Application of DOI in Egypt

Introduction

Egypt has all the ingredients necessary for becoming a hub in the ICT industry in the Middle East and Africa (MEA). With its ideal geography and infrastructure, Egypt could well become the ICT leader of the region in the near future.

Egypt's central location in the northeast corner of Africa, between the continents of the world is an amazing asset for any investor who wishes to tap this region. As a political leader in the MEA region, Egypt provides excellent access to markets in the area, and acts as a bridge between East and West, North and south. Egypt is also a crossroad of shipping lines and optical fiber cables.

With a population of more than 71 million, Egypt is one of the most populated countries in the region. About 58% of the Egyptian population is living in rural areas, 51% of the population is males, about 58% of the Egyptian population is under the age of 25, and more than 15 million young Egyptians are currently enrolled in primary, secondary and technical education. Meanwhile, over 265.000 university students graduate each year, as do more than 1.2 million high-school students.

Out of the total number of university graduates, 16.000 graduates each year from technical universities, more than a third of them speak two or more languages.

Egypt's ICT Sector roadmap started with Issuance of Law 19/1998 for separating operation and regulatory functions Establishing the Telecommunications Regulatory Authority (TRA).

Presidential Decree 101/1998 for defining roles and responsibilities of the TRA

For the first time in Egypt, a unified law has been articulated to allow the provision of public utility on competitive basis.

Commitments under the WTO- BTA for the liberalization of the telecom sector in June 2002:

Joining the WTO- Information Technology Agreement for reduction on customs on ICT related products in April 2003.Successive annual reductions of tariffs to 0%

Egypt has removed customs on IT products as a part of the tariff reform process in September 2004

Egypt is committed to the deregulation of international telecommunications services by the end of 2006 by providing number of licenses for private sector ventures to provide international voice and data telecommunications services in a transparent process.

MCIT Capacity Building Efforts:

ICT project with the cooperation with Egyptian Central Agency for public Mobilization and Statistics (CAPMAS).

Its Objectives are to establish information society indicators, Capacity building to facilitate measuring ICT indicators in Egypt.

We expect to have good Description of the major information society indicators in Egypt, be able to make comparison between Rural and Urban areas in Egypt and making comparisons with other countries and regions for benchmarking.

Formation of Indicators Unit in MCIT

MCIT has created a dedicated unit to produce and update required ICT indicators and
Avail the updated Egypt's ICT indicators to national and international users.

Egypt's Digital Opportunity Index

The digital opportunity index has been developed to be used as a tool to understand and
analyze the current situation in each country with regard to ICTs, and the setting of future
targets and benchmarking the Information Society. The DOI index allows for tracking
changes over time both changes in absolute scores, as well as changes in rankings relative to
other economies and provides the most useful tool for measuring progress in narrowing the
international digital divide between countries.

Having a look to the evolution of the DOI in Egypt over time, (table 1). We can notice that
Egypt has a medium DOI score (.38 as indicated in the World Information Society Report
2006ranking Egypt 90th.), but after we have calculated the DOI Index using updated data
related to the end of 2005, we have noticed that the DOI index value reached .41 ranking
Egypt 79th..Egypts DOI will be elaborated in more detail later in this paper and we will
highlight the MCIT supporting initiatives in order to bridge the gap to reach an ideal
information society.

Table: 1

	2000	2001	2002	2003	2004	2005
DIGITAL OPPORTUNITY INDEX	…	0.32	0.35	0.37	0.38	0.41
Opportunity	0.81	0.83	0.91	0.94	0.94	0.97
Infrastructure	0.10	0.12	0.14	0.16	0.18	0.22
Usage	…	0.01	0.01	0.01	0.03	0.04

Having a look to the sub components of the DOI Index for Egypt, we can notice that:

The Opportunity index is high (.97) compared with Korea republic (.99) ranking Egypt 52nd.

This was a result of some initiatives introduced by Egyptian government. Egypt pioneered the
Free Internet and radically slashed the cost of Internet access making it quite affordable; also,
it is the case for mobile tariffs and very good mobile coverage in Egypt, which will be more
enhanced by the introduction of the third mobile operator first quarter of 2007.

Egypt has experienced a strong gains in infrastructure under its Master plan 1 & 2 covering
period 2000 to 2007, which aimed to provide nationwide connectivity via an integrated
telecom backbone .A PC for every household program, which offers subsidies on PCs for
Egyptian families, as well as a Universal Service fund to promote universal access in
telephone services have had some success in developing the fixed line network in Egypt.
Egypt's infrastructure growth rate (fixed & mobile) is one of the fastest in the region. The
number of mobile subscribers in Egypt has been doubled almost in one year from 7.6 millions
in 2004 to 13.6 millions by the end of 2005,88.6% of them are prepaid subscribers.

Usage sub index is a weak point for Egypt's DOI, broadband is the issue. The number of
ADSL lines in services so far merely exceeds 142 thousand lines. Indicators have recently
shown that the number of Internet users in Egypt has hit 5.2 millions representing around 1.7

million Internet subscribers, which means that broadband subscribers account for only 8.4 % of total Internet subscribers, 71% of ADSL subscribers are located in Cairo.

This can be attributed to a number of reasons: first, the current ADSL service charges, although they are more or less comparable to international prices, are considered relatively high for living standards in Egypt (GDP per Capita 1443 US$) specially in rural areas. Additionally, real demand driven by content or killer applications is still missing, also lack of market awareness, play an important role.

For benchmarking if we compare Egypt's DOI with other regions and with Korea Republic as good example, we can notice that:

Although Egypt is one of the heights DOI in Africa, it needs more efforts to improve the usage DOI sub index, especially in the Broadband area.

Although Egypt's Infra structure sub index is relatively growing with a good rate, but there is still more work to be done to improve the infrastructure ,both fixed and mobile using wireless technology as a key component of the Information society. Still we are working in Egypt to break the barriers having an affordable fixed line Internet Access Device.

DOI Break down for Egypt,2005

Now we will explore the components of Egypt's DOI in more detail:

Opportunity index: Egypt's rank 52nd.

Egypt's Opportunity sub index includes three Indicators (table 2)

Table 2

	2000	2001	2002	2003	2004	2005
Opportunity	**0.81**	**0.83**	**0.91**	**0.94**	**0.94**	**0.97**
Percentage of population covered by mobile cellular telephony	0.86	0.86	0.91	0.91	0.91	0.98
Internet access tariffs as a percentage of per capita income	0.78	0.81	0.91	0.95	0.96	0.96
Mobile cellular tariffs as a percentage of per capita income	0.81	0.83	0.92	0.96	0.96	0.96

Accessibly to ICTs with affordable prices. The percentage of the population covered by mobile cellular telephony represents basic accessibility, while Internet and mobile cellular tariffs (as a percentage of per capita income) measure affordability. We have noticed that the Opportunity sub index has increased last year from .94 to .97 ranking Egypt the 52nd. For this sub index , as a result of Egyptian promoting initiates and the competition environment in the mobile market in Egypt

Internet access tariffs:

Egypt has pioneered the Free Internet Model. In January 2002, the government's first major success in its effort to make technology more affordable came with the launching of the Free Internet Initiative in Cairo. The Free Internet model is a Public Private Partnership, a joint effort between MCIT and Telecom Egypt, in cooperation with the majority of Egypt's private Internet Service Providers (ISPs). The initiative offers subscription free Internet services to Internet users via dialup to special-prefix numbers starting with 0777 or 0707. In September 2002, free Internet services was available nationwide. Today, Internet users across Egypt are only charged for the price of local phone calls associated with connecting to the network. The local phone call charges are approximately 0.15 USD for an hour of access. The

revenues from the free Internet calls are shared between Telecom Egypt and the service providers.

 The Free Internet model was a major step in increasing the number of Internet users in Egypt. The program effectively abolishes the major cost barrier of Internet access for users, and has encouraged many who had previously not made use of the Web to log on. After introducing the Free Internet Model, the number of Internet users increased more than five folds since JAN.2002 (more than 5.2 million users through more than 1.7 million connected households.

The Total international capacity increased last year from 2.88 gigabit /sec to 5.51 gigabit/sec now in June 2006.

Mobile cellular tariffs:

There are two mobile operators in Egypt. The third operator will be active first quarter of 2007 , the two present operators innovated many attractive prepaid subscription schemes addressing low profile customers .This was the main reason that the number of mobile subscribers in Egypt has been doubled almost in one year from 7.6 millions in 2004 to 13.6 millions by the end of 2005, 88.6% of them are prepaid subscribers. Both mobile operators worked hard last year to improve coverage , they installed xx transmitting stations only last year to improve coverage (xx % of the total transmitting stations). Coverage has increased notably last year from,.91 to .98. This was the main driver for the increase of Egypt's opportunity sub index last year from .94 to .97 in 2005 ranking Egypt 52nd.

Infrastructure index : Egypt's rank 77th.

This sub index includes network indicators (percentage of fixed & mobile cellular subscribers), households with internet access (fixed & mobile) and the access device to fixed internet (percentage of households with computer).We have noticed that this index has increased last year from .183 to .219 ranking Egypt the 77th. The main driver for this sub index was the wide deployment of both fixed and mobile infrastructure (table 3).

Table 3

	2000	2001	2002	2003	2004	2005
Infrastructure	0.10	0.12	0.14	0.16	0.18	0.22
Proportion of households with a fixed line telephone	0.38	0.42	0.48	0.53	0.57	0.61
Mobile cellular subscribers per 100 inhabitants	0.02	0.04	0.07	0.08	0.11	0.19
Proportion of households with Internet access at home	0.02	0.02	0.04	0.06	0.08	0.11
(Mobile) Internet subscribers per 100 inhabitants	0.00	0.00	0.00	0.01	0.01	0.02
Proportion of households with a computer	0.08	0.09	0.10	0.12	0.14	0.16

Egypt's telecommunications infrastructure has increased dramatically during the last few years. Fixed telephone lines have shown a steady increase from 7.5 million in 2000 to 12 million in 2005.The second fixed line operator is expected to be in 2008/2009.

At the end of 2001 two private mobile operators were serving 3.4 million mobile users, by the end of 2005 this figure had increased to 13.6 million. Also in January 2002, Egypt's free internet Initiative pushed both Telecom Egypt (TE) and other licensed data backbone operators to expand their networks in terms of both capacity and coverage .TE opened its

exchanges nationwide to interconnection and licensed operators were permitted to co-locate their equipment all across country.

All this resulted in significant increase in the number of Internet users from one million in 2001 to 5.2 million now and the international Internet capacity has increased from 20 Mbps in Oct. 1999 to 5510 Mbps now. Telecom Egypt (TE) is the voice incumbent in Egypt.

Egypt currently has two mobile telephone operators they installed 1151 towers only last year covering 100% of urban area and 95% of rural area of Egypt. Total number of towers reached 5778 in June 2006.there is a mutual interconnection agreement between both operators as well as with Telecom Egypt who is acting as the incumbent fixed voice operator. First quarter of 2007 will witness the third mobile operator and end of International connectivity monopoly.

MCIT Supporting Initiatives:

A Computer for Every Home

The goal of making the Internet affordable can be achieved only through the introduction of affordable access devices. To increase PC usage and to attain the level of penetration to reach 1 PC per every three families, MCIT has worked in partnership with the private sector to develop an initiative to provide the hardware needed to get more people online. The aim of the Computer for Every Home initiative is to provide end-users with PCs at prices affordable for the average user. By the end of 2007, 14 million users are expected to benefit from 4 million PCs.

The initiative is another example of Public Private Partnerships in Egypt in which Egyptian private sector companies are participating. Partially manufacturing and assembling computers locally, with some components imported from abroad, the initiative markets reasonably priced computers paid for in monthly installments with payments charged to the users' telephone bills. All PCs are being sold with a pre installed Microsoft Widows XP Operating system. Locally developed value added software is being made available with the PCs. The credit history of the fixed phone subscribers is checked and the fixed phone line guarantees the PC. The target is to reach 100,000 PCs sold annually to lower market segments and to open the market to Egyptian and foreign investors.

MCIT role is to certify and monitor the performance of the companies from the private sector that have joined this program.
MCIT and Intel signed an agreement in June 2006 to provide and educate nationwide understanding of the fundamentals in using personal computers as a key success for our developing market in terms of economy, education, tourism …etc. The PC Initiative program obstacle was the low affordability rate for the developing market citizens, but with the introduction of *Intel Discover PC Initiative Program – Low-Cost PC "Family PC"* for our developing market citizens, it impressively challenges on the basis of price affordability, compact design, quality control, and …etc; resulting in a PC platform in the finger tips of every home, work, community PCs for public access, schools, teachers, professors, retailers, SMEs', the list is endless. This is the kind of technology that MCIT endeavors, sponsors, and persuades for its responsibility towards the local citizens in the Egyptian communities, towns, and governorates.

The IT Clubs Model

The IT Clubs model offers a communal solution to problems of affordability, accessibility, and awareness. IT Clubs, currently 1349 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. The IT Clubs model is a public- private sector initiative to bring affordable Internet access throughout the country to those who cannot afford the PCs. For nominal fees reaching LE 1 (about USD 0.15) per hour and by providing hardware, software, and Internet connections, the government has made IT a daily reality for many who previously had little experience with the new technologies. As an added benefit, local businesses are also welcome to use the IT clubs. In addition, MCIT built up Mobile Internet Units supported by the ICT Trust Fund they are IT –equipped buses or caravans that can tour areas not currently served with an IT club.

With many centers based in the deprived and rural areas, IT clubs provide opportunities for those with the greatest need. 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. The government collaborates with Egyptian and international entrepreneurs to accelerate the rate of expansion of these clubs throughout the country.

IT clubs also create job opportunities for university graduates who join the Training of Trainers program. Graduates who complete the program become IT club trainers, charged with providing courses at a particular IT club. To reinforce the concept of community at each club, trainers must live in the same governorate as the club they work in, capitalizing on their familiarity with the needs and interests of the local community.

Through its continuing commitment to IT clubs, MCIT is taking the latest technology to the grass roots of society, and, by making IT a part of local communities; it is increasing opportunities for all citizens.

The Basic Development Training Program

One of MCIT objectives is to provide all citizens access to the worldwide resources available on the Internet. MCIT sponsored the Basic Development Training Program (BDTP) targeting the fresh graduates to make them more actively participating in the Information society. BDTP is a flexible project that has been established in 2000 in cooperation with universities and research centers, involving mainly university professors in the restructuring of the trainee's educational base. The BDTP is a highly focused, hand on education, providing a solid foundation for the trainees for their integration into Egypt's Information Society. Students are encouraged to work in teams and to adopt creative and innovative ideas with value to the industry. More than 133 thousand have been trained until now.

MCIT has started an ambitious plan to prepare preparatory schools and university students, as well as government employees to get the International computer-driving license within five years.

The Professional Training Program

MCIT setup the Professional Training Program (PTP) as an intensive human resource development program in 2000 to facilitate the development of IT and communication

specialists. Participants in this program are exposed to current state of the art technologies and knowledge within the ICT industry. More than 23 thousand have been trained until now.

 MCIT provided substantial funds to support both BDTP and PTP programs.

Utilization index : Egypt's rank 91st.

Utilization shows the extent of ICT usage and includes the proportion of individuals that used the Internet. Quality is reflected in ratio of broadband subscribers among Internet subscribers for both fixed and mobile technologies. Usage index is a weak point for Egypt's DOI, the internet subscribers are still low due to lack of affordable pc to log on the Internet and small ratio of broadband internet and mobile subscribers.

The growth rate last year of broadband subscribers reached approximately 10x growth rate of free Internet subscribers

Table 4

	2000	2001	2002	2003	2004	2005
Usage	…	0.01	0.01	0.01	0.03	0.04
Proportion of individuals that used the Internet	0.010	0.015	0.025	0.039	0.056	0.070
Ratio of Broadband Internet subscribers to Internet subscribers	0.000	0.000	0.002	0.005	0.023	0.055
Ratio of Broadband mobile subscribers to mobile subscribers		0.000	0.000	0.000	0.000	0.000

Egypt is leading an ambitious Broadband Initiative with the objective of increasing broadband penetration. Started in May 2004, promising affordable high-speed connection to the Internet. MCIT has established a framework for promoting broadband connectivity. Connectivity tariffs has been reduced by 40% in June 2006 to reach wider base (US$ 17/ month for 256 kbps and US$ 26 /month for 1 Mbps. The initiative is expected to drive the development of local electronic content and online applications in the various sectors of the economy.

Broadband Wireless Access is also included on Egypt's broadband agenda as it stands like an attractive candidate for availing broadband services nationwide, particularly in rural and new satellites where infrastructure may not be as developed as in the urban areas.

WiMAX technology has been recently introduced in Egypt for fixed wireless broadband, as it is optimized for both Line of Sight (LOS) and non line of sight (NLOS), WiMAX can be used in a wide frequency bands, which gives service providers greater flexibility.

MCIT and the National Telecommunication Regulatory Authority (NTRA) are working to set up working model and licensing procedures. This will be a good complement to mobile broadband in Egypt. The current drive is to introduce broadband services in 7000 schools countrywide. A related development concerns the trials of WiMAX which could provide a very attractive solution for making broadband services available in rural areas and satellite cities, where infrastructure is less developed than urban areas. AWiMAX field trial was instituted at the Smart Village. The trial tested the technology and application and the viability of the business model. The results provided valuable information on how to structure a regulatory framework that will encourage widespread WiMAX deployment.

Urban – Rural DOI Analysis in Egypt: (table 5)

Now we will use the DOI to analyze the performance within Egypt:

Table 5

	2005	2005 urban	2005 rural	% of urban
DIGITAL OPPORTUNITY INDEX	**0.408**	**0.468**	**0.354**	76
Opportunity	**0.966**	**0.973**	**0.945**	97
Percentage of population covered by mobile cellular telephony	0.980	1.000	0.950	**95**
Internet access tariffs as a percentage of per capita income	0.958	0.958	0.939	98
Mobile cellular tariffs as a percentage of per capita income	0.963	0.963	0.947	98
Infrastructure	**0.219**	**0.371**	**0.092**	25
Proportion of households with a fixed line telephone	0.610	0.990	0.285	29
Mobile cellular subscribers per 100 inhabitants	0.191	0.340	0.080	24
Proportion of households with Internet access at home	0.106	0.179	0.045	25
(Mobile) Internet subscribers per 100 inhabitants	0.022	0.039	0.009	24
Proportion of households with a computer	0.164	0.307	0.042	**14**
Usage	**0.042**	**0.061**	**0.027**	45
Number of individuals that used the Internet	0.070	0.127	0.028	**22**
Ratio of Broadband Internet subscribers to Internet subscribers	0.055	0.055	0.055	100
Ratio of Broadband mobile subscribers to mobile subscribers	0.000	0.000	0.000	

Opportunity index rural-urban,2005:

The people living in the rural areas have less chance to participate in the Egyptian information society, as they have less accessibility to ICTs represented here in the index by the mobile coverage (95%) while in urban areas it reached now 100%. Per capita income in the rural areas, according to surveys is lees by 30% than urban areas, these results less affordability for the tariffs, either access tariffs or mobile cellular tariffs. Because of these reasons, we can easily notice that the ***Opportunity index in the rural areas in Egypt is 76% of the same index in urban areas. The main driver for the lower score of opportunity in rural areas is mobile coverage there (red rounded box).***

Infrastructure index rural-urban,2005:

As expected, connectivity differs widely between urban and rural areas, which include the network indicators of proportion of households with fixed line telephone, mobile cellular subscribers per 100 inhabitants, proportion of households with Internet access at home and mobile Internet subscribers per 100 inhabitants. It also includes the interface device with the Internet represented by the proportion of households with a computer. The gap here between urban and rural areas is considerably high. ***Infrastructure index in the rural areas in Egypt is 24.9% of the same index in urban areas. The structure of the DOI allows us to study in more detail the weak areas where we have to investigate and recover it .Looking into the indicators under this infrastructure index ,we notice that proportion of households with a computer is the main driver for the low score in rural areas infrastructure index (red bordered box in table 5.***

The reasons behind the low score of infrastructure in rural areas are mainly less developed fixed infrastructure. Less affordability to have either a fixed telephone line or a PC. Lower rate of deployment for new fixed lines either due to less demand for new lines or due to technical constraints preventing the installation for remote and isolated areas , culture difference between urban and rural areas , in rural areas it was sufficient to have one telephone line for the whole family including children who already built their own small family but still living in the same big house of the family and lack of awareness of the importance of ICTs to the people living in the rural areas.

In 2005 a Universal Service Fund was established under the control of the National Regulatory Authority (NTRA) to meet the policy objective of correcting for market failures that may disadvantage people living in remote areas or poor communities. The Universal Service Fund creates incentives for public –private partnership implementation companies to supply remote, underserved areas throughout Egypt predominately inhabited by low-income earners with telecommunications services, including Internet access, at reasonable prices. All companies that obtain telecommunications license in Egypt must contribute part of their revenues to the Universal Service Fund. The fund then makes up the shortfall for operators when provision to certain areas would otherwise be uneconomic.

Telecom Egypt made a long-term partnership with American and Chinese companies to deploy for a state of art wide scale CDMA network for fixed voice and data communications in Egypt. This project will help to raise the telephone penetration in Egypt in rural areas and will provide access using wireless high-end CDMA 2000 1-X technology.

Usage index rural-urban,2005:

As expected utilization differs widely between urban and rural areas, which includes number of individuals that used the Internet and ratio of broadband subscribers (Internet & mobile) .The gap is high. *utilization index in the rural areas in Egypt is 45% of the same index in urban areas. we notice that number of individuals that used the Internet is the main driver for the low score in rural areas utilization index (red bordered box in table 5.*

The reasons behind this low score in utilization index are less affordability to have the Internet access device, the PC, culture difference between urban and rural areas and lack of awareness. The broadband indicators in this index are extremely low in both urban and rural areas. MCIT is leading ADSL public awareness to boost the number of broadband subscribers and to attract private sector to invest in content and broadband applications. The indicators for ADSL lines distribution all over Egypt indicates that 71% in Cairo, 13% in Alexandria, 11% in Delta, 3% in Canal-Red Sea- Sinai and 2% in Upper Egypt.

February 2006 started the process to introduce the third mobile operator in Egypt, deploying 3G network, it expected to commence operation by the end March 2007.Mobile penetration rate expected to grow from 20% in June 2006 to about 45% in 2010.

Conclusions:

Data collection and analysis are essential to address the impact of policies and business strategies on ICT development. The eleven indicators included in the DOI cover core areas to be monitored in order to track changes in the magnitude of the digital divide. Quality of the indicators is subject to internal capacity building to collect the required data and the need for each country to avail resources to cooperate with international agencies.The value of the DOI lies in its flexibility to be applied on the evaluation of performance across and within the same country as we demonstrated here for the urban and rural areas in Egypt and we used the same index to benchmark Egypt with other countries or regions. The modular structure of

DOI makes it easy to integrate it with other indices of interest. DOI can track progress when adopting new technologies such as broadband and mobile Internet.

In particular, DOI can be used to monitor the transformation of the telecommunication sector towards next- generation networks.

We have to think of more indicators in the Utilization index to reflect in more detail concerning services and mobile capabilities for better real measurement of the digital divide. Finally, we can say that the DOI is a practical and powerful tool for enriching policy and the development of the Information Society.

Egypt has to move forward and focus on rural areas, increase broadband utilization.

Human resource capacity building is a major issue in mobilizing Egypt's available workforce to work within the Information Society. Illiteracy eradication efforts continue and an extensive range of ICT training programs are being implemented, such the professional Training Program. Levels of qualified graduates with ICT fields are increasing, particularly the numbers of women.

Egypt's e-strategies have been formulated as sustainable and versatile, with a mind to inviting both the private and public sectors to play a major role in any development. The private sector is being seen as a crucial stakeholder in the country's progression towards the information society. The foundations for development, such as the establishment of an improved telecom infrastructure and use of wireless technology, have successfully utilized collaborating in these sectors. In addition, a further deregulated environment that is now being fostered by the NTRA is providing more flexible circumstances to attract investment and encourage entrepreneurship. In short all aspects of Egypt's e-strategy towards the Information Society are involving Public Private Partnerships.

International and regional organizations are also playing an important role in making available the necessary resources for building capacity and evaluation. The United Nations Development program, The world Bank, EU, and USAID have assisted in different degrees in the development and success of ICT projects. Multi Stakeholders Partnerships have become an elementary part of Egypt's plan of action.