offer new developments in language, videos, images, educational and culture material collected from different websites worldwide.

IX. MEDIA

A. MEDIA INDEPENDENCE AND PLURALISM

Mass media is one of the major components of the new electronic era; this was supported by the gradual decline in the role of the government and more importance of the exchange of information outside of state systems. Egypt is currently undergoing a whole process of change with the government permissions for private newspapers and the increasing number of websites of these newspapers in addition to electronic blogs, which create a platform for people to practice their rights of expression without government intervention. It should be noted that a presidential decree has been issued for protecting journalists from being imprisoned for their articles.

B. THE MEDIA AND ITS ROLE IN THE INFORMATION SOCIETY

The media plays an essential role in the development of the Information Society and is an important contributor to freedom of expression and plurality of information. Countries working toward building Information Societies should encourage the development of domestic legislation that guarantees the independence and plurality of the media, including the Internet, and at the same time contains appropriate measures to protect intellectual copyrights, children, and the societies' cultural mores.

Over the course of the last five years, technological advances have begun to blur the boundaries between information technology and communications and the two domains have become more integrated. Examples of media convergence include the rise in popularity of music and video downloads through the

Internet to home PCs and iPods, the use of mobile phone text and multimedia messaging, digital television, and broadband access that allows users to centralize all of their media and data needs in one "box."

Egypt currently is considering plans to support the growth of converged media industries and the applications that will devolve from it. The government is continuing to make heavy investments in telecommunications and IT infrastructure and is looking particularly closely at the potential that broadband connectivity presents to deliver media content that has been traditionally delivered through terrestrial and satellite broadcasting.

This strategy is seen as being useful in bringing the benefits of the information age to the reach of the majority of the population, due to the availability of content in Arabic, as well as the convenience and ease of use of the communications networks. The delivery of the content over electronic networks could be the catalyst needed for stimulating demand for communications as well as media services.

In May 2006, MCIT hosted an event prior to the meeting of the World Economic Forum in Sharm El Sheikh. The conference , entitled "Convergence of ICT and the Broadcasting Industry: Regional Perspectives and Opportunities", gathered together industry experts to debate and explore the issues related to media convergence, from content and service delivery to technical transfer, business case studies, and examples of successful convergence projects. With its historical leadership in the area of content production and distribution in addition to highly competitive ICT markets, Egypt is well placed to lead the region in this area. MCIT and the Ministry of Information have initiated a strategic dialogue with leading international players to analyze and explore the potential of convergence to help meet Egypt's development goals. The ministries are currently analyzing the various technological and regulatory issues related to convergence and are expected to announce an action plan to promote converged services in Egypt and the region.

X. INTERNATIONAL AND REGIONAL COOPERATION

A. FINANCING OF ICT NETWORKS AND SERVICES

While Egypt is depending primarily on its own financial resources in funding its ICT networks and services, it is working closely with international partners for developing and enhancing the quality of ICT networks and services. In 2008, a number of contracts and arrangements were made in this regard. A contract between Alcatel - Lucent and Telecom Egypt was signed in order to setup a Management of Change (MoC) follow up program to improve the Network Operations Efficiency to better control the Quality of service provided by the network.

B. INFRASTRUCTURE AND DEVELOPMENT PROJECTS

Egypt has committed itself to cooperating with international and regional organization in different projects in the aim of promoting the ICT sector in Egypt.

The Egyptian National Postal Organization (ENPO) in partnership with the European Union, the Ministry of Communications and Information Technology, and the Ministry of International Cooperation, is implementing a two-year institutional twinning arrangement with the EU's postal administration to support ENPO in preparing for anticipated regulatory changes and liberalization of the postal sector. With the EU postal administration's assistance, ENPO is modernizing its financial management systems, quality measurement methodology, and marketing organization through the application of EU best practices, adapted to the Egyptian context, and creating awareness of the kind of management skills needed to cope with the dual impact of market liberalization and regulation.

The Egyptian government represented by the Ministry of International Cooperation and its international partners have found creative ways to reduce the country's debt burden and at the same time promote development goals. Exchanging Debt for Development is a program designed to demonstrate

innovate methods of reducing debt and at the same time establish public private partnerships to encourage the use of ICTs to further development, increase awareness of the developmental potential of ICTs, and make ICTs more accessible and affordable for all citizens.

Egypt and Italy reached a debt swap agreement that utilizes an ICT development approach. The ICT program covers 5 per cent of the total debt swap agreement between Egypt and Italy, with a total value of 48.5 million Egyptian pounds. It consists of five interrelated projects that are divided into two main categories. The first category includes two projects: the Smart Schools Network Project (SSNP) and the Mobile IT Clubs Project (MITC). The program provides ICT access points to local communities. The second category includes three projects: the Community Knowledge Generation and Electronic Library Project (CKGeL), the Illiteracy Eradication Project (IE), and the Community Development Portal Project (CDP). The program provides applications support for the beneficiaries. The results to date of the debt for development program indicate that, even though the absolute amount of money released for development programs by debt swaps is modest, it has had a positive impact on socio-economic development in Egypt. Moreover, program supporters note that the experience gained from the Italian program should greatly increase the likelihood of additional successful arrangements, which will, in turn, enhance Egypt's overall future prosperity.

The Egyptian Information, Telecommunications, Electronics and Software Alliance (EITESAL) is working in an alliance with the Egyptian Commercial Service, the Exporters Council and international companies to assist members to market their services and products abroad. EITESAL has also signed a Memorandum of Understanding with Northern Virginia Technology Council (NVTC) for cooperation in the field of technology business associations.

This cooperation includes the creation, development, and management of committees and committee activities for the members, as well as helping EITESAL in establishing effective communications with its members through the use of electronic publications and newsletters. The cooperation also includes the creation of affinity programs and management of their benefits structures. EITESAL additionally is working in partnership with international organizations to establish certified ICT training programs for primary and secondary school teachers and setting up certified ICT maintenance and support centers.

Egypt has also cooperated with International Organizations in order to build an Information infrastructure based on robust data and internationally comparable indicators. In that context, several key figures have been reviewed and corrected to reflect the performance of the ICT sector in Egypt, for example MCIT has engaged with the World Bank in projects to review the GDP deflator, the FDI and the exports figures for the ICT sector.

C. WSIS FOLLOW-UP

In order to assure the sustainability of the WSIS process after the completion of its Tunis phase, plans have already been put in place to implement a mechanism for the Geneva and Tunis Plans of Action. They will be based upon continuing cooperation between the Egyptian government and all concerned stakeholders, with an aim to achieve the development goals of the Millennium Declaration. For each action line detailed in the Geneva and Tunis Plans of Action, the Egyptian government intends to bring together the necessary teams of stakeholders to facilitate their implementation. It is intended that the plans are executed hand in hand with UN bodies or specialized agencies leveraging on their expertise, and working where possible within Egypt's existing resources. Following the second phase of the WSIS, Egypt appreciates that to build an Information Society will require unremitting effort. Egypt is committed to keep fully engaged, nationally, regionally and internationally, to ensure sustainable follow up to the implementation of agreements and commitments reached during WSIS process and its Geneva and Tunis summits. The government and its ministry plans carefully to consider the multifaceted nature of building the Information Society, effective cooperation among all stakeholders, respect for their mandates, and leveraging on their expertise. On a local level, MCIT formed a committee for taking stock of the different projects, programs, and initiatives related

to the WSIS action lines. Representatives from 17 organizations, including MCIT, attended six follow up meetings during the period from March to September 2006 (Table 7). A dedicated web based database was developed to enable the stakeholders to enter data on projects themselves. By November 2006, the total number of projects exceeded 120. The collected data from those projects was used as a base to produce this report and will also be published on a frequently updated web site.

On a regional level, Egypt, in concert with other Arab states, played an important role in networking and early negotiations, which culminated in the formation of an Arab ICT strategy addressing Arab concerns and priorities in the field of ICT. Egypt played a main coordinating role in translating the strategy into an action plan during the Pan Arab Conference on the WSIS, which was then approved by the Council of Arab ICT ministers.

Internationally, Egypt actively participated in the preparatory process for holding the first meeting of the Internet Governance Forum (IGF) in Greece, and was selected as a member of the IGF's Advisory Group headed by the Special Advisor to the UN Secretary General. H.E. Dr. Tarek Kamel, Egypt's Minister of Communications and Information Technology addressed the inaugural ceremony of the Forum on 30 October 2006, where he emphasized the need to further consolidate efforts of all stakeholders in order to increase the robustness of the Internet.

As a result of the importance of the advanced core indicators adopted from the WSIS meetings, Egypt hosted the 7th ITU indicators annual meeting in Cairo in March 2009, the event is considered one of the most important forms of international and regional cooperation with 78 participant countries and remarkable international organizations in the field.

Policies and Impact Assessment:

MCIT is conducting a project with UNCTAD "ICT POLICY REVIEW OF EGYPT". The main objective of the project is to assess the implementation of national ICT master plans by examining how ICT and e-business development issues have been operationalized in country development strategies and identifying policies, initiatives and implementation mechanisms favoring the development of the information economy. The project as well will analyze the impact of ICT policy measures and initiatives on the economy and discuss the value of integrating ICTs as an instrument within broader national development processes.

The spread of ICT in Egypt through government policies and initiatives during the past few years has had a significant impact on the Egyptian economy and society. MCIT have started a new project of "Assessing the impact of ICT on the Egyptian Economy" since the beginning of 2008. This project aims at measuring the impact of ICT uptake on the Egyptian economy, mainly focusing on growth, investment, exports and employment. This measurement will be done quantitatively through building a dynamic Computable General Equilibrium (CGE) model for the Egyptian economy with its main sectors.

XI. MILLENNIUM DEVELOPMENT GOALS (MDGS)

A. PROGRESS TOWARDS ACHIEVING THE MDGS

Egypt has made sound achievements towards the fulfillment of its commitments towards the MDGs; commitment to poverty alleviation has acquired clear momentum through the explicit adoption of the goal of reducing poverty to 15 percent by 2011/12 in its national Sixth Five Year Socioeconomic Plan (2007-2012).Egypt has already achieved its international commitment of reducing to half extreme poverty based on $1 per day. Education enrolment saw substantial improvements for both males and females during the period 2000-2006. Non-enrolment and school dropout rates remained high in certain areas. It is expected that by 2015 almost all children of primary school age will be in school.

Egypt is addressing women's empowerment and has demonstrated its commitment through institutional arrangements, major legislative changes and a large number of initiatives and actions. Egypt's efforts to reduce child mortality are paying off. There have been improvements in maternal health and impressive reduction in maternal mortality ratios and in proportion of births attended by skilled personnel.

Egypt has succeeded in combating HIV/AIDS and controlling malaria, while tuberculosis and schistosomiasis are regressing. There is still a challenge in sustaining environmental quality and increasing investments in protection measures. Finally, Egypt has witnessed a rising trend in its ODA disbursements from a variety of rich countries and international organizations, and these have been allocated to fulfill the development needs of different sectors.

The share of exports of goods and services in Egypt's GDP has been increasing throughout these years. Egypt's external debt has witnessed stable movement in the last few years, with a decline in the ratio of debt interests to exports of goods and services. The Egyptian ICT sector has been growing fast in the past years especially with the increase in investments directed to it, resulting in more access to landlines and cell phones, along with the extensive use of personal computers and access to the internet.[27]

B. USE OF ICT FOR ACHIEVING THE MDGS

ICT is an anchor in achieving MDGs in the last few years where initiatives of education programs, health and poverty eradication had mainly relied on ICT applications, and as mentioned previously in this document the use of ICT had added more value to the efforts made towards combating illiteracy, improving health and enhance the level of education standards.

Millennium Development Goals (MDGs) are the frame of a vision for the future. Progress over time is measured for each of the eight MDGs through relevant targets and indicators. ITU has been given the mandate to measure one of the targets (make available the benefits of new technologies, especially information and communications) of Goal 8 (a world in which developed and developing countries worked in partnership for the betterment of all) through three main indicators:

- 8.14: fixed telephone lines per 100 population;
- 8.15: mobile cellular subscribers per 100 population;
- 8.16: Internet users per 100 inhabitants.

As follows, we realize Egypt's progress in the three indicators during the period 2000–2008.

TABLE 1. EGYPT'S PROGRESS IN THE THREE INDICATORS DURING THE PERIOD, 2000-2008

Year	Internet users per 100 inhabitants	Mobile subscribers per 100 population	Fixed lines per 100 population
2000	1.01	3.45	9.06
2001	1.52	5.23	10.13
2002	8.25	6.67	11.4
2003	10.82	8.45	12.8
2004	11.81	10.92	13.5
2005	12.65	19.11	14.6
2006	13.53	24.76	15
2007	14.24	40.63	15.2
2008	16.68	57.18	15.7

Source: MCIT, 2009

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[27] http://www.undp.org.eg/Portals/0/MDG%20Links/Overview%20of%20the%20MDGR%20(2)%20for%202008%20English.doc

XII. BUILDING ICT SECTOR

A. ICT FIRMS

According to the General Authority for Investment (GAFI) classification, ICT firms are classified into three main categories: Communication firms, IT firms and systems technology services. In addition, ICT firms include some multinationals such as: Satyam an Indian firm for Software Development, Valeo Interbranch Automotive Software Egypt (VIAS Egypt), French firm for R&D and maintenance of Embedded software modules & Systems for the Automotive Industry ITS, the Kuwaiti firm for Remote Management system (RMS) for the offshore outsourcing services, and the American Epicor Software Corporation for Software engineering and customer support.

The number of ICT firms registered has increased tremendously through the past eight years; for instance, the total ICT firms operating in 2006 was 600 firms, this number has increased by an average annual growth rate of 22.3 per cent to reach 2,938 firms in 2008.

Figure 8. Number of ICT Companies in Egypt (2000-2008)
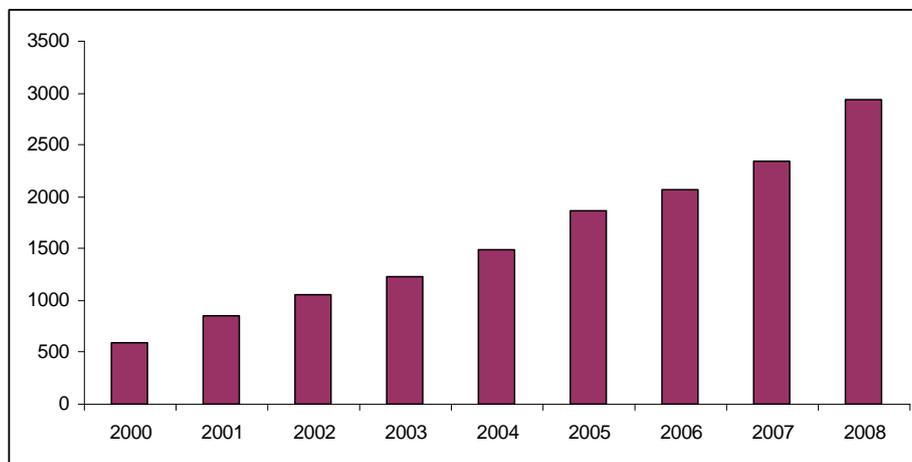
Source: MCIT, 2009

B. R&D AND INVESTMENTS IN THE ICT SECTOR

Egypt, keen to promote investment in the ICT sector, has formulated a series of innovative incentives to create one of the most competitive marketplaces in the region. Egypt's General Authority for Investment and Free Zones is a one-stop shop for investors - local or foreign - that integrates all relevant administrative bodies to make investment simple and straightforward. In addition to the legislations mentioned before to empower the ICT sector, Also, legislations bringing banking, labor and investment procedures to world standards.

Egypt has also developed incentive packages and a favorable climate to attract FDI through the following measures:

- No restrictions on Foreign companies' investments and freedom to repatriate profits.
- Providing an incentive package for ICT companies in free zones.
- Providing tax exemptions to ICT companies.
- Simplifying export and import procedures.
- Contribution to employees training.

Egypt's ICT exports have increased by an average of 38 per cent during (2006-2008) where the exports' value increased from $350 million in 2006 to $850 million in September 2009. On the other hand, the custom tariff on ICT Intermediate goods has been reduced to zero percent.

The ICT investment increased by 80 per cent from 6.3 billion EGP in 2004/2005 to 11.4 billion EGP in 2007/2008. The total expected ICT investments (2006/2007-2011/2012) reaches EGP 124 Billion.[28]

On the other hand, Egypt was positioned as the Middle East's prime winner to take advantage of the boom in global outsourcing, already worth an estimated $300bn in 2009 according to reports published by A.T. Kearney, Yankee Group, Datamonitor, Gartner, The London School of Economics, Global Services-Tholons and the Commonwealth Business Council. Egypt was assessed as having the strongest position based on its young population, sustainable and abundant talent pool of technologically skilled and multi-lingual university graduates. Its geographical position - close to Europe and Asia - coupled with strong government support are also factors, which contribute to Egypt being an outsourcing hotspot.

Figure 9. Growth of ICT Investments
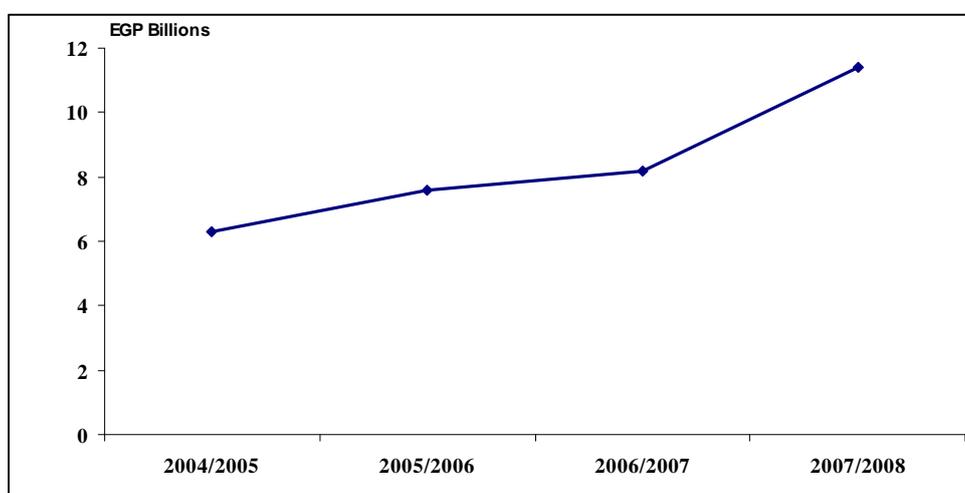
Source: MCIT, 2009

One illustration of how Egypt's multilingual and technology skills are the multitude of international companies using Egypt as a base for software development, technical support contact centers and research facilities. Examples of which include IBM, Intel, Microsoft, Cisco, Oracle, Satyam, Wipro, Orange, Alcatel, Teleperformance and Vodafone, among others. Furthermore, the British National Outsourcing Association (NOA) named Egypt the Outsourcing Destination of 2008.

1. *IBM Nanotechnology Center*

Egypt and IBM signed two cooperation agreements for establishing a nanotechnology research center in Egypt, developing a services science university curricula and launching a Global Service Delivery Center based in Egypt. Egypt's first Nanotechnology Center is also the first in North Africa. The three-year agreement starts January 2009 with joint investments in the range of $30 million. Partners in the Center are Nile University, Cairo University and IBM; with main fields of research being in the areas of simulation and modeling software, alternative energy sources (thin film silicon photovoltaics) and energy recovery for desalination.

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[28] http://www.mop.gov.eg/English/PDF/year%207%20-%208.pdf

Another agreement for training and human recourses development Services Science, Management & Engineering (SSME) was signed, which will establish an IBM Academy to introduce SSME into the Egyptian Universities' curricula. SSME is a new academic discipline designed to develop the skills required in an increasingly services-based global economy. It brings together ongoing work in computer science, operations research, industrial engineering, business strategy, management sciences, social and cognitive sciences, and legal sciences.

2. *Information Technology Academia Collaboration (ITAC)*

ITIDA's Information Technology Academic Collaboration (ITAC) aims to promote Industry/Universities collaboration through linking academic research with industry and market needs. These collaborative research programs will bring value to IT companies, universities, researchers and the technology community.

ITAC programs have been designed to link industry research with market needs. This is coupled with opportunities within IT companies for undergraduate, graduate, master students and Ph.D. students, preparing them for the global IT marketplace.

There are six main programs available as part of ITAC; they include:

(a) Product Development Projects – Provide products whether on the level of prototype (with a budget up to 500 thousand Egyptian pounds)[29] or final product (with a budget up to 3000,000 pounds). The source of the project in this case is usually an IT company, aiming to increase its competitive edge through benefiting from the research capability of the academia;

(b) Advanced Research Projects (ARP) – Researches coming usually from the academia and its final output is a proof of concept or a prototype (with a budget up to 500 thousand Egyptian pounds) (the availability of a partner IT Company is necessary);

(c) ITIDA Fellowships - ITAC Steering Committee selects a number of innovative research areas, to be supported under the umbrella of ITIDA, highly qualified researchers are given fellowships to support their research with a maximum of 130 thousand pounds;

(d) Patent Filing Program (PFP) – Aims to encourage protect and motivate creativity and innovation. ITIDA will support filing a number of patents per year with a maximum of 15 thousand dollars per patent;

(e) Student Graduation Projects - IT companies provide proposed subjects for graduation projects, based on market needs. Selected student graduation projects are funded through ITAC with a maximum of 10,000 pounds per project;

(f) Students Summer Training – offers the students practical on job training during the summer vacation in the largest ICT companies working in Egypt. The objective of this program is to help the students to get prepared for their future professional life as well enhancing their educational capabilities. Each student is paid 500 pounds salary per month.

3. *MED-IST Project*

The overall objective of MED-IST is to bring the Mediterranean Partner Countries (MPC) closer to the European framework program in the field of information society technologies through an open consultation process to review current research policies and develop appropriate guidelines. MED-IST target the research communities including research organization and IT companies and train them on the procedural aspects and

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[29] Average exchange rate for 2008 is 5.43 LE per USD.

providing assistance in finding cooperation partners in Europe through workshops / tutorials on the R & D capabilities.

The Med-IST objectives are to:

(a) Establish a research agenda that reflects their priorities and defines the strategic approach to closer co-operation with the European Framework Program;

(b) Promote the thematic priority of the research community and IT industry in the MPC;

(c) Identify promising research organization and relevancy private industry in the MPC that are suitable in participating in the R & D activities;

(d) Facilitate the development of network between R & D organizations in the MPC and the EU in order to exchange ideas and pursue job research collaboration.

4. *The Map IT Project*

The Map IT Project is a joint Euro-Mediterranean initiative, funded by the IST program (Information Society Technologies) of the European commission, aimed at promoting and developing research co-operation among the ICT communities of Europe and the south Mediterranean (MED) countries (Algeria, Egypt, Jordan, Lebanon, Morocco, Palestinian Authority, Syria and Tunisia). The project's aim is to expose as many organizations as possible to collaborate opportunities with Europe as well as to the services provided free of charge by the MAP IT project (information training) to be applied on 300 firms. The main business lines of those firms are; development and creation, system integration, smart cards, programming, telecommunication, IT sectors, localization and arabisation and consulting.

MAP IT aims to highlight the opportunities for research collaboration in ICT between Europe and the Mediterranean region. The final objective is to both create awareness of the many EU research-funding opportunities to the MED stakeholders while simultaneously identifying top MED players to the European Commission to foster future strategic cooperation in the ICT fields.

The Map IT project developed a CD "Egypt on R&D and Innovation" containing the firms database, the research centers database, masters and doctoral thesis and research papers published in the last five years related to the research topics of the European commission. Conduct workshops and seminars for the companies to train them on digital libraries, research, e-education and language techniques. Moreover, the Map IT project constructed expert group from the companies' employees and the research entities like: Information Technology Institute, Cairo University and Nile University to study in the technical fields related to R&D.

C. CONTRIBUTION OF ICT SECTOR IN THE NATIONAL ECONOMY

In 2007-2008, the total ICT turnover reached more than EGP 44 Billion. The total value added of the sector at fixed prices reached EGP 26.3 Billion in the same year compared to EGP 23 Billion in 2006-2007; ICT sector contributed to 3.5 per cent of Egypt's GDP in 2007-2008. The overall growth of the sector's value added was 14.2 per cent in 2007-2008. The sector's growth in 2007-2008 was 7 per cent higher than the growth of the total economy. The ICT Real GDP recorded the highest sector growth rate during the third quarter of 2008 to reach 14.6 per cent while the tourism sector came second with 14 per cent growth rate during the same quarter. It is worth mentioning that MCIT in cooperation with MED have been cooperating since 2007 to revise the ICT sector's output figures, reaching a better methodology and more accurate data; following international standards. MED has started publishing the revised figures since 2007/2008, which constitute a full quarterly series for the sector's output since 2005/2006 until the present.

In 2008, about 175 thousand people worked directly in the ICT sector. This number included workers in: the communications sector, the IT sector, the smart village, Egypt Telecom and Egypt post. Concerning indirect workers; there are about 14 thousand employees who work in both IT clubs and internet cafes. In addition; It is expected; that the new IT park in Maadi will attract new investment of about EGP 10 billion and create 40 thousands job opportunity in 2012.

Figure 10. Selected economic sectors value-added (2007/2008)
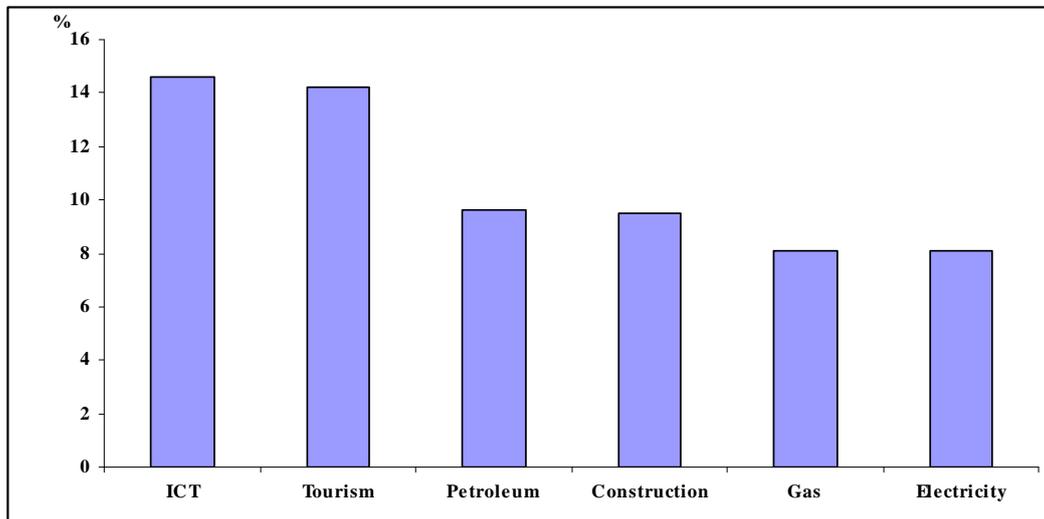
Source: MoED, 2009

As a result of the continuous liberalization and deregulation processes, The ICT sector attracted in average US$1 Billion foreign direct investment annually. Moreover, the sector was transformed from one competing for resources to a net contributor to the treasury. The Egypt's ICT sector added over EGP 43 billion to the treasury during the period (2005-2008); enabling the government to improve different social services.

D. GOVERNMENT FACILITATION

The government believes that strong facilitation is pivotal to the successful formation of an information society. As part of this belief, providing incentives that foster an attractive climate for investors is a primary focus. Such a climate revolves around a deregulated environment, transparency, free competition, and universal services. In emphasizing the importance of these elements, all telecommunications and information technology investments fall under investment law #8 of 1997. The Telecom Act lays the foundation for licensing national companies for management and operation of networks and services. Investment Law #8 streamlines the process for international companies to invest in Egypt. The solid legal structure complimented with MCIT's work to create an e-friendly society; an environment in which e-businesses can flourish and an information society can thrive.

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ANNEX I

Core ICT Indicators

Table 1. ICT Infrastructure and access

	Indicators	2007	2008
A1	Fixed telephone lines per 100 inhabitants	15.2	15.7
A2	Mobile cellular Telephone subscribers per 100 inhabitants	40.6	57.2
A3	Fixed Internet subscribers per 100 inhabitants	14.2	16.6
A4	Fixed Broadband Internet subscribers per 100 inhabitants	0.64	1.02
A5	Mobile Broadband subscribers per 100 inhabitants		
A6	International Internet bandwidth per inhabitant (bits/second/in habitant)	201	361
A7	Percentage of Population covered by mobile cellular telephony	93.5	95
A8	Broadband Internet access tariffs (per month), in US$	4.49	4.54
A9	Mobile cellular tariffs (OECD monthly low-user basket) in US$	4.53	3.62
A10	Percentage of localities with public Internet access centers (PIACs) by number of inhabitants	39	41

Table 2. Access to and use of ICT by households and individuals

	Indicators		January 2008	January 2009
HH1	Proportion of households with a radio		85.7	79.4
HH2	Proportion of households with a TV		96.5	96.8
HH3	Proportion of households with a fixed line telephone		51.5	53.06
HH4	Proportion of households with a mobile cellular telephone		43.5	57.47
HH5	Proportion of households with a computer		10.5	13.1
HH6	Proportion of individuals who used a computer (from any location) in the last 12 months		16.6	22.5
HH7	Proportion of households with Internet access at home		35.3	45.4
HH8	Proportion of individuals who used the Internet (from any location) in the last 12 months		7.0	7.6
HH9	Location of individual use of the Internet in the last 12 months	Home	45.1	55.2
		Work	12.1	15.0
		Place of education	30.6	24.3
		Another persons home	2.0	2.5
		Mobile access via a mobile cellular telephone		
HH10	Internet activities undertaken by individuals in the last 12 months(from any location)	Getting Information about goods or services	5.5	4.1
		Getting Information related to health or health services	2.7	3.2
		Getting information from general government organizations via websites or email	10.3	4.0
		Communicating	18.7	25.7
		Purchasing or ordering goods or services	0.3	0.4
		Internet banking	0.7	0.8
		Education or learning activities	55.7	46.0
		Interacting with General government organizations	4.7	3.6
		Playing or Downloading video games or computer games	-	30.9
		Downloading software	-	14.2
HH11	Proportion of individuals with use of a mobile cellular telephone		15.0	21.9
HH12	Proportion of households with access to the Internet by type of	narrowband	42.6	28.0
		broadband	60.6	73.7

	access			
HH13	Frequency of individual of the Internet in the last 12 months (from any location)	At least once a day	30.2	31.6
		At least once a week	49.3	38.7
		At least once a month	4.0	3.0

Table 3. Use of ICT by businesses

	Indicator		**2008**
B1	Proportion of Businesses using computers		40.1
B2	Proportion of Persons employed routinely using computers		14.9
B3	Proportion of Businesses using the Internet		3.05
B4	Proportion of Persons employed routinely using the Internet		8.6
B5	Proportion of businesses with a web presence		59.5
B6	Proportion of businesses with an intranet		19.4
B7	Proportion of Businesses receiving orders over the Internet		3.5
B8	Proportion of Businesses placing order over the Internet		3.5
B9	Proportion of businesses using the Internet by type of access	narrowband	11.8
		broadband	93
B10	Proportion of businesses with a local area network (LAN)		24.5
B11	Proportion of businesses with an extranet		1.8
B12	Proportion of Businesses using the Internet by type of activity	Communicating	79.9
		Getting Information about goods or services	66.2
		Getting information from general government organizations	40
		Internet banking or accessing other financial services	25.5
		Interacting with General government organizations	13.1
		Providing Customer services	36.2
		Delivering products on line	26.3
		Internal or External recruitment	
		Staff training	

Table 4. ICT sector

	Indicator	**2008**
ICT1	Proportion of total business sector workforce involved in the ICT sector	3.3
ICT2	ICT sector share of gross value added	3.98

Table 5. ICT in Education

	Indicator	**2008**
ED1	Proportion of schools with a radio used for educational purposes	
ED2	Proportion of schools with a TV used for educational purposes	
ED3	Proportion of schools with a telephone communication facility	90
ED4	Student-to-computer ratio	47:1
ED5	Proportion of schools with Internet access	30.7
ED6	Proportion of students who have access to the Internet at school	43.8
ED7	Proportion of students enrolled at the tertiary level in ICT-related fields	
ED8	Proportion of ICT-qualified teachers in primary and secondary schools	4.31

Table 6. ICT Economic Indicators

Item	Value in 2008
ICT GDP at fixed prices (billion US$)30	4.8
ICT GDP at fixed prices annual growth rate (%)	14.2
ICT expenditure (billion US$)[31]	7.6
ICT total issued capital (billion US$)	7
Average annual FDI in ICT sector (billion US$)	1
ICT exports (million US$)	750
ICT contribution to total GDP (%)	3.5
No. of ICT companies	2907
No. of ICT employees (thousands)	175
ICT contribution to the treasury (billion US$)[32]	1.1
Fixed line monthly price basket (US$)	4.84 (in 4th quarter of 2008)
Mobile monthly price basket (US$)	3.62 (in 4th quarter of 2008)
Internet monthly price basket (US$)	4.49 (in 4th quarter of 2008)

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[30] Data for fiscal year ending June 2008

[31] Data for 2007

[32] Estimated figure

Annex II

Best practices case studies in e business

Trade Egypt "An endless world of possibilities"

Trade Egypt was established in 2001 with the specific purpose of enhancing the exports of Egyptian products through utilizing Information Technology platforms and the explosive online B2B marketplace. The company had undergone through an extensive research process to identify the main services that are of real value to customers and have developed efficient means to deliver those services in a timely, professional manner. It also acts as a facilitator for international trade through a package of services provided for member exporters and importers.

The development of the idea was backed by the declaration of the Government of Egypt in 2002 that "*exporting is a matter of life or death*" putting it on the top priorities of development policies, the developers of the website worked to provide an integrated workplace for traders as it provides global buyers with the opportunity to post their requests to buy Egyptian products, also, exporters in turn will be able to view those Trade Leads and contact the buyers with their offers to sell, subscribes can search through our database of more than 500,000 international buyers worldwide, classified according to the products. Trade Egypt built a network of alliances and partners to get the most out of benefits of online business, each offer to sell posted by our members is automatically multi-posted to hundreds of other B2B trade portals thus maximizing the exposure of the posted offer to the widest range of potential buyers.

The portal offers an online catalogue upon registration within the Tradeegypt.com marketplace, whereby subscribing member exporters can display their products names, pictures, specifications, and all commercial details. The Web-Based Administrative Application allows members to interactively change the contents of their catalogues at anytime from the convenience of their own computer. A unique URL for the catalogue will be provided so that the member Exporters can place it on their business cards as their product website. This Online Catalogue is promoted by Tradeegypt.com to millions of international buyers who are identified and located through our International Affiliate Program and approached professionally through a Global Marketing Campaign.

Providing value added services to exporters is an important concept of the portal thus Tradeegypt.com provides it's subscribing Egyptian exporters with the ability to post Requests For Quotation (RFQ) for specific shipments. Those RFQs are viewed by a large number of shippers thus giving the Exporter a better chance of receiving competitive reduced prices in addition to "The Shipper Bulletin Board" which provides shippers with a medium to present their promotions and their last minute spaces at reduced charges.

Speed Send "Simplifying life @ work"

Having noticed how lengthy procurement processes are in Egypt, two young IT specialists decided to provide an electronic solution to this problem by applying an electronic procurement solution, which drives down procurement costs and achieves company-wide purchasing efficiency. The intuitive design and straightforward interface is simple enough for the casual user, yet powerful enough for the professional buyer. It has a real-time reporting tool that offer the clients strategic insight into their purchasing performance & trends.

The company started operations in 2001 and has successfully grown to acquire 45 corporate clients from the Banking, Fast Moving Consumer Goods (FMCG) and services sectors in addition to 400 small and medium clients. Currently SpeedSend operates 6 e-catalogues for office supplies, paper and numerous Notebooks, technology supplies, maintenance supplies, print on demand and ink and toners, displaying over 2,000 items from a wide product range & growing vendor (50 primary source vendors) network to bring customers more of the products they need to facilitate daily business operations.

SpeedSend is a Select HP Business Partner, a certified Xerox corporate re-seller, and the success of SpeedSend and its good record of providing services to companies in the market have encouraged vendors to participate in its platform.

As SpeedSend has proven its success in applying ICT to facilitate procurement processes, it has attracted the attention of the French office supplies company "Lyreco" which acquired in 2006 a share of 15 per cent of the company; this is a major success in the company's record allowing for a new type of FDI in Egypt in ICT business. The evolution of SpeedSend as an e-procurement model could be seen as effective utilization of Egypt's orientation towards empowering ICT enabled services and reflects the reasonable acceptance of the Egyptian business society to apply electronic solution to streamline business operations.