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# Chapter 10
# ICT Strategy Development: From Design to Implementation – Case of Egypt

**Sherif Kamel**
*The American University in Cairo, Egypt*

**Nagla Rizk**
*The American University in Cairo, Egypt*

## ABSTRACT

*Information and communication technology (ICT) is continuously setting the pace for a changing, competitive and dynamic global marketplace and representing an enabling platform for business and socio-economic development. The impact of ICT adoption, diffusion and adoption can go well beyond being a state-of the-art infrastructure; it can have concrete impact on development. ICT strategy development from start to finish, from design to implementation should cater to the different needs of the community whether it is societal, economic, business and political with an aim to realize universal access to optimize the impact in terms of scalability and sustainability. Building the ICT infrastructure and infostructure will not realize quantum leaps in the development process unless it is coupled with concrete projects and initiatives that engage the society at large with its multiple stakeholders from public, private, government and civil society organizations irrespective of their locations whether urban or remote, gender or background. This chapter describes the evolution of the ICT sector in Egypt with an emphasis on national ICT strategy development across its different design and implementation phases as an integral element of Egypt's overall development process within the context of an emerging economy.*

## INTRODUCTION

Developing nations when addressing their future development plans, they need to develop a formula that integrates the changes and developments that are taking place globally and adapt a methodology that addresses their local changing needs while optimally allocating their limited resources to serve their business and socioeconomic development requirements. For policymakers, promoting information and

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communication technology (ICT) for development has taken center stage due to its impact on development and on democracy across different sectors with implications on governance, better management and transparency (Frasheri, 2002).

Within the context of ICT deployment in developing nations, it is worth noting that in the 1960s and 1970s the focus was more directed to the role played by the state and the public sector. This was followed in the 1980s and 1990s by diverting the attention to the role played by the private sector and ICT multinationals. In the early years of the 21st century, the attention was shifted to the role of non-governmental organizations (NGOs) and their vital involvement in diffusing ICT among different communities at urban and rural levels and especially underprivileged groups. Most recently, it is the small and medium-sized enterprises (SMEs) and startups who are taking center stage with the notion of entrepreneurship and innovation. Moreover, the role of the civil society was coupled with the growing attention being directed to corporate social responsibility (CSR) and the role of the community at large to integrate socially with the underprivileged segments in the community. The shifting role of ICT and the corresponding strategies have been consistently adapting to the dynamic changes taking place in global markets both developing and developed.

Developing nations should focus on various socioeconomic needs of the society and to the benefits that could be realized from the amalgamation of the experiences and resources of the state (government), private sector, public sector and the civil society through models of partnership and collaboration such as public-private partnership (PPP). In many cases, the national ICT strategy intends to deploy a multi stakeholders' approach to improve social inequality, economic development and the quality of life of the citizens. The objective is usually to contribute to the long-term national development plans by capitalizing on the opportunities enabled through ICT. These developments are changing, iterative and regularly adapting to market needs. Alternatively, in developing strategies, nations look at competition, investment, innovation and ICT as part of an overall integrated solution that needs to be formulated for ICT to have an effective impact on business and socioeconomic development and growth (Kamel, 2009). In Egypt, the primary objective of ICT adoption, diffusion and adaption is to support national development plans while engaging all stakeholders including the government, the private sector and the civil society. ICT is perceived as an enabler for socioeconomic development and a tool that can transform the society. The universal reach across different levels in the community is believed to be a key factor in realizing nationwide societal development.

ICT innovations are increasingly having important implications on business and socioeconomic development due to its role in introducing and diffusing the concepts of knowledge sharing, community development and equality. However, it is important to note that having an ICT infrastructure alone is not enough to solve all developmental problems; ICT should be looked at as a catalyst, a platform for development that needs the environmental and logistical setting to help the developmental process (Harris 1998; Kransberg 1991). The implications of ICT for development could be felt at the individual, organizational and societal levels. ICT advances have always changed the way human interact, learn, communicate, compete and strategize. While the basic needs of humankind have long been food, clothing and shelter, the time has come to add information to such invaluable list. Universal information access is becoming a primary need for everyone. Information and its technology platform is becoming an integral part of day-to-day lives around the world with implications on individuals, organizations and societies. This is manifested in the growing evolution of the information society, knowledge sharing, big data analytics and more.

The implications on developing nations could be remarkably effective if these technology innovations are properly introduced and managed in a world increasingly affected by access to timely, effective and accurate information. However, if the implementation process is not well supported and controlled, the result could be an increasing digital divide between developed and developing nations. It is important to avoid the fact that ICT could be marginalized in the development process. There is an urgent need to show that ICT generates the wealth of the enterprise, which in turn pays for socioeconomic development at large including but not limited to the effective role of SMEs. Moreover, it is ICT that is delivering the productivity gains that enable lives of material comfort for many around the world that would have been unthinkable only two centuries ago (Heeks, 2005).

ICT is not an end in itself but a means towards reaching broader policy objectives. ICT's main objective should be to improve the everyday lives of the community to fight poverty and to contribute towards the realization of the Millennium Development Goals (MDGs) (www.wsis-online.net). Moreover, WSIS emphasized the fact that ICT has the capability to provide developing nations with an unprecedented opportunity to meet vital development goals and thus empower them to leapfrog several stages of their development far more effectively than before (Ulrich & Chacko, 2005). However, there is a lot that still needs to be done within the context of developing nations for ICT to have the real anticipated impact. For example, it is widely diffused in the literature that the developing world's lack of universal access to ICT, often labelled the digital divide. Nevertheless, it is important to note that such divide is available between nations and within nations both developed and developing despite the fact that the impact of difference of rationalities exists between the developed and developing worlds (Avgerou, 2000). The digital divide is usually due to a number of reasons including, expensive personal computers for most citizens of developing nations, poor or limited telecommunications infrastructure especially in remote locations, and high illiteracy rates and poor educational systems (Radwan et al., 2009; Kamel & Tooma, 2005).

There are various factors that can help curb down the digital divide that relate to the legal and regulatory environment, awareness and capacity development among the community as well as the mechanisms in place for the collaboration between the different sectors in the economy. Moreover, the issue of electronic readiness (eReadiness) takes center stage in transforming the digital divide into a platform for social inclusion. Countries, sometimes, opt for massive national investments in rendering the population electronically ready to pave the way for electronic applications that could have implications on efficiency, transparency, rationalization of resources and social inclusion.

Since the early 1990s and with the diffusion of the Internet, millions of people around the world started relying on it for information interchange on a daily basis (Hashem, 1999). The Internet since its introduction has become the global medium for communication and is a major driving force of change in the global market place (Kamel, 1995). It is truly believed that ICT in general while neutralizing the time and distance barriers are the driving forces of globalization with great potentials for people to improve their lives (Colle & Roman, 2003). The reach of technology with the current and emerging communications platform makes the potentials without boundaries.

With the growing use of ICT, it is becoming a priority to deploy them effectively and efficiently to serve the socioeconomic and development objectives of the society. It is perceived that by combining emerging technology, appropriate organization, qualified human resources, capital formation techniques, and proper understanding of the needs of rural populations, this might pave the way for innovations that bring the Internet to underprivileged and rural areas in developing nations. Therefore, there is an urgent need to close the technology divide (gap) through a comprehensive plan for empowerment and social

inclusion and by decentralizing the ICT infrastructure presence in developing nations beyond the nations' capitals and the major cities because the Internet connectivity in those areas is extremely poor and represents a compelling need to improve village life (Press, 1999a). This can only be realized through national ICT plans, strategies and policies that would characterize the needs of the community and set out initiatives and projects accordingly. It is important to note that improving ICT universal access has been one of the primary recommendations of the World Summit on the Information Society (WSIS) that was held in Geneva (Switzerland) in December 2003 and emphasized in the second summit in Tunis (Tunisia) in November 2005 (www.itu.int). Universal access through broadband initiatives is becoming an invaluable factor for engaging and empowering remote and underprivileged communities. Providing the community with access to the Internet and knowledge repositories in many ways contribute to societal development due to the knowledge sharing across different levels in the society.

According to the study conducted in 1995/1996 by the United Nations Commission on Science and Technology for Development (UNCSTD), it underlined the importance of coordination for the formulation of national ICT strategies (Mansell and When, 1998). Moreover, the study pointed out the complexity of strategies to attract and maintain support for installation and maintenance of national ICT infrastructure in relatively low-income developing nations. The need for resources mobilization, proper environment, legislations and regulations, amongst other elements is important for building and sustaining such infrastructure. It is important to note that to promote an efficient and equitable national information infrastructure, governments of developing nations must create a negotiating environment in which banks, local telecoms, as well as other concerned parties are willing to act in a developmentally responsible way (de Alcantara, 2001).

There are four aspects to the digital divide including people, information, knowledge, and technology and these critical aspects should be developed together for an effective implementation to take place. ICT, which is a vital element of the knowledge economy, can be both a unifying and a divisive force. Its divisive aspect has come to be known as the digital divide, referring to the differences between those who have digital access to knowledge and those who lack it (Arab Human Development Report, 2002). This notion has been revisited in every single report published since then as well. The digital divide also referred to as haves and have-nots, relates to the possession of ICT resources by individuals, schools and libraries to variables such as income level, age, ethnicity, education, gender and rural-urban residence (Kamel, 2005a). Reactions vary concerning the digital divide. In the final analysis, its existence is undeniable, but it is not a technological issue. Technology has always been, and will continue to be, a social product, an element that is greatly emphasized especially with the emergence of social networks and their impact on individuals and societies. It is important to note that the challenge has to do with the ecosystem at large with all logistics and operational details involved and not just the technological elements (Kamel, 2009).

For societies to develop, grow, and benefit from the ICT evolution, nationwide introduction, adoption, diffusion and adaptation of technology should take place, something that is hardly seen in developing nations where most of the technology implementations and infrastructure are focused in the capital and the major cities. All these elements demonstrate the importance of developing national ICT strategies. Respectively, based on WSIS recommendations, nations around the world since 2003 opted to develop national ICT strategy that is integral to their development process. These strategies were adapted to the continuous changes taking place in the local and global environments.

ICT developments and their contribution to socioeconomic development are often researched and studied to assess their effectiveness and benefits on individuals, organizations and societies especially

in the context of developing nations. The objective of this chapter is to demonstrate the role of partnerships between different stakeholders in rendering ICT a platform for development and the implications on the economy. The evidence compiled from the literature is analysed to identify a set of lessons and recommendations for future implementations in similar environments. The focus is on showing how nations while developing their ICT strategies should also have the long-term vision and plans to move from the design to the execution phase. The research methodology utilized is mainly qualitative based on a set of interviews coupled with the researcher's impressions and interpretations of the implications of ICT diffusion within the community. In addition, a comprehensive analysis of the body of knowledge available coupled with an extensive literature survey of published reports, articles and documents on ICT deployment and diffusion in developing nations with a focus on Egypt was conducted. This chapter primarily focuses on the analysis of aggregate level information on ICT deployment in Egypt and its associated role on the economy at large given the identification of ICT as a driver for business and socioeconomic development.

## EVOLUTION OF THE ICT SECTOR IN EGYPT

ICT in developing nations is becoming a necessity for socioeconomic development (Press, 1999b). ICT are increasingly being recognized as essential tools for development, tools that can empower people, enhance skills, increase productivity, and improve at all levels (Schware, 2005). However, this can only be realized through a two-tier approach where society will contribute in shaping the infrastructure, which will in-turn contribute in shaping the society. Egypt, as a developing country, has heavily invested in its technology and information infrastructure since 1985 to become the platform for the economy's development and growth (Kamel, 2005b). During the period 1985-1995, a government-private sector partnership had a remarkable impact on building Egypt's information (infostructure) infrastructure (Kamel, 1997, 1995). During that period, hundreds of informatics projects and centers were established in various government, public and private sector organizations targeting socioeconomic development (Kamel, 1998). These projects that included human, technology and financial infrastructure development had invaluable inputs in building a growing information technology literate society capable of leading Egypt into the 21st century from an information perspective (www.idsc.gov.eg). Such elements represented the major building blocks necessary to establish a full-fledged information infrastructure capable of keeping pace with the developments taking place globally.

In 1999, ICT was identified as a priority at the highest policy level and a new cabinet office was established namely the ministry of communications and information technology (MCIT) leading to more investments and infrastructure build-up (Kamel, 2005b). Respectively, the growth of the ICT industry took massive steps during the last decade in different aspects including human, information, legislation and infrastructure (American Chamber of Commerce in Egypt, 2007). The period 2005 and beyond witnessed a remarkable increase in the number of IT companies providing sales and technical support of hardware, software, and in the development of IT solutions, systems integration and consultation. This helped create employment opportunities for fresh graduates and unemployed candidates interested in the ICT sector within major cities. More importantly, it provided opportunities for those living in the remote and underprivileged communities directly contributing to improving their economic status. Moreover, it helped ICT multinationals coming to Egypt to expand their businesses and penetrate both local and regional markets that are growing in number as the potential for a large IT marketplace grows

(American Chamber of Commerce in Egypt, 2007). This was a period of constant growth due to the needs in the marketplace but also due to the growing size of the market.

During the period 2011 and beyond with the multiple economic and societal challenges that Egypt faced, the ICT sector was still expected to realize double digits' growth, far outpacing the economy at large. In many ways, the development of the ICT sector has the power and potential to become the platform for all the sectors of the economy to realize major transformations that can help realize socioeconomic development. With the development of Egypt's uprising in 2011, the ICT infrastructure including the growth in the use of social media was perceived as an effective enabler, a supporter and a facilitator for economic prosperity, freedom and social equity.

The ICT sector as a dynamic, growing and attractive sector succeeded to attract many talented human resources that used to work in a variety of diversified fields. Therefore, the number of ICT employees kept increasing in exponential terms with an annual growth ranging between 8-10% reaching around an additional 500K jobs by 2017-18. The ICT sector is a major building block of economic growth in Egypt contributing to real gross domestic product (GDP). The growth rate of the sector was 6% in 2011-12 and expected to grow to 10% by 2015-16. In terms of contribution to GDP expectation for it is to rise from 3.2% to 4.1% during the same period (MCIT, 2013). According to the minister of ICT, during the fiscal year 2017-18, ICT annual growth rates are expected to reach 20% and account to 6% of Egypt's GDP (Helmy, 2013). The ICT sector is one of the fastest growing sectors in Egypt. It has managed to transform itself from a sector that consumes resources in the infrastructure build-up phase into a sector that is generates revenues and provides employment opportunities and a platform for development and growth through its variety of value-added services. These figures could represent a major boost to a country that is ranked 16$^{th}$ in the world in 2008 terms of population with 76.8 million and expected to reach 150 million in 2050 becoming one of the most populous countries in the world (United Nations, 2015). The population is expected to hit 200 million by 2100 and judging by today's demographics whereas 60% of the population are under the age of 25, the youth opportunity is expected to grow demonstrating a massive marketspace for ICT adoption, diffusion and adaptation (World Population Prospects, 2015).

It is fair to say that 75% of Egypt's population are millennials (under the age of 40). They represent those born in the early 1980s through the early 2000. They have a different way to look at life and to things in general. They are predominantly tech/web savvy, they were born into an emerging world of technology and have grown-up connected to the Internet and are regularly surrounded by smart phones, laptops, tablets and other tech-based gadgets, tools, and applications. In brief, technology and smart devices are shaping their space. They are also passionate and ambitious when it comes to entrepreneurship and innovation, mostly are interested in tech-startups. Most of them are virtually connected via social networks and they value its impact on the community. They also believe in access rather than ownership giving regular and constant rise to the sharing economy. All these elements contribute to the development of increasing prospects of the role and impact that ICT can have on socioeconomic development in the society. Therefore, the formulation of strategies, especially digital strategies should cater to the evolving nature of the community in Egypt.

Respectively, multiple initiatives and projects were introduced in recent years all aiming at preparing the community for the information society such as Free-Internet model, PC for every home (PC2010), establishment of IT clubs, and the introduction of broadband services in addition to projects relating to key sectors such as education, health, banking, and public administration amongst others (MCIT, 2005a). These projects have helped improve the digital demographics of the community at large especially when the infrastructure was diffused to reach communities in the remote and unprivileged areas.

*Table 1. Electronic readiness in Egypt*

| Indicators | Oct 1999 | Dec 2002 | Dec 2004 | Dec 2006 | Dec 2008 | Dec 2011 | Dec 2013 | Dec 2015 |
|---|---|---|---|---|---|---|---|---|
| **Internet Subscribers** | 300,000 | 1.2 million | 3.6 million | 6 million | 11.4 million | 29.75 million | 37.50 million | 46.20 million |
| **ADSL Subscribers (Broadband)** | N/A | N/A | N/A | 206,150 | 593,042 | 1.65 million | 2.49 million | 3.75 million |
| **Internet Penetration per 100 Inhabitants** | 0.38% | 2.53% | 5.57% | 8.25% | 15.59% | 34.83% | 44.65% | 51.34% |
| **Mobile Phones** | 654,000 | 4.5 million | 7.6 million | 18 million | 38.06 million | 78.99 million | 95.89 million | 107.41 million |
| **Mobile Phones Penetration per 100 Inhabitants** | 0.83% | 5.76% | 9.74% | 23.07% | 50.7% | 97.93% | 111.43% | 118.89 |
| **Fixed Lines** | 4.9 million | 7.7 million | 9.5 million | 10.8 million | 11.4 million | 8.96 million | 7.47 million | 6.06 million |
| **Fixed Lines Penetration per 100 Inhabitants** | 6.2% | 9.8% | 12.1% | 13.8% | 15.2% | 11.98% | 8.22% | 7.23% |
| **Public Pay Phones** | 13,300 | 48,000 | 52,700 | 56,449 | 58,002 | 23,664 | 22,481 | 21,397 |
| **IT Clubs** | 30 | 427 | 1,055 | 1,442 | 1,751 | 2,163 | 2,163 | 2,163 |
| **ICT Companies** | 870 | 1,533 | 1,870 | 2,211 | 2,621 | 4,250 | 4,489 | 5,210 |
| **IT Companies** | 266 | 815 | 1,374 | 1,970 | 2,012 | 3,599 | 3,764 | 3,896 |
| **Communications Companies** | 59 | 75 | 152 | 244 | 265 | 295 | 310 | 328 |
| **Services Companies** | 88 | 121 | 148 | 211 | 242 | 356 | 490 | 578 |
| Number of Employees in the ICT Sector[1] | 48,090 | 85,983 | 115,956 | 147,822 | 174,478 | 212,260 | 256,400 | 280,415 |

Table 1 demonstrates the status of electronic readiness in Egypt showing the number of Internet users, PC penetration rates and the total number of IT clubs (Kamel, 2009; 2005b and 2004; MCIT, 2011).

One of the effective platforms that helped diffuse ICT in Egypt across different segments of the community during the last decade has been the models of IT clubs and Internet Cafés. They helped spread the usage of the technology among youth as well as other segments in the community. In addition, there were a variety of projects that were introduced that used a diversified scope of business and operational models for design and implementation as well as resource allocation; the most successful was the deployment of public-private partnership (PPP) models providing affordable Internet access throughout the nation's 27 provinces. The locations include youth centers, culture centers, non-governmental organizations, universities, schools, public libraries and information centers amongst other locations. The total number of clubs currently stands at 2,163 as compared to 30 in 1999 (MCIT, 2009). All IT clubs are equipped with computers with Internet connectivity (MCIT, 2007). Some facilities are remote and they move between towns and have wireless connectivity. They also have the facilities to invest in human resource capacities by offering training programs to help promote ICT awareness and utilization. Moreover, they offer seminars and orientation sessions on a variety of technology tools and applications. The model of IT clubs in Egypt reflects the typical telecenters available in many other developing na-

tions (Kamel, 2004). In the case of Egypt, the objective of these telecentres goes beyond ICT diffusion with more focus on using the IT clubs as platforms supporting socioeconomic development of the local community especially in remote and unprivileged areas (Kamel, 2005a). In today's growing entrepreneurial environment, such platform is extremely useful for the proliferation of many tech-based startups that address different needs and requirements of the community.

An ideal ICT strategy should guide the development of a sound information environment in order to deliver convenient and universal access to information, improve communication, support collaboration and learning and ensure flexible, responsive and above all reliable systems. The strategic objective of the strategy should be able to develop and implement a business-driven institutional IT strategic plan that positions IT as a strategic asset and provides a context for institutional decisions regarding IT investments, governance and organizational structure. Being part of the global economy, Egypt has realized the importance of promoting the ICT sector and marked a new era for Egypt's ICT sector by the formation of MCIT in 1999, where the IT industry enjoyed a new and more liberalized regulatory framework. This was followed by the establishment of multiple organizations and institutions that support the development and continuous improvement of the ICT industry including but not limited to the Information Technology Industry Development Agency as well as the smart villages and many others.

Investment in the ICT sector grew from 8% to 15% annually out of the total investment compared to 3% in 2006. In 2008, 93% of total investments in the ICT sector were through private investments either local or based on foreign direct investments, which averaged around 1 billion US dollars in 2007, 2008 and beyond. The ICT market in Egypt generates around 2.9 billion US dollars of annual revenue with almost 2.5 billion US dollars (86%) derived from the telecommunications sector. The market in Egypt is one of the most advanced in the region due to service availability and the size of the market. Multiple developments and modernization is regularly taking place. For example, Telecom Egypt who holds the monopoly over landlines started to replace copper cables with fiber optic cables, a project that would cost around 5.6 billion US dollars (Egypt Economic Profile, 2016). This is just a sample of the amount of investment earmarked for the country's infrastructure. In addition, over the last decade, the investment in human capital has yielded dividends in the sense that Egypt is currently ranked 16$^{th}$ out of 55 countries according to A. T. Kearney's 2015 Global Service Location Index (GSLI) for outsourcing and offshoring businesses and is currently the region's industry leader and providing over 60K job opportunities.

During the period 2004-2008, as indicated in the seventh World Telecommunication ICT sector meeting held in Cairo in March 2009, the ICT sector witnessed an overall 20% growth with over 7.8 billion US dollars generated to the treasury; this was mainly due to the issuance of the third mobile operator in Egypt. Such investments are directed to the continuous development and improvement of the information infrastructure as well as for the investment in human resource capacities. The projections had indicated that continuous growth derived by increasing demand in response to bold trade and tax reforms would realize a stronger economic activity and increased disposable income for households (Kamel, 2006). However, following the 2011 uprising there has been a slowdown in the growth projections.

Reference Egypt's strategic vision, the government is sustaining its ongoing economic and institutional reforms, investment incentives, infrastructure development and global integration to enhance its competitiveness regionally and globally and to support investment in different fields especially in the ICT sector. Egypt planned to increase ICT exports to 1.1 billion US dollars by 2010 (MCIT, 2005b); which was realized coupled with a continuous growth in the local market. These projections were based

on the increase in ICT investments due to the government efforts to improve the business climate, which led to foster economic growth since 2004. In terms of investment in human capacities, MCIT has made a commitment to invest in the future by working to ensure that today's students and employees receive the education and training that will prepare them to lead Egypt in the information society. MCIT in collaboration with its different partners is focusing on developing basic and professional ICT skills by collaborating with government ministries, agencies as well as multinationals and companies from the private sector to develop a variety of training programs designed to provide a wide range of ICT-related concepts and applications. Some of the initiatives and projects that contributed in the investments in human capacities included the smart schools network, the eLearning competence center as well as the support received from Egypt's ICT Trust Fund which was established in cooperation with UNDP in 2002 (ICT Trust Fund, 2007). These initiatives and many more were introduced in recent years targeting the remote locations and underprivileged communities.

## FORMULATION OF EGYPT'S INFORMATION SOCIETY INITIATIVE

The evolution in the information society heralds a new socioeconomic order. This era is witnessing the emergence of information-based economies, with traditional economic, industrial and business activities moving towards more knowledge-driven processes and the progressive transformation of advanced economies into knowledge-based, technology-driven, services-dominated economies. These shifts are increasingly laying emphasis on economic activities with intellectual content and knowledge, enabled by the development and exploitation of emerging ICTs within all spheres of human endeavour. Against that background, Egypt is recognizing the need to develop rapidly its information and knowledge base through massive investments in ICT and human capacity development, improving and broadening universal access to higher and quality education and training with an emphasis on lifelong learning and creating digital content accessible to the society.

Egypt efforts for ICT development are government-led in collaboration with the private sector and civil society. In that respect, Egypt has developed a number of policies and strategies to facilitate socioeconomic development and accelerate the transformation of the nation's economy and society to become information-rich and knowledge-based. MCIT has formulated its 2007-2010 national ICT strategy with an objective to integrate different constituencies and to highlight its plans to use ICT as a platform and as an enabler to help socioeconomic development. The plan paved the way for the Egyptian Information Society Initiative (EISI), which is structured around seven major tracks, each designed to help bridge the digital divide and progress Egypt's evolution into an information society. The initiative has been constantly updated and amended to cater for the changing needs in the society and the changing dynamics in the marketplace.

EISI represented the vision of the ICT strategy translated into initiatives and programs that targets diffusing ICT connectivity. Table 2 demonstrates the different EISI building blocks. Egypt shares with other developing nations many of the challenges of building an information society, which could be rewarding to share with other countries with similar environments to learn from each other and capitalize on different lessons learned.

*Table 2. Egypt information society initiative*

| | |
|---|---|
| **eReadiness "Equal Access for All"**<br>• Enabling all citizens to have easy and affordable access to the opportunities offered by new technologies.<br>• Developing a robust communication infrastructure is key. | **eLearning "Nurturing Human Capital"**<br>• Promoting the use of ICT in education.<br>• Developing a new generation of citizens who understand and are comfortable with the use of ICT in their daily lives. |
| **eGovernment "Government Now Delivers"**<br>• Delivering high quality government services to the public in the format that suits them.<br>• Reaching a new level of convenience in government services.<br>• Offering citizens the opportunity to share in the decision making process and greatly improve efficiency and quality. | **eBusiness "A New Way of Doing Business"**<br>• Creating new technology-based firms.<br>• Improving workforce skills.<br>• Using electronic documents.<br>• Developing ePayment infrastructure.<br>• Using ICT can be a significant catalyst to increase employment, creating new jobs and improving competitiveness. |
| **eHealth "Increasing Health Services Availability"**<br>• Improving citizens' quality of life and healthcare workers work environment.<br>• Adding value using ICT through reaching remote populations.<br>• Providing continuous training for doctors, and offering the tools for building a national health network. | **eCulture "Promoting Egyptian Culture"**<br>• Documenting Egyptian cultural identity through the use of tools to preserve. manuscripts, archives and index materials<br>• Offering worldwide access to cultural and historical materials.<br>• Generate and promote interest in Egyptian cultural life and heritage. |
| **ICT Export Initiative "Industry Development"**<br>• Fostering the creation of an export-oriented ICT industry.<br>• Developing an ICT industry can be a powerful engine for export growth and job creation. | |

## SWOT ANALYSIS OF THE ICT MARKET IN EGYPT

The ICT sector grew tremendously during the last 20 years going through a number of phases from introduction to adaptation to diffusion and adaptation. However, the analysis of the local and global markets showed a number of challenges that faced the growth of the sector. These challenges were augmented following the 2011 uprising given the changes in the economy. However, it is important to note that still the ICT sector has managed to maintain its competitive advantage and was one of the economic sectors that was least affected by the changes that took place. The following SWOT analysis has been developed based on studying the different factors related to the ICT sector and highlighting its relative and competitive advantages and its potentials for growth and contribution in overall development beyond the current capacities. The analysis served as a main platform for building Egypt national ICT strategy. Table 3 demonstrates the findings of the SWOT analysis.

## FORMULATING EGYPT'S NATIONAL ICT STRATEGY

The government of Egypt since the late 1990s has embarked on a national effort to formulate a national ICT strategy that captures the national vision defining the introduction, use and diffusion of ICT for business and social economic development at large. The strategy that has been dynamically amended to reflect the changes in the global marketplace and catered for the transforming local needs was mainly related to infrastructure development, national information infrastructure build-up, investment in human resource capacities, market and environment development in the build-up to the formulation of the information society.

*Table 3. SWOT analysis of the ICT sector in Egypt*

| Strengths | Weaknesses |
|---|---|
| • Number of university graduates.<br>• Low employee turnover (labour laws).<br>• Government vision and support to ICT.<br>• Political stability.<br>• Infostructure (national information infrastructure).<br>• Telecommunication infrastructure.<br>• Low ICT infrastructure cost.<br>• Low cost of starting/doing business.<br>• Skilled, qualified and multilingual fresh university graduates. | • Small market size (ICT companies and market).<br>• Mainly hardware-dominated industry.<br>• Limited services business opportunity.<br>• Limited outsourcing projects (recently growing).<br>• Most large bids are government-related.<br>• Bureaucratic purchasing rules (red-tape).<br>• Fierce competition and price-driven market.<br>• Buyers market (service and quality value).<br>• General business climate/environment (though progressing).<br>• Import-based industry.<br>• Limited industry expertise (need for critical mass).<br>• Non-availability of enough capital investment. |
| **Opportunities** | **Threats** |
| • Growing economy with a focus on exports.<br>• Potentials for an ICT service-oriented hub.<br>• Possible Local market growth rate.<br>• Human capacity building programs.<br>• ICT to improve sectors competitiveness.<br>• eGovernment services and applications.<br>• Large number of private sector SMEs.<br>• Growing role of the civil society.<br>• Multinationals subcontracting national and local companies and vendors.<br>• Price-sensitive markets/lines of business.<br>• Outsourcing activities from US and EU.<br>• Buyers' market created by competition.<br>• Emerging technologies adopted to increase productivity and reduce costs.<br>• Mobile technology advantages.<br>• Role of government and NGOs in supporting and promoting the ICT sector. | • Availability of skills in required numbers.<br>• Perception of ICT value and delivery of required quality.<br>• Ability to cooperate between companies (legislative environment).<br>• Competition between government and private sector companies.<br>• Competition from other nations to Egyptian exports.<br>• Minimal research and development efforts.<br>• High local software and intellectual property piracy rate (recent improvements).<br>• Inadequate legal and regulatory climate.<br>• EU nations causing price pressures on ICT exporters to create low-cost, effective IT outsourcing to their markets. |

The guiding principle of the comprehensive national ICT strategy was that it was integrated, embedded and clearly linked to the local national development priorities. In that sense, ICT as a sector was looked as a potential for a productive sector, contributing to GDP and a facilitator for overall development. The government gave a priority to the ICT sector as a driver of economic growth. According to the World Bank, Egypt's ICT expenditure on ICT has reached 5.95% of GDP in 2007 coming ahead of many developed and developing nations (World Bank, 2009). Moreover, the government is giving priority to the ICT sector within its policy development framework scoring 4.4 on a scale of (1-7) in 2006 (World Bank, 2008). This trend continued in the following years contributing to the treasury and helping create regular job opportunities in different sectors across different provinces. Developing national ICT strategies in recent years has been the culmination of efforts undertaken by many nations since the 1980s.

Strategies during that time were focusing on computerization of the government administrative and operational procedures, coordination of computer education and training as well as the development and promotion of a computer services industry. Highly articulated ICT policies were developed in the 1990s, inspired by the Unites States announcement of the development of a national information infrastructure (NII) plan with key focus on private investment, competition, access and universal services (UNECA, 2003a). Gradually, it was perceived that as part of their economic development strategy, governments should make substantial efforts to develop their national ICT strategies that can compete on a global

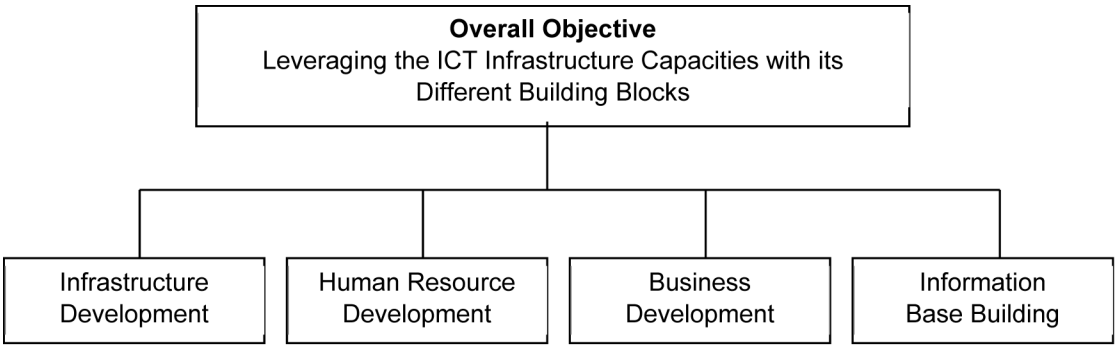
scale (Neto et al., 2005). In that respect, developing nations followed two different approaches in defining their national ICT strategies.

Electronic readiness is important to place nations on the global ICT "digital" map, something that not all nations, especially developing, can afford missing. In that respect, ICT strategy, vision and policies must not only be suitable but should also be embedded in a holistic application and implementation scheme. The ICT strategy, vision and policies of a nation, cannot afford to keep the different building blocks of ICT separate. Their amalgamation must be done at a priority basis otherwise, ICT as a platform for development will not bring the desired results. Moreover, successful applications of ICT for development depend on macro drivers, availing the required ecosystem as well as the preconditions and building blocks of the required environment (Neto et al., 2005).

Egypt, as an African nation, was part of the framework of the African Information Society Initiative (AISI) that emerged from recommendations of the conference of African ministers of economic development and planning in 1996. Egypt among other nations strived to develop its national information and communication infrastructure (NICI) strategies and policies that articulate long-term policy, infrastructure, content and application as an integral part of overall national development (UNECA, 2003b). Egypt is considered among the nations that have advanced their national strategies from conceptualization to implementation. The advantage of the model is that all constituencies are involved, the government, the private sector and the civil society. The ICT strategy in Egypt was translated in the deployment of a two-tier approach, developing national strategies and harnessing ICT applications in key sectors such as education, health and commerce with an emphasis on promoting electronic commerce, attracting FDI to stimulate the knowledge-based economy and to create jobs for the youth and to harness the potential of ICT.

Egypt ICT strategy goes beyond telecom reaching a cross-sectoral approach to creating an enabling environment and mainstreaming ICT into national development policies by addressing all sectors such as trade, finance, investment, education, government, health, commerce and media amongst others. The target is to transform Egypt into becoming a vibrant and dynamic ICT hub in the Middle East with a thriving digital economy and IT-empowered citizens (MCIT, 2007). Figure 1 demonstrates the overall objectives of the national ICT strategy during the period 2000-2004 (MCIT, 2005a). As indicated earlier, it is important that ICT strategies are dynamic and iterative to match and realize the objective of the national strategies.

*Figure 1. National ICT strategy building blocks (2000-2004)*



The national ICT strategy is a product of the collaboration of many stakeholders including the community, the government, private and public sector organizations as well as the civil society. The engagement model is a critical success factor in the realization of the objectives of the strategy. According to WSIS in 2003 and 2005, all nations were encouraged to develop their national ICT strategies including the necessary human capacity building taking into account national local conditions. In that respect, strategies should aim to maximize the social, economic and environmental benefits of the information society, which can only be realized if governments create a trustworthy, transparent and non-discriminatory legal, regulatory, and policy environment (www.wsis-online.net). Egypt national ICT strategy objectives were mainly formulated to promote the information society and to build an export-oriented ICT industry. Such objective by nature is dynamic and changing based on emerging ICTs and its relation to socioeconomic development.

The national ICT strategy was formulated to encourage social inclusion in the information age. The use of ICT to minimize the creation of communities of *haves* and *have-nots* was a key-targeted outcome. At the local level, the commitment to maximum social inclusion of its population required considerable pro-active support including financial investment to ensure that Egypt is given universal access to the Internet backbone and to NII. Moreover, the strategy addressed issues such as human resources capacity development and upgrading the physical infrastructure to be able to compete in global deregulated markets. At the global level, access became invaluable in shaping the role Egypt plays in global trade and markets. Respectively, convergence became vital. The emerging role of ICT and its integration in major sectors such as education, entertainment, health, and financial services became a prerequisite for developing nations to be able to integrate in the global information economy and Egypt factored that element in its national ICT strategy.

Egypt national ICT strategy has been dynamic and flexible adapting to the changing nature of the sector. In that respect, during the period 2004-2006 a revised strategy was formulated to include new elements such as providing an institutional support for developing electronic access (eAccess) and providing institutional development of electronic government (eGovernment) and electronic business (eBusiness). Figure 2 demonstrates the amendments that were introduced to the national ICT strategy for the period (2004-2006). The government of Egypt has made a strong commitment to advance the cause of human development in the context of an open economy. It is arguably believed that human capital represents Egypt's oil of the 21$^{st}$ century. The nation's main and most invaluable resource that could transform the economy and the society at large and the notion of information technology and innovation in general could play a pivotal role. Additionally, the structural adjustment program that began in the early 1990s has caused positive and profound changes in the competitiveness of the country. Something to capitalize on and to leverage moving forward. Three main elements could characterize the economy being more open and that includes strengthening of market mechanisms, privatization of government enterprises and an increasing role for the private sector and the civil society (Kamel, 2006).

The role of MCIT required the provision of a policy framework for the ICT sector to grow and become competitive both locally and globally. Table 4 demonstrates the main categories under which fall the changing projects affiliated and identified as part of the national ICT plan. The majority of the projects were implemented by the private sector with financial and technical support and guidance from MCIT (www.mcit.gov.eg). In 2006, and with the continuous development in the ICT sector in Egypt, a revisit to the strategy was conducted and a new ICT sector strategy was formulated for the period 2007-2010. The new strategy has been formulated to cater for three main components, ICT sector restructuring, ICT for reform and development and ICT industry development as demonstrated in Figure 3.

*Figure 2. National ICT strategy building blocks (2004-2006)*

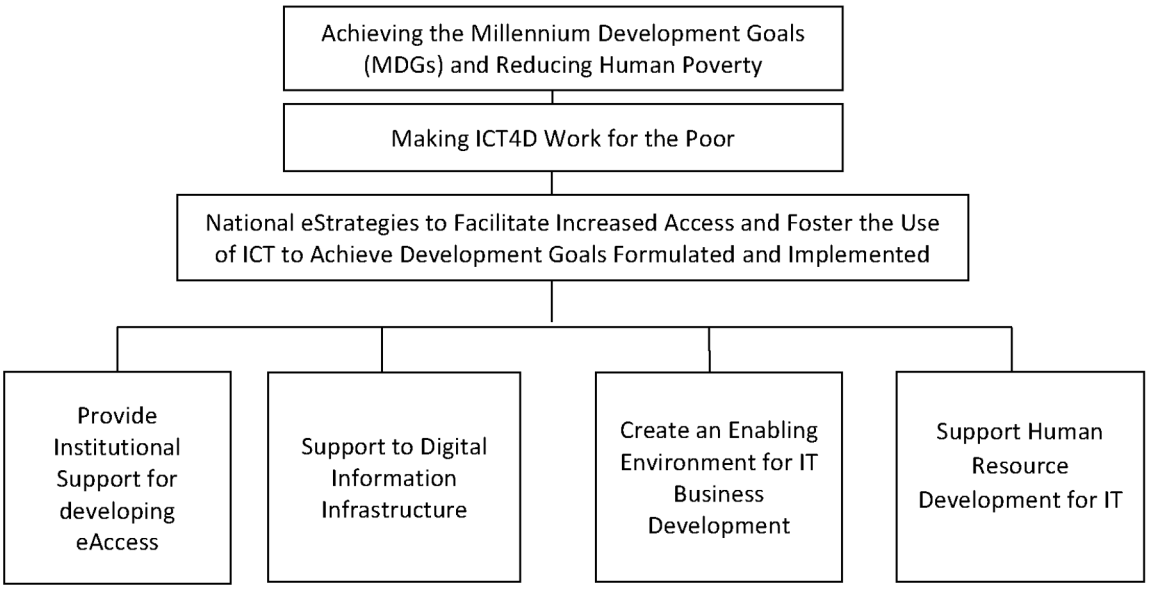
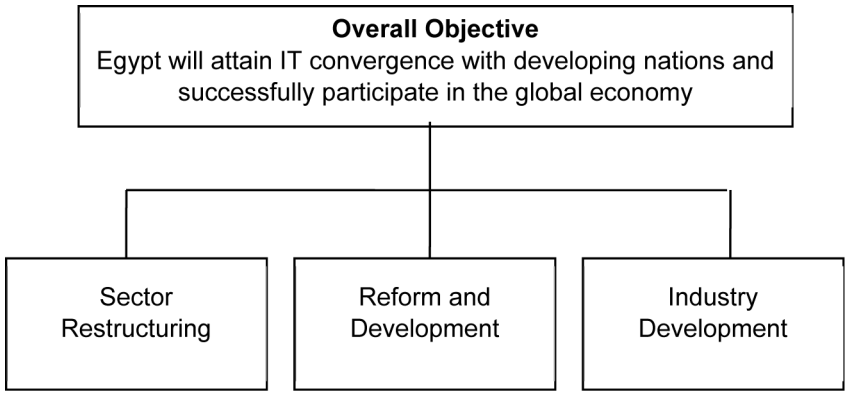



*Table 4. National ICT plan projects categories*

| |
|---|
| • Promoting national demand for ICT in collaboration with different stakeholders.<br>• Focusing on an export-oriented strategy with emphasis on software development through outsourcing.<br>• Investing in human resources as the primary building block in the ICT ecosystem.<br>• Forging international alliances and partnerships to increase diversity, encourage FDI and create job opportunities.<br>• Modernizing the ICT infrastructure to participate in the global ICT space.<br>• Availing the legislative environment allowing successful implementation and sustainability of projects. |

*Figure 3. National ICT strategy building blocks (2006-2010)*



During the period 2007-2010, the focus of the amended national ICT strategy was on sector restructuring by increasing the state resources to reach 3.9 billion US dollars through restructuring the national postal service, initial public offering for Telecom Egypt (TE) and the provision of National Telecommunications Regulatory Authority (NTRA) licenses such as 3G and WIMAX services amongst others. Moreover, the government intended to exert maximum efforts to maintain the current level of investments in the ICT sector that is levelled at an annual growth rate of 20%. Finally, the government planned to help deploy state-of-the-art ICT tools and applications to serve the development in the society in different sectors. In terms of using ICT for reform and development, the strategy intended to follow three main paths. This included; deploying ICT tools through increasing the penetration rates to mobiles, PCs, Internet usage, broadband services and ICT clubs; developing the postal services network with its 4000+ branches; and finally completing the ICT infrastructure in different institutions. Moreover, the strategy focused on using ICT as a catalyst in reforming a number of sectors including:

- Education;
- Health; and
- Government institutions (ministries) amongst others.

In terms of industry development, the strategy intended to focus on innovation, research, and development in ICT through the formulation of partnership agreements with ICT multinational companies. This included the development of different technology incubators for small and medium-sized enterprises (SMEs) in the ICT sector, investing in human capital, media convergence, development of digital content and promoting ICT exports through outsourcing. The rationale was to look at ICT as a platform for empowering the community as a key element for socioeconomic development. In 2011 and post Egypt's uprising, a new amendment was introduced to the strategy by integrating a universal access modality that targets maximizing Internet access through broadband for the whole community. This is an attempt to support sectors such as industry, education and SMEs through capitalizing on what ICT can offer leapfrogging several sectors and contributing to the transformation of remove and underprivileged communities.

In 2012, post Egypt uprising a new strategy was developed to take the ICT platform from the planning to the execution phase. The emphasis at this stage was primarily on the digital economy. Institutional development was an integral element of the process. With a more challenging economy, the need for more FDI was important and ICT was perceived as one of the possible venues. The main building blocks of the new strategy included digital platforms, training and investing in human capital, technology parks, innovation clusters, reaching out to marginalized and underprivileged communities and more (MCIT, 2013). The vision that was known as digital economy 2020 was defined as "to realize the societal needs for all using simple, affordable access to knowledge and services through ICT anywhere and anytime". The overall objectives included attracting investment into the ICT sector, expanding ICT companies, creating job opportunities, providing public information access, availing most government services through online platforms and more.

The new strategy intended to realize a set of impacts that included improving efficiency, fighting corruption, enhancing transparency, ensuring social equality, reducing cost, decreasing time to service, supporting decision making at the centralized and decentralized levels and contributing to the nation's GDP. There were three strategic objectives for the strategy and that included:

- Developing a national integrated digital platform to contribute to achieving socioeconomic development and social equity;
- Supporting the ICT industry development through innovation and entrepreneurship attracting foreign direct investment and creating job opportunities;
- Building on Egypt's unique geographical location and optimum utilization of submarine cables to become a global Internet hub.

Table 5 demonstrates the main pillars of the strategy that reflect its primary directions being digital, industry-driven, development-oriented and targeting the positioning of Egypt in the global digital map as a focal hub. The strategy was launched with the national broadband initiative in December 2013 with a total investment of 40 million US dollars. The objective of the initiative was based on the fact that with 10% increase in broadband penetration, an additional 1.38% in GDP growth will be realized as 50K jobs will be created (Helmy, 2014). The overall strategy targets were identified as to move from 4% contribution to GDP in 2013-14 to around 7% in 2019-20 realizing a growth rate of the sector of about 17% as opposed to 10% in 2013-14. This would leave to creating around 400K job opportunities by 2020 (Helmy 2013).

## CONCLUSION

Successful ICT strategies need a number of elements in order to be effective and to realize its targeted objectives. This includes, but is not limited to, leadership from top executives and policy makers, involving all stakeholders in implementation, deploying a holistic approach covering all sectors, having a clear vision, a set of realizable objectives and identified and agreed-upon set of key performance indicators, enabling a liberalized economy, monitoring ICT developments, tailoring towards the nation's requirements and mainstreaming ICT into national socioeconomic development plans. There is a need to emphasize the role of the government in creating the right atmosphere that encourages private sector investment in ICT related businesses. This role was maintained throughout the transition period that started in January 2011 and still in place with several governments in charge. However, all sharing the support to the ICT sector as an enabler for the targeted development process. The liberalization of the telecom sector is important to encourage competition and promote FDI. The creation of a universal access policy through broadband is invaluable to induce mass-market deployment of ICT leading to improving the service quality and speed. Moreover, instituting the necessary foreign investment laws and enforcing software piracy

*Table 5. ICT strategy main pillars*

| **Digital Strategy Pillars** | |
|---|---|
| Basic infrastructure. | Information infrastructure and digital content. |
| Electronic, design and manufacturing. | Community development. |
| ICT industry programs and initiatives. | Cyber security and eSignature. |
| Legislative and policies framework. | |

and copyright infringement laws, which encourage ICT multinationals to establish regional operations, thus providing work opportunities for skilled individuals and limiting the brain drain effect. Egypt has already shown over the last decade some headway on the ICT development path. However, it needs to strengthen its commitment and speed its process for a long-term sector development and growth. Such a strategy would invariably drive faster growth across all economic sectors, which will lead to a sustainable socioeconomic development that can be reflected at the individual and societal level.

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## ENDNOTES

[1] There are over 54,000 indirect job opportunities associated with IT clubs and Internet cafés across Egypt.