EGYPT’S ICT LANDSCAPE:
A LOCOMOTIVE FOR GROWTH AND DEVELOPMENT

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ABSTRACT

In spite of the rapid progress in the Information and Communication Technology (ICT) sector, its spillover has been limited. There is a clear need to scale up efforts and to deal with the many challenges that affect Egypt’s aspirations of becoming a regional and global hub. This paper is unique in addressing the question whether the ICT sector has truly succeeded in becoming a locomotive for growth and development, or whether its weak and inadequate linkages with subsectors, not having grown in step with the rest of the economy, have had as an effect on the creation of a dual economy.

The methodology examines the impact of ICT on social and economic development, focusing on e-government, e-tourism and e-education, and later provides recommendations, both general and specific, to enhance the role of ICT in these sectors. Results show that tremendous efforts have been exerted by the government to enhance the usage of ICT in these areas. However, the effect has not been proportionate to ICT growth—ICT must be at the heart of Egypt’s development agenda to meet today’s global competitiveness requirements.

ملخص

بالرغم من التقدم السريع الذي تم إحرازه في مجال تكنولوجيا المعلومات والاتصالات، فإن تداعيات ذلك على القطاعات الأخرى لا يزال محدودا. فهناك حاجة واضحة لتكييف الجهود والتعامل مع العديد من التحديات الكثيرة التي تؤثر على طموحات مصر في أن تصبح مركزاً إقليمياً وعالمياً في هذا المجال. ويعد هذا البحث فردا في سعيه نحو الإجابة عن التساؤل عن إذا كان قطاع تكنولوجيا المعلومات والاتصالات قد نجح بالفعل في أن يصبح قاطرة للنمو والتنمية، أم أن هناك عدد كافياً لروابط القطاعات الفرعية الأخرى في الاقتصاد الوطني- التي في واقع الأمر لم تحلق في ركابه ولم تحرز تقدماً مازدا - أدت إلى خلق اقتصاداً مزدوجاً.

تتناول منهجية البحث تأثير قطاع تكنولوجيا المعلومات والاتصالات على التنمية الاقتصادية والاجتماعية مع التركيز على ثلاثة قطاعات هي: الحكومة الإلكترونية، والسياحة الإلكترونية، والتعليم الإلكتروني. كما تخلص الورقة البحثية إلى توسيعات عامة وتوصيات محددة لتفعيل دور قطاع تكنولوجيا المعلومات. تظهر النتائج أن الحكومة قد بدأت جهوداً هائلة لتعزيز استخدامات تكنولوجيا المعلومات والاتصالات في القطاعات الثلاثة سالفة الذكر، بيد أن الأثر النهائي لتطوير تلك القطاعات تكنولوجيا لم يكن متسناً مع نمو قطاع تكنولوجيا المعلومات ذاته.

يخلص البحث إلى أن تطبيقات واستخدامات تكنولوجيا المعلومات يجب أن تكون في صلب جدول أعمال التنمية في مصر لتلبية متطلبات التنافسية العالمية.
1. INTRODUCTION

Information and knowledge are gaining critical importance in Egypt’s economy. Egypt, as a developing nation, with an economy in transition, has realized the potential of Information and Communication Technology (ICT), and has increasingly invested in building its ICT infrastructure during the 1980s. It was in the late 1990s, however, that ICT was put on the national agenda as an enabler for socio-economic development and a gateway to the knowledge society (Kamel 2008). Since nationally prioritized, ICT services have drastically expanded, transforming from a subsidy-supported state to an independent sector that gives the country a digital foundation (Kamel 2009). Unequivocally, ICT is expanding access to information, deepening and broadening knowledge and driving the country into the digital age.

Indications of ICT’s rapid expansion in Egypt are numerous. The sector’s growth has outpaced growth in the national economy by nearly three-fold at rates of 20 percent compared with the national economy’s 7 percent in 2007. In 2007/08, the contribution of ICT to GDP was 3.9 percent. This figure, however, only reflects the communications services of the larger ICT industry, thus, a significant portion of the sector’s productivity, e.g. information technology, is not included, as these activities are included in the national accounts under “Other Services” (Helmy 2009). ICT revenues nearly doubled from $4.30 billion in 2005/06 to $7.9 billion in 2009/10, pointing to a burgeoning economic force (MCIT 2011c). Further, investment in ICT was approximately 15 percent of total investment in 2006/07, which compares favorably with other developing countries at Egypt’s income level. As for Egypt’s IT exports, they reached $1.1 billion at the end of fiscal year 2010/11, and exports are expected to double by fiscal year 2012/13 (MCIT 2011f). These developments helped place Egypt 4th in the list of the leading emerging economies for offshoring services—a testament to its growing global foothold in the ICT industry (Kearney 2011).

Figure (1) exhibits that this impressive growth has also steadily reached a great portion of the population: the number of Internet users has increased enormously from 0.6 percent of the population in 1999 to 33 percent in 2011 (MCIT 2011d). Mobile phone subscribers have also skyrocketed from roughly 1 percent of the population in 1999 to 99.5 percent in 2010, as shown from figure (2) (MCIT 2011e). Over the last 2 years, the number of subscribers has increased by more than 1 million annually. Employment opportunities have also risen due to increased ICT cultivation, with a 57 percent increase in direct employment from 115,280 in 2000 to 181,734 in 2009, and the number of information technology companies have increased by more than five-folds from 498 in 2000 to 2,728 in 2009 (MCIT 2010g).

1. $1.00 = EGP 5.69.
At this juncture, it is important to note that while in some sectors government numbers may be questionable in terms of accuracy and timeliness, the Ministry of Communications and Information Technology (MCIT) has done an exceptional job of collecting regular and reliable data through an expansive survey team. MCIT works in close cooperation with other governmental agencies, such as National Telecom Regulatory Authority (NTRA), regularly consults with international organizations, such as the World Bank, on technical issues and supplies data to the International Telecommunications Union (ITU). Also, noteworthy is the fact that ICT in Egypt is a relatively new arena; the devoted authority – MCIT – was only established in 1999. Therefore, a pool of preexisting research in the form of conventional academic literature is lacking in this sector, hence, limiting the scope of rigorous methodology. However, through interviews with various stakeholders and recent papers from academics to private sector practitioners to businesses, this paper aims to make a contribution to building the nascent literature on ICT in Egypt.

As said, since 1999, Egypt has made ICT development a central priority, and has used an expanding portfolio of technological services at both governmental and non-governmental levels. Sound ICT infrastructure is the gateway to information sharing in the modern era and central to socio-economic prosperity. Benefits at the household, communal and national levels are manifold: increased productivity, employment and income opportunities, as well as improvements in basic rights: healthcare, education and transparency. Accordingly, the government has enacted its national ICT strategy. A key component of the strategy has been the ICT clubs, which have helped bring PC’s into each of the country’s 28 provinces (Kamel 2010). The clubs have become increasingly prominent over the past 10 years: growing from 30 in 1999 to nearly 2000 in the span of a decade at a growth rate of roughly 13 percent per annum. Also, the government has made certain to spread the IT clubs to rural areas as well, with the 2008 layout of the clubs as follows: 623 in Upper Egypt governorates, 543 in urban governorates, 487 in Lower-Egypt governorates and 98 in borderline governorates (Kamel, 2009).

Another large undertaking is the ICT Trust Fund jointly founded by MCIT and the United Nations Development Programme (UNDP). Established in 2002, the Fund supports ICT projects in
the fields of community development, agriculture, education, health, improving opportunities for the disabled and the growth of micro, small, and medium enterprises. Its work is an example of how the government seeks to leverage the full range of ICT advantages, from increasing business efficiency to empowering marginalized demographics. There are also additional national projects to enhance ICT role in education, healthcare, banking and public administration- to name just several-, while public-private partnerships have helped bring affordable Internet access to libraries, schools, youth centers, NGOs, universities and culture centers.

Yet, ICT development must also be carried out with caution. ICT growth is not an end in itself, and mismanaging it can threaten social cohesion and a country’s development agenda. Indeed, while ICT growth is an economic advantage, however, if it does not diffuse into other sectors, it may create a two-tier society, deepening the gap between the haves and have-nots. Egypt’s national ICT strategy indeed recognizes these concerns, yet, efforts still need substantial scaling up, especially in terms of spreading ICT access to rural areas and usage in other sectors, as addressed in the three subsector case studies that follow. The public and private sectors must make certain that ICT is widely and diversely applied, and they must also use it to advance agendas outside of ICT development. For instance, public-private ICT initiatives can help achieve Egypt’s objectives in education and general capacity building, as well as healthcare and other long-term development goals. ICT can also help improve the country’s tourism sector—a critical area for both employment creation and balance of payments sustainability. Furthermore, ICT is also being used to establish more government transparency, which must continue to develop, especially in Egypt’s liberalizing economy.

This paper reviews the potential impact of ICT, while examining the role it plays within key social and economic development sectors and agendas: education, tourism, government efficiency and cross-sector synergies. Section (2) highlights the sector’s immense progress in recent years that has enabled Egypt to become a hub for offshoring, such as call centers service, in the Middle East and North Africa (MENA) region. The section also addresses the question of whether the ICT sector has become a growth locomotive for Egypt, or if it has deepened the digital divides by not having grown in step with the rest of the economy. Section (3) focuses on how ICT has driven development in various sectors of the economy. In each of the three sectors addressed, the paper deals with the present status of ICT in the sector, as well as confronts the challenges. Section (4) proposes next steps, first in general terms and then specifically in relation to each sector discussed. Finally, section (5) emphasizes the need for placing information technology at the heart of Egypt’s development agenda. It stresses how global competitiveness requirements go beyond traditional price and quality factors to areas, such as: global exposure, online business efficiency, an ICT-oriented and equipped workforce, adaptation, transparency and resilience.

2. ICT: A RAPID EXPANSION WITH REMAINING CHALLENGES

While acknowledging the impressive growth of the Information and Communication Technology (ICT) sector and its contributions to GDP, employment and revenues, however, its spillover has been limited. There is a clear need to scale up efforts and to deal with many of the challenges, which also affect Egypt’s ranking in the region and globally. In terms of the ICT Development Index, Egypt ranks 12th in the Arab world and 96th globally. ICT penetration and maximization of its benefits are
essential, yet, a long-term vision entailing a regulatory institutional infrastructure and a strategic framework that permits synergy across sectors are currently lacking.

2.1 ICT as an Enabler for Economic Development

Expansion of ICT has been largely driven by the introduction of government programs such as the 2002 “Free Internet Initiative” and “PC for Every Home Initiative”, carried out in partnership between Telecom Egypt and 17 private sector companies. Within the latter initiative, families receive internet-ready PCs with no collateral or deposit needed; only a fixed telephone line is required (MCIT 2009). A more recent national program, “PC 2010 – Nation Online”, has effectively built on progress and lessons learned from past national efforts. Its core goal is to bring the number of families with PCs up to 25 percent of households or roughly 3 million families by end of 2010 (Kamel 2010). Some 44 percent of households use computers in 2010 (MCIT 2011). With the country’s GDP per capita hovering around $5,690 the change in purchasing power bodes well for many more people (MCIT 2010). Lastly, taking a cue from ICT initiatives in other countries that have had difficulty disseminating new technologies to areas outside of large cities, PC 2010 has prioritized bringing its services to the 27 governorates in Egypt, with a particular focus on marginalized demographics. Reducing the price of infrastructure and catering to a wider clientele and geographic areas make the initiative, perhaps, the most successful ICT-based endeavor in Egypt to-date. More ambitious still is the newest ICT initiative announced in November 2011, the National Broadband Plan, dubbed eMisr, which aims to increase household broadband subscriber rate from 2 percent by the end of 2011 to 22 percent in 2015 and 40 percent in 2021. The strategy also focuses on mobile broadband as a market with great growth potential; the plan calls for 10 percent of the population to be subscribed to mobile broadband by 2015 and 15 percent by 2021 (MCIT 2011).

ICT exports consist mainly of offshoring: a practice by which companies relocate certain business processes from one country to another, such as international ICT companies shifting ICT operations to Egypt. For example, Oracle, IBM, Cisco, Google, Yahoo and Microsoft all have major operations in Egypt. Oracle supplies 7 percent of its worldwide support and 20 percent of its regional support from Egypt. In addition to IBM call centers based out of Egypt, one of IBM’s nine global delivery centers is located in Egypt, consisting of virtual teams handling global projects. Cisco’s tech support for the region is run out of Egypt; Cisco Senior Vice President, Howard Charney labels broadband Internet as the fourth utility—no longer a luxury, but rather a necessity.

4. In its effort to make technology more affordable, Egypt's Ministry of Communications and Information Technology launched, on the 14th of January 2002, the Free Internet Initiative. A unique Egyptian experience, where Telecom Egypt, in cooperation with the majority of Egypt's Internet Service Providers, started offering subscription-free Internet services to users in Cairo, via dial-up to special-prefix numbers starting with "0777" or "0707". The Free Internet Initiative aims at laying the foundation for Egypt's Information Society, increasing the number of online users, changing their usage patterns, boosting the infrastructure and building the base for future e-Government projects. Today, Internet users all across Egypt are only charged for the price of local phone calls associated with connecting to the net. 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, in the best interest of Egyptian citizens.

5. With the PC for Every Home initiative, Egyptians with little or no credit history can pay for their computers on small monthly installments.

6. AmCham event titled "Driving the Networked Economy in Egypt" with speaker Mr. Howard Charney, Senior Vice President, Office of the President, Cisco. Accessible at http://www.amcham.org.eg/events_activities/events/details/Default.asp?ID=367&P=1.
A.T. Kearney’s Global Services Location Index sees Egypt climb two places from 2009 to fourth place in 2011 for offshoring ICT services; Egypt is the leader in the Middle East (Kearney 2011). The report states, “[Egypt] has scored consistently well over time because of its economical wage rates and large supply of talent. The Egyptian government has also actively promoted the sector abroad, while aggressively pushing industry to bring its standards up to international levels.”

Just as the spread of ICT can boost competitiveness on regional and global levels, diffusion of new technologies can also foster social inclusion. In many developing countries online/digital courses have helped educate students, who formerly had limited learning resources. ICT has also bridged geographic divides between communities, allowing them to communicate, exchange ideas and discuss common challenges to develop solutions. Lastly, and perhaps most importantly, the creation of ICT clubs, training centers, mobile phone centers and other ICT-based institutions generate employment and equip beneficiaries with marketable skill sets.

Egypt is aware that ICT can drive both economic and social agendas. Adopting new technologies and becoming more in tune with global ICT trends has created an increasingly thriving industry that is responsible for nearly 4 percent of the country’s GDP, as shown in table (1).

**TABLE 1. ICT Contribution to GDP**

<table>
<thead>
<tr>
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<th>% of GDP</th>
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<tbody>
<tr>
<td>Agriculture</td>
<td>13.7</td>
</tr>
<tr>
<td>Industry</td>
<td>37.3</td>
</tr>
<tr>
<td>Services</td>
<td>39.0</td>
</tr>
<tr>
<td>Tourism</td>
<td>6.2</td>
</tr>
<tr>
<td>ICT</td>
<td>3.8</td>
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*Note: 2009/10 GDP was $189 billion; ICT figure from ICT Indicators Portal, MCIT 2011.*

It is unlikely that Egypt’s ICT sector will suffer any long-term consequences as a result of the revolution and the aftermath of the global financial crisis. This is attributed to two main reasons: (i) Egypt’s proven credentials in developing its ICT sector will continue to give it a head start in attracting FDI and (ii) ICT services have proven to be necessary and are no longer seen as luxury services. Hence, demand will remain inelastic in Egypt, especially for broadband services and mobiles. ICT was a core driver of Egypt’s revolution, which mobilized the forces of social media.

**2.2 Challenges for Achieving ICT’s Potential Advantages**

While progress to-date has been impressive, Egypt still lags in the adoption of ICT compared with other countries. To quote the Economist Intelligence Unit (EIU), Egypt is still figuring out “how to extract the maximum economic and other benefits from the use of digital technology” (EIU 2010). Penetration varies across sectors and regions demonstrating that, while access has grown, its spillover has been limited, and there is a clear need to scale up efforts. Similarly, most ICT development in Egypt continues to be concentrated in urban areas, highlighting the need to invest in more infrastructures for rural governorates (Helmy 2009). When wielded effectively, broader and deeper ICT penetration enables information and knowledge diffusion to remote and marginalized areas and demographics not residing in the most populated areas. In fact, while ICT-producing industries generate, on average, less than 5 percent of GDP, they account for nearly 50 percent in productivity.
growth in many countries, showing how instrumental ICT has become in determining prosperity across the economy (Abutaleb, Abdel Mottaleb and Gamal 2005).

Regionally, Egypt’s ICT challenges are present; besides, it remains below the Middle East and North Africa’s (MENA) average in three major ICT indicators: mobile phones, fixed telephone lines and Internet users. As said, MCIT abolished Internet subscription charges through the Free Internet Initiative, requiring users to pay only as much as the price of local phone calls—approximately $0.15 per hour associated with connecting to the network. Yet, only 15 percent of the population in 2009/10 used the Internet, which is significantly low compared to UAE (52 percent), Qatar (42 percent) or Bahrain (33 percent). Moreover, Egypt is among the lowest broadband subscribers worldwide, reaching only 2.15 per 100 inhabitants in 2011 (MCIT 2011). Table 2 (ITU 2009). In terms of ICT Development Index (IDI), Egypt ranks 12th in the Arab world and 96th globally. Its IDI value of 2.70 is considerably low compared to UAE (6.11 IDI), ranking 1st among the Arab countries and 29th globally, as exhibited from table (2) (ITU 2010).

<table>
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<tbody>
<tr>
<td>United Arab Emirates</td>
<td>1</td>
<td>29</td>
<td>6.11</td>
<td>33</td>
<td>5.20</td>
<td>36</td>
<td>3.36</td>
<td>4</td>
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<tr>
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<td>33</td>
<td>5.67</td>
<td>35</td>
<td>4.95</td>
<td>38</td>
<td>3.26</td>
<td>2</td>
</tr>
<tr>
<td>Qatar</td>
<td>3</td>
<td>45</td>
<td>4.68</td>
<td>45</td>
<td>4.25</td>
<td>46</td>
<td>2.85</td>
<td>0</td>
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<tr>
<td>Saudi Arabia</td>
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<td>52</td>
<td>4.24</td>
<td>54</td>
<td>3.76</td>
<td>68</td>
<td>2.28</td>
<td>2</td>
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<tr>
<td>Kuwait</td>
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<td>65</td>
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<td>59</td>
<td>3.54</td>
<td>67</td>
<td>2.82</td>
<td>-6</td>
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<tr>
<td>Oman</td>
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<td>71</td>
<td>3.45</td>
<td>71</td>
<td>3.17</td>
<td>71</td>
<td>2.16</td>
<td>0</td>
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<tr>
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<td>7</td>
<td>74</td>
<td>3.33</td>
<td>79</td>
<td>2.98</td>
<td>67</td>
<td>2.32</td>
<td>5</td>
</tr>
<tr>
<td>Libya</td>
<td>8</td>
<td>78</td>
<td>3.24</td>
<td>80</td>
<td>2.92</td>
<td>77</td>
<td>2.10</td>
<td>2</td>
</tr>
<tr>
<td>Lebanon</td>
<td>9</td>
<td>82</td>
<td>3.17</td>
<td>78</td>
<td>3.02</td>
<td>64</td>
<td>2.39</td>
<td>-4</td>
</tr>
<tr>
<td>Tunisia</td>
<td>10</td>
<td>85</td>
<td>3.06</td>
<td>83</td>
<td>2.74</td>
<td>95</td>
<td>1.88</td>
<td>-2</td>
</tr>
<tr>
<td>Syria</td>
<td>11</td>
<td>93</td>
<td>2.76</td>
<td>90</td>
<td>2.65</td>
<td>101</td>
<td>1.73</td>
<td>-3</td>
</tr>
<tr>
<td>Egypt</td>
<td>12</td>
<td>96</td>
<td>2.70</td>
<td>100</td>
<td>2.44</td>
<td>97</td>
<td>1.82</td>
<td>4</td>
</tr>
<tr>
<td>Morocco</td>
<td>13</td>
<td>97</td>
<td>2.68</td>
<td>103</td>
<td>2.33</td>
<td>112</td>
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<td>6</td>
</tr>
<tr>
<td>Algeria</td>
<td>14</td>
<td>100</td>
<td>2.65</td>
<td>97</td>
<td>2.47</td>
<td>105</td>
<td>1.60</td>
<td>-3</td>
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<tr>
<td>Djibouti</td>
<td>15</td>
<td>125</td>
<td>1.57</td>
<td>125</td>
<td>1.48</td>
<td>125</td>
<td>1.08</td>
<td>0</td>
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<tr>
<td>Mauritania</td>
<td>16</td>
<td>126</td>
<td>1.57</td>
<td>128</td>
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<td>130</td>
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<td>2</td>
</tr>
<tr>
<td>Sudan</td>
<td>17</td>
<td>127</td>
<td>1.57</td>
<td>122</td>
<td>1.50</td>
<td>132</td>
<td>1.02</td>
<td>-5</td>
</tr>
<tr>
<td>Yemen</td>
<td>18</td>
<td>129</td>
<td>1.52</td>
<td>126</td>
<td>1.48</td>
<td>126</td>
<td>1.07</td>
<td>-3</td>
</tr>
<tr>
<td>Comoros</td>
<td>19</td>
<td>134</td>
<td>1.46</td>
<td>130</td>
<td>1.41</td>
<td>127</td>
<td>1.07</td>
<td>-4</td>
</tr>
</tbody>
</table>


These signs of a lag point to both the lack of an enabling environment and the subsequent need to continue ICT development. The need for a more enabling climate is also reflected in Egypt’s low ranking in e-readiness, in which the EIU places it at 57th out of 70 developed and developing

7. The IDI is a useful tool to benchmark and assess ICT developments, and to monitor the digital divide on a scale from 1 to 10. The IDI is a composite index made up of eleven different indicators, grouped into three sub-indices. The sub-indices measure ICT infrastructure and access, ICT use and intensity and the capacity to use ICT effectively.
countries—behind all other listed Middle East countries except for Iran and Algeria (EIU 2010). In fact, some argue that ICT is the weakest pillar supporting Egypt’s transition to a knowledge-based economy (Ghoneim and Mandour 2008). Furthermore, the private sector’s hesitance and inability to contribute to enhancing Egypt’s knowledge economy are apparent. Expenditures on Research and Development (R&D), which in theory should come from the private sector, are almost exclusively from the government; 90 percent of R&D is from public expenditures, whereas foreign sources provide for the remaining 10 percent (Zeng 2006). Compared to the rest of MENA and the world, Egypt’s consumer and business adoption, innovation, legal and economic institutions have shown declining trends compared to all countries (Ghoneim and Mandour 2008).

ICT penetration and maximization of its benefits are essential, yet, a long-term vision entailing a regulatory institutional infrastructure and a strategic framework that permits synergy across sectors is currently lacking. Additional issues range from security of transmissions to credibility of information, intellectual property rights (IPRs), as well as standardization of information on the Internet to avert user’s confusion. Also, a lack of trained specialists, growth of broadband access and connection speeds need to be addressed. Another challenge, and perhaps the most important, is finding ways to diversify ICT usage beyond strictly communication. Indeed, not only citizenry, but also private enterprises have by and large not yet realized the full potential of the Internet. Over 80 percent of private firms, including large ones (250+ employees), use the Internet predominantly for communicating through e-mails (MCIT 2009a). Also, key services that go beyond conventional ICT usage, such as delivering products online or providing customer services, i.e. publicizing information or conducting business transactions, are limited at best (Figure 3) (MCIT 2009b). These challenges have as yet not helped the ICT sector to become the locomotive for Egypt’s economy.

Figure 3. Proportion of Private Enterprises Using Internet by Type of Activity

<table>
<thead>
<tr>
<th>Type of Activity</th>
<th>Jun-08</th>
<th>Jun-07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sending and receiving e-mails</td>
<td>93.3</td>
<td>91.9</td>
</tr>
<tr>
<td>Information about goods and services</td>
<td>58.9</td>
<td>56.2</td>
</tr>
<tr>
<td>Information from government organizations</td>
<td>40</td>
<td>36.2</td>
</tr>
<tr>
<td>Other information searches or research</td>
<td>58.9</td>
<td>55.5</td>
</tr>
<tr>
<td>Internet banking or financial services</td>
<td>56.8</td>
<td>55.8</td>
</tr>
<tr>
<td>Transactions with public authorities</td>
<td>9.8</td>
<td>14.4</td>
</tr>
<tr>
<td>Providing customer services</td>
<td>36.2</td>
<td>36.2</td>
</tr>
<tr>
<td>Delivering products online</td>
<td>26.3</td>
<td>19.4</td>
</tr>
<tr>
<td>Other types of activity</td>
<td>1.9</td>
<td>0.4</td>
</tr>
</tbody>
</table>


8. E-readiness is defined by the EIU as the “state of play” of a country’s information and communication technology (ICT) infrastructure and the ability of its consumers, businesses and governments to use ICT to their benefit.
Furthermore, small and medium-sized enterprises (SMEs) are also hesitant towards full-scale ICT adoption, mainly due to the high costs of ICT equipment and training of personnel. Specifically, SME owners have said that ICT often fails to add value to offset the costs of capital and training. Sometimes these costs also cause cash flow management challenges, due to time lags between adoption and outcomes. While the long-term benefits indeed outweigh the short- and medium-term losses, SMEs are still reluctant to internalize such costs. ICT suppliers, public policy and SME organizations would need to clearly identify the challenges facing SMEs in adopting ICT and develop approaches to address them. This should be of particular importance to SMEs in the fields of tourism, textiles and garment and other low-tech goods and services, as they are some of the most important private sector development drivers in Egypt.

Another challenge Egypt has yet to address is the adaptation to new methods and time needed for this technology to acquire economic significance. The process of widespread ICT integration throughout society is a long-term one. First, new technology has to be introduced to the economy—innovation, which hinges on R&D and experimentation with ideas. Then, it is gradually adopted by many people—diffusion. The two are equally crucial: no new technologies have an economic impact until they become widespread in the economy (Mukoyama 2003).

By the same token, for the ICT sector to significantly contribute to economic development as well as employment and exports, the effective deployment of ICT across the population is critical. Building the adequate infrastructure in telecommunication and backbone fiber networks, obtaining the commitment of the government to privatization, engaging the private sector through the necessary regulations and capacity building to train professionals and students on the wide range of ICT applications are prerequisites for the ICT sector to thrive in Egypt (El-Demery 2009).

ICT’s spillover effects to the rest of the economy and specific lead sectors are rarely engaged in empirical studies or through in-depth analysis. Achieving a better conception of the degree to which such diffusion has occurred in the public and private sectors is crucial.

3. IMPLICATIONS OF ICT USAGE ON DIFFERENT SECTORS

To guarantee global economic integration, reform and openness of the economy alone are no longer sufficient. Such efforts must be accompanied by the application and diffusion of ICT-based marketing, communicating with the general public, relaying easily accessible information to all stakeholders, and in general promoting transparency and efficiency and maintaining pace with global development trends. ICT usage meets each of these requirements and can be used in a variety of ways to advance Egypt’s economic and social agendas. This section reviews how ICT has been used in Egypt’s government, tourism and education sectors, the results attained so far, and how it can spur growth and development, so that it can effectively become a locomotive and driver of the economy.

3.1 E-Government

E-government has helped open new lines of communication between the public sector and citizens around the world, creating transparency and accountability and increasing efficiency. Egypt has recognized the importance of e-government in enhancing its services to its people, and has made digitizing its operations a core element of its national ICT agenda (MCIT 2007).

9. Based on interviews with SMEs.
MCIT and the Ministry of State for Administrative Development (MSAD) are the two main entities in this movement. MCIT was the e-government torchbearer, but in 2004 MSAD assumed control of implementing e-government tools within public services. Together, and with the help of the private sector, the two ministries have created an e-government platform in Egypt, which has developed steadily in recent years. Between 2007 and 2011, the percentage of government entities using the Internet increased from 22.5 percent to 40 percent. Given the near non-existence of online government activity several years prior, this jump in Internet usage is noteworthy (MCIT 2011). Additionally, nearly 70 percent of government organizations have websites in 2011 up from 62 percent in 2007, and the percentage of organizations with established Intranets rose sharply from 16 percent to 72 percent between 2007 and 2011 (MCIT 2011). Indeed, efforts to build its own capacity are paying dividends, and the government’s ability to create transparency for citizens is another testament to the success of its e-government agenda.

The government’s adoption of ICT is best understood through its creation of a “citizen-centric, online gateway” (Microsoft 2007). As the name indicates, these initiatives are geared towards enhancing government communication with citizens to increase transparency and accountability throughout the public sector and also to boost the speed and efficiency with which the two work together. Additionally, through enhancing the rate of communication and conducting business, the new system substantially reduces costs – both time and money – for the general public, creating a stronger public-citizen relationship (Microsoft 2007). With the new e-government tools, the general public can now access more than 700 informational services and 100-plus transactional services, through the online e-government portal launched in 2001, which includes general information pages, inquiry options for voicing concerns and transaction services (MCIT 2011). Prior to adopting these methods, the interface between the government and citizens was complicated, involving long waits and multiple trips to government agencies. The process was often especially challenging for people residing in rural areas, as they were forced to travel and wait for long periods of time to benefit from public services (MCIT 2011). Finding ways to integrate rural demographics is tantamount to Egypt’s ICT strategy, especially because e-government tools help decrease the digital divide between rural and urban areas.

In terms of increased efficiency and savings, some estimate that the transition to e-government reduces the average number of monthly visits that citizens have to pay to government agencies from 3.5 to 1.5, which could yield an annual direct cost savings of $4.2 million and an increase in additional savings of $1.58 million each year due to saved work hours (Microsoft 2009).

Microsoft, for example, has been an asset in Egypt’s e-government program, and has worked with the government introducing online services including paying telephone bills and traffic fines as well as completing tax forms. In 2007, Microsoft helped digitize university applications. Prior to the online process, Egyptian universities received 400,000-plus applications annually, each of which was completed and submitted through a tedious process. The old process began with a visit to the central university enrollment office to purchase the application form. From there each prospective student would complete the application and then submit it via two visits and a payment fee to the enrollment office. Once submitted, university administrators would have to enter each applicant’s information manually into the university's database. However, with the new e-government platform the efficiency of the process has increased substantially, as applications are obtained, completed and submitted
online; thus, eliminating the labor, visits and costs previously required. This new method also helps applicants living in rural areas, who were significantly disadvantaged by the trips and costs, associated with the application process (Microsoft 2009).

To structure the new online services, the partnership developed three portals: (i) government services portal, where citizens and businesses can access and submit government forms and complete transactions online; (ii) investment portal to provide local and foreign investors with the necessary information for starting a business in Egypt; (iii) Ministry of Foreign Affairs’ portal for citizens living abroad, giving them access to government services; i.e., visa applications, and in turn helping them bypass consulate visits. Additionally, MSAD has worked to make sure that government employees can fully utilize the e-government platform. First, the Ministry provides training to civil servants on how to use the e-government system. Making sure that employees are ICT proficient increases the speed with which they can respond to citizens’ requests. Second, MSAD has established a workflow system to document and monitor citizens’ requests in the portals, increasing government awareness of the general public on e-government activity and needs. The Ministry has also created a set of standards to better monitor and improve response time to requests. To hasten procedures, MSAD has also continued to develop the “one-window stop” within the portals (MCIT 2011a).

Globally, Egypt’s prioritization of e-government has received recognition as well. Progress is noted in the World Economic Forum’s 2010/11 Networked Readiness Report, which ranks Egypt 49th and 70th (out of 138) in terms of government prioritization of ICT and government’s vision of the future, respectively, as well as 27th in terms of government IT promotion (World Economic Forum 2011). These positive indicators are also reflected in the increase in Asymmetric Digital Subscriber Lines (ADSL) from 2007 to 2011. Over this time period, the number of government organizations with access to ADSL increased by 22 percent, with the number of dial-up connections decreasing by approximately 21 percent over the same time period (MCIT 2011b). Further, the United Nations 2010 E-Government Survey ranks Egypt 3rd in Africa in terms of e-government development, and 23rd globally (out of 189 countries) in the report’s online service index (United Nations 2010). The Index was based on an assessment of each country’s national website, specifically on how easily its contents could be accessed and used by citizens. The study also ranks Egypt fairly high, 42nd, in its e-participation index, which assesses the extent to which the government has used online tools to engage citizens in decision-making processes, share information, and involved them in other components to deepen government-citizen interactions (United Nations 2010).

The impact of ICT vis-à-vis e-government is clear: Labor productivity increases as citizens save time by using e-government applications. For example, during elections, people used mobile broadband devices to determine which polling station they should vote at by plugging in their identity card numbers; thus, saving the time and cost of finding out by phone or going in person to a government office. The government, in turn, also saves on labor costs.

3.1.1 Challenges

There have been strong initiatives that are leading Egypt in the right direction, but the government’s ICT services still have much ground to cover. The real benefit of e-government has hardly impacted the proportion of Egyptian government organizations using the Internet, which were less than 40 percent in 2011 (ICT 2011c). Moreover, one can easily assume that this proportion is highly
concentrated in specific ministries and has not spread to others, where the bulk of employees are settled. In most government offices, one can still observe cramped workspaces, outdated office equipment and limited ICT access. Further, between July 2007 and 2011, the proportion of government entities with a web presence increased only slightly from 62 percent to 69 percent (with a dip in 2010), showing how ICT adoption in the public sector is slow, and that one third still uses it just barely, if at all.

The Egyptian government’s ICT indicators also suggest that the government’s application of ICT services is diversifying slowly. While government rates of emailing are fairly high at 87 percent, customer services, banking, delivering products and other ICT services are used sparingly, increasing minimally, if at all, over the past four years (ICT Indicators Portal 2011). For example, e-payment is largely dependent on credit cards, of which use is limited, due mainly to the lack of confidence of using credit cards for paying on-line. In addition with a high illiteracy rate, low penetration of information technology and limited use of credit cards, the possibility of the majority of the population to interact with e-government portals remains questionable (Sayed 2004). For instance, given the limited use of credit cards, only a small portion of the population can actually partake in the online payment for public services. Also, automation of workflow in government offices is hindered by the general reluctance to use automated systems, resulting from unfamililiarity with information technology and uncertain security measures (MCIT 2003).

In fact, in the World Economic Forum’s Global Information Technology Report 2010/11, Egypt’s lowest ranking in the government usage category is the procurement of advanced technologies. Although its rank in this indicator is neither significantly positive nor negative, at 85 out of 138, it still falls in the bottom half globally, suggesting that while citizens have received increased exposure to online tools to interface with the public sector, government offices are not yet using the full range of ICT services (World Economic Forum 2011). Additionally, benefiting from e-government among the Egyptian population is still hindered by low penetration of personal computers and Internet, as well as computer illiteracy. MCIT itself has acknowledged the lack of both literacy in general and “e-literacy” as challenges to their latest eMisr initiative for broadband (MCIT 2011a). The lack of infrastructure and willingness to diversify ICT usage leaves substantial room for improvement, especially in human resource development.

These remaining hurdles also draw attention to how governments should measure the efficacy of e-government initiatives. Achievement in e-government is not to be measured only against technical and numerical criteria, but also through promoting communication with all citizens, the integration of employees and offices, a reduction of bureaucracy and a more efficient allocation of resources (Sayed 2004). As said, ICT is not an end in itself, but a means to achieve better governance and stimulate engaged participation by the entire citizenship. E-government as a full circle of services encompassing government to government, government to citizens and government to business has still major challenges to overcome. Sensitizing the public and establishing linkages between the ministries, on one hand, and between various ministries and the public, on the other hand, are in much need of scaled up efforts.
3.2 E-Tourism

Tourism can have a “horizontal impact” on an economy, bringing in business from abroad, generating jobs and enhancing collaborations between the public and private sectors (UNCTAD 2005). Globally, the tourism industry has become increasingly reliant on the web; an indispensable tool for marketing and allowing clients to access large amounts of information. Such facilities ease customization of resources for better services to customers and can also influence the success or failure of tourism companies. Access to information and the ability to do business over the Internet also increases competition at both the national and global levels. Managers who lack these systems cannot efficiently interface with clients, or deliver them quick and easy business services, resulting in great difficulty in competing in the global tourism market.

E-tourism offers major opportunities to all kinds of suppliers, including SMEs that should be capable of improving their business significantly and remodeling it in new and more cost-effective ways. In today’s competitive market, the size of the travel agencies or of the organizations is no longer the key determinant of a competitive business. Rather, it is their ability to effectively use ICT services (both in terms of cost and marketing appeal) to sell their products—quality of work emphasized over quantity. If SMEs can overcome the costs of capital and provide ICT training, they can become ideal agents for e-tourism by using online business transactions and offering low-cost and up-to-date information (UNCTAD 2005). Wielding these resources, SMEs can compete with larger and more sophisticated enterprises, as new information and skills will enable them to customize their services and tailor the packages to customers.

3.2.1 Public-Private Partnerships in Tourism

Public-private partnerships and more creative usage of ICT technology are becoming keystones in mobilizing the e-tourism industry, notably in developing countries. Such partnerships should be supportive to SMEs and encourage local tourist and government tourist offices to advertise their services online, as well as provide information on the tourism sector, and allow consumers to book online. To that end, it is necessary to develop websites that contain information on tourist destinations and services. The United Nations Conference on Trade and Development (UNCTAD) has undertaken a global e-tourism initiative, using public-private partnerships to develop websites known as “e-marketplaces” for branding tourism. Each site is designed with a business plan that fits each partner country’s “market demand” and “development strategies”. The website also serves as a useful link for various stakeholders in the tourism industry – hotels, airlines, etc. – to leverage each one’s assets in designing and maintaining the e-marketplace’s business plan (UNCTAD 2005).

As a necessary condition for the public-private partnership to succeed in the tourism sector it is essential to emphasize the need of investing in human resources development. The focus on bringing employees up to speed to use ICT in more sophisticated ways supports two key practices in e-tourism: i) development of local enterprises and ii) knowing how to use technology, which is as important as technology itself.

Monitoring consumer behavior is also a large part of the work of the public-private partnership. By tracking consumer visits and knowing the amount of activity their websites receive, companies can assess how effective their outreach is, and more effectively tailor their services to meet consumer preferences. For instance, by providing consumers with questionnaires companies cannot only receive
feedback on their work, but also establish dialogues with clients to enhance services and improve products. The UNCTAD initiative argues that certain tourism companies that have been able to use such technology to calculate the return on investment of online marketing campaigns have found that Internet-based outreach yields a greater return than traditional media (UNCTAD 2005). These methods, in addition to the general monitoring of consumer behavior, again re-affirm the cost-effectiveness and efficiency of ICT-based tourism.

3.2.2 Egypt’s Progress

Tourism is central to Egypt’s economic development, driving both growth and employment opportunities throughout the country. Egypt is one of the most well-known and visited tourist destinations in the world, boasting sites beyond its temples, particularly its beaches and desert areas. The economic impact of tourism on Egypt is also evidenced through a number of indicators. The contribution of tourism to GDP has been around 13 percent ($26.7 billion) in 2010. Also, the sector employs about 2.5 million people, roughly 11 percent of total employment (World Travel and Tourism Council 2010). To put these numbers in perspective and to demonstrate the country’s reliance on the sector, tourism’s contribution to employment and GDP are equal to or higher than the same numbers for nearly every OECD country, as seen from figures (4) and (5) (OECD 2010). The latest statements from the Minister of Tourism claim that one of seven workers is employed by tourism (Ministry of Tourism 2011).

Further, the World Economic Forum’s Travel and Tourism Competitiveness Report recognized the Egyptian government’s strong prioritization of travel and tourism development, and identified it as one of the top-20 nations worldwide in terms of government expenditures on travel and tourism (Blanke and Chiesa 2009).

In terms of web-based representation, the Ministry of Tourism is linked to a website containing a wide range of information: Egypt’s top travel destinations, advice on visiting Egypt with a limited budget, custom tours, etc. Indeed, the Ministry provides tourists with an attractive and comprehensive introduction to the country (Ministry of Tourism web site).

Further, Egypt State Information Service’s (SIS) website has done well to advertise the full spectrum of Egypt’s tourist destinations, featuring the well-known pharaonic sites, in addition to the lesser-known safaris, oases and Islamic monuments. It also links to articles and other publications on Egyptian travel, and contains entries on 25 of the country’s most famous cities/locations (Egyptian
State Information Service 2010). The SIS allows visitors to access the Ministry of Tourism’s official home page, the website for Cairo airport, publications on Egyptian travel and other tourist-friendly sites. There are at least 30 websites on travel and tourism in Egypt that are linked to the SIS and Ministry of Tourism’s websites, showing that the country does indeed have an Internet presence supporting its tourism industry (Ministry of Tourism web site). These online portals collectively help display Egypt’s deep and wide range of tourist attractions, again showing how the country is becoming a player in Internet tourist marketing.

3.2.3 Remaining Challenges

Despite the move towards online marketing of its tourist attractions, Egypt success stories in this regard are rare. While domestic hotels and other tourist attractions have gradually grown their online presence, recent trends in global e-tourism suggest that to compete, countries must do more than simply showcase themselves. Consumers are increasingly adept at using the Internet and expect a wide range of online services at their fingertips; travel and tourism companies must be prepared to meet these demands.

To become relevant and attractive, companies’ websites must contain more than information on interesting and historic locations. The story is more complicated than just advertising, and involves the participation of multiple players and creative ICT usage. Tourism revenues and job creation in Egypt are indeed notable, but it is evident that the full potential has yet to be reached. As ICT is a proven catalyst for widespread growth and has served this purpose in tourism industries globally, Egypt must prioritize ICT integration into its own tourism operations.

Egyptian companies have not yet taken full advantage of ICT. Many still turn to traditional channels to promote and advertise their services, which limit Egypt’s ability to more actively compete for international, let alone domestic tourists. Further, some 80 percent of tourism in Egypt is beach and seaside related, with which many countries can compete and outdo, while the remainder is largely cultural tourism (Ministry of Tourism 2011). While the country’s wealth of historical and cultural sites will remain attractive for years to come, absent effective advertisement, easy booking and payment options on the web, and accessible information on tourist areas, risk being overshadowed by other countries. Additionally, this is an opportunity for tourism companies to promote industry diversification in areas such as ecotourism, river tourism and medical tourism, which are all high on the government’s agenda (Ministry of Tourism 2011).

Most Egyptian tourism enterprises have yet to develop their online presence, and even those that have a website do not have information or services in place to support Internet marketing and transactions (Eraqi and Abdallah 2008). In their interviews of Egyptian tourist agencies, Eraqi and Abdallah found that 80 percent of those interviewed continue to use fax, telephone and direct sales as their most common communication channels. Only 20 percent said that they used the Internet as their first choice for communication. The vast majority of bookings continue to come from international tour operators, suggesting that the capacity and willingness to employ in-house ICT services are still lagging. Most tourism enterprises use the Internet for emailing only, and those who do have websites primarily use them to provide information about their companies and the tours they offer, but rarely for more advanced marketing purposes, i.e., interactive features and tour packages.
These service and knowledge gaps can also be seen in the Ministry of Tourism’s website. Although the site includes a list of tourist offices in Egypt, the majority of them does not have websites or even email addresses listed. Of the ones provided, only 3 have websites or email addresses, all of which are located in the US or Canada. Domestic tourism companies appear to play only a minor role in marketing Egypt’s tourist sector, and those few that have established an online presence need to begin developing more sophisticated and engaging services for clients.

There are also beliefs that a combination of local tourism agencies’ reliance on price negotiations and local banks’ complicated procedures further compound the transition to e-tourism. Additionally, bank’s high transaction fees discourage agencies from switching to online business. Currently, only four banks allow tourist companies to accept credit card payments on their websites.\(^\text{10}\) Despite its introduction, most companies still rely on the old method of “signature on file”, whereby banks accept photocopies of a tourist’s credit card, passport/I.D. and signature. This system continues because the four banks offering online credit card payments charge an extra 1 percent commission on top of the regular fees, which average 2 percent. Internet payment methods such as Paypal have become instrumental for businesses and clients interested in doing quick and safe online transactions. Because of Egypt’s current limitations, however, local tourism companies attempt to use overseas associates to enable PayPal transactions. Problems arise when repatriating funds back to Egypt, as banks require extra documentation for large transfers as they suspect money laundering; thus, causing a liquidity problem for the tourism company.\(^\text{11}\)

Many online marketeers and tourism agencies that are interested in e-commerce are forced to wait until banks relax their policies (International Arab Conference for E-Tourism and E-Marketing 2009). As such, agencies’ refusal to agree on uniform pricing rules and procedures and an inflexible relationship between banks and their clients are also responsible for keeping Egypt behind in the e-tourism industry. To circumvent the e-finance challenge, local tourist companies sign contracts with foreign agencies that provide the tourists, the e-finance capabilities and the know-how. The unfortunate product is that most of the revenues get repatriated back overseas, and relatively little flows into the Egyptian economy. No study has determined what portion of tourism revenues actually go to Egyptian companies; globally however, developing countries receive as little as 5 percent of the money that developed countries spend when visiting (Petti 2005).

### 3.3 E-Education

The interdependence between education and ICT cannot be overstated. Working in tandem, education and ICT are *par excellence* the pillars for a knowledge-based society, opening a gateway to a more globally stable, competitive and integrated economy. Yet, while ICT and educational institutions feed off one another, if the education system cannot accommodate and meet the requirements of new technology, the ICT sector can also be a limiting factor. Sustainable and scalable ICT diffusion is ultimately dependent on a thriving knowledge economy, which, given Egypt’s education track record, may necessitate revamping the education sector. There are major obstacles to promoting e-education in Egypt’s schools and universities, including 18 state and 19 private universities in addition to 9

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10. This system only started two years ago. The four banks are Arab African International Bank, Banque Misr, Commercial International Bank and National Bank of Egypt.

11. Interview with Holiday Tours, 8 Nov 2010.
academies. To begin with, lack of funding, hesitance to change and computer illiteracy amongst many teachers and students have made attempts to introduce computer and Internet-based learning difficult (Helmy 2009). Additionally, a large part of university syllabuses cannot be easily transferred onto the Internet; posing another hurdle for e-education. Using the Internet to study and communicate with teachers is indeed efficient, but if the majority of students do not own a computer and/or are not user-oriented, Internet-based studies could create more problems than they hope to solve.

Limitations that prevent an education system from running on ICT are magnified in examining Egypt’s potential to develop a knowledge-based economy. The World Bank’s Knowledge Economy Index (KEI) identifies the challenges and opportunities in developing a knowledge-based economy through ranking various indicators: Economic Incentive and Institutional Regime, Education, Innovation and Information and Communications Technologies. According to the KEI, since 1995, Egypt’s performance has diminished in each of these indicators except for Education, which registered no significant changes (World Bank 2009b). The Index also suggests that the digital divide between Egypt and higher income countries has grown over the past 10-15 years. While a direct comparison with the highest performers does not give the most accurate picture, the results are troubling even within a regional context. Out of the 18 countries listed within the KEI’s MENA category, Egypt places 12th, with its indicator nearly 1.5 points below the regional average (World Bank 2009b).

3.3.1 Is Egypt’s Education System Ready for an ICT-Infusion?

Egypt does not augur well in its educational system. The World Economic Forum’s 2010/11 Global Information Technology Report states that out of 138 countries, Egypt ranks 124th in terms of the quality of math and science education, respectively (World Economic Forum 2011). Similarly, the Trend in International Mathematics and Science Study (TIMSS) ranks countries in terms of students’ performance on math and science exams, and places the countries within a bracket of advanced, high, intermediate or low achievement. In the most recent assessment, 2007, Egypt’s secondary grades placed in the low category for math, and at the bottom of the intermediate category in science, slightly above the low bracket (Boston College 2008). The outcomes of these global rankings are indeed troubling, especially in light of Egypt’s educational expansion in recent years. Between 1985 and 2003 enrollment rates in primary education increased from 83.7 percent to 98.3 percent, while gross enrollment rates in secondary school increased from 61.4 percent to 87.1 percent and enrollment in higher education grew from 18.1 percent to 32.6 percent (Assaad and Barsoum 2007). This strong indication of increased access to education is encouraging, yet, it has apparently not effectively strengthened student aptitude and ability to compete in the labor market.

Egypt’s education system’s performance is partially due to its public expenditures on education. As shown from table (3), spending on education in 2007/08 was 3.8 percent of GDP ($4.95 billion), lower than regional neighbors Jordan (4.94 percent in 1999), Oman (4 percent in 2006), Syria (4.9 percent in 2007), Tunisia (7.1 percent in 2006), Morocco (5.5 percent in 2006) and Saudi Arabia (6.75 percent in 2004) (World Bank 2010). An additional troubling facet is that only 66.4 percent of Egyptian adults are literate, which is particularly lower among women 57.8 percent compared to 74.6 percent for men (UNESCO 2007).
TABLE 3. Education Expenditure

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<tr>
<td>Public Expenditure on Education (as percent of GDP)</td>
<td>4.94</td>
<td>3.8</td>
<td>5.5</td>
<td>4.12</td>
<td>6.75</td>
<td>7.1</td>
<td>3.8</td>
<td>5.6</td>
<td>4.1</td>
<td>5.2</td>
<td>3.5</td>
<td>4.7</td>
<td>4.7</td>
<td>1.91</td>
<td>4.7</td>
<td>5.7</td>
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Sources: World Bank’s Development Indicators (2010); Egypt’s Human Development Report (2010).

Egypt’s lag compared with other countries in the region suggests that it should increase spending to address these challenges, as well as rectify the lopsided expenditures. The government spends 78 percent of its higher education budget on current expenditures; i.e., salaries and administrative costs, leaving only 22 percent for capital expenditures; i.e., spending on maintaining infrastructure and updating schools to keep pace with increasing quality requirements and rising enrollments. The lack of preserving schools to adjust to growing enrollments is compacted by the fact that only 50 percent of hired staff at schools are there for academic purposes, while the other half is administrative (Egypt’s Human Development Report 2010). In other words, with half of the staff serving administrative roles, there are not enough teachers/professors to meet the increasing student sizes. As such, it is clear that in addition to a relatively small percentage of GDP allocated towards education, the capacity of schools and universities to provide students with a quality education is lacking as well.

While Egypt has witnessed relatively high and growing education enrollments, there is overall low educational attainment and students often have skills with low relevancy to employers’ needs (Zeng 2006). Additionally, education in Egypt lacks depth and creativity as students primarily learn via memorization (rote education), which limits innovative thinking and idea creation—skills needed to enter and contribute to the national and global workplace (Kozma 2005). The de-linkage between schools and the job market is further accentuated in a 2008 World Bank report, which argues that Egypt’s educational policies have “generated a whole generation of youth with the wrong set of skills” (Mahmood 2009). According to an ILO survey, as shown from table (4), on average, barely Egyptian graduates obtain what is considered very good practical training for the job market, and likewise, the majority of them cannot adequately apply their skills to the workplace (ILO 2007).

TABLE 4. Graduate Skill Levels

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<th>Workers’ Skill (percent)</th>
<th>Very Good</th>
<th>Fair</th>
<th>Poor</th>
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<tbody>
<tr>
<td>Required technical skills</td>
<td>18.2</td>
<td>50.5</td>
<td>31.3</td>
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<tr>
<td>Practical training at school</td>
<td>10.1</td>
<td>42.4</td>
<td>47.5</td>
</tr>
<tr>
<td>Communication skills</td>
<td>38.6</td>
<td>49.4</td>
<td>12</td>
</tr>
<tr>
<td>Writing skills</td>
<td>39.2</td>
<td>41</td>
<td>19.8</td>
</tr>
<tr>
<td>Ability to apply knowledge learned at school</td>
<td>22.4</td>
<td>37</td>
<td>40.6</td>
</tr>
<tr>
<td>Commitment and discipline</td>
<td>62.9</td>
<td>28.9</td>
<td>8.2</td>
</tr>
<tr>
<td>Overall preparedness</td>
<td>13.5</td>
<td>66.1</td>
<td>20.5</td>
</tr>
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</table>

There is a de-linkage of learning at schools and universities and the new requirements by the private sector. The ILO report also finds that the level of satisfaction of employers (mainly the new recruitment by the private sector, formal and informal enterprises) with their young recruits is generally fair (66 percent). However, many employers assessed the application of knowledge learned at schools as poor (40.6 percent). The same low ranking is given to the practical training provided to young applicants at school (48 percent of employers) (ILO 2006). From table (4), it is clear that education and training system fails to provide the skills required to perform in the private sector.

### 3.3.2 Egypt’s Efforts to Promote ICT-based Education

E-education can revolutionize university education in Egypt and raise the academic standards of students by introducing them to new fields of information and learning. It also offers the advantages of not requiring full-time study and of opening access to a large number of experts at low cost. Such teaching methods can meet the needs of increasing numbers of students and better prepare them for the job market as well, and there are some successful models already in place.

The government’s main program is the Egyptian Education Initiative (EEI), which aims to integrate ICT use in the educational process in Egypt. EEI focuses on enhancing teaching skills, quality assurance, access to technology and expanding ICT education and access throughout Egypt. With a budget of $80 million, it is helping to implement a strategy for the education of professionals and to show that training through ICT is more affordable and accessible than traditional methods. The initiative is a public-private partnership, and is done in tandem with multinational IT companies, the World Economic Forum and additional donors. Outside of teaching basic computer skills, EEI aims at increasing the capacity of teachers by providing e-training to upgrade their educational competencies, and henceforth develop teachers’ abilities to incorporate ICT into education, with a focus on math, English, science and information technology. From 2006–2008, 100,000 teachers from 2,000 schools had received training, and 39,000 PCs had been delivered (Kamel 2008). By 2010, 11 preparatory schools in remote areas were the first public schools equipped with high-speed wireless Internet within the EEI framework. Out of a total of 2,000 schools covered in the EEI’s pilot scheme, 1,929 have been provided with 13 computers each. Indeed, EEI has quickly become an impactful model that subsequent initiatives, at both the public and private level, must seek to replicate.

Another initiative that has goals of ICT learning and skill development is the ICT for Illiteracy Eradication (ICT4IE) project. ICT4IE targets Egyptians at the age of 15 and older, who cannot read and write (UNDP 2009), and particularly focuses on serving rural areas and women (Egypt ICT Trust Fund 2010). Created in 2002, the initiative is funded by the ICT Trust Fund and uses CD-based courses to teach reading and writing skills. In addition to the CD courses, ICT4IE also trains instructors and encourages them to utilize ICT in their classrooms. This focus on empowering both illiterate individuals and instructors helps diffuse the ICT4IE methods throughout communities and promote sustainability of the program as well.

ICT4IE has a growing number of achievements. In 2009, it won the World Summit Award; a competition organized by the UN for e-content and creativity and part of the UN World Summit on Information Society, placing first out of 20,000 projects from 157 countries. ICT4IE has worked in 20

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governorates and has roughly a rate of 5,000 enrollments, graduating 2,812 students (Egypt ICT Trust Fund 2010). It has also partnered with the National Council for Women and 450 NGOs throughout Egypt—a further sign of its efficacy and scalability. ICT4IE, like EEI, is another example of how ICT can be used in the education reform process, furthering both the ICT and education agendas.

Expanding ICT and improving the educational system must go hand in hand, and the Smart School Network (SSN) is another model that fulfills this objective. SSN’s goal is to equip students, at public preparatory schools, with ICT skills that they can use in their university education and later on in the workplace. In addition to promoting e-education amongst students and teachers, SSN also helps schools themselves to become more ICT proficient through integrating ICT into their administrative practices (Egypt ICT Trust Fund 2010). The general smart school model includes two computer labs, each containing 21 computers with Internet connections: 20 for students and 1 for the teacher (Kamel 2009). Students spend an average of four hours in the labs per week, and in some cases the labs double as community learning centers, which are opened to students and community members after school hours (Egypt ICT Trust Fund 2010). Throughout its two completed phases, SSN has worked with 43,348 students, 3,468 teachers and 775 administrators in 17 governorates (Egypt ICT Trust Fund 2010). Its pilot project in 2005 worked with 38 primary schools and approximately 18,500 students. Now, in its third phase, which is supported by the United States Agency for International Development (USAID), SSN has been scaled up substantially, and is working towards reaching 85 schools in total in 19 governorates (Kamel 2009).

Further, Egypt’s Information Technology Industry Development Agency (ITIDA) is becoming a prominent supporter of ICT in educational advancement. Together, with the Ministry of Higher Education (MOHE) and MCIT, ITIDA has established Edu-Egypt to support ICT proficiency amongst university students. In the program students advance their soft skills, language abilities and technical competence with the intention of becoming competitive contributors to the national and global labor market. In addition to preparing more young people to meet employer demands, Edu-Egypt also works to generate multinational training programs in private sector disciplines, such as marketing, business development and finance. In its first year Edu-Egypt graduated 3,000 students and aims at supplying the market with 40,000 graduates per year by 2011.

3.3.3 Remaining Challenges

Yet, while these initiatives have proven successful and have generated promising results, a number of challenges still persist: limited technological infrastructure and minimal civic participation, which compound the major problem of the lack of quality education. The numbers of beneficiaries from SSN, EEI and other projects have risen steadily, yet roughly 16 million students throughout the entire education system need to benefit from ICT-driven learning (Kamel 2009).

This need to increase scale is further evidenced through examining Egypt’s past expenditures on education. Although the mentioned challenges have lingered for quite some time, Egypt has spent roughly the same percentage of its GDP on education for the past two decades. In 1991, public expenditures on education were approximately 3.89 percent of GDP, showing that by and large, recurring educational deficiencies have not warranted much change in the government budget (World Bank 2010). Further, on the subject of government spending, Egypt spent a mere 0.2 percent of its GDP on R&D in 2007, with a significant gap between it and the global leader; Israel which spent 4.7
percent of its GDP on R&D (World Bank 2010). New technologies and the development of new teaching methods could come from R&D, yet limited spending constrains the diffusion of new technology into other sectors, such as the education system.

The fact that e-education initiatives still need to achieve a nationwide impact indicates two realities that must be addressed in reform efforts: (i) e-education adoption is long and hard and (ii) the central components of a knowledge-based economy are lacking in Egypt. While these facts are humbling and might discourage some from prioritizing e-learning before revamping the education system itself, Egypt cannot postpone scaling up its e-education agenda. Doing so would risk widening its digital divide both domestically and internationally and further distance Egypt from a knowledge-based economy. As such, Egypt must comprehensively re-interpret the role of ICT throughout its entire education system and find ways to effectively integrate e-education into its schools and universities.

4. RECOMMENDATIONS

The government must play a central role in diffusing ICT throughout Egypt. Efforts to do so must include a wider adoption of ICT throughout all ministries and communities outside of urban areas. Diffusion’s success hinges on the legal and regulatory infrastructure that permits synergy across sectors. Judging from past success stories of ICT diffusion, one sector acting on its own will fall short of comprehensive and successful national reform, and it is the government’s role to begin initiating the inclusion of all sectors.

4.1 General

The World Bank reported in 2009 that every 10 percentage point increase in broadband subscription penetration in low- and middle-income countries increases GDP by an average of 1.38 percent. As mentioned, the eMisr plan aims for 22 percent of households to be broadband equipped by 2015 and 40 percent by 2021. Announced in November 2011, the eMisr will be implemented through $2.4 billion of public and private investment, and it is poised to facilitate Egypt’s ambition to be a global ICT center. In addition, an average of 11,000 jobs will be created every year for four years (MCIT 2011a).

In order to effectively implement such an ambitious broadband expansion, the following actions are recommended. First, increasing competition; there are only eight Internet Service Providers (ISPs) in Egypt, and some of which are subsidiaries of larger communications companies.13 Second, ensuring the right level of government intervention by preventing oligopoly/cartel pricing behavior; public-private partnership is key in this respect. Third, launching a campaign, focusing on awareness raising activities, is essential. This can be combined with an education campaign that aims to have various demographics trained on Internet usage; this will spur higher demand for broadband service. Fourth, broadband cities can be developed to attract more services firms and create more jobs. Finally, mobile broadband should be favored over fixed line broadband—MCIT recognizes that while fiber optic

13. The eight ISPs are: EgyNet (Etisalat), LINKdotNET (MobiNil), MenaNET, Nile Online (Etisalat), NOOR, Raya Telecom (Vodafone), TE Data (Telecom Egypt) and Yallamisr. These ISPs are licensed by NTRA (National Telecommunications Regulatory Association).
networks are suitable for urban centers, satellite technology is a more viable means to connect rural areas.

Cloud computing can also promote ICT use at lower costs. Globally, a dramatic shift is occurring in the way companies manage their ICT systems. Before long, companies will no longer rely on basements full of hardware servers nor be held back by costs associated with hardware maintenance. Cloud computing is simply data hosted on the Internet rather than stored on physical computer servers. Egypt has the potential to become a regional player in cloud computing.

Benefits from cloud computing include the following: First, computing power is instantly available at any point of time and for however long. Second, individual customized clouds can be built using initiatives, such as Microsoft’s “Windows Azure”. Third, it is cost-effective as equipment purchases or rental costs are avoided, since resources are located offsite in a data center, not owned or managed by the enterprise using the cloud service. Customers pay for what is used, and there are no maintenance fees. Fourth, it is easy to grow and shrink according to corresponding demand. This provides the ability to match ICT resources to real life business needs. Companies can connect to one, two or ten servers, and shrink back when needed. Infrastructure is often shared; virtualization allows multiple customers and applications to share the same physical machines. Users are not limited by size or geographic barriers, as the cloud can be accessed anywhere with an Internet connection. Finally, the cloud delivers faster deployment than traditional servers, is less prone to crashes and allows businesses to respond in a timely manner to market opportunities without technology constraints.

Egypt has a competitive advantage as it is well connected by several international submarine fiber optic cables in combination with a national fiber-backbone infrastructure. A governmental cloud for Egypt can be shared among different agencies and promote efficiency in the public sector. Work flow and project management can be improved, and business applications offered are based on needs. There is no reason why Egypt cannot play host to other countries in the region and continent, and become a cloud computing hub service provider for the Middle East and Africa. Egypt can establish another “Smart Village” with the express purpose of setting up server farms to host cloud computing services. As with any new product or technology, trust issues will ultimately be resolved through time and service provider brand and reputation. There are steps that can expedite trust building. Accreditation schemes through government bodies or private sector organizations can effectively stamp a seal of approval on trusted service providers.

Digital signatures that are reliable and secure are extremely important for any country seeking to be taken seriously as an ICT player. Egypt's Information Technology Industry Development Agency (ITIDA) announced the launch of the new Egyptian e-Signature Competence Center in 2011. The center—the first of its kind across the Middle East and North African region—will provide significant support and services to countries across the region looking to implement e-government initiatives and digital identity projects in a secure and safe way. The center should aim to provide comprehensive solutions and tailored programs to implement digital identity projects and services.
4.2 Specific

4.2.1 E-Government Recommendations

MCIT and MSAD have laid a foundation for sound e-government. Their efforts are paying off in terms of the expanding portfolio of services now offered to citizens, private sector partnerships and the growing number of government entities that are re-structuring their operations on ICT. Yet, given the notable amount of government organizations that have not yet acclimated to the ICT environment and the inflated employment level in the public sector, it can be suggested that MCIT and MSAD must both scale up their efforts and increase collaborations with other ministries. The government can play a significant role in guaranteeing ICT diffuses into other sectors through better coordination and co-operation.

To guarantee diffusion, the government must also raise public awareness of ICT’s potential, which is crucial for all echelons of society and will play a pivotal role in dictating the speed at which ICT is to be adopted. These efforts must also involve a re-interpretation of ICT, showing that its services expand beyond mobile and Internet usage. It is rightly put by the Economist Intelligence Unit that, ultimately, it is the actual users who determine a country’s e-readiness, not its networks (EIU 2007).

Government collaboration with the private sector and facilitating its increased adoption of ICT can also play a major role in boosting Egypt’s ICT leadership in the region. Developing a local language, content, and an accessible user-friendly application is vital for successfully raising awareness and for reinforcing ICT education and training. The Arabic language will be required to maintain a better pace with globalization, and to develop terminology that can be easily integrated into typical public discourse. Egypt can also expand on the Arabic agenda through the Arab World. With the largest Arabic-speaking population in the world and strong business relationships with leading global ICT companies – Google, IBM, Microsoft, etc. – Egypt is poised to drive Arabic content online.

4.2.2 E-Tourism Recommendations

The Egyptian revolution has brought devastating losses to tourism industry to the tune of $3 billion in 2011 (Ministry of Tourism 2011). The situation in fact presents Egypt with an opportunity to recalibrate based on new reliance on ICT. The Internet, and subsequent transition to e-tourism, has shifted products from “mass-produced to customized and information-based”, showing that a proliferation of services is not as needed as higher quality and more effective services (Eraqi and Abdallah 2008). Egypt’s historic and scenic sites will keep its industry afloat, but to remain competitive in the global tourism market it will need to diversify and strengthen its application of ICT services. As said, Egypt has already displayed its ability to adopt new technologies, but to wield them to their full advantage companies will need employees who can use standard Internet features and can also create effective online content. Investing in developing local manpower and marketing tools will increase the chances of boosting the industry’s exposure and accessibility.

If tourism companies could access ICT technologies, receive training on how to take full advantage of them and do business within an environment in which they feel secure, they could begin more easily integrating themselves into global e-tourism and e-commerce. The government can
introduce incentives; such as tax breaks to businesses that train their employees on ICT services, online credit payment systems to promote speedy and safe business, and increase exposure to the array of advantages to ICT to demonstrate both the necessity and advantages to digitizing their operations.

The Ministry of Tourism should also work with MCIT to implement an ICT strategy within Egypt’s tourism industry. To increase the industry’s global exposure and access to world markets Egypt must develop both national ICT policy and SMEs involvement in parallel. The public sector can take on the role as a facilitator and convener, encouraging tourism enterprises throughout the country to partner and adopt a common online management system. The private sector can complement these efforts by advancing commercial activities. The public sector can then help monitor these activities as well as the content and services that the tourism companies offer on their websites.

E-marketing and e-commerce must become central tools. Adopting these technologies will require collective strategic management actions from both the government tourism organizations and private tourism companies. The government must modify regulations in order to help tourism companies adopt information system technologies and tourism public authorities should stimulate the private sector to apply them. With the public sector serving as the facilitator, and the private sector driving commercialization and developing ICT usage, Egypt can solidify its place as a competitor in the global tourism market.

4.2.3 E-Education Recommendations

Moving forward, there must be a powerful emphasis on cultivating a supportive “social and cultural environment” for ICT that begins with Egypt’s education sector (EIU 2010). Guaranteeing the development of both the education system and the e-education relies on the implementation of a national strategy involving all schools and regions: a strategy focusing on both access and usage—the two must be applied in tandem.

Scalability and sustainability must be the top priorities for e-learning in Egypt. As such, the next steps are to increase the number of initiatives and to make sure that once easy-accessible, reader-friendly and secured programs are set in place that they grow beyond the pilot phase. The steps to increase ICT access will also include faster Internet connection speeds and simply increasing the number of computers, whether at homes, computer labs at schools and in universities, or internet cafés throughout the country, and must be accompanied by training as well. The government could consider subsidizing the costs of hardware as part of its ICT national strategy, thus allowing families, individuals and businesses to more affordable purchase of PCs, laptops, etc.

Further, new e-learning programs need to provide creative solutions to help Egyptians overcome non ICT-based challenges. In other words, illiteracy and a lack of analytical thinking, while not stemming from ICT infrastructure or skills, can be overcome through ICT. ICT4IE has used computer programs to teach Egyptians basic literacy skills, and reformers must continue to design initiatives and courses that leverage such technology outside of its conventional domain.

Additionally, the Ministry of Education (MOE) cannot be the sole player in reform efforts. It is incumbent upon MCIT to work closely with MOE and MOHE, as one cannot operate to full capacity without the others, especially if systemic changes in the education system are the objectives.
However, at present, the coordination between the ministries is lacking; the MCIT continues to develop its ICT strategies and ICT-based educational programs without developing a national plan that spills over into the rest of the economy (Kozma 2005). The three ministries must also jointly develop the national e-education strategy to prevent duplication and to maximize impact.

Egypt can also look to models that other nations have used to reach sustainable and scalable use of ICT. A case in point is Singapore. In the 1990s, Singapore was growing at an impressive annual rate of 6.7 percent, and realized that, in order to sustain its growth, it had to improve the quality of its educational system. Reforms were carried out through increasing students’ understanding of science and mathematics, which helped develop a more productive, technology-based economy: one capable of creating and utilizing technological innovations (Kozma 2005). Such reforms proved enormously advantageous and have been sustainable as well with Singapore positioned amongst the top-20 knowledge-based economies in the world (World Bank 2009).

Another telling example is found in South Africa. As e-education, much like the ICT sector itself, overcomes geographic borders, the rise of distance-learning has been a natural product of expanded e-education. In South Africa, distance learning is being used to train teachers to help the country reach its Millennium Development Goals quota, most notably at the University of South Africa (Steinberg 2003). The creative use of ICT in education also demonstrates another means of moving out of traditional communication-based and calling for center application.

If Egypt is to be an information society and develop a knowledge-based economy, research developing and the creation and sharing of new knowledge must become a top priority. As such, the penetration of technology throughout society would need to increase significantly. Doing so is a shared responsibility between the government and the private sector, as together they should form a solid partnership to ensure the success of ICT for growth and development through a more apt educational system for the new information society.

5. CONCLUSION

Although the ICT sector has leapfrogged in a relatively short period of time—much faster by far than all other sectors—the spillover effect has been minimal and has clearly impinged on the diffusion of new technologies. While the government is exerting tremendous efforts to enhance the usage of ICT, these endeavors are confined to only a few ministries. The private sector too, which must work in tandem with the government through public-private partnerships, is often hesitant to adapt to the new technologies, because of inadequate regulations and insecurity. With no safety nets and few incentives to employ a rich usage of ICT, many private sector companies remain unaware or suspicious of its vast possibilities.

Moving forward, the goal must be sustainability, scalability and a long-term vision for the sector. Indeed, the efforts to-date suggest a gradually shifting mindset towards increased ICT in national development. However, with large portions of the population, including much of the public and private sectors, in a state of “digital illiteracy”, there is a clear need to expand training, infrastructure and, in general, increase awareness of the manifold benefits ICT holds. As said, the public sector must lead this movement, while working consistently with the private sector. Specifically, if the two sectors were to come to a mutual agreement on the long-term benefits of
holistic ICT adoption; i.e., tax breaks for ICT training to employees and a secure credit system, employees and services in both can help bridge the digital divide.

Its small victories in recent years show that Egypt is aware of the necessity of holistic ICT development. The task now is to bring the rest of the country up to speed. With several successful models and gradually increasing collaborations with the private sector, Egypt must now boost funding and planning to make sure ICT continues to diffuse throughout the country and to carry its entire population into the digital age.

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