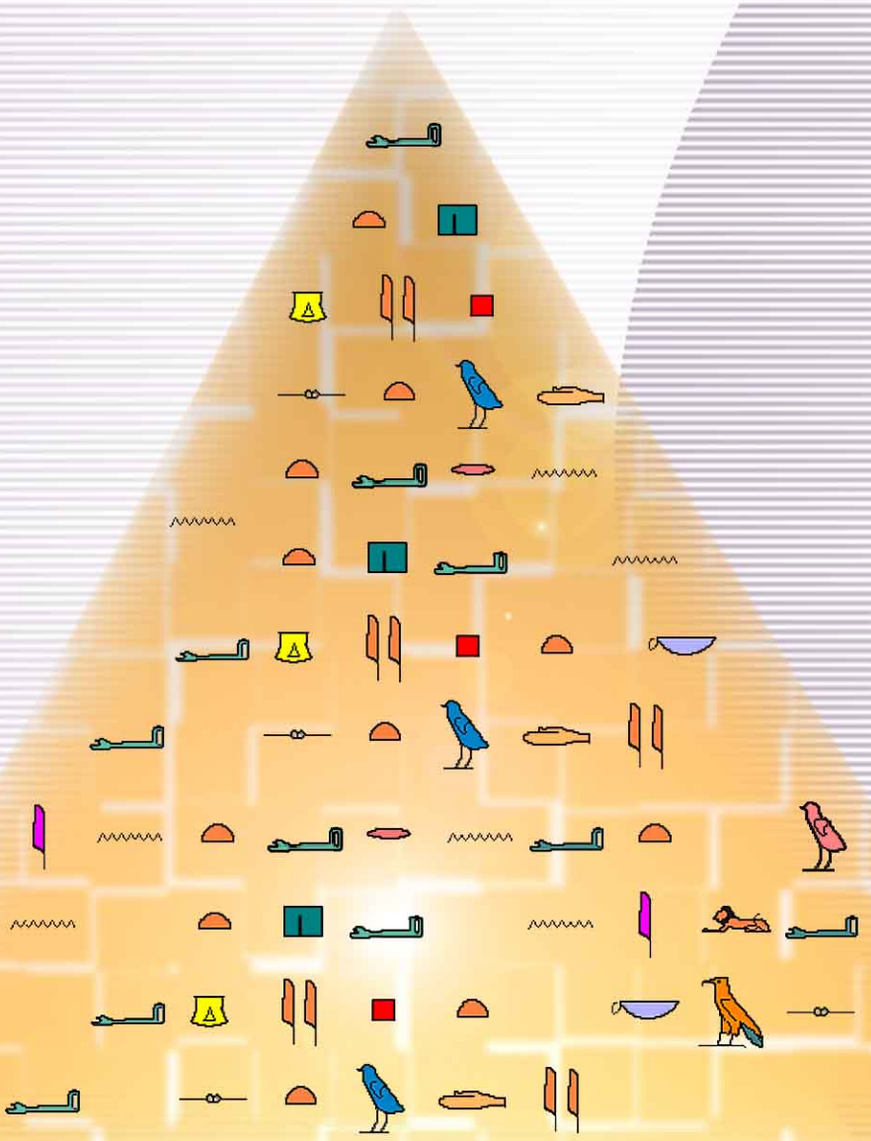
Internet on the Nile:

Egypt Case Study



International Telecommunication Union

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This report was based on a research visit to Egypt carried out in May 2000. A list of interviewees is contained in Annex 1 to this report. The authors would like to thank all those who contributed and commented on the report. This report is one of a series of six Internet diffusion case studies undertaken by the ITU during 2000. Other studies cover Bolivia, Hungary, Nepal, Singapore and Uganda. For more information, see the web site at www.itu.int/ti/casestudies.

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1. Country background

1.1 Overview

The Arab Republic of Egypt is located in northeast Africa. It is bordered by Libya on the west, Sudan on the south, the Red Sea and Israel on the east and the Mediterranean Sea on the north. With an area of 1'001'450 square kilometers, the country is divided into two by the north flowing Nile River. The capital and largest city is Cairo.

The roots of Egyptian history go back more than 6'000 years to the beginning of settled life along the banks of the Nile. Egypt is considered one of the great civilizations of the past and its Pyramids are the oldest and only surviving example of the ancient wonders.

Both the Sinai Peninsula—the only land bridge between Africa and Asia—and the Suez Canal—the shortest sea link between the Indian Ocean and the Mediterranean Sea—are part of Egypt. As the most populated Arab state and with its proximity to Israel, Egypt plays an important role in Middle Eastern geopolitics. Administratively, Egypt is divided into 26 governorates and eight geographical regions: Upper Egypt; Central Egypt; North Upper Egypt; Greater Cairo; the Canal Zone; the Delta; Alexandria and Matrouh.

Figure 1.1: Map of Egypt

Source: The World Factbook.

1.2 Demography

Egypt's last census in November 1996 showed a total population of 59.3 million.[1] The latest population estimate, for 1999, is around 62 million. In addition there are some 2.8 million Egyptian citizens living abroad. It is estimated that there are over 15 million people living in Cairo. Other large cities include Alexandria, Giza, Shubra el Kebma, and El Mahalla el Kubra. The percentage of the population living in urban areas in 1999 was 45 per cent.[2] The estimated population growth is 1.7 per cent.[3]

The Nile Valley and the Delta, which account for less than four per cent of the total area of the country, are the most densely populated parts of Egypt while over 95 per cent of Egypt's land area is desert.[4] Continued population growth represents an acute problem for Egypt. It is the most populated

country in the region and suffers from high density on fertile lands and accelerated depletion of natural resources.[5] According to the Egyptian State Information Service, "*one of the fundamental goals of Egypt's policy is to redistribute the population and to make full use of the so far unexploited areas and natural resources available. Great attention is presently directed to the new cities with special emphasis given to the master development plan of Sinai; an area with huge economic and strategic potential*."[6]

The major ethnic group in Egypt is the Eastern Hamitic (Egyptians, Bedouins, and Berbers) forming 99 per cent of the population. The remaining one per cent is made up of people of Greek, Nubian, Armenian, and other European (primarily French and Italian) origin. While the majority of the Egyptians are Sunni Muslims, there is a minor faction that practices Coptic Christianity. Egypt's official language is Arabic. English, and to a lesser extent French, are understood by most of the educated class and many official government web sites exist in English.[7]

1.3 Economy

In 1991, following problems of low productivity, economic stagnation, high population growth and inflation, Egypt undertook several International Monetary Fund (IMF)-supported structural reform measures. The results of these reforms have been slow in coming, yet the economy has shown visible signs of improvement, manifested by lower inflation rates (down from 21 per cent in 1992 to 4 per cent in 1999) and increasing GDP growth *per annum* (up from 1.9 per cent in 1992 to 5.5 per cent in 1999). Egypt's GDP was US$ 89.1 billion in 1999, or US$ 1'440 per capita. This categorizes Egypt as a middle-income country. Egypt's total debt, as a percentage of GDP, has decreased from 87.9 per cent in 1989 to 33.6 per cent in 1999.[8]

In 1999, agriculture accounted for 17.4 per cent of GDP, industry for 31.5, and services for 51 per cent. Current official estimates place unemployment at 8 per cent, and the labor force is growing at around 2.7 per cent annually.[9]

The principal export commodities for the country include oil, agricultural products (especially cotton and textiles), metal products and chemicals. The estimated value of exports for 1999 was US$ 4.5 billion. Major trade partners include the United States, the European Union and Japan. The value of imports for 1999 amounted to US$ 17 billion. The major import commodities are fuel, foods, and capital goods.[10]

Tourism forms an important part of Egypt's export earnings. In November 1997 the tourism industry faced a setback with the massacre of 58 tourists by Islamic militants in Luxor. While the government took immediate steps to alleviate the situation, there was a 19 per cent fall in income earned from tourism, from US$ 3.64 billion in 1996-97 to US$ 2.94 billion a year later.[11]

The government's recent commitment to liberalizing the public sector has produced mixed results. While there was an initial surge in privatization in 1996, most public enterprises remain overstaffed with huge debts and poor quality services. However, the government's zeal to privatize is evident in the way it is promoting privatization in some sectors, especially the cement and banking industry[12].

1.4 Human development

Egypt ranks 119th out of 174 in the United Nations Development Programme's (UNDP) Human Development Index (HDI), placing the county in the medium human development category. The HDI is composed of a basket of indicators including life expectancy at birth, adult literacy, school enrolment and GDP per capita. Egypt is also one of the countries that have made the fastest progress in human development, starting with a low HDI of 0.432 in 1975 to a medium HDI of 0.616 in 1997.[13] Table 1.1 shows Egypt's Human Development ranking compared to other Arab nations.

Table 1.1: Human Development Indicators

Egypt compared to selected Arab economies, 1998

HDI Rank	Economy	Life expectancy at birth (years) 1998	Adult literacy rate (% age 15 and above) 1998	Combined primary, secondary and tertiary gross enrolment ratio (%) 1998	GDP per capita (PPP US$) 1998
36	Kuwait	76.1	80.9	58	25'314
92	Jordan	70.4	88.6	69	3'347
101	Tunisia	69.8	68.7	72	5'404
119	**Egypt**	**66.7**	**53.7**	**74**	**3'041**
124	Morocco	67.0	47.1	50	3'305
143	Sudan	55.4	55.7	34	1'394
148	Yemen	58.5	44.1	49	719
	Arab States	**66.0**	**59.7**	**60**	**4'140**

Source: United Nations Development Programme <www.undp.org/hdr2000/english/book/back1.pdf>.

In 1996, 90.4 per cent of the households were provided with electricity[14] but only 20 per cent of these households had telephones. Both figures are likely to affect the usage of, and access to, the Internet.

1.5 Politics

Egypt's recent political history can be traced back to 1922 when it gained independence from Great Britain. Remnants of British control over the country came to an end following the Second World War. In 1954, Gamal Abdel Nasser, leader of the then ruling military junta, came to power. When the US and the World Bank withdrew financial support for the building of the Aswan High Dam in mid-1956, Nasser nationalized the privately owned Suez Canal Company. This move resulted in invasion by Britain, France, and Israel. There was almost universal condemnation and the invading forces were compelled to leave. Egypt regained control of the canal and the Suez crisis made Nasser the hero of the Arab world.[15]

Nasser held a strong following amongst the Egyptian population until his death in 1970, despite the defeat against Israel in the June 1967 war. Vice-President Anwar el-Sadat succeeded Nasser as president. In an attempt to improve relations with Israel and the United States, President Sadat involved his country in various negotiations with Israel and signed the Camp David accords of 1978. The accords provided for a return of the Sinai, which had been captured by the Israelis in 1967, to Egypt in May 1982. While his attempts to reconcile with Israel made Sadat a hero in Europe and the United States, it alienated Egypt from other Arab states. On October 6, 1981, Sadat was assassinated by members of a group of religious extremists.[15]

Sadat's successor, Hosni Mubarak, was overwhelmingly approved in a national referendum on October 24, 1981. With the end of President Sadat's rule, there was a gradual liberalization of the political climate in Egypt—citizens began to experience more freedom of expression, and the judiciary has demonstrated greater independence from the executive and legislative branches of parliament.

[1] United Nations Statistics Division: http://www.un.org/Depts/unsd/demog/dybcd-pub.

[2] International Planned Parenthood Federation, Country Profiles, Egypt: http://www.ippf.org/regions/countries/egy/index.htm#SOCIO.

[3] World Bank, Egypt Country Data Profile (data for 1999): http://devdata.worldbank.org/external/dgprofile.asp?rmdk=82608&w=0&L=E.

[4] Egypt State Information Service, Yearbook 1999: http://www.us.sis.gov.eg/public/yearbook99/html/land02.htm.

[5] International Planned Parenthood Federation, Country Profiles, Egypt: http://www.ippf.org/regions/countries/egy/.

[6] Egypt State Information Service, Overview, Land and People: http://www.us.sis.gov.eg/egyptinf/overview/html/ovwland.htm.

[7] See, for example, http://www.presidency.gov.eg/index.html or http://www.us.sis.gov.eg.

[8] World Bank, Egypt, Country Brief: http://www.worldbank.org/html/extdr/regions.htm.

[9] World Bank, Egypt at a Glance, and Egpyt Country Brief: http://www.worldbank.org/data/countrydata/aag/egy_aag.pdf.

[10] World Bank, Egypt at a Glance: http://www.worldbank.org/data/countrydata/aag/egy_aag.pdf.

[11] Financial Times. Country Briefs. ECONOMIC OVERVIEW: Not yet on the global stage: http://www.ft.com/ftsurveys/country/sc2aa6.htm.

[12] Financial Times. Country Briefs. Privatization: A Testing Time: http://www.ft.com/ftsurveys/country/sc2ae6.htm.

[13] UNDP, Human Development Report 1999: http://www.undp.org/hdro/Backmatter1.pdf.

[14] UNDP. Egypt Human Development Report 1997-98. Available at http://www.undp.org.eg/HDR/HDR-97-98/default.htm.

[15] The Library of Congress Country Studies, Egypt, Chapter 1, Historical setting: http://lcweb2.loc.gov/frd/cs/egtoc.html.

2. Information and Communication Technology Sector

2.1 Telecommunication sector

2.1.1 History and Current Status

The structure of the telecommunications industry in Egypt represents a relatively traditional structure in that the incumbent operator, Telecom Egypt, remains the dominant player. But there are signs of change. The current reform process positions Egypt as one of the more forward-looking of the Arab countries. In particular, the process of corporatization of the incumbent has already taken place, the separation of regulatory and operational functions is underway, and the privatization of the incumbent is at an advanced stage of planning. However, the most dramatic changes in the sector have been brought about by the introduction of privatization and competition in mobile communications and Internet service provision.

Telecommunications in Egypt began as long ago as 1854, when telegraph services were introduced in Alexandria. For much of the ensuing period telecommunications in Egypt were conducted by the government. In 1982, the Arab Republic of Egypt Telecommunication Organization (ARENTO) was created. ARENTO was given a mandate for the development of telecommunications and a full monopoly on domestic and international traffic. In April 1998, the process of corporatization progressed a step further with the creation of Telecom Egypt (TE) as a joint-stock company, inheriting ARENTO's monopoly. However, in the same year, competition was introduced in mobile services with two new companies entering the market. Subsequently, other telecommunication services were deregulated and the *de facto* competition in the Internet market was also endorsed.

The same law that established Telecom Egypt, Law 19 of March 26 1998, also created the Telecommunication Regulatory Authority (TRA) as an independent regulator. It is expected that TRA's independence will be confirmed by a new law, currently being drafted. The sector was further revamped in 1999, when responsibility for telecommunications, which had previously rested with the Ministry of Transport and Communications, was transferred to a newly-created Ministry of Communications and Information Technology (MCIT). The MCIT is championing an energetic approach to development of the sector. The new law, expected to be passed in early 2001, should put the sector onto a sounder, more commercial footing and establish a timetable for further liberalization and the licensing of additional players.

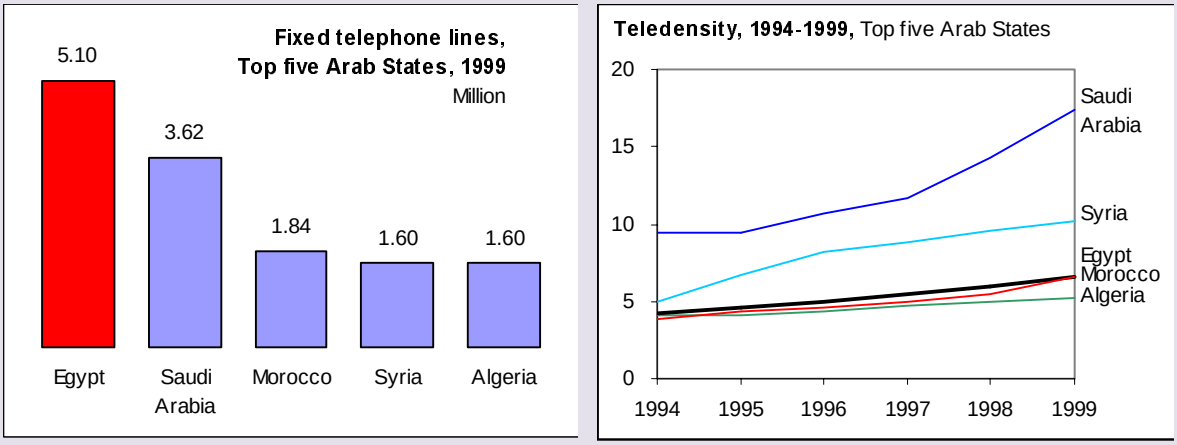
2.1.2 Public Telecommunication Operators

Telecom Egypt is by far the biggest company in the Egyptian telecom market. It is also the biggest telecommunications company in the Arab region, as measured by number of fixed telephone lines in operation. At the start of the year 2000, Telecom Egypt had some 5.7 million subscribers and a teledensity of just under seven lines per 100 inhabitants (see Figure 2.1). This places it behind the Gulf States but marginally ahead of Algeria and Morocco. By mid 2000, following the completion of the Egypt 2000 project, this had increased to seven million lines with a teledensity of 8.5.

While the growth rate in the number of main telephone lines over the last five years has been 13 per cent per year, this has not been sufficient to keep ahead of demand. The waiting list has remained fairly static, at around 1.2 million for most of the

Figure 2.1: Egypt's place in the Arab region

Top five Arab countries by number of fixed telephone lines, 1999 and by teledensity (telephone lines per 100 inhabitants), 1994-99



Note: In left hand diagram, statistics relate to year-ending 1999. In right-hand chart, figures for Egypt relate to financial year ending 30 June (i.e., 1999 = 30 June 1999).
Source: ITU World Telecommunication Indicators Database.

1990s. At current rates of growth, this converts to an average waiting time of just over two years but the goal is to increase growth to 1 million lines annually in the early years of the 21st Century. It is likely that the phenomenal growth of mobile communications will also reduce the level of the waiting list for fixed service.

Telecom Egypt enjoys a monopoly over all fixed-line domestic voice services in the country and, crucially, over international transmission and voice services. For consumers, access to international services was, until recently, quite restricted, requiring separate registration and authorization. Previously, access to international telephone service required a deposit of L.E. 100 (US$ 29) but even since this has been discontinued, only 148'000 subscribers are registered to make direct-dialed overseas calls.

The management style of Telecom Egypt was, until recently, more typical of a government bureaucracy than a private company. It used a five-year planning cycle to establish goals (for instance, the current goal is to reach a teledensity of 12 lines per 100 by the year 2002).

There are some signs of change. For instance, Telecom Egypt has now set up a marketing department, recognizing the need to sell its services and market its brand in an increasingly competitive market. It has also established a new web site <www.telecomegypt.com.eg> and, as a precursor to privatization, issued its first annual report in English for the year ending June 2000. Similarly, it has established a "New Services" department and is actively pursuing joint ventures with other companies in fields such as data communications (with EGYNet) and Internet Service Provision (with GegaNet). It has also recently become more innovative in its approach to Internet access and IP Telephony. In June 2000 a new head of the company was appointed, Akeel Beshir, an entrepreneur who previously managed Giza Systems, a hardware and software company. The planned privatization of Telecom Egypt is likely to bring about further changes. However, this has now been postponed

due to unfavorable market conditions.

Orascom Telecom is emerging as the second major player in the country. It is part of a consortium that owns *MobiNil*, the country's leading cellular operator, which bought Telecom Egypt's GSM network in May 1998. In February 2000, Orascom acquired an 80 per cent stake in Telecel International, a company with holdings in cellular operators in numerous African countries. This was the largest ever acquisition by an Egyptian company. In total, Orascom now has stakes in 18 GSM licences, including operators in Jordan, Syria and Yemen. Orascom is also a shareholder in Menatel (with France Telecom), which has a franchise (from Telecom Egypt) for the installation of a minimum of 20'000 public payphones over a ten-year period. Orascom is also the biggest player in the Internet Service provision market. In April 2000, it acquired the remaining 59 per cent it did not own of InTouch, the country's largest ISP and combined this with Link Egypt, another leading ISP of which it acquired 50 per cent in July 1999. Orascom Telecom is a subsidiary of Orascom Technologies, which, in turn, is one of three companies run by Orascom, a company founded in 1950 and privately owned by the Sawiris family. It employs some 20'000 people in Egypt alone. Via the Technologies subsidiary, Orascom is involved in computer hardware, software and services. It acts as a local agent for Hewlett-Packard and Lucent (a major supplier to Telecom Egypt). Orascom is also involved in tourism and construction.

MobiNil (www.mobinil.com.eg) is the leading cellular operator in Egypt. By year-end 2000, it had amassed some 1.2 million subscribers, giving it around 55 per cent of the market. At the time it was created, through the purchase of Telecom Egypt's GSM operations in 1998, it had only 83'500 subscribers. MobiNil's principal owner is Orange (majority-owned by France Telecom) which holds 71.25 per cent of the company following its purchase, in January 2001, of the quarter share owned by Motorola. The remaining 28.85 per cent is owned by a consortium comprising Orascom Telecom, and local companies Systel and Raouf Abdel Messih (Alcatel's local agent). By acquiring Telecom Egypt's assets, MobiNil was able to gain a flying start in the market, which it has maintained to date. The company is now valued at US$ 2 billion on the Cairo Stock Exchange.

Misrfone (www.clickgsm.com) is the second cellular operator and operates under the brand name of ClickGSM. It won the tender for the second mobile cellular license in March 1998, and launched service in November 1998. Like MobiNil, it paid US$ 515 million for a 15-year license. Within its first year of service it gained some 332'000 subscribers. As of September 2000, it had 790'000 subscribers, of which 85 per cent are on pre-paid schemes. Misrfone's owners are international mobile operators Vodafone (60 per cent) and MSI Cellular, a subsidiary of French water company, CGSAT, as well as local companies Banque du Caire, EFG-Hermes and the Alkan Group.

In addition to Telecom Egypt and the two mobile operators, there are a number of other industry players that received licences either from Telecom Egypt (before corporatization) or from the MCIT. One characteristic of these players is that Telecom Egypt invariably has a shareholding in them. Thus, it may be more appropriate to regard them as franchisee operations of Telecom Egypt rather than as competitors. These licensed operators include:

- Two payphone operators, Menatel and NilePhone;
- Two operators of Very Small Aperture Terminals (VSAT) networks, Local Alcan Trading Group and NEC (these licences were issued directly by Telecom Egypt);

- Nile Online, a newly-established Internet infrastructure company.

- EGYNet, a data communications company.

2.1.3 Regulation and policy-making

The newly created Ministry of Communications and Information Technology has oversight over the telecommunications and Internet sectors. An independent regulator, the Telecommunications Regulatory Authority (TRA) was established by presidential decree 101 on April 4th, 1998. The TRA has experienced some difficulties in establishing an identity independent of Telecom Egypt. Its legal status should be clarified by the new telecommunications law. A draft version of the Law (as at 3 June 2000) foresees that the TRA would be responsible for publishing a list of licensed operators and defining the conditions under which licences may be issued. The TRA will also be responsible for ensuring the optimal use of the spectrum.

The government has embarked upon a program of progressive market liberalization. Initial steps towards liberalization in mobile and Internet services should also be extended to basic services and the Internet backbone market. Impetus for this move came from the new Minister of Communications and Information Technology, and a relatively democratic and inclusive process has been adopted for elaboration of the new law.

In December 1999, four groups were established to draft sector reform changes:

- A legal group to draft a new Telecommunication Act for Egypt. The draft law was prepared by June 2000 and recommended a stronger level of private sector participation.

- A technical group, aimed at assessing the current infrastructure and the development of an integrated master plan.

- A business group that prepares marketing and pricing recommendations for existing and new services. The private sector will help bring these new services to the end users. An example of a popular initiative, which came out of this group's work, is the premium rate Internet access scheme, discussed in the next chapter. On-going work includes defining a licensing framework and developing business models.

- The fourth group is concerned with human resource development in telecommunications and IT.

The new law foresees a progressive liberalization of the sector. One positive move in this direction is that, as of 1st October 2000, the price of international leased lines used for Internet has been cut by 30 per cent and the price for premium rate Internet access has been cut by 50 per cent. However, the overall policy direction remains controversial and the situation is subject to clarification. One example of this uncertainty is the situation concerning the licensing of a third mobile network. Telecom Egypt says it already has a license; other operators say that no new licences will be awarded before 2003.

2.1.4 Network

Egypt's telecommunications network has been modernized and extended over the last few years and almost 100 per cent of subscriber lines are now digital. The long distance dialling network now reaches some 254 cities. ISDN service was introduced in Cairo in 1998 and there is also a nationwide X.25 network (Egypt Net) with a capacity of 3'500 ports.

International connectivity is assured by the SEA-ME-WE 1, 2 and 3 submarine cables that link the country to other countries across the Mediterranean as well as to South East Asia and Western Europe. Egypt is also linked to the FLAG cable that follows a simi-

lar route. At a regional level, there are fibre optic links to Syria and Lebanon (ALITAR-BRITAR) and to Italy and Greece. Satellite communications are also used extensively and there are some nine earth stations in operation. Egypt has one of the world's largest networks of educational television via satellite.

2.1.5 International Service

Telecom Egypt has a monopoly over international traffic relations. During 1999, the total volume of international telephone traffic (incoming and outgoing) was 681 million minutes, an increase of 13 per cent over the previous year. There are almost four times as many minutes of incoming traffic as outgoing. However, this is not true for all routes. As Figure 2.2, (left chart) shows, while the ratio between incoming to outgoing is ten to one for traffic with the United States and six to one for Saudi Arabia, the two biggest traffic partners, Egypt actually sends more traffic than it receives to correspondents such as Italy, Lebanon and Canada.

Over the last five years, Egypt's international traffic has grown by around ten per cent per year (Figure 2.2, right chart). The effects of the decline in tourist traffic in 1997 and 1998 are evident in the reduced rate of growth in these years. However, higher growth returned in 1999. This is likely to have been further stimulated by the cuts in international tariffs, of up to 40 per cent on longer-distance routes, which were made in 2000.

2.1.6 Market Indicators

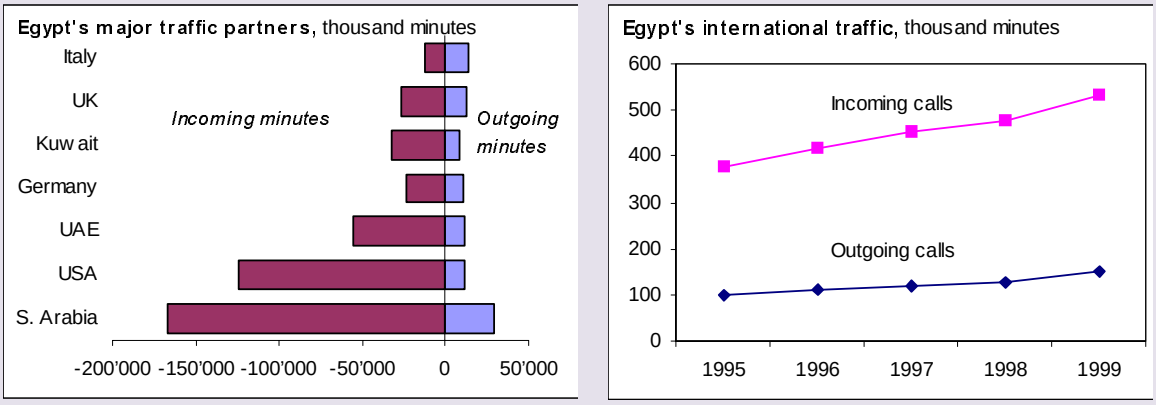
The main telecommunication indicators for Egypt are summarized in Table 2.1.

2.2 Information Technology sector

Egypt's Information and Communication Technology (ICT) sector is one of the largest in the Arab region. One source puts the value of the ICT market at US$ 2.4 billion in 1998, with IT (computer services, equipment and software) accounting for around twenty per cent.[1] Software is a particular bright spot, estimated to be growing by 20 per cent a year. Egypt is starting to emerge as a regional software hub with some 80 per cent

Figure 2.2: Egypt's international traffic

Major partners, incoming and outgoing traffic, 1999, and traffic trends, 1995-1999, in thousands of minutes



Source: ITU/TeleGeography Inc. "Direction of Traffic Database."

Table 2.1: Leading Telecommunication Indicators

Year ending 30.06

	Unit	1995	1996	1997	1998	1999	2000
TELEPHONE NETWORK							
Main telephone lines	000s	2'716	3'025	3'453	3'97	4'686	5'484
-per 100 inhabitants		4.6	5.0	5.5	6.0	7.0	8.5
-% digital	%	67	72	75	82	86	96
Waiting list (1)	000s	1'300	1'300	1'278	1'363	1'294	1'300
Public payphones (2)		4'734	5'046	4'946	4'976	10'316	21'987
MOBILE SERVICES							
Mobile cellular subscribers	000s	7	7	65	91	481	1'448
-per 100 inhabitants		0.01	0.01	0.10	0.14	0.72	2.28
Radio paging subscribers (3)		23'000	37'000	36'335	27'307	28'770	26'971
TRAFFIC							
International outgoing telephone traffic (minutes)(4)	10x6	100	113	119	127	149	...
International incoming telephone traffic (minute) (4)	10x6	376	417	451	475	532	...
STAFF							
Telecommunication staff (5)		52'291	51'750	51'981	54'015	55'568	...
Main telephone lines per employee		52	58	66	74	84	...
REVENUE							
Telecommunication revenues (US$) (6)	10x6	640	774	874	1'055	1'121	...
Telecommunication revenues as a % of GDP	%	1.06	1.15	1.16	1.28	1.26	...

Notes: (1) 1995-96, 2000: ITU estimates. (2) From 1999, including Menatel and Nile Telecom. (3) 1995: ITU estimate. (4) Year ending 31.12. (5) Telecom Egypt. (6) Telecom Egypt.
Source: ITU.

of software exports destined to other Arab countries (primarily Saudi Arabia). Duties on imported software are relatively high (23 per cent), perhaps to protect the nascent industry. There are a growing number of IT specialists and IT organizations. In addition, Egypt has played host to leading IT exhibitions and conferences such as Gitex and Comdex. According to government figures, there are some 700 high tech companies in Egypt.

2.2.1 Computer market

There are some 1.4 million personal computers in Egypt for a penetration of 2.1 per 100 inhabitants. Practically all computers and parts are imported with a significant portion reassembled locally. The value of computers and peripherals imported in 1999 was US$ 328 million, up some 20 per cent over the previous year. Import taxes are a relatively low five per cent. Egypt has emerged as the largest Arab PC market with sales of 270’000 in 1999. The market price for a PC purchased in Egypt is not significantly higher than the world market price, though products are sometimes later to market due to delays in introducing Arabic language operating systems. Because

of the lack of credit card facilities, it is relatively rare for users to purchase computers directly from abroad. As a result, computer importing companies have been able to hang on to the market and to develop subsidiary business lines in software, turnkey services and systems integration. One of the most successful is Raya, a subsidiary of the Triangle Group, which recently underwent an International Public Offering (IPO) valuing the company at several billion US dollars.

2.3 The Internet market

2.3.1 History of Internet in Egypt

As in many parts of the world, the Internet in Egypt has developed outside the formal telecommunication sector. What makes the history of Internet in Egypt unique is the degree of government support from early on. The Egyptian Cabinet Information and Decision Support Center (IDSC) (http://www.highway.idsc.gov.eg/aaindex.htm) (see Box 2.1) has played a key role in raising awareness about the Internet, provided a forum for dialogue between the ISPs and the incumbent telecom operator (Telecom Egypt) and played an active role in encouraging the diffusion of Internet services outside of Cairo.

The first use of the Internet can be traced to a link started by the Egyptian Universities Network (www.frcu.eun.eg) in October 1993, via an initial 9.6 kbit/s link to the European Academic and Research Network (EARN). However, according to Dr. Tarek Kamel, co-founder and Secretary of the Internet Society of Egypt (ISE), awareness of Information Technology in the country predates the Internet by about 10 years.[2]

A landmark event that raised awareness within government circles of the potential of the Internet was the International Conference on Population and Development held in Cairo, from 5-13 September 1994 and attended by some 15'000 people.[3] One of the conditions for hosting the meeting was that the Egyptian Government had to provide a 64 kbit/s connection to the Internet for the duration of the conference. This link, established via a leased line to Montpellier, France, cost the Egyptian Government US$ 450'000 for nine days.

Following this event, the government decided to allow the IDSC and the Regional Information Technology and Software Engineering Centre (RITSEC) (http://www.ritsec.com.eg) to offer free Internet accounts to government agencies, NGOs, and private companies as part of a long-term government funded campaign. The objective of this initiative was to promote awareness of the Internet and boost the number of users in sectors such as trade, manufacturing, health care, tourism and social services.

Box 2.1: Egypt's Information and Decision Support Centre (IDSC)

The Information and Decision Support Centre (IDSC) started as a think tank for government ministries and eventually evolved into an instrument for building-up a national information infrastructure. The mission of IDSC is to provide information and decision support services to the government for socio-economic planning and to improve the country's managerial and technological infrastructure through enhancing the decision making process. To realize such an ambitious mission, the objectives of IDSC are to:

- develop information and decision support systems for top policy-makers in Egypt.
- support the establishment of decision support centers in different ministries and make more efficient and effective use of the available information resources.
- initiate, encourage and support informatics projects that could accelerate managerial and technological development of Egyptian ministries, sectors and governorates.
- participate in international cooperation activities in the areas of information and decision support.

Another landmark event was the decision taken in December 1995 by the Chairman of Telecom Egypt to establish an open-door policy for commercial Internet services. Telecom Egypt stated that it would establish Internet gateways and allow 12 ISPs to begin operating.

In October 1996 Internet diffusion suffered a setback when the Egyptian press ran a series of negative articles, claiming that the Internet was being used for the spread of subversive literature. This led to demands from government circles that an official body be nominated to regulate the Internet in Egypt. The best candidate, it was decided, would be a local chapter of the Internet Society. The Internet Society of Egypt (www.ise.org.eg) was formed with the understanding that it would act as the regulatory body for Internet matters. Formed under law No. 32 of 1994, the Egyptian ISOC Chapter is managed by a Board of Directors. It includes 15 members elected by the General Assembly of the Society. The Internet Society has been instrumental in establishing a code of ethics for Internet use; defining ground rules for commercial relationships between ISPs and Telecom Egypt; establishing policies for IDSC with respect to services offered to government departments and reducing leased-line prices and removing sales tax on Internet services. The Internet Society helps run the annual CAINET conference and exhibition in Cairo and, in March 2000, hosted a major meeting of the Internet Corporation for Assigned Names and Numbers (ICANN).

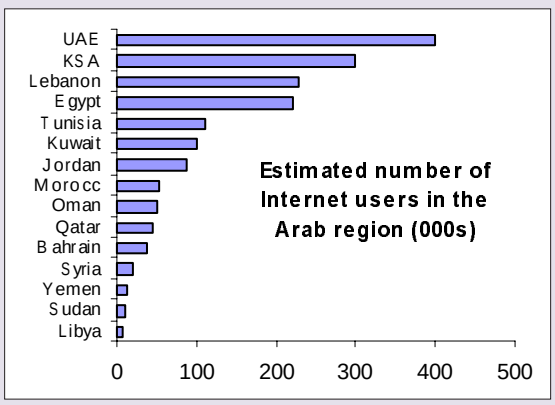
2.3.2 Current Market Structure

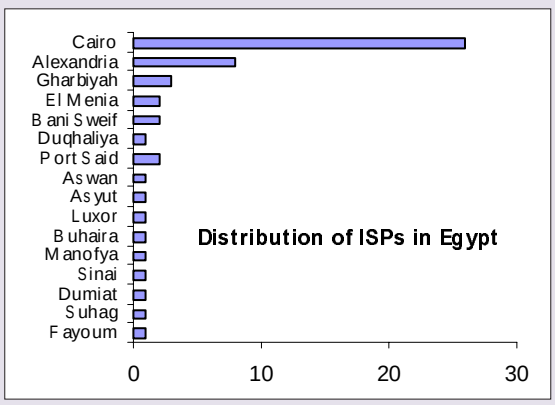
As shown by Figure 2.3 (left chart), in March 2000, Egypt had the fourth largest number of Internet users in the Arab region, behind the United Arab Emirates, Saudi Arabia and Lebanon. There are some 60 Internet Service Providers in Egypt, catering to roughly 55'000 subscribers. It is generally estimated that there are some four users for each commercial account, which would put the number of Internet users at about 220'000. Estimates vary, though, and the London-based Al-Sharq Al-Awsat newspaper has estimated the number of Internet users in Egypt at 400'000.[4] As the population of Egypt is around 60 million, Internet penetration is less than 0.4% and the vast majority of these users reside in Cairo.

As Figure 2.3 (right chart) shows, the majority of ISPs are located in Cairo, with only one or two ISPs serving most other towns. This means that although there is considerable com-

Figure 2.3: Internet users and ISP distribution in Egypt

Estimated Internet users in Arab region, 000s, March 2000 and distribution of ISPs in Egypt





Source: ITU adapted from Internet Arab World Magazine (left chart) and IDSC (right chart).

petition available in Cairo, citizens living outside the capital often have only one ISP to choose from. IDSC is actively trying to combat this trend by offering substantial discounts on bandwidth to ISPs establishing operations outside of Cairo and Alexandria.

The largest ISPs are LINKdotNET, *GegaNet* and *Internet Egypt*. As ISPs are generally reluctant to divulge the number of subscribers, an accurate picture is hard to come by. However, it is safe to say that these three ISPs hold the lion's share of the market. In view of the relatively low ratio of subscribers for each ISP, the market appears ripe for consolidation. Indeed, LINKdotNET was formed from the merger of *Link Egypt* and *InTouch* in June 2000.[5] LINKdotNET has 230 staff serving some 100'000 users and hundreds of corporate customers. This makes LINKdotNET the largest ISP in Egypt and, potentially one of the largest ISPs in the Arab region. Orascom, the large investment company, owns 75 per cent of LINKdotNET. The remaining 25 per cent are owned by Link Egypt.

Khaled Bichara, Former Managing Director of Link Egypt, recently appointed President and CEO of LinkdotNet.

Before the merger, Link Egypt was one of the country's largest ISPs, reporting over 7'000 subscribers. It was started by Khaled Bichara in March 1996 together with 11 other college graduates with an initial seed capital of LE one million (US$ 300'000). The company employed 130 staff, all under 30 years old. According to Mr. Bichara, in its last four years, Link Egypt saw growth rates of 100 per cent per annum. It also opened offices in Dubai and offered web development and e-commerce solutions within the United Arab Emirates, Saudi Arabia and Kuwait. Link Egypt also had PoPs in Cairo and Alexandria but 90 per cent of its subscribers were based in Cairo. Link Egypt offered a range of services including dial-up (both post and prepaid), leased-line and web development and it reported some 70 corporate customers in a range of industries (i.e., oil companies, financial services, media, etc.) with leased line capacity ranging from 28.8 to 256 kbit/s. Web development accounted for an increasing percentage of revenue and the development team increased from two to 30 in the last three years. Link Egypt was the first ISP to offer flat rate pricing. Initial pricing of US$ 42 per month dropped to US$ 22 per month. After the merger, in December 2000, the monthly flat rate offered by LINKdotNET was around US$ 12.

Mohamed El-Nawawy founded the other company involved in the merger, InTouch Communications, in January 1992. Although the Internet was not available in Egypt at that time, InTouch offered a variety of data services via X.25 data networks, and positioned itself as the Egyptian CompuServe. It also introduced an X.400 messaging service for a flat US$ 50 monthly fee. In June 1993, InTouch became the first Egyptian company to be registered in the .com top-level domain and from 1995 started to offer full Internet dial-up access. InTouch had two international gateways to Europe, a terrestrial circuit via IDSC, as well as a receive-only satellite circuit. Its total capacity was unknown but InTouch claimed that it was in the order of multiple E1s.

Mohamed El-Nawawy, Former Director of InTouch

Table 2.2: Egyptian Internet Service Providers

May 2000

ISP	Web Page	City
ALEXCOMM (MADENTEX)	www.alexcomm.net	Alexandria
ALEXNET	www.alexnet.com.eg	Alexandria
DATA EXPRESS	www.dataxprs.com.eg	Alexandria
TECHNOMINA	www.tecmina.com	Alexandria
INTERNET ALEXANDRIA	www.inetalex.ie-eg.com	Alexandria
GLOBALNET	www.globalnet.com.eg	Alexandria
CNS	www.cns-egypt.com	Alexandria
ACCESS	www.access.com.eg	Cairo
COMMNET GROUP	www.commnet.com.eg	Cairo
DATUM	www.datum.com.eg	Cairo
EGYPT ONLINE	www.egyptonline.com	Cairo
EIS	www.eis.com.eg	Cairo
GEGANET	www.gega.net	Cairo
IEC	www.iec.egnet.net	Cairo
INFINITY	www.infinity.com.eg	Cairo
LINKdotNET	www.link.net	Cairo
MIST	www.mist-net.com	Cairo
PAN ARAB COMPUTER CENTER	www.pacc.com.eg	Cairo
RITE	www.rite.com	Cairo
CLICK	www.click.com.eg	Cairo
S.C.C.	www.scc.com.eg	Cairo
ETSNET	www.etsnet.com.eg	Cairo
STARNET	www.starnet.com.eg	Cairo
THE WAY OUT	www.wayout.net	Cairo
WORLDNET	www.worldnet.com.eg	Cairo
INTERNET EGYPT	www.ie-eg.com	Cairo
SHAHD	www.shahd.com	Cairo
ONLINE	www.online.com.eg	Cairo
PURENET	www.purenet.com.eg	Cairo
NIEREC	www.nierec.com.eg	Cairo
MENA NET	www.menanet.net	Cairo
SOFICOM	www.soficom.com.eg	Cairo/Alex
BEC	www.bec.com.eg	Port Said
SINAINET	www.sinainet.com.eg	Sinai
CONSULTANT INFORMATION CENTER	www.cic.com.eg	Tanta
INTERNET ISMAILIA	www.ie-eg.com	Ismailia
INTERNET SIXTH of OCTOBER	www.ie-eg.com	6th of October
INTERNET HURGHADA	www.ie-eg.com	Hurghada

Source: PC Week Egypt.

The Egyptian German Telecommunication Industries (EGTI) is a local company established as a joint venture between Telecom Egypt and Germany's Siemens in 1990. Today Telecom Egypt, which used to be the biggest shareholder, has a rather symbolic role, given that most of its shares have been sold to Siemens. EGTI's main activities are concentrated on production, installation, and commissioning of public digital telephone exchanges. EGTI also installs new digital switches that can function as a point-of-presence (PoP) for Internet Service Providers. EGTI formed GegaNet (www.gega.net) as an ISP in 1996 and Telecom Egypt and GegaNet jointly own Commnet, another Internet service Provider (www.commnet.com.eg). GegaNet offers a range of dial-up, ISDN and leased line services including prepaid, post-paid and premium services. GegaNet currently has 6'000 dial-up subscribers and provides leased-line services to some 30 corporations. Leased line connectivity ranges from 64-512 kbit/s. On average there are 10-15 users per leased line. GegaNet has a T1 (1.5 Mbit/s) outbound bandwidth via Teleglobe, costing US$ 15'000 per month and six Mbit/s incoming bandwidth via iSkySat, costing US $30'000 per month.

The merger of Link Egypt and InTouch has moved *Internet Egypt* (www.internetegypt.com) to third place in the ISP ranking. Claiming 4'000 individual and 105 corporate subscribers, Internet Egypt offers a range of services including dial-up, premium and leased line. It also generates revenues from web hosting and web development. A dial-up subscription costs US$ 224 a year or US$ 18 a month. Internet Egypt has a direct terrestrial T1 (1.5 Mbit/s) link to the United States via Cable & Wireless and an incoming E1 satellite connection (two Mbit/s). Internet Egypt has also been authorized by RIPE (www.ripe.net) to act as registrar for Egypt and the Middle East. Internet Egypt operates seven Internet cafés in Cairo that also double as support and outlet centers.

2.3.3 Bandwidth

The IDSC is the main provider of national Internet bandwidth in Egypt. According to Mostafa Abdel Wahed, Director of Communications, IDSC/RITSEC accounts for 70 per cent of national IP traffic with an estimated 14 Mbit/s of total capacity. Telecom Egypt and GegaNet handle the remaining 30 per cent. By pooling bandwidth, IDSC is able to offer cheaper tariffs than those available from Telecom Egypt for both dial-up and wholesale connectivity. However, capacity is often oversold, leading to congestion and poor quality of service. IDSC/RITSEC has installed digital multiplexers in the public switches, enabling the creation of a digital network in Egypt. The network, managed by Telecom Egypt, provides a high-speed distribution network for more than 50 nodes throughout the country.

Bandwidth to the academic sector is provided via the *Egyptian Universities Network* (EUN) (www.frcu.eun.eg). EUN has been connected to the Internet since October 1993, initially through a 64 kbit/s link. Subsequent upgrades brought speeds to 256 kbit/s in October 1996 and 512 kbit/s in December 1997. Further capacity was added in April 1999, bringing speeds up to 2 Mbit/s. EUN connects major Egyptian universities to the Internet. In addition, it connects approximately 90 sites from the academic, research and governmental sector and it provides accounts for some 4'000 dial-up subscribers comprised of university staff and postgraduate students.

A newcomer on the Egyptian Internet scene is Nile Online, which was recently granted a license to operate a commercial Internet backbone in Egypt.[6] Nile Online is owned by Telecom Egypt and other investors.

Total international Internet bandwidth was 26 Mbit/s at October 1999.[7] Access to the international gateway is controlled by Telecom Egypt, which is planning a massive increase in capacity.[8] However GegaNet and Internet Egypt have direct access to the US

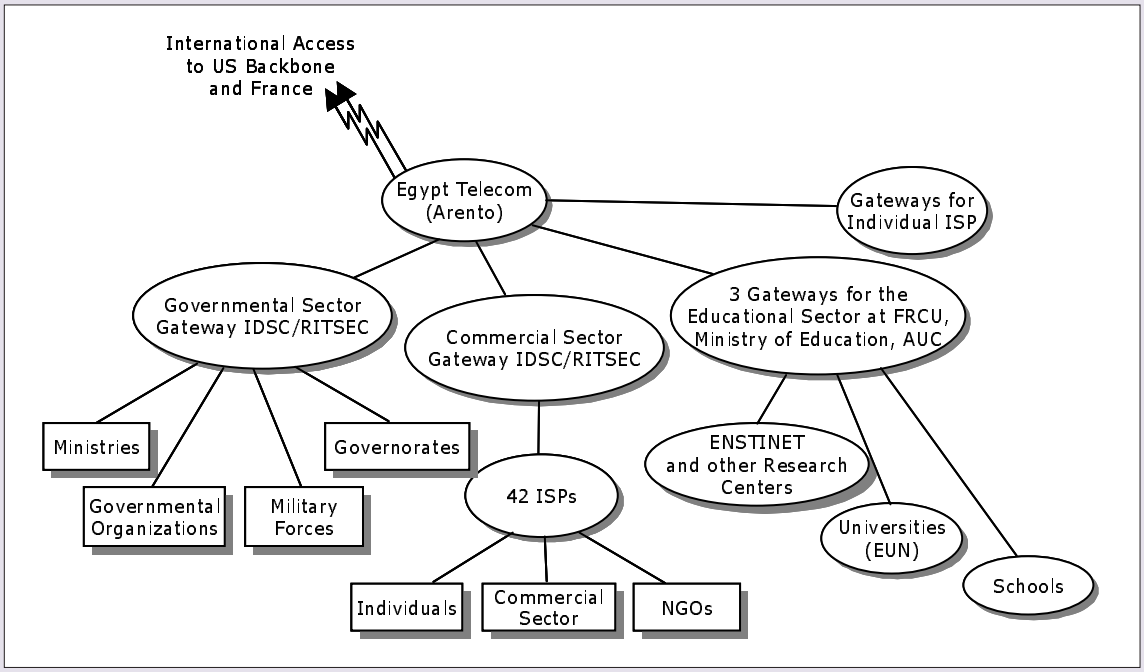
backbone via Cable and Wireless and MCI. It is anticipated that available bandwidth will increase significantly as a result of two forthcoming developments:

- Nile Online is expecting to establish an IP backbone network domestically that will provide an additional 45 Mbit/s of bandwidth initially.

- A new submarine cable across the Mediterranean, Nautilus 1 (MN1), will be put into place during 2001. The bandwidth capacity 3.84 Terabits per second can theoretically transport 45 million phone calls simultaneously or 300 hours per second of digital video. However, it is likely that most of this bandwidth will remain unused until demand rises.

Although Telecom Egypt still holds a monopoly on the *terrestrial* gateway to the Internet, there are a number of bandwidth providers offering inbound links via satellite. One is *iSkySat* that provides a bundled solution, offering ISPs a one-stop shopping resource for satellite space segment, gateway transmission services and a dedicated connection to the Internet backbone. iSkySat uses a hybrid combination of satellite and terrestrial connection, enabling the less bandwidth intensive outbound request to travel over the terrestrial circuit and routes the more bandwidth intensive return traffic over a simplex satellite connection. Configuration ratios are typically 4:1 (inbound vs. outbound). The connection can be configured in such a way as to allow time sensitive applications, such as chat, audio, etc. to be routed via the terrestrial network while less time sensitive applications (e.g., email and web traffic), are routed over the simplex satellite circuit. This 4:1 network configuration is optimized for Egyptian users wishing to browse web sites located in North America. However, the asym-

Figure 2.4: Internet Gateways



Source: Internet Society of Egypt.

metric nature of this connection means that overseas users generally have much slower access to Egyptian web sites. This can be disadvantageous for Egyptian based sites that hope to attract international visitors (e.g., for tourism).

Telecom Egypt's recent announcement about building a new Internet Access Network should bring some significant changes.[9] Telecom Egypt plans to transform Egypt's existing telephony infrastructure from circuit-switched to a packet-based voice and data network. In the interim, the new system will separate data from voice traffic, providing faster service for Internet users.

2.4 Mass media

Egypt has the strongest journalistic traditions amongst Middle Eastern countries, with important film, television, and sound industries, as well as the largest publishing sector in the Arab world (See Table 2.4).

The major information organization in Egypt is the State Information Service (SIS), which, as part of the Ministry of Information, is the public information organ and press agency of the government. SIS has 42 Foreign Press and Information Offices stationed around the world. It launched its own web site in September 1996 (www.sis.gov. eg), which is a major source of information online. Besides offering information on current affairs, it also provides facts and data on Egyptian civilization, history, culture, economics and politics. It also offers online audio and video transmissions.

Table 2.3: Egyptian daily newspapers with their own web site

October 2000

Newspaper	URL
Al-Ahram	www.ahram.org.eg
Al-Youm	www.alalamalyoum.com
El Sha'ab	www.elshaab.com
Al Gomhouria	www.eltahrir.net

Source: ITU.

2.4.1 Print

All newspapers and periodicals operate under governmental supervision and partial government ownership, as do all publishing houses. While Egypt is open to the idea of the new information age in an increasingly global society, it is also concerned about proctecting its cultural and national identity. The government is vigilant about the repercussions of sensitive or social content, given the conservative Islamic mores and Egypt's location in a volatile region.

In 1996 Egypt had 17 daily newspapers, with a total daily circulation of 2.4 million copies. This means that roughly one in every 17 adults reads a daily newspaper.[10] Al-Ahram, the semi-official daily in Egypt, has a circulation of nearly one million and is also available online. Other major Arab language newspapers include Al-Youm, Al Gomhouria, El Sha'ab, Al Akhbar, Al Mesaa, Al Gomhuriyyah, Al Wafd, and Al Alam Al Youm. Table 2.3 shows the dailies that are available online.

2.4.2 Radio

Radio gained influence as a means of communication during President Gamal Abdel Nasser's rule, when it was used as a tool for pan-Arab broadcasting. Egypt's radio broadcasting system is the biggest in the Arab world, transmitting programs in Arabic, English, French, and other languages.[11] There are 11 radio stations servicing the entire country. In 1997 there were an estimated 20.5 million radio receivers, which represents 317 radios per 1000 inhabitants.

2.4.3 Television

TV transmission, which is under government control, began in

Table 2.4: Mass media indicators

Indicator	Value	Source
Number of daily newspapers Circulation	17 2.4 million	UNESCO Statistical Yearbook 1999 (data for 1996)
Number of radio receivers Sets per 100 inhabitants	20.5 million 31.7	UNESCO Statistical Yearbook 1999 (data for 1997)
Television households Households with a television (%)	11.6 million 83.5%	European Audiovisual Observatory, Statistical Yearbook 2000
Number of satellite dishes As % of TV households	877 thousand 7.6%	European Audiovisual Observatory, Statistical Yearbook 2000

Source: ITU adapted from Sources shown above.

1960 with just one channel but has now expanded to include two nationwide channels that cover the whole of Egypt and six regional channels that each cover an array of governorates.[12] In 1999 there were an estimated 11.6 million television households, which means that about 84 per cent of all households have a TV set. Egypt does not have cable television. Pay television is available in the form of encrypted over-the-air transmission with 46'000 subscribers at March 2000. Satellite is the most popular source of multichannel television with an estimated 877'000 dishes. Almost all Egyptians watch TV regularly.[13]

Egypt's first satellite, Nilesat 101, an audio-video communication satellite, was launched in 1998 and covers the whole country, as well as other parts of the Arab region and some neighbouring countries, such as Turkey and Iran. The success of Nilesat 101 (www.nilesat.com.eg) has led to the launch of a second satellite, Nilesat 102. While Nilesat 101 has 18 channels, of which 12 are already in use, Nilesat 102, which was launched in August 2000, will provide an additional six channels in its coverage.[14]

In 1992 the government of Egypt started a project called Media Production City (MPC), which was completed in 1997. MPC plans to produce some 8'500 hours of TV programs and 100 films per year. MPC, which is also known as the 'Hollywood of the East', is the biggest media production center in the Middle East and is equipped for cartoon production, sound recording, editing, dubbing, and television and video filming.[15] Egypt is interested in possessing up-to-date media production facilities in order to expand and improve its national media output, and to introduce Egyptian and Arab specialized TV channels. According to one source, "*Egypt, whose population of around 64 million is more than double that of any other Arab country, hopes Nilesat and the media zone will help it regain its once-dominant role in the Arab media industry, challenged in the past decade by proliferating Arab satellite stations funded by Gulf money*".[16] Egypt's broadcast media ambitions point to the country's potential as an Internet content provider and information hub within the Arab region.

[1] Other parts of the ICT sector include telecommunication equipment and services. This data and other in the section come from *European Information Technology Observatory 99*. EITO. Frankfurt. www.eito.com.

[2] For more on the early years of the Internet in Egypt see Tarek Kamel. "Internet Commercialization in Egypt: A Country Model." *Internet Society 1997 Conference Proceedings*.

[3] See the web page for the United Nations International Conference on Population and Development: www.iisd.ca:80/hGET /linkages/cairo.html.

[4] Reuter, 'Work like an Egyptian', November 14, 2000

[5] LinkdotNet. "Link Egypt merges with InTouch To Form LINKdotNET." *Press Release*. 19 June 2000. www.link.net/docs/link_Media.htm.

[6] The backbone will supposedly have a capacity of 210 Mbit/s to serve up to five million subscribers. See Khalid Hassan. "Egypt Building 210-Mbit/s Connection to Become Internet Gateway for Region." *DIT News*. 10 August 2000. www.ditnet.co.ae/Itnews/newsaug2000/53.html.

[7] See email entitled "Update on Local Exchange Point in Egypt / Internet Update" on the Network Startup Research Centre web site at: www.nsrc.org/db/lookup/operation=lookup-report/ID=939058779810:489020354/fromPage=EG.

[8] For example, Telecom Egypt signed an agreement in July 2000 to increase capacity on the FLAG undersea fibre optic network to 155 Mbit/s. See Flag Telecom. "Growing Internet Demand Leads Telecom Egypt to Purchase Increased Capacity from Flag Telecom Between Alexandria and New York." *News Release*. 27 July 2000. www.flag.bm/index_e1.htm.

[9] Ericsson. Telecom Egypt selects Ericsson to build Internet Access Network". *Press Release*. 6 December 2000. www.ericsson.com/press/20001206-0009.html.

[10] The term adult here applies to those Egyptians that are 15 years or older. Approximately 65 per cent of the total population is 15 years or older, see: www.un.org/Depts/unsd/social/youth.htm. Newspaper circulation data are from the UNESCO Statistical Yearbook 1999, Section: Daily newspapers: unescostat.unesco.org/statsen/statistics/yearbook/cult.htm.

[11] Arab Net: www.arab.net/egypt/culture/et_media.html.

[12] Egypt State Information Service (SIS): www.us.sis.gov.eg/egyptinf/overview/html/ovwinfo.htm.

[13] European Audiovisual Observatory. *Statistical Yearbook 2000*. See also, US Department of State. *Country Commercial Guide 2000*, Egypt. www.state.gov/www/about_state/business/com_guides/2000/nea/egypt_CCG2000.pdf.

[14] Document INFO/13-E, presented by Salah Hamza, Head of Engineering, Nilesat Co., at the ITU Preparatory Meeting of the Arab Region for the World Telecommunication Development Conference, Alexandria, Egypt, October 2000. See also: Egypt State Information Service (SIS), Yearbook 1999, Information, www.us.sis.gov.eg/public/yearbook98/html/Icinf1.htm.

[15] Egypt State Information Service (SIS), www.us.sis.gov.eg/public/yearbook98/html/Icinf1.htm.

[16] Arabia.com. "Taboo-breaking Arab broadcaster to set up in Egypt". April 18, 2000, www.arabia.com/article/0,1690,Life|18463,00.html.

3. Internet strategy and policy

3.1 Role of incumbent telecommunications operator in Internet

Although Telecom Egypt (www.telecomegypt.com.eg) holds a monopoly in most areas of telecommunications in Egypt, it is not perceived as being a major player in the Internet. However, this is misleading. Telecom Egypt (TE) is the sole provider of the domestic and international connectivity and also has shareholdings in several ISPs. The reason that Telecom Egypt is not perceived as being involved in the Internet is because it has not associated its own brand name with many Internet services, preferring to work via franchisees, and does not provide national Internet peering. However, it is likely to do so in the near future.

In contrast with other countries, where competition in Internet services allowed new market entrants to establish their own international gateways, Telecom Egypt has retained its monopoly. Even though it owns the entire backbone network, TE was slow in responding to the promise of the Internet. Corporatization in 1998 did not lead to any immediate changes although the company's recent decision to improve its existing telephony infrastructure to provide faster and better Internet access for its end-users, shows TE's increasing interest in expanding its addressable market for new revenue generation opportunities.

With regards to the ISP market, Telecom Egypt decided to establish an open-door policy for commercial Internet services in 1995 and it established private and public Internet gateways and allowed 12 ISPs to begin operating. Today, there are more than 60 ISPs. Telecom Egypt, recognizing the need to sell its services and market its brand in an increasingly competitive market, is actively pursing joint ventures with other companies in fields such as data communications and Internet Service Provision through a franchise model.

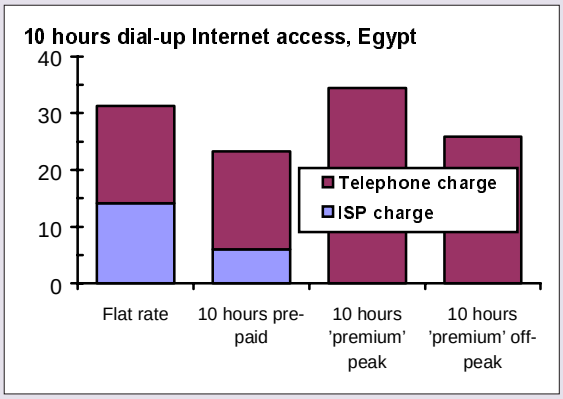
3.2 Pricing structure for Internet services

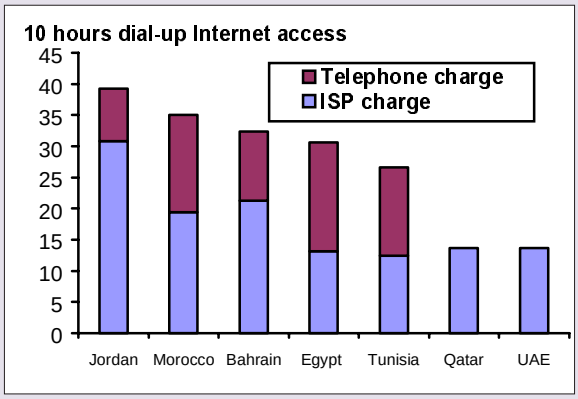
Internet Service Providers in Egypt offer a range of dial-up and leased line services charged at either a flat rate, hourly, or even per minute basis. These services are offered on both pre or post paid basis. For dial-up tariffs, telephone usage charges may be applicable. A number of free calls units (6 minutes each) are allowed per year (1'600 for residential users and 300 for businesses). Once these calls are used, users are charged ten piastres (2.9 US cents) per 6 minute unit. A so-called "premium rate" service was launched in December 1999 where users pay a higher telephone usage charge, but no ISP access charge (see Box 3.1). However this rate results in charges that are actually higher except for users where there is no local ISP (see Figure 3.1, left chart). Egyptian dial-up Internet tariffs fall in the mid-range of those charged in other Arab countries (see Figure 3.1, right chart). Several companies are contemplating launching 'free' Internet access. Users would not pay a subscription fee but only the regular local telephone rates. This would most likely have a strong impact on the market's pricing structure.[1]

There are a variety of prices for high-speed access to the Internet via leased lines depending on whether the customer is a direct client of Telecom Egypt, an ISP, or a client of an ISP. One limitation is that digital leased lines and ISDN are not available on all exchanges. Also, none of the ISPs publish their leased line prices. Telecom Egypt provides digital leased lines ranging from 9.6 kbit/s -

Figure 3.1: ISP Dial-up tariffs

Various Internet dial-up plans within Egypt and selected Arab States, December 2000, US$/month





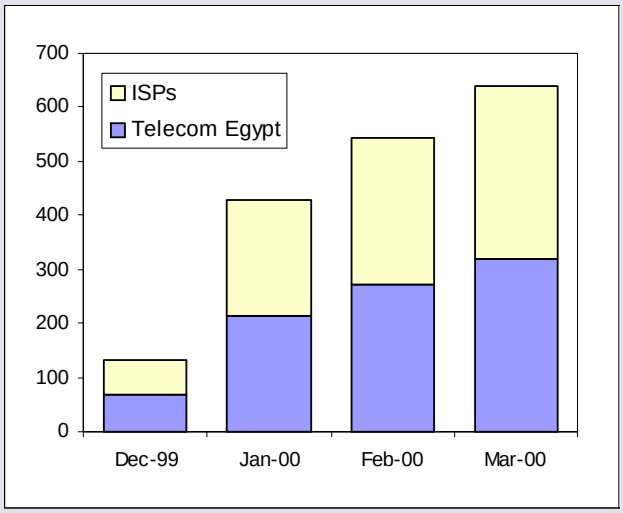
Source: ITU adapted from ISP data.

Box 3.1: Premium rate services

Premium Rate Services were introduced in Egypt in December 1999, following months of extensive discussions between Internet Service Providers and Telecom Egypt.[2] The scheme is now open to all ISPs. Each ISP is allocated a 900-access number by Telecom Egypt. A subscriber dialing the 900 number is routed to the ISP via Telecom Egypt's intelligent network and is charged on a per minute basis. Telecom Egypt collects the revenue from the subscriber and shares 50 per cent of this with the ISP. The subscriber is charged 20 piastres (5.7 US cents) a minute for peak usage and 15 piastres (4.3 US cents) a minute for off-peak use. The premium service generated revenues in excess of US$ 600'000 in March 2000.

Box Figure 3.1: Doing things differently

Revenues from premium rate Internet services, in thousands of US dollars per month, and an example of advertising



Source: Telecom Egypt, ITU Egypt case study research.

Table 3.2: Leased line pricing

Prices per month of Telecom Egypt digital leased lines and ISDN, December 2000

Digital leased lines		
	LE	US$
64 kbit/s	833	$239
128	1'333	$383
265	2'083	$599
384	2'917	$838
512	3'500	$1'006
ISDN BRI	83	$24

Source: ITU adapted from Telecom Egypt.

512 kbit/s. It also provides Basic Rate Interface ISDN connections. Pricing for Telecom Egypt's high speed access is shown in Table 3.2. GegaNet provides ISDN Internet access at a significant mark-up over conventional dial-up tariffs. For example, GegaNet's conventional flat rate monthly dial-up tariff is LE 105 whereas it charges LE 185 for ISDN dial-up.

3.3 Regulatory status of Internet

Responsibility for Internet policy and regulation in Egypt is carried out by a number of organizations including MCIT, IDSC, ISE and even the incumbent telecommunication operator, Telecom Egypt. As a result, there is some confusion about exact duties and responsibilities.

3.3.1 Internet Service Provider (ISP) Market

In theory, the Internet service provision market is open and there are no license requirements or fees in order to become an ISP. In reality there are a number of approvals that must be obtained. For example, ISPs must obtain a concession agreement from IDSC in order to operate.[3] Furthermore, ISPs are generally not allowed to provide their own infrastructure but must lease domestic lines and international connectivity from IDSC.[4] The idea is that it is more efficient to pool resources and purchase connectivity in bulk to lower costs. However, three ISPs have an exemption from this requirement and have varying degrees of international connectivity. There are no foreign equity limits for ISPs but currently, only one, GegaNet, is partially foreign owned.

There is a local exchange located at IDSC. It connects the four gateway operators in Egypt (IDSC/RITSEC, EUN, Internet Egypt and GegaNet) and provides a peering service for national traffic. In addition, EUN operates a local Internet exchange for the educational sector.

3.3.2 Top Level Domain Name

The Supreme Council of Universities is the official administrator for Egypt's top-level domain name (.EG).[5] As in many other countries, second level domains are used (and required) of which there are seven: .com.eg (for business), .net.eg (for ISPs), .eun.eg (for the Egyptian Universities Network), .edu.eg (for other academic institutions), .sci.eg (for scientific organizations), .gov.eg (for government) and .org.eg (for non-profit organizations).

Responsibility for registering domains is split between EUN and IDSC. EUN is responsible for .eg.eun, .eg.edu, and .eg.sci while IDSC is responsible for registering the .eg.gov, .eg.com and .eg.org domains. It is not clear who is responsible for .eg.net. In order to register in the .eg.gov domain, the entity should be within "*governmental sector*" (e.g., ministries, military, governorates). Requirement for registration within the .eg.com domain is that the entity should be a private sector organization in Egypt. Other conditions also apply. The name server must be physically located in Egypt. In order to protect copyrights, the domain name must be related to the entity name and should not be a generic name. The name must also start with alphanumeric characters and cannot be longer than 22 characters (including the .com.eg, etc.). Neither the IDSC nor the EUN charge for registering a domain.

IDSC has devolved registration of .eg.com names to ISPs who charge different fees.[6] Egyptonline, for example, charges LE 400 (US$ 115) for the first year and LE 300 for every following year. A domain name registration with Commnet (Telecom Egypt's ISP), however, costs only LE 150 (US$ 43) per year.

There are no national statistics online on the number of hosts, domains or web servers in use in Egypt. The .EG top-level domain name is captured by international host counts. For example, the Internet Software Consortium listed 5'422 hosts and 269 sub-domains under .EG in their July 2000 survey. Curiously, RIPE found only 2'191 .EG hosts in a December 2000 survey. In a February 1999 survey, Netcraft found 593 web servers using the .EG domain. Egypt ranks fifth in its number of hosts compared to other Arab nations. On a per capita basis, Egypt is one of the lowest ranking Arab countries. This suggests that many sites in Egypt are not using the .EG domain name. Indeed, Telecom Egypt struck an agreement in March 2000 to become a registrar for generic top-level domain names (e.g., .com).[7]

3.4 IP Telephony

IP Telephony is currently a closed market in Egypt. Telecom Egypt is the sole provider of IP Telephony services in the country (see Box 3.2). There is no local IP Telephony within a city or Governorate since the price of a telephone call would be incurred in addition to the Internet subscription fee or tariff, making the service unattractive. However, IP Telephony may be a potential solution for long distance phone calls from one Governorate to another, both for personal use or interoffice communications. However, the total charge incurred, including the Internet tariff and the price of the local phone call, should be cheaper than the long distance tariff to justify this activity.

International IP Telephony is a somewhat tolerated activity in Egypt (though provision is restricted to Telecom Egypt). There is no explicit law that restricts the provision of IP Telephony services through Internet service providers, but TE's contractual agreements with ISPs restrict the use of acquired bandwidth to the provision of Internet data and text services only, not real-time voice. End-users may make international calls over the Internet, for instance from a PC. However, Internet Service Providers may not advertise voice over IP services. ISPs are not liable for voice over IP traffic that passes through their access points. Telecom Egypt monitors ISP traffic and if a company is discovered to be providing IP Telephony over TE's infrastructure, this company may be closed down and the owner put in prison. International calls over IP may be terminated at a rate as low as three cents/minute, which is much cheaper than the current International tariff charged by Telecom Egypt over fixed lines (slightly less than US$ 1). Nevertheless, TE has undergone tremendous efforts to liberalize the telecom market. It reduced the tariffs on international telephony several times during 2000, particularly on routes to the United States.

Since incoming international phone traffic is one of the largest sources of revenue for Telecom Egypt, the next telecom law will continue to give full control to Telecom Egypt for international telephony for the forthcoming five years. As the percentage of profit for international telephony decreases *vis à vis* revenue from mobile services, current access providers for Internet and data services could be possible candidates for distribution of voice over IP services. Telecom Egypt has an agreement to deal with two operating carriers to provide voice through a direct link (using IP protocol) with the US, but not through the public Internet. This is a PC to Phone service. This service is provided at its web site (www.support.idsc.gov.eg) at a rate of the equivalent of 20 cents/minute. However, customer support for this service has not reached competitive levels. TE could possibly redistribute its services to ISPs for reselling of IP telephony, yet TE is still weary of venturing and losing control over this market. Phone to phone services are not provided as of yet although TE is planning to provide "poor quality" services at off-peak times (8:00 p.m. - 8:00 a.m.).[8]

Box 3.2: Telecom Egypt: If you can't beat them, join them

Ties between Egypt and the United States are significant. There are over 100'000 Egyptians living, working and studying in North America. At the same time, Egypt is the second largest recipient of US foreign assistance. Thus, there is considerable potential for international telephone calling between the two destinations. While outgoing traffic from Egypt to the United States has increased modestly since the mid 1990s, incoming traffic to Egypt increased dramatically, at least until 1998, when it stabilized (see Figure below). In 1998, US carriers started routing their traffic via alternative routes, which resulted in lower settlement payments, including refile via third countries, routing via "leaky PBXs" and, increasingly, via the Internet.

The reason that US carriers have been shifting traffic away from the direct route is due to mounting settlement payments to Egypt, which reached some US$ 80 million in 1999. Egypt has been reducing its settlement rate with the United States by an average of 12 per cent per year, and has agreed to come down to US benchmark rates on schedule. This is not enough to placate US carriers, nor to off set the increasing effects of asymmetry in the traffic balance. It is estimated that around 30 million minutes of traffic from the United States was diverted in 1998. It is not possible to know what proportion of this went via the Internet, but it is thought to be a considerable amount.

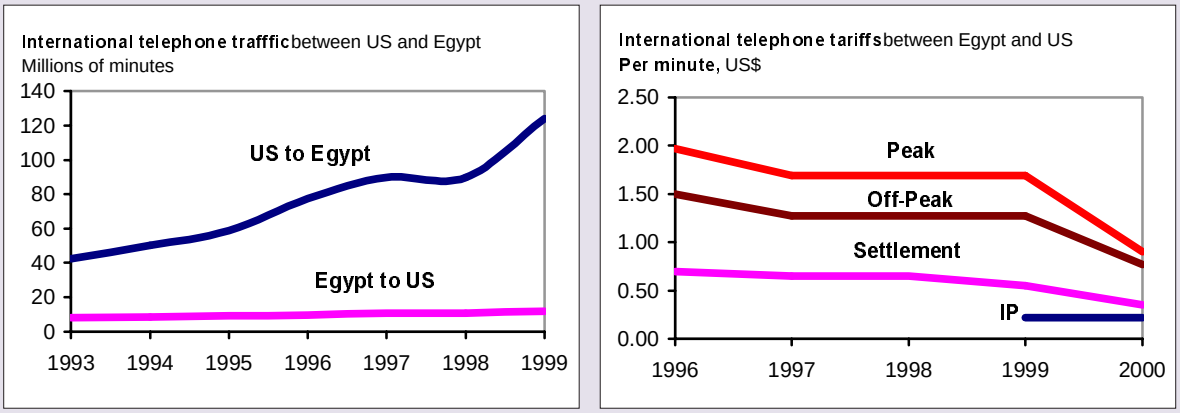
net2phone, an IP Telephony company, is known to have been particularly active in Egypt. Early in 2000, Telecom Egypt convinced the government to block net2phone's traffic.[9] This has had mixed success since users can try any of another some dozen IP Telephony services. So Telecom Egypt decided if it can't beat IP Telephony it might has well join in. In March 2000, it signed a deal with eGlobe of the US to market retail IP Telephony service. The press release for the agreement shows support from the highest levels, quoting Egyptian Minister of Communications and Information Technology, Dr Ahmed Nazif, as saying "*I am pleased to offer the newest of technologies allowing our people to more efficiently and economically access the global marketplace*".[10]

Telecom Egypt is offering the new IP Telephony service at 80 piastres (21.6 US cents) per minute for calls to the United States compared to the published rate for PSTN calls of 3.50 Egyptian pounds (US$0.95) per minute. In order to promote the service, Telecom Egypt is offering ISPs and other resellers a 10 per cent discount. Even so, Telecom Egypt reports that the majority of traffic is incoming rather than outgoing, suggesting that it is being less successful than it had hoped in marketing the service nationally. One reason may be that the web site it established to market the service, www.commegypt.net, is regularly congested and works only sporadically.

Telecom Egypt's rate of 21.6 US cents per minute for IP Telephony is considerably below the official settlement rate with the United States, which is currently 35 US cents per minute. It is not known what Telecom Egypt is receiving for incoming calls terminated over its IP Telephony service. The main point is that, at least Telecom Egypt is now gaining some revenue from what would otherwise be lost traffic.

Box Figure 3.2: Traffic and tariff trends between Egypt and the United States

International telephone traffic, in millions of minutes, 1993-99, and tariffs in US$ per minute, 1996-2000



Source: ITU World Telecommunication Indicators Database.

3.5 Universal access

3.5.1 Community telecenters

If Internet is to move outside the preserve of a well-educated, wealthy elite, then public access facilities are critically important. In this respect there are a number of private and public sector initiatives underway to help create awareness and access to the Internet.

The vast majority of Internet users in Egypt are based in urban areas. Cognizant of this, the MCIT has launched a program to bring Internet to citizens in all 26 governorates. There are plans to establish some 300 community telecenters over the next two years. Each telecenter will use existing facilities wherever possible and will be equipped with ten PCs, each connected to the Internet via a local area network. The telecenters will provide training, technical advice and aim to attract involvement and interest from diverse sectors of the economy. All telecenters will be established with local partners. Some of these will focus on specific user groups and applications. Wherever possible, telecenters will use existing infrastructure, such as libraries, clubs, schools, universities, etc.[11]

The United Nations Development Program, along with other partners, has launched three telecenters in Egypt. These Technology Access Community Centers (TACC) (www.tacc.egnet.net) became operational in March 1999 in two cities, Zagazig and Tenth of Ramadan in the Governorate of Sharkeya, about 80 kilometres north of Cairo.[12] A preliminary evaluation was carried out in late March 2000. The evaluation revealed that during the first year of operation, the TACCs generated considerable interest and attracted some 3'000 users, most of whom have no other access to the Internet. It also revealed that the sites have become important sources of local content, generating over one thousand pages in just one year. The centers have targeted lower income groups and also users from surrounding rural areas.

There are also plans to use the Egyptian network of post offices to provide public access to the Internet and to kick start e-commerce. The Egypt Post Office has a network of 3'500 outlets based all over the country, many of which are adjacent to local telephone exchanges. The postal network is already used to distribute 1.5 million pensions and salaries, and MCIT hopes to extend this to provide a wide range of online e-commerce and e-government services. This might include renewal of drivers' license, electronic transfer of funds, payment of bills, distribution of pension, access to government information, etc.

Another possible location for mass access to the Internet are Egyptian libraries. There are around 1'300 libraries of which over 100 are on the library network and more than 30 have a web site

The Governor of Sharkeya visiting one of the TACCs in Zagazig City

3.5.2 21st Century Kids Computer Clubs

A further initiative to extend access is the 21st Century Kids Clubs, which were established in 1997 in order to prepare Egyptian children for the next millennium. They provide Internet connectivity, software libraries and qualified trainers to help children utilize IT. The project is a good example of the collaboration between the government, NGOs and the private sector, with the government providing the training, NGOs hosting the clubs and the private sector donating funds for the equipment

Box 3.3: Cairo's Internet Cafés

Cairo boasts some 60 Internet cafés several of which are run by ISPs such as Internet Egypt or St@rnet. Typical costs are about US$ 2.8 for one hour. According to the owner of St@rNet, the location of Internet cafés is critical. The most successful Internet cafés are situated in districts with high tourist and student traffic that, on a typical day, might draw 50 customers. Tourists account for 60 per cent of the users and students for a further 25 per cent.

No license is required to operate an Internet Café. As the average age of Egyptian customers is generally between 12 and 20, disposable income is limited. Mainly located in affluent sections of Cairo, most Internet Cafés provide some kind of training and other value-added services. The most popular applications used are Web browsing and chat.

and the software. The clubs are managed by an NGO, Integrated Care Society www.ics.org.eg, whose Chairperson is HE Mrs. Suzanne Mubarak, First Lady of Egypt. There are some 40 computer clubs in 17 governorates and the goal is to establish over 1'000 clubs by 2002.

3.5.3 Universal service in telecommunications

Until very recently, insofar as Telecom Egypt was fulfilling universal service obligations, it was doing so through implicit cross-subsidies within its tariff structure, in particular from profitable long-distance and international services to less profitable local access and local call services. This has proved relatively beneficial to Internet growth in that low local call charges help to promote more dial-up access.

For other aspects of its universal service obligation, Telecom Egypt has taken an innovative approach. For the task of installing payphones, Telecom Egypt has licensed two franchisees, Menatel and Nile Phone. These operators receive no level of subsidy from Telecom Egypt, and are obliged to follow Telecom Egypt's pricing structure but they are nevertheless obliged to run the payphones profitably and to bear any losses. They also face penalties if they fail to install the requisite number of payphones agreed on in their contract with Telecom Egypt. Thus it may be argued that Telecom Egypt has effectively outsourced this part of its universal service obligation.

As part of the revision of the new telecommunications law, it is likely that a universal service fund will be proposed. However, the details of this fund, including who will run it, who will contribute and who will benefit, are still to be agreed.

3.6 Content

"Egypt could naturally be the sort of Arabic content and software development hub in the region, like it has always been for other industries, such as the movie or TV industries." Ahmed Nazif, Minister of Communications and Information Technology

Egypt faces a conflict in confronting Internet content. On the one hand it is sensitive about political and other content that offends its values.[13] On the other hand, a significant constraint to further Internet penetration in Egypt is availability of relevant content. Rather than exclusively focusing on banning sites, the government, specifically the IDSC, has made considerable effort to develop content. It faces significant challenges in this activity having to do with a tradition of information poverty. As one interviewee stated: *"We are not an infor-*

mation-based society." Furthermore, there is a gut instinct in some sectors of the government that information should be closely held by the state and then, if necessary, disseminated to the general public in a sanitized format.[14]

Egypt's Information Highway project was launched by IDSC in 1995 to build up home grown content. Pilot web sites were launched for culture, tourism, health care, environment, education, public services and local government administration. Most of these pilot projects were successful and some of them evolved into full-blown operations, such as TourismNet (www.tourism.egnet.net). The private sector has recently been active in developing content. The year 2000 has witnessed the launch of several portals. Companies such as Bayt.com and Minhina.com are competing to launch portals providing information to local citizens as well as the Egyptian diaspora. There has also been a rise in specialized portals such as marriages (e.g., marriageegypt.com and afrah.com, meaning wedding).

Language is a barrier to the use of the Internet for the majority of Egyptians who only understand Arabic. Progress is being made in this area and there are now a number of Arabic portals, such as Arabia.Com and Naseej.Com. In addition, there is now software that provides English to Arabic web-based translation. For example, Sakhr Software (www.tarjim.com.sa) recently announced a service that translates English web pages into Arabic.

[1] Khaled Diab. "Egypt gets first free access Internet portal." *Total Telecom*, 17 January 2001. <www.totaltele.com/view.asp?ArticleID=35824&Pub=tt>.

[2] In the Egyptian context, premium-rate Internet services are equivalent to so-called "free Internet access" elsewhere. Despite the fact that the premium rate is twice the price of a local call, it has nevertheless proved very popular.

[3] IDSC listed 54 ISPs as being connected to it. See www.support.idsc.gov.eg/Isp/ISP-list.htm.

[4] The price of national leased lines rented to ISPs were lowered in October 2000. See "Log On Like an Egyptian." *Wired News*. 14 September 2000. www.wired.com/news/print/0,1294,38780,00.html.

[5] For more on domain names, see ISE's Domain Registration web page at: http://www.ise.org.eg/domain.htm

[6] A list of ISPs who perform registration services is available at the RIPE web site, "Local Internet Registries offering service in Egypt" at: info.ripe.net/ripencc/mem-services/general/indices/EG.html.

[7] Network Solutions. "Network Solutions and Telecom Egypt Team to Promote Domain Name Registrations in the Middle East and Africa." *Press Release*. 27 March 2000. www.nsol.com/news/2000/pr_20000327.html.

[8] Eng Abdel Kawi, Director of Technical Affairs, Telecom Egypt. Tarek Kamel, Advisor to the Minister of CIT, Emad El Azhary, Consultant to Telecom Egypt and Khaled Bichara, CEO of LinkdotNet

[9] One of the reasons put forth for the ban on Internet Telephony was the need to protect Telecom Egypt's revenues to make the company more appealing to investors in the run up to its eventual privatisation. See "Egypt: To Telecom Egypt's glee, government cracks down on VoIP." *Telecoms & Wireless Africa / Middle East* (The Economist Intelligence Unit/Pyramid Research). 17 March 2000.

[10] eGlobe. "eGlobe Launches VoIP Service with Telecom Egypt." *Press Release*. 13 March 2000.

[11] There are even plans to launch a boat telecenter that will float down the Nile. See American Chamber of Commerce. "IT Flows to the Countryside." Business Monthly.

[12] Tetiana Anderson. "Egypt's Cyber Cafes for the Poor." *UNDP Choices*. June 2000. www.undp.org/dpa/choices/2000/june/p22-23.htm.

[13] As Tarek Kamel notes: "*The Egyptian society… has its own conservative traditions. The indecent material on the Internet has triggered a lot of debates and controversy among society groups of different ages*." See Kamel, Tarek. "Internet Commercialization in Egypt: A Country Model." *Internet Society 1997 Conference Proceedings*. www.isoc.org/isoc/whatis/conferences/inet/97/proceedings/E6/E6_2.HTM. The Egyptian Internet Society, in its Code of Ethics, calls on members "*To accept responsibility in using and maintaining Internet service…and to disclose promptly factors…that might affect or conflict with the Egyptian traditional values, ethics, religion, or national welfare*." www.ise.org.eg/ethics.htm.

[14] Mintz, Steve. *The Internet as a Tool for Egypt's Economic Growth*. October 1998. www.intlpros.com/Egypt%20Study.htm.

4. National absorption of Information and Communication Technology

4.1 Government

The 13th of September 1999 was a turning point in the Information and Communication Technology (ICT) history of Egypt. The first National Conference on the Promotion of Technology and Information Technology, organized by the Cabinet Information and Decision Support Centre (IDSC), was used to launch a number of major ICT initiatives. The conference was opened by President Hosni Mubarak who reiterated Egypt's firm commitment to supporting technological development, with emphasis on ICT as a basis for national development.[1] Achievements with respect to information technology were highlighted, including:

- Establishment of government information centers;
- Creation of national databases;
- Supplying schools with computers;
- Establishment of seven faculties and one center specialized in IT training.

A month later, a new Ministry of Communications and Information Technology (MCIT) was formed. For the first time in the history of Egypt, the IT community was to be represented by its own ministry. A National Plan for ICT was issued in December 1999, with a special focus for the next five-year period on:

a) Promoting national demand for information technology and developing sector projects;

b) Enhancing the software export industry;

c) Developing human resources and skills;

d) Establishing international alliances;

e) Modernizing communication infrastructure; and,

f) Creating a proper legislative environment.

The plan is based on partnership between the public and the private sector. While the ministry intends to fund core projects within the plan, other projects will be funded through the private sector. Government spending in support of the plan is forecast at LE 1.2 billion (US$ 338 million) between 1999 and 2002. While this is a concrete indication of government support, it amounts to just 0.4 per cent of total government expenditure.

The Egyptian government accounts for roughly one third of the economy and thus has a major impact on the country's development. Therefore IT use within the government can both set an example as well as improve government efficiency and the delivery of public services. The IDSC has been instrumental in developing information systems to assist policy-makers in various ministries. These efforts have, however, not permeated to lower levels of government and there is a major need for government re-engineering to adapt to IT and training of public employees. The new IT plan calls for the training of 20'000 government workers a year over the next three years.

4.1.1 e-Government

The IDSC has played a major role in providing government information online. Its *Information Highway* project was launched in 1995. Web sites were established for various sectors such as tourism, health, culture, the environment and local government. The project was very successful and won several international awards.[2] Some of these sites have been taken over by their respective ministries and evolved to become rich

Box 4.1: Egypt's Government Sector Internet Pioneers

It is impossible to talk about the Internet in Egypt without reference to Hisham El Sherif and Tarek Kamel, both of whom have played key roles in increasing awareness and influencing government policy. Acting through forums such as the Ministry of Communications and Information Technology (MCIT), the Information and Decision Support Centre (IDSC) and the Internet Society of Egypt (ISE), these individuals have been instrumental in shaping Egypt's Information Society.

Hisham El Sherif is co-founder of the Regional Information Technology and Software Engineering Centre (RITSEC) and founder of IT Investment, which has pioneered the development of IT usage in the African region in financial and on-line services. El Sherif is also the co-founder and former Chairman of the Advisory Board of the IDSC, which, since 1985, has developed IT projects in Egypt. In 1996, El Sherif chaired the Task Force that instigated the African Information Society Initiative, since adopted throughout that region.

El Sherif is also a member of the World Bank Technical Advisory Panel on Information for Development, a Commissioner of the Global Information Infrastructure Forum and a widely published and awarded Professor at the American University in Cairo.

Tarek Kamel is a member on the Board of Trustees of the Internet Society and the co-founder and Secretary of the Internet Society of Egypt. Kamel founded the Communications Department at the IDSC. He managed the main Egyptian Internet gateway, servicing over 50 commercial ISPs and hundreds of government organizations. Kamel's work extends into liberalization issues, such as a tax reduction for ISPs as well as a government and private sector partnership to serve the Egyptian Internet community. Kamel manages to combine his job as Senior Advisor to the Minister of Communication and IT (MCIT) with a post as advisor on the Board of Directors of Telecom Egypt.

Kamel co-founded the annual ISE CAINET conference and chaired its program committee for the last three years.

sources of information while others languished due to a lack of support.

Today, all of the governorates have an online presence through GovernoratesNet (www.ipgd.idsc .gov.eg). In addition, twelve of 32 national ministries are online as well as various other government agencies and departments. Online government services are being organized through the Government Online portal (www.alhokoma.gov.eg) (*alhokoma* means *government* in Arabic). The first service provided was an on-line version of the form for the national identification card. Three hundred forms are currently displayed on the web site.

The IDSC and the MCIT are also exploring other methods of providing electronic government services. The IDSC recently launched a pilot program to create information kiosks for the public. It is planned to install public information kiosks in rural and remote areas to enable citizens to access forms for a particular service and submit them for processing.

4.2 Health

Perhaps 100 out of some 350 hospitals in Egypt have access to the Internet. Less than ten per cent of these hospitals actively use the Internet as a source of information, with most doctors using the Internet for personal matters and as an electronic library. In January 2000 an Internet café was established at the Ministry of Health. There are around 150 Internet users out of 5'000 people working there. A web site was created for use by physicians at the Ministry. The IDSC's Information Technology Institute (ITI) graduates developed this web site and are currently expanding it to provide the general public with information on diseases.

The major means of communication within the Ministry are telephone and fax rather than e-mail. The ministry does not have a web site. Medical records are not computerized and limited medical information is kept in electronic format. However, video streaming has proven to be an effective and powerful educational tool for support staff

Box 4.2: CiraNet - Pharmaceutical Portal

The Egyptian pharmaceutical industry is to become a leading example of B2B e-commerce in the country. CiraNet, announced during the summer of 2000, is a joint venture between Citibank and Raya Holdings (an IT holding company). CiraNet will be a business-to-business exchange between suppliers and buyers of pharmaceutical products in Egypt. Raya recently obtained a license from the MCIT for a public data network, which would connect buyers with suppliers. The CiraNet Pharma portal <www.ciranet.com> will provide English and Arabic content and will also include a call center, payment processing and delivery. The project went live in February 2001. Some obstacles are likely to arise during the initial phase. The main problem is linked to the business *culture.* There is a strong resistance to change and there is a need to build trust in this new purchasing process. Most pharmacies do not use personal computers, let alone have access to the Internet. There are some 19'000 pharmacies in Egypt out of which 2'000 have personal computers. Nonetheless the rewards could be great. Egypt produces over 90 per cent of its needs for pharmaceutical products and has a giant market of some 60 million people.

and health care professionals. This is because Egyptian culture relies heavily on visual and oral methods of training in contrast to the West, where education is much more text-based. There is, however, only a very limited amount of educational information available online and more intensive efforts need to be made in this direction.

The country's national IT plan calls for the development of a health information network for citizens and the development of hospital information systems. These projects are to be funded by the Ministry of Health. Given the Ministry's lukewarm IT support in the past and the vast sums needed for basic health programs, it is uncertain whether these projects will succeed. Nonetheless some projects are materializing such as a prototype for a countrywide telemedicine network.

4.2.1 HealthNet

In 1995, IDSC took the initiative to develop several *Information Highway* projects, aimed at providing online content for various sectors. *HealthNet* (www.highway.idsc.gov.eg/health) was a pilot project designed to offer online content for the health industry in Egypt. As a pilot information network, it facilitated communication and information exchange among physicians, health care providers and patients in Egypt. Its main accomplishments were:

a) Establishing a web site containing online databases on physicians, drugs, medical and pharmaceutical companies, and hospitals;

b) Connecting more than 60 hospitals and providing Internet access to more than 400 physicians and health care providers;

c) Conducting training workshops for physicians and raising general awareness in the community;

d) Establishing an electronic mailing list for physicians and health care professionals to facilitate interaction;

e) Establishing four national medical information centers.

The Ministry of Health did not take over ownership of this project from the IDSC, so the initiative never evolved into full implementation. However the web site is still up and running.

4.3 Education

"*We have called for comprehensive reform of the educational system at all levels and stages in order to cope with this new epoch …that depends on the efficiency of using and investing information to serve the society. We have achieved some important points…introducing computers into basic education programs, paying more attention to technical education*

and the rehabilitation of the teacher to be more able to understand the new trends of the (information) age." Hosni Mubarak, President of Egypt.

"*You can finish high school without seeing a computer. You could very well finish college without seeing a computer: that's the education problem. The students are not going to be citizens of the world (if) they don't know how to use new, world order machines*." Mohamed El Nawawy, Founder of Egypt's first commercial ISP.

4.3.1 Ministry of Education

An Egyptian Ministry of Education publication notes the current educational crisis in Egypt that has serious implications for developing a creative, information-based society.[3] The educational system has been based on rote training, which does not encourage the development of independent thinking. Curricula and exams are often based on a single textbook and students are not encouraged to read other books or develop their own individual opinions and ideas. There are few laboratories, leading to an emphasis on theory at the expense of practice and experimentation. Teachers receive low salaries and have had to resort to alternative means of income such as private lessons. Finally, with a literacy rate of just over 50 per cent, Egypt faces an immense adult-education task in order to adapt its citizens to the information age.[4]

The government has a number of ambitious programs to improve Egypt's educational system by adapting school curricula, enhancing the quality of teachers, and integrating IT in the educational sector. In an effort to document the status of the educational sector, a national database is being developed to include information about school buildings, education in each governorate, computer inventory, building capacity, school supplies, etc. This database also includes a geographic information system, which depicts distribution of schools throughout Egypt's governorates. It will allow identification of areas that remain deprived of educational services in order to improve the establishment and distribution of new services.

The Ministry of Education has installed 27 technology development centers for educational directorates. Each center is equipped with a multimedia laboratory and an advanced science laboratory. Distance training, illiteracy eradication courses and one-class teacher training are provided via a videoconference network. The total number of people trained through this network has reached 374'000.

4.3.2 Primary and Secondary Education

The Ministry has a plan to provide Internet access to every school. Out of the 32'000 schools in Egypt, 23'000 are equipped with computers, of which 6'000 are equipped with phone lines and Internet connectivity. In 90 per cent of these Internet connected schools, there is only a single computer installed; the remaining ten per cent have at most 20 computers per school. The Ministry of Education has an Intranet, which the director of the information center would like to replicate in every school across the nation. This network is exclusively financed by the Ministry.

Despite the large number of computers being installed in schools each year, the benefit is limited due to the low computer to student ratio, the limited number of hours allotted to computer classes and the elementary level of the curriculum. Most of the hardware installed is outdated and unable to run the latest software. Even private schools that boast advanced computer labs cannot provide students with sufficient hands-on computer experience. Nonetheless, the only three schools with web sites are private and they have been successful in international computer competitions. This suggests that if public schools had the same resources, there is great potential for Egyptian youth in the Information Age.

Some schools have closed their Internet services because costs were too high. It has been suggested that

the government should provide a special educational rate for Internet access. Only very few students use computers at home and there is a major lack of Arabic content.

4.3.3 Universities

Fourteen universities are connected to the Internet via the Egyptian Universities Network (EUN) (sunsite.scu.eun.eg). EUN has a two Mbit/s connection to the Internet. In addition EUN connects some other 90 academic and research and development sites and has some 4'000 subscribers among staff and postgraduate students.

Despite EUN's accomplishments, there are still large barriers to ICT access and usage in higher education. The total number of students in universities and higher education is 1.7 million, most of which do not have computers at home. Connectivity prices are relatively high and most professors hardly make use of the Internet in the educational process. Although there are several good computer departments in Egyptian universities, the majority of undergraduate courses are either too general or not sufficiently up-to-date. Computer courses have been introduced at all university faculties, but limited resources allow only computer basics to be taught, at least in the first years of college.

Though most national universities have an online presence, few provide interactive services such as online application form submission. Web sites of private universities, such as the American University in Cairo (www.aucegypt.edu), provide more substantial and regularly updated information.

Egypt has a serious shortage of human resources, especially with regards to IT project managers, marketing and sales experts and business analysts. It would be particularly helpful to integrate project management and marketing programs with technical and computer science related curricula at the university level. One innovative program is a collaboration between Egypt's Regional Information Technology Institute (RITI) (www.riti.org) and Middlesex University in the United Kingdom. They offer 16-month courses leading to Masters' degrees in Business Information Technology or E-Commerce. The course is taught at RITI's campus in Cairo and the degree is awarded by Middlesex.

4.3.4 Technical training

Technical and post-graduate training is an other area where improvements are needed. When President Mubarak visited the United States in 2000, he managed to seal alliances with IT firms such as Microsoft, IBM and Cisco in upgrading Egypt's IT education. It is planned to train 5'000 professionals a year so as to develop IT in Egypt and to compete in international markets (see Box 4.3). It is estimated that the value created by each Egyptian IT expert is some US$ 100'000, which would add up to a billion dollars a year to Egypt's GDP.[5]

ITI

The IDSC Information Technology Institute (ITI) was established in 1993 in order to increase the number of IT personnel. The 9-month ITI program has been so successful it cannot keep up with demand. The IDSC and other government IT departments have priority in recruiting ITI graduates for up to three years. ITI is fully funded by the government and students receive a stipend. In July 2000, 1'300 students graduated, with 15 per cent obtaining employment abroad (mainly in other Arab countries and the United States). ITI also offers professional training programs to ministries and local governments. The ITI program is highly valued as a step towards building badly-needed IT human resource capacity. However, some graduates' skills are described as too limited because the program tries to cover too many subjects. Many hiring managers would prefer the ITI program to be more finely tuned in order to produce graduates with more specialized, in-depth skills and knowledge about practical business applications.

Some private institutes have similar courses but the majority of computer training is done through small private training centers that lack expertise and

Box 4.3: The next India? Egypt's software dream

Egypt's dream is to become a leading software exporter, much like India is today. This is not totally unrealistic given that there is some evidence of an emerging Egyptian software industry. In 1999, the value of the Egyptian computer software market was estimated at around US$ 50 million. This is less than what Microsoft makes in one day but for a country with a per capita GNP of around US$ 1'400, an illiteracy rate of 45 per cent and where around one fifth of the population is classified as below the poverty line, it is not bad. Furthermore, Egypt does have some advantages. There is a major need to *Arabize* software for the Middle East region, a potentially large market with some 175 million speakers, the sixth most spoken language in the world. This is an area where Egypt feels it could excel. The same way that it leads the Arab world in producing media content—books, films and broadcasting—it feels it can lead in electronic content development.

In order to complete this dream, Egypt realizes that it must devote considerable resources to educating and training IT professionals. Even though it can boast of a over a dozen universities and some 200'000 computer trainees, it knows it needs to do much more to compete in the world market. Most university graduates do not have specialized computer skills and most trainees are learning basic application packages or simple skills such as data entry. Egypt has only 5'000 skilled computer workers such as programmers and system engineers.

Human resources figure strongly in the country's *National Plan for Telecommunication and Information* which states: "*Human resources are considered the most important component in the communication and information industry*." The Plan calls for the creation of an *Egyptian Software Export Development Organization* to help push software exports to US$ 500 million in five years. In order to achieve that, the nation will need 30'000 IT specialists. It proposes the establishment of a *National Institute of Information Technology* capable of graduating 5'000 students a year. This is a five-fold increase over current IT training capacity of 1'000 students a year. The government plans to spend over US$ 100 million through June 2002 on human resource development projects in the high tech sector.

Egypt knows that it cannot become a software powerhouse with only its own resources. In that regard, it struck two deals in April 2000 with major multinational ICT companies to strengthen training capacity. The *Ministry of Communications and Information Technology* signed an agreement with Cisco to train 1'000 students a year.[6] Two training academies will be established in Egypt that could later become a hub for Cisco training in the Arab and Africa regions. The first stage began in May with Egyptian instructors being trained in Cisco centres in the US and Europe. A second deal was forged with IBM.[7] The US computer giant will contribute over US$ 44 million and train 3'000 Egyptians a year in 6-month courses at IBM training centres in Egypt. The top ten per cent will be trained a further six months at IBM computer labs around the world.

It is ironic that at the same time that Egypt is attempting to develop its computer software industry, it is accused of having one of the highest piracy rate in the world. According to the Software and Information Industry Association, some 75 per cent of all software in Egypt is pirated.[8] This is not surprising considering the relatively high price of packaged software compared to income and explains why freeware such as Linux is so popular in emerging economies. Furthermore, lest self-righteous software police complain too vociferously, alleged Egyptian software piracy amounts to a mere 0.3 per cent of the world total. Nonetheless, the government is taking steps to curb even this. Copyright laws are already on the books so the problem has more to do with enforcement and awareness plus realistic pricing by multinational software firms. To tackle the latter, a deal was forged with Microsoft.[9] In return for more stringent enforcement, Microsoft has agreed to produce its products locally at lower prices. Microsoft will also help Egyptian software companies develop applications for export to other Arab countries and the rest of the world.

Part of India's success is explained by familiarity with the English language. This is not only important to sell applications to the large Anglophone market but also to understand software, most of whose inner workings and documentation is in the English language. One problem is that English is mainly only understood by Egypt's elite. To battle that, the government has made English language courses a mandatory part of the university curriculum. However that may be too late to acquire intuitive understanding; the government might explore introducing English training earlier in the educational process. Another Indian strength has been its ability to leverage on contacts made overseas through Indians studying and working abroad. In this area, Egypt plans to send its best IT students to other countries for further studies. In a related move, a n European Union development assistance project has targeted a number of Egyptian software companies to help them develop software for Irish companies.[10] An Irish consulting company has been hired to represent the companies, market their software and provide sales leads. The irony

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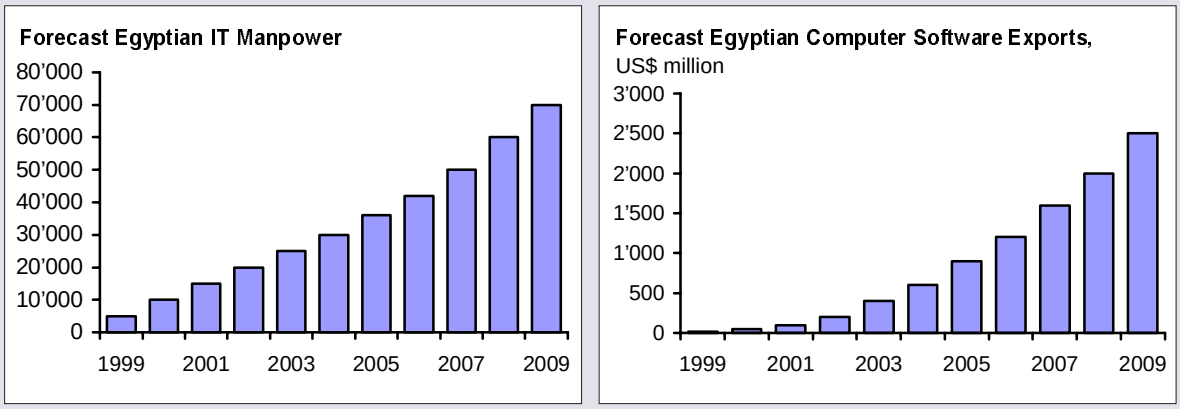
here is that only a decade ago Ireland embraced ICT as a means to boost its economic development and to reduce unemployment. This has been so successful that Ireland itself is facing a shortage of some 10'000 programmers by the year 2000.

One consulting group has proposed that Egypt, along with Jordan and the United Arab Emirates (UAE), pool their human resources.[11] Jordan, like Egypt, is vying to become a regional IT hub while the UAE has the highest Internet penetration in the Arab region and is also trying to become a regional hub, through its own Silicon Valley, Dubai Internet City. Instead of competing with each other, it suggests that Jordan and Egypt cooperate to market their lower cost IT workers to computer companies in the UAE.

There are no shortage of proposals, plans and agreements for turning Egypt into a regional software centre. Bold forecasts are being made with one Egyptian claiming the country will "*be the next Singapore or India in the IT field…Watch for the 'Made in Egypt' in the technology field…Egypt is planning to build a true IT industry for software*."[12] But before it gets there, it has a long way to go. India already exports some US$ four billion of software a year, a figure that even under the most optimistic scenario, Egypt would still not reach in a decade. Others caution that Egypt should not just mimic India but should focus on the regional market for Arabic software and value-added applications such as "*e-government and Web-enabled government services*."[13] Egypt faces tough choices but before it decides, it must build up human resources. That will not happen overnight. Therefore the government cannot afford to deviate from its intended IT training plans if Egypt stands half a chance of becoming a global software player in order to dramatically boost its economic development.

Box figure 4.3: Egypt's Computer Software Dream



Source: Egyptian Ministry of Telecommunication and Information. National Plan for Telecommunication and Information.

provide low quality service. Training centers authorized by international software companies provide high quality training but charge fees that are out of reach for most potential trainees. Consequently, qualified computer professionals are rare and high in demand, resulting in high labor cost.

One growing threat is potential brain drain. The high demand for skilled IT workers in developed countries is already causing a depletion of human resources in Egypt. There is a large discrepancy in salaries offered locally and internationally. A fresh graduate would earn within the range of US$ 400- US$ 700/month. This person would easily earn US$ 5000/ month in the U.S. Therefore, the lack of available human resources coupled with a continuing brain drain poses a serious threat to human resources and skills availability in ICT.

4.4 Electronic Commerce

"It has become imperative that Egypt should join the electronic commerce arena, to enable Egyptian companies to conduct business with international markets…and to conduct commercial deals via modern communication channels…"—Egypt's National Plan for Communications and Information Technology.

Electronic commerce has been heavily publicized in the local media for the past couple of years and there is much public interest. There have been many initiatives and efforts towards getting Egypt e-commerce ready.[14] Some significant achievements include:

- Financial institutions online. A growing number of Egyptian financial institutions have web sites. These include the Central Bank (www.cbe.org.eg), the Cairo and Alexandria Stock Exchanges (www.egyptse.com) and a number of commercial banks. There is also a growing amount of financial and economic information available online.

- Financial data network. The Egyptian Company for Networks (EgyNet) is installing a US$ 600 million Asynchronous Transfer Mode (ATM) network connecting financial institutions. It will allow them to connect their branch offices and provide home banking.

- Budding e-commerce sites. Despite barriers (described below), there are a growing number of e-commerce web sites peddling everything from cars (www.caronnile.com) to real estate (www.e-dar.com). Some sectors such as tourism are particularly well represented (see Box).

4.4.1 e-commerce Plans

The new Ministry of Communications and Information Technology rolled out Egypt's *National Plan for Communications and Information Technology*. With regard to electronic commerce, the Ministry's main objectives are:

- To establish a Certificate Authority;

- To adapt current customs and taxation systems to support e-commerce;

- To carry out a project that uses e-commerce for government purchasing;

- To execute a joint public and private project that implements e-commerce in the banking and financial sector;

- To construct an Egyptian network for e-commerce in collaboration with the Ministry of Economy and Foreign Commerce, investor associations and other organizations involved in foreign trade;

- To build local awareness by organizing workshops on e-commerce.

The Ministry of Economy and MCIT have formed a joint e-commerce task force. It will focus on the following six areas: 1) regulations and law; 2) telecommunications infrastructure; 3) encryption and payment security; 4) procedures for establishing e-commerce companies; 5) Small and Medium Enterprise (SME) incentive programs; and, 6) public awareness.

The MCIT is consulting with the business community about the creation of a Federation of Information Technology companies. Within this federation, it plans to establish an Egyptian Certificate Authority (ECA) to authenticate online buyers and sellers. ECA's legal body could take on any of the following forms: A private entity such as the Society for Worldwide Interbank Financial Telecommunication (SWIFT) or the Egyptian Banks Company (a clearinghouse); a governmental entity, such as the *Authority for Weights*; or a private entity under supervision.[15]

Egypt's government is in the process of drafting an e-commerce law. It has formed a legal committee from various government ministries and legal entities but there is still no law for

ital signatures. There is also no official government position with regard to e-taxes.

According to a paper drafted by the e-commerce committee of the Egyptian Internet Society, there may not be a pressing need for a new law because existing laws could simply be amended.[16] Egyptian law is based on the French legal system. Such a system bases court rulings on written law and the judiciary interpretation of the law. A judge thus rules according to the law and his own interpretation of the law. With regards to e-commerce, there is "impossibility of the availability of written proof", to which the normal "means of evidence" can apply. Hence, Egyptian law, as it currently stands, is applicable to e-commerce and could theoretically accept all means of evidence in online disputes.

4.4.2 Challenges for e-commerce[17]

Payment

There are two sides to the payment issue in Egypt. On the one hand, credit cards—the most popular way of paying for consumer purchases over the web—are not widely used. On the other hand, even if they were, there are limitations to Egyptian web sites accepting credit card payments. Although there are over 100 licensed banks in Egypt, the total number of credit cards in use is less than half a million (0.8 per cent of the population). This low number can be partly attributed to a cash-based culture. Credit card awareness in the consumer market is still in its initial phase. On the other hand, requirements for obtaining a credit card are stringent. It is often the case that users must maintain bank deposits equivalent to around twice their credit limit. This is problematic for the majority of Egyptians. Since credit cards are the primary method of settling consumer transactions on the Internet, the small number of credit cards necessarily limits the e-commerce market. Banque Misr recently introduced an Internet credit card tailored to the local market. It can only be used for Internet purchases and has a monthly limit of between US$ 50 – 200.

The lack of on-line credit card validation in the country is another problem. The Central Bank of Egypt has thus far resisted becoming a clearinghouse for credit card settlements. However, it is conducting a study on modernizing the national financial settlement system. In the meantime, some Egyptian companies are using credit card validation services located abroad. They are paying higher fees for this, which is a drain on the national economy. The problem the lack of credit card validation poses for Egyptian web commerce is reflected by the tale of a local florist web site. Though it provided a popular service it was forced to close because typically flowers are ordered for someone else. Thus the florist often had to make two trips for every order, one to the purchaser to collect the payment and a second to deliver the flowers.

One solution to the credit card problem and lack of Internet access has been to establish payment centers. These centers have personal computers with Internet access to the merchant's web site and are equally equipped to receive payment. For example, the e-dar real estate web site has established centers in several Cairo districts. They are used to receive cash payments from individuals who would like to advertise their property as well as allow users to search the e-dar web site. Another example is CarOnNile.com that sells used automobiles over its web site. It has a center located at a Cairo car dealer where users can go to pay for advertising their car on the site as well as browse through the selection of cars available. For a fee, CarOnNile will go and collect the payment.

Awareness

Lack of awareness is a critical barrier to the implementation of e-commerce in Egypt. The limited number of Internet users in the country and hence potential consumer base, discourages commercial efforts to cre-

ate online sites for consumers to buy and sell. One study claims that less than one per cent of Internet users in urban areas of Egypt have ever made an online purchase. Instead of waiting for the demand (the pull), a solution could be to provide the supply (push) of viable e-commerce sites in Arabic to break down the language barrier and to attract potential consumers (as well as corporate customers). The market is at the early stage of consumer adoption and by catalyzing awareness, the rate of adoption could be accelerated.

The private sector alone cannot carry alone the burden of building awareness of e-commerce. The national government, NGOs, as well as international organizations should encourage and raise e-commerceawareness across all sectors of society.

The Electronic Commerce Committee of the Internet Society of Egypt was founded in October 1997 (ecom.ise.org.eg). It has organized various workshops, developed the e-commerce track of the annual Egyptian Internet Society conference, and lobbied various groups to bring about awareness of the potential of e-commerce for Egypt.

Regional and international cooperation

The Arab region shares a common culture and language and the challenges, risks and barriers are common to many countries of the Arab world. Consequently, it would be beneficial for Arab countries to cooperate and collaborate in the area of e-commerce.[18] With regards to the African region, the Common Market for Eastern and Southern Africa (COMESA), of which Egypt is a member, has taken limited action towards bringing together member countries to collaborate on this issue.

A number of international negotiations and agreements are taking place, which are formulating the global e-commerce framework. Major organizations in the international e-commerce arena include the World Intellectual Property Organization (WIPO), the United Nations Commission on International Trade Law (UNCITRAL), the Organization for Economic Cooperation and Development (OECD) and the World Trade Organization (WTO). One problem is that Egypt is not a signatory to the WTO's Basic Telecommunications and Information Technology Agreements or the WIPO copyright treaty. It is imperative that Egypt participate actively in the many international forums that are laying the foundations and regulations for electronic commerce.

Logistics

One factor that influences the success of the e-commerce process is fulfillment mechanisms. A client who places an order for papyrus paintings from a handicraft web site of a store in the Khan El Khalili Bazaar should receive the purchase promptly. In order for this to happen, affordable and reliable automated delivery processes should be in place. Relatively few businesses have the basic back-end infrastructure, meaning that inventory is manually processed. Furthermore, the Egyptian postal system needs to be made more efficient to handle rapid delivery. This presents a further obstacle to delivery of products to clients in a timely and efficient manner.

Legal

The legal system is in dire need of reform. Judges and lawyers are overburdened with work. Although there are over 15'000 judges in Egypt, on average they handle 4'000 cases a month (each case averages 50 pages) and write 1'300 rulings a month. The legal profession is also in dire need of training in electronic commerce.

A joint legal electronic commerce committee was formed in coordination with the IDSC and the Ministry of Justice in March 2000. This committee drafted an Egyptian cyberlaw that will be debated by the General Assembly. At the moment, there are no laws for digital signatures or electronic contracts.

Culture

Another barrier is the Egyptian business mentality that is resistant to change. E-commerce necessitates business transformation but decision-makers are used to doing business in a certain way and do not want to change the way they work.

Top-level decision-makers also exert "territorial behaviour," meaning that they want to have control over their business territory. They feel that they are losing control over company assets if they venture into e-commerce. One manager, for example, made all his employees use one single e-mail account, which he had the password to allowed him to check all incoming mail.

Top management of most companies in Egypt do not use e-mail because they were not raised in the information age. Information technology is not part of their daily routine. This is coupled with their unwillingness to invest in information technology due to lack of perception of its added value.[19] The lower management tends to be more technologically adept and convinced of the benefits of IT. Yet another drawback is that business in Egypt is not conducted at 'net speed', reducing the competitiveness of the country.

Dot.com support

The government still controls a large portion of the economy with over 50 per cent of procurement in government hands. As governments generally do not tend to be efficient or quick to react to new technology, this has serious consequences for Egypt's e-commerce potential. Furthermore, because such a large portion of the economy has been under government control, there is still not widespread appreciation of the private sector. Egypt lacks a finance mechanism for supporting dot.coms. Egyptian banks have avoided financing Internet start-ups. Venture capitalists are a rarity and the government has not helped in providing incentives for e-commerce. Another problem is that companies are valued on their fixed and tangible assets and not on their intellectual property.

Egypt is not an information-based society and lacks transparency. Information on the Egyptian market is not readily available or attainable. "*Since this is Egypt, I couldn't get the statistics and numbers from their side*" remarks a local entrepreneur seeking information that would help his business.

There is also a lack of managerial skills in local Internet start-ups. Young en-

Table 4.1: e-commerce costs in Egypt compared to other countries

Item	Cost
Individual Spending on IT	On average, Egyptians spend US$ 5 per year (0.5% of income) on IT, whereas the Swiss spend US$ 995 (5% of income).
Hosting Cost & Price/Performance	Egypt=$60 USA=$25 Taking into consideration the average income, this figure is costly for an Egyptian. Additionally, the price/performance is very slow. This is an added (time) cost in itself.
Web site Design and Implementation	Cost ranges from $500 to $35,000, the minimum cost still being too expensive.
Internet Access	US$ 15/month in Egypt. US$ 10/month in U.S. US$ 80,000 for T1 connection versus US$ 14,000 in the U.S.
Computers	Adjusting for relative wage rates, a computer in developing countries is approximately 5-10 times more expensive than in the USA

Source: El-Nawaway and Ismail.

Box 4.4: Tourism

Tourism is Egypt's primary source of foreign revenue, which amounted to US$ 4.3 billion for the year ending June 2000.[20] Almost five million tourists visited the country in 1999. Not only is Egypt home to the second largest number of historical monuments in the world, it is also surrounded by the Mediterranean and the Red Sea, the latter of which contains the world's second largest national underwater reserve.

TourismNet (www.tourism.egnet.net) is an initiative stemming from the Information Highway Project of the IDSC. TourismNet provides an online database of information about the tourist industry. Its busy web site has 25'000 online pages, covering all aspects of tourism in Egypt, available in four languages (Arabic, English, French and German). The IDSC manually compiled information from travel agencies and hotels and published them on the web site. This includes services provided to tourists such as hotels, restaurants, diving centers, etc. Egyptian tourism offices abroad also use the information, in addition to tourist offices in Egypt. The Egyptian Ministry of Tourism has its own official tourist-oriented web site (www.touregypt.net).

There are individual initiatives by rising dot.com companies to build sites that provide links to globally recognized online reservation systems (e.g., the Egyptian web site www.fondok.com provides links to hotels through the global web site www.travelnow.com). There has been no concerted national effort to build an online reservation system for hotels in Egypt. The Hotel Chamber of Commerce is currently working on an e-commerce project, which should be completed within the next three months.

The Ministry of Tourism's IT center is using the Internet to promote tourism by partnering with package tour operators from the region. The Internet is thus used for basic e-mail exchanges between Egypt and other countries in the region and for jointly displaying information about tourist packages on the Internet.

Tourism holds a strong potential for e-commerce in Egypt. A large number of tourists are from Europe and North America with easy access to the Internet. If Egyptian hotels and travel agents could provide online reservation services, this would increase their business possibilities.

trepreneurs are not trained to manage companies upon leaving university graduate from a technical faculty (e.g., engineering or computer science).

Affordability

Affordability is a critical issue in Egypt, where one fifth of the population lives below the poverty line. E-commerce is heavily dependent on information technology: Internet access, computer utilization, web-hosting, etc. The relative costs of establishing and maintaining an e-commerce operation in Egypt are high (see table 4.1). One solution is public access centers. These centers may provide services to the general public or to specific industries situated in industry zones.

[1] "Address by President Muhammad Hosni Mubarak to The National Conference on The Promotion of Technology and Information." 13 September 1999. www.presidency.gov.eg/html/13_9.htm.

[2] www.idsc.gov.eg/awards.asp.

[3] Technology: A Tool for Developing Education in the 21st Century. Arab Republic of Egypt: Ministry of Education (Technology Development Center). May 1997.

[4] Egypt also has a large gender literacy gap. Some 66 per cent of Egyptian men over the age of 15 are literate compared to 43 per cent for women. See US AID Egypt, Economic Growth Activities, Education at www.usaid-eg.org/proj-ed.htm.

[5] Reuters, 'Work Like an Egyptian', Nov. 14, 2000.

[6] Cisco Systems. "Egypt's Ministry of Communications and IT Signs Agreement with Cisco Systems to Bring a New Generation of Internet Skills to Egypt." *Press Release*. 24 April 2000. www.cisco.com/warp/public/3/middle_east/education_mocit.html

[7] DITnet. "IBM Signs Agreement Worth More than $44 million with Egyptian Government." *IT News*. 3 April 2000. www.ditnet.co.ae/ITnews/newsapril2000/newsap6.html.

[8] SIIA. "Five Years: $59.2 Billion Lost." *Press Release*. 24 May 2000. www.siia.net/sharedcontent/press/2000/5-24-00.html.

[9] "Microsoft to Help Egypt Fight Software Piracy." *Middle East Times*. metimes.com/issue36/bus/04microsoft.htm

[10] US AID. "PSDP's Remote IT Marketing Support Office Incubator in Ireland." *GTG Link*. August / September 2000. www.usembassy.egnet.net/usaid/gtg/gtgsep2.htm.

[11] Arab Advisors. "A Recent Analysis by the Arab Advisors Group Suggests that Egypt and Jordan Should Merge their IT Labor Markets." *Press Release*. 17 December 2000. www.arabadvisors.com/Pressers/presser-171200.htm.

[12] DITnet. "'Made in Egypt'—A New Label in Information Technology is Coming." Daily news from Comdex Egypt'99. 13 May 1999. www.ditnet.co.ae/html/comdex99/thursday4.html.

[13] "Work Like an Egyptian." *Wired News*. 14 November 2000. www.wired.com/news/print/0,1294,40171,00.html.

[14] One company even claims that over 80 per cent of all Egyptian business-business dealings will be online within five years. See "Egypt: New JV Signals First Serious Foray into E-commerce." *Business Middle East*. 27 September 2000. Available on the ebusinessforum.com web site.

[15] See Sherif El-Kassas. "Means of Proof in the Virtual World." CAINET 99. www.cainet99.com.eg/presentations.htm.

[16] Mohamed Lotfy. "The Future of Electronic Commerce in Egypt from a Legal Point of View." Cainet 99. www.cainet99.com.eg/presentations.htm.

[17] For an in-depth examination of Egypt's e-commerce barriers see El-Nawawy, Mohamed and Ismail, Magda. "Overcoming Deterrents and Impediments to Electronic Commerce in Light of Globalization: The Case of Egypt". Inet 99 Conference Proceedings. www.isoc.org/inet2000/cdproceedings/inet99/1g/1g_3.htm.

[18] UNCTAD/UNDP Report on the UNCTAD/UNDP Arab Regional Workshop on Electronic Commerce, Cairo, Egypt, September 26-28, 1998.

[19] Egypt has been ranked as one of the bottom ten countries in terms of IT investment as a share of GDP. The Egyptian value was less than one per cent. See IDC. *EMEA IT Market Monitor*. August 2000. emea.idc.com/newsletters/emm/0008emm.stm.

[20] "Explore Beyond the Pyramids." *International Herald Tribune*. 14 November 2000. www.iht.com/articles/1524.html.

5. Summary and Recommendations

5.1 State of the Internet in Egypt

The Mosaic Group (mosaic.unomaha.edu/gdi.html), has developed a framework for characterizing the state of the Internet in a nation. They consider six dimensions, each of which has five ordinal values ranging from zero (non-existent) to four (highly developed). The dimensions are as follow:

- pervasiveness: a measure based on users per capita and the degree to which non-technicians are using the Internet;
- geographic dispersion: a measure of the concentration of the Internet within a nation, from none or a single city to nation-wide availability;
- sectoral absorption: a measure of the degree of utilization of the Internet in the education, commercial, health care and public sectors;
- connectivity infrastructure: a measure based on international and intra-national backbone bandwidth, exchange points, and last-mile access methods;
- organizational infrastructure: a measure based on the state of the ISP industry and market conditions;
- sophistication of use: a measure characterizing usage from conventional to highly sophisticated and driving innovation.

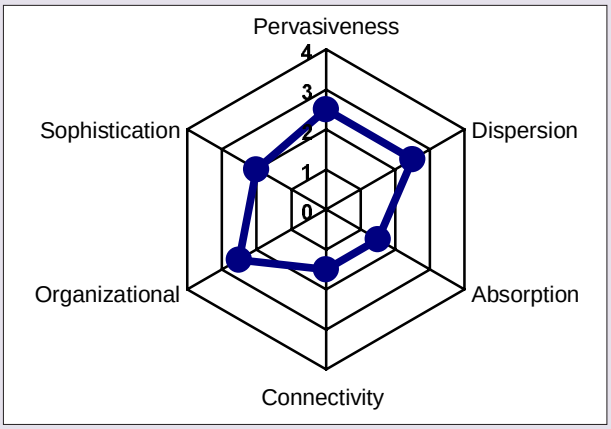
A definition of each dimension and its levels is shown in Annex 2, and Egyptian values for these dimensions are shown below:

Pervasiveness is rated at level 2.5, between *Established* and *Common*. There are no known methodologically sound market surveys estimating the number of Internet users. In mid-June 2000, there were around 55'000 Internet subscribers. It is gen-

Figure 5.1: State of the Internet in Egypt

June 2000

Dimension	Value
Pervasiveness	2.5
Geographic Dispersion	2.5
Sectoral Absorption	1.5
Connectivity Infrastructure	1.5
Organizational Infrastructure	2.5
Sophistication of Use	2
TOTAL	**12.5**



Note: The higher the value, the better. 0 = lowest, 4 = highest.
Source: ITU adapted from Mosaic Group methodology.

erally assumed that there is an average of four users per account in Egypt. This would place the number of users at around 220'000, 0.37 per cent of the population.

Geographic Dispersion is rated at level 2.5, between *Moderately* to *Highly Dispersed*. There were some 60 ISPs at June 2000 though most are located in Cairo. Eighteen out of 26 governorates have an ISP. Internet is available at a single nationwide rate by dialing a standard telephone number (however the price is more than the local telephone usage charge).

Sectoral Absorption is rated at level 1.5, *between Rare and Moderate*. The government has made efforts to provide online content through the IDSC. Internet connectivity at the university level is good with access provided by the Egyptian University Network. Connectivity at the primary and secondary school level is poor. Although around one-fifth of these schools supposedly have Internet access hardly any have a web site. Perhaps one third of Egypt's hospitals have Internet access but less than ten per cent actively use it; only five hospitals and clinics out of some 4'000 in the country have a web page. Business use is growing but still limited.

The **Connectivity Infrastructure** is at level 1.5, between *Thin* and *Expanded*. National bandwidth is 14 Mbit/s with a national exchange connecting major gateway operators.[1] Total international bandwidth is 26 Mbit/s. Most access is via dial-up with some leased line and ISDN. There is no cable modem or ADSL access.

The **Organizational Infrastructure** is at level 2.5, between *Controlled* and *Competitive*. There are theoretically no barriers to becoming an ISP. However, ISPs are restricted in the ability to provide national and international infrastructure. Some are allowed to provide it and others not. Telecom Egypt controls the bulk of international Internet capacity. Regulations are not always clear or transparent.

Sophistication of Use is at level 2.0, *Conventional*. Most web sites are static. The majority of businesses have not yet been transformed by the Internet.

This framework has been applied in several other nations. The dimension values for other Arab nations as well as major emerging markets are compared to Egypt below. Egypt compares favorably to Saudi Arabia and Jordan, bearing in mind that the surveys for the latter two countries were done earlier. Egypt is just behind the software powerhouse India but lags another large emerging market, Mexico. Finally, Egypt has some distance to cover before catching up with Tunisia, the highest ranked Arab nation for which this framework has been applied, see Table 5.1.

5.2 Recommendations

With about 55,000 Internet subscribers and an estimated 220,000 users as of mid 2000, Egypt lies in fourth place in the region behind Lebanon, Saudi Arabia and the United Arab Emirates, in terms of Internet penetration. However, at less than 0.4%, Internet penetration remains relatively low. Commercial Internet services started into Egypt in 1996, at about the same time as mobile services. Indeed, the costs of both services are roughly the same at around LE 150 a month. However, whilst the number of Internet subscribers hovers between 50,000 and 60,000, there are now more than 2 million mobile subscribers.

One of the leading figures in the Egyptian Internet, Mohamed El-Nawawy, argues that the predominant cause for the relatively low Internet penetration in Egypt remains lack of awareness, caused primarily by limited access to personal computers in schools and universities. He cites the case of one leading Egyptian University that, in the early 1990s, had just four computers for some 1'600 students.

Although the government of Egypt is cognisant of this constraint, it will need to enlist the efforts of the private sec-

Table 5.1: State of the Internet in Egypt compared to other economies

	Date	P	GD	SA	CI	OI	SU	Total	Source
Saudi Arabia	2-99	1	1	1	1	2	1	7	Mosaic
Jordan	9-99	3	1	2	1	2	1	10	Mosaic
Egypt	**6-00**	**2.5**	**2.5**	**1.5**	**1.5**	**2.5**	**2.0**	**12.5**	**ITU**
India	12-99	2	3	1	1	3	3	13	Q
Mexico	12-99	3	3	2	2	3	3	16	Q
Tunisia	12-99	3	3	3	2	3	3	17	Q

Note: The following dimensions are considered: Pervasiveness (P), Geographic Dispersion (GD), Sectoral Absorption (SA), Connectivity Infrastructure (CI), Organizational Infrastructure (OI), and Sophistication of Use (US). The higher the value, the better (0 = lowest, 4 = highest).
Source: ITU, Q: unvalidated questionnaire result from Press, Larry. "Second Internet Diffusion Survey". OnTheInternet. November/December 1999. (som.csudh.edu/cis/lpress/gdiff/otidevnations.htm). MOSAIC Group (mosaic.unomaha.edu/gdi.html).

tor and multiply its own efforts if the Internet is to be brought to a wider audience, particularly one that lives outside the main cities of Cairo and Alexandria. The following recommendations are proposed in the spirit of achieving this goal.

5.2.1 Telecommunications and Regulation

Continue the path of progressive deregulation. The path of liberalization that Egypt has been following since the late 1990s, notably in mobilephones and Internet service provision, is now bringing rewards. These policies should be continued and strengthened. In order to accelerate the diffusion of the Internet, it is recommended that the Ministry and regulator consider:

- **Full liberalization of the market for data communications**, including permitting private companies and large users to construct, resell and self-provide international IP connectivity. Notably, this should include provision of two-way VSAT data communications, direct access to international undersea cables and satellites, and construction of high-speed local networks (e.g., based around xDSL technologies). This should help to bring down the high prices, especially for international connectivity, which are currently hindering growth. Competition should also help to make Telecom Egypt more customer-responsive, for instance in reducing the delays for providing leased lines.

- **An accelerated timetable for the liberalization of voice over IP (VoIP) and fax over IP**. There may be sound reasons for allowing Telecom Egypt to retain the international fixed-line voice monopoly for a specified period, during which tariffs can be rebalanced and the privatization/commercialization process completed. However, these arguments are not necessarily valid for IP Telephony where Telecom Egypt's continuing monopoly and exclusive deals with IP Telephony providers may hinder technological development and market innovation.

- **Continuation of the liberalized regime for ISPs**. This should not require licensing or regulatory authorization.

- **Avoid awarding any further exclusive licences** and review

the sunset clauses on existing licenses.

- **Becoming a signatory to the WTO's basic telecommunications agreement and IT agreement,** as a way of making a public commitment to the course of liberalization. This would also help in attracting further foreign investment into the sector.

Ensure accounting separation. In the period before full liberalization of the data market, it is recommended that existing major suppliers of international Internet connectivity (i.e., Telecom Egypt, IDSC and, shortly, Nile Online), be prevented from becoming full ISPs as this would create a potential conflict of interest. Furthermore, it is recommended that where other companies with licences to provide services in restricted markets (e.g., mobile operators) wish to provide Internet services, it must be done so on the basis of full accounting separation with no cross-subsidy of the services offered in the liberalized market from profits generated in the restricted market.

Publish all licences in the public domain. There is currently some uncertainty in the marketplace about which licences have been awarded for which services and covering which periods. Transparency would be enhanced if all existing licences, including those issues earlier by Telecom Egypt, were made publicly available, for instance by publishing them on the regulator's web site. Telecom Egypt's licence, once drafted, should also be made available for public comment.

Empower TRA. The Telecommunication Regulatory Authority (TRA) needs to operate with full independance to enhance transparency and bolster confidence in the sector. Board members of the regulatory authority should be more representative of the telecommunications market as a whole. Moreover, there should be an open channel of communication between interested parties in the telecommunications market and the regulatory authority.

Make Internet access available nationally at local call rates. The provision by Telecom Egypt of the 900 premium rate service for Internet access (with revenues shared between Telecom Egypt and the Internet Service Provider) has had an immediate beneficial effect in promoting Internet growth, particularly among new users. This should be extended on a non-discriminatory basis, for instance by making the service nationally available at the same local call rate, irrespective of the location of an ISP's point of presence. In addition, dial-up access to Internet at local call rates should be facilitated progressively throughout as much of the country as possible.

Establish a timetable for issuing 3G mobile licenses. Mobilephones already outnumber Internet users in Egypt by almost 5 to 1 and, in the longer term, it is likely that mobile access to Internet will become increasingly significant, particularly for non-English speakers. But more bandwidth is necessary for mobile Internet to be viable. The government should announce a timetable for issuing third generation (3G) mobile licenses so that the market can prepare appropriately. Given the high costs and time incurred in establishing a 3G network, it would be better if the licenses were awarded sooner rather than later. This will require more effort to be made in clearing and managing more effectively the spectrum required for mobile services.

Continue the policy dialogue. The practice, introduced by the new Ministry, of holding regular meetings for policy dialogue on aspects of telecommunications reform (i.e., the Working Groups established for Technical, Legal, Business Development and Human Resource Development issues) has been very beneficial and should be continued in an appropriate format. For instance, the initiative to announce the 900 service came as a direct result of these meetings. Perhaps it may be feasible to create a "Telecommunications Society" to mirror the excel-

lent work carried out by the Internet Society in Egypt.

5.2.2 Internet and IT

Promote Awareness. Much work needs to be done in promoting awareness of the Internet, especially on its potential use in health, education, tourism, e-commerce etc. National campaigns to promote the concept of *Internet for All* could help. Moreover, the private sector, which has a stake in increasing Internet penetration (e.g., ISPs, Chambers of Commerce, Investors associations etc), should be encouraged to take part in building awareness and therefore creating a larger potential customer base for use of Internet services.

Separate out the commercial operations of IDSC from its governmental functions. The Information and Decision Support Centre of the Egyptian Cabinet has played a crucial role in establishing and promoting the Internet in Egypt. This role was particularly important in the early days, before commercial ISPs were well-established. As a result, the IDSC is now the major provider of Internet connectivity as well as being a major, if inactive, ISP. This has created a potential conflict of interest between IDSC's operational functions and its role as a branch of the government. It is recommended that the IDSC's commercial functions as the major Internet hub be hived off, possibly to become a not-for-profit Internet Exchange, to avoid a conflict of interest with the IDSC's main role, in bringing the government online and acting as a domain name registrar.

Create an e-commerce task force. While there are many barriers to the development of electronic commerce, the government has control over the creation of an Internet-friendly legal environment. Specifically, the issue of credit card verification (digital signatures) should be clarified to enable e-commerce to flourish. This will require that the Central Bank take a lead role in endorsing the development of e-commerce and upgrading the banking community's network. There is also a need for clearer public endorsement of e-commerce at the highest government levels since this would induce the proper "line of control" over all ministries, not just from the Ministry of Economy. There is a need for general IT policy reform and specifically greater automation of workflow systems within the government (e.g., logistics, customs, taxes, courier and postal services). To this end, it is proposed that an e-commerce task force be established comprising members from both government and private sector bodies, including trade associations. Egypt should also participate actively in international e-commerce initiatives, for instance at UNICITRAL or WIPO.

Promote public access to the Internet. The existing initiatives being undertaken by MCIT/IDSC are to be commended but more needs to be done. One promising opportunity is to promote Internet access via Post Offices. In addition, more information should be collected on the number of cybercafés and their usage in order to promote this form of access.

Develop an Arab regional strategy. The Arab world has a common language and culture. However, to date there has been only minimal regional co-operation on Internet issues (the Regional Arab Information Technology Network, RAITNET, established in 1997, is an exception). One area where regional co-operation would be beneficial is over creation of more Arabic (and perhaps iconographic) content. The majority of content on web sites in Egypt is in English and most training courses are in English. Thus, the Egyptian market may not expand beyond the 2-5 per cent of the population who speak English. If Internet is to become pervasive in Egyptian society, then more effort needs to be made to promote the availability of Internet content in Arabic and Arabic portals. Government can play a role here in making more public information available in Arabic on government web sites.

Invest in the next generation. Government resources are scarce and

need to be used sparingly. However, one area where government investment will bring huge future dividends is in education. The education ministry is already well advanced with plans to ensure that all schools are connected to the Internet, but more could be done, for instance in improving the connectivity of schools and increasing the number of PCs available. Where feasible, use of the Internet as a research resource should be incorporated into the timetable. Giving all school students an e-mail address would help promote usage. In addition, Internet kids clubs are helping to spread awareness. Also, the Egyptian universities council should be given a regular budget for IT and Internet activities. Private sector sponsorship or financing of Internet connectivity in schools and universities should be encouraged.

Support human resources development. There is already a shortage of trained IT professionals in Egypt and this situation is likely to get worse. A particular problem is in the field of project management where relevant skills are lacking. In addition, the end-user-community needs to be better trained, especially in the government sector and in specialist fields, such as the legal community. A certification system to recognize excellence in IT training institutes and to make more courses available in Arabic as well as English would help to formalize the current training efforts. The initiative taken by the MCIT to work closely with the private sector through the establishment of human resource development working groups also provides an excellent launch pad. It will serve towards a better understanding of public and private sector needs in this area and in generating new human resources policies that better prepare students and workers to meet the challenges of the emerging digital economy.

Put government online. Government Ministries and Agencies should be encouraged to use the Internet to provide public access to information and services. Where private sector portals make this information available, efforts should be made to ensure it is accurate and up-to-date. Transparency and open provision of data and information should be encouraged as a general government policy. This will facilitate the process for content providers to collect and gather information whether in textual, audio or visual format.

Conduct more market research. There is currently only limited and often outdated information available on the development of the Internet market in Egypt. The regulatory authority and/or the MCIT should commission a market research study to ascertain the true level of use among different segments of the population. For instance, a periodic (semi-annual?) census of ISPs to collect basic data (e.g., number of accounts, web sites hosted etc) would help to inform policy-makers. It is recommended that a specialized research center be established. This center would research and collect data about ICT related issues and concerns. This information is necessary to provide a better understanding of the market for local and foreign direct investors.

[1] See e-mail from IDSC to Network Startup Resource Centre, dated 4 October 1999. www.nsrc.org/db/lookup/operation=lookup-report/ID=939058779810:489020354/fromPage=EG.

Annex 1: List of Interviewees

Name	Position
Telecom Egypt	
Eng. Abdullah Abbas	Central Department Chief of New Services & Marketing
Sanaa Soliman	General Manager of Marketing
Elham Zakaria	General Manager, EgyptNet
Eng. Amr Badawi	Director, Technical Affairs
Eng. Emad El Azhari	Consultant
Eng. Azza Torky	Vice Chairman for International Telecommunications & Backbone
Telecommunications Regulatory Authority	
Eng. Fekreya Allam	Vice Chairman
Ministry of Communications and Information Technology	
Dr. Tarek Kamel	Senior Advisor to the Minister
Dr. Sherif Hashem	Director, Information Society Development Office
Dr. Ali El Hefnawy	Senior Advisor to the Minister
Other Organizations	
Dr. Gamal Mohamed Aly	Director, Egyptian Universities Network
Eng. Mostafa Abdel	Director Communications Department, IDSC
Eng. Christine Arida	Senior Network Engineer, IDSC
Eng. Sayed Gharbawi	Manager, Middle East Government Relations & Standards, Motorola
Eng. Amin Kheir El Din	CEO, Triangle Group & Chairman of Business Working Group at MCIT
Sherif Kamel	Director, Regional Information Technology Institute (RITI)
Dr. Gamal El Sayed	Chairman & Managing Director, Egyptian German Telecommunication Industries
Horst Kovacic	Deputy Managing Director, EGTI
Friedrich Pacher	General Manager, EGTI
W.R.B Wigglesworth	Telecommunications Regulatory Advisor
James Hatch	Principal, Smith Consortium
Mobile Operators	
Eng. Mohamed El Mogy	Director, Regulatory Affairs, Click GSM
Mohamed Shabib	Director, Telecom Authorities Relations, MobiNil
Internet Service Providers	
Khaled Bichara	Managing Director, *Link Egypt*
Mohamed El Nawawy	Former Managing Director, InTouch
Amr Abualam	Managing Director. Soficom Communications
Wael Ammar	Executive Manager, GegaNet
Nagui Anis	Managing Director, United Communications & Starnet
Tamer Zanaty	Business Development Manager, United Communications
Other Ministries	
General Mohamed	Manager, Technological Development & Decision Support Center, *Ministry of*
Dr. Tayseer El Sawy	Director, Information Center, Ministry of Health & Population
Les Fishbein	Health Information Systems Advisor, Health Policy Support Program,
Ibrahim Ezzat Kabeil	Undersecretary of State for International Tourism, *Ministry of Tourism*
Fatma El Gammal	Director, PC Center, *Egyptian Tourist Authority*
Amr Saad	Manager, IT Center, Cairo International Conference Center, *Ministry of Tourism*
Noha Tharwat	Web Developer, Cairo International Conference Center, *Ministry of Tourism*

Annex 2: Framework dimensions

Table 1: Pervasiveness of the Internet	
Level 0	*Non-existent*: The Internet does not exist in a viable form in this country. No computers with international IP connections are located within the country. There may be some Internet users in the country; however, they obtain a connection via an international telephone call to a foreign ISP.
Level 1	*Embryonic*: The ratio of users per capita is on the order of magnitude of less than one in a thousand (less than 0.1%).
Level 2	*Established*: The ratio of Internet users per capita is on the order of magnitude of at least one in a thousand (0.1% or greater).
Level 3	*Common*: The ratio of Internet users per capita is on the order of magnitude of at least one in a hundred (1% or greater).
Level 4	*Pervasive*: The Internet is pervasive. The ratio of Internet users per capita is on the order of magnitude of at least one in 10 (10% or greater).

Table 2: Geographic Dispersion of the Internet	
Level 0	*Non-existent*. The Internet does not exist in a viable form in this country. No computers with international IP connections are located within the country. A country may be using UUCP connections for email and USEnet.
Level 1	*Single location*: Internet points-of-presence are confined to one major population center.
Level 2	*Moderately dispersed*: Internet points-of-presence are located in at least half of the first-tier political subdivisions of the country.
Level 3	*Highly dispersed*: Internet points-of-presence are located in at least three-quarters of the first-tier political subdivisions of the country.
Level 4	*Nationwide*: Internet points-of-presence are located in all first-tier political sub-divisions of the country. Rural dial-up access is publicly and commonly available and leased line connectivity is available.

Table 3a: Sectoral Use of the Internet			
Sector	**Rare**	**Moderate**	**Common**
Academic - primary and secondary schools, universities	>0-10% have leased-line Internet connectivity	10-90% have leased-line Internet connectivity	>90% have leased-line Internet connectivity
Commercial-businesses with > 100 employees	>0-10% have Internet servers	10-90% have Internet servers	>90% have Internet servers
Health-hospitals and clinics	>0-10% have leased-line Internet connectivity	10-90% have leased-line Internet connectivity	>90% have leased-line Internet connectivity
Public-top and second tier government entities	>0-10% have Internet servers	10-90% have Internet servers	>90% have Internet servers

Table 3b: The Sectoral Absorption of the Internet		
Sectoral point total	**Absorption dimension rating**	
0	Level 0	*Non-existent*
1-4	Level 1	*Rare*
5-7	Level 2	*Moderate*
8-9	Level 3	*Common*
10-12	Level 4	*Widely used*

Table 4: Connectivity Infrastructure of the Internet					
		Domestic backbone	**International Links**	**Internet Exchanges**	**Access Methods**
Level 0	*Non-existent*	None	None	None	None
Level 1	*Thin*	≤ 2 Mbit/s	= 128 Kbit/s	None	Modem
Level 2	*Expanded*	>2 – 200 Mbit/s	>128 Mbit/s -- 45 Mbit/s	1	Modem 64 Kbit/s leased lines
Level 3	*Broad*	>200 Mbit/s -- 100 Gbps	>45 Mbit/s -- 10 Gbps	More than 1; Bilateral or Open	Modem > 64 Kbit/s leased lines
Level 4	*Immense*	> 100 Gbps	> 10 Gbps	Many; Both Bilateral and Open	< 90% modem > 64 Kbit/s leased lines

Table 5: The Organizational Infrastructure of the Internet	
Level 0	*None*: The Internet is not present in this country.
Level 1	*Single*: A single ISP has a monopoly in the Internet service provision market. This ISP is generally owned or significantly controlled by the government.
Level 2	*Controlled*: There are only a few ISPs because the market is closely controlled through high barriers to entry. All ISPs connect to the international Internet through a monopoly telecommunications service provider. The provision of domestic infrastructure is also a monopoly.
Level 3	*Competitive*: The Internet market is competitive and there are many ISPs due to low barriers to market entry. The provision of international links is a monopoly, but the provision of domestic infrastructure is open to competition, or vice versa.
Level 4	*Robust*: There is a rich service provision infrastructure. There are many ISPs and low barriers to market entry. International links and domestic infrastructure are open to competition. There are collaborative organizations and arrangements such as public exchanges, industry associations, and emergency response teams.

Table 6: The Sophistication of Use of the Internet	
Level 0	*None*: The Internet is not used, except by a very small fraction of the population that logs into foreign services.
Level 1	*Minimal*: The small user community struggles to employ the Internet in conventional, mainstream applications.
Level 2	*Conventional*: The user community changes established practices somewhat in response to or in order to accommodate the technology, but few established processes are changed dramatically. The Internet is used as a substitute or straight-forward enhancement for an existing process (e.g. e-mail vs. post). This is the first level at which we can say that the Internet has "taken hold" in a country.
Level 3	*Transforming*: The user community's use of the Internet results in new applications, or significant changes in existing processes and practices, although these innovations may not necessarily stretch the boundaries of the technology's capabilities.
Level 4	*Innovating*: The user community is discriminating and highly demanding. The user community is regularly applying, or seeking to apply the Internet in innovative ways that push the capabilities of the technology. The user community plays a significant role in driving the state-of-the-art and has a mutually beneficial and synergistic relationship with developers.

Annex 3: Acronyms and Abbreviations

ICT	Information and Communications Technology
IDSC	The Cabinet Information and Decision Support Center
ISE	Internet Society of Egypt
ISP	Internet Service Provider
IT	Information Technology
ITI	Information Technology Institute
LE	Egyptian Pounds, the currency used in Egypt. At June 30 2000, 3.48 Egyptian Pounds were equal to one US dollar.
MCIT	Ministry of Communications and Information Technology
NGO	Non-Governmental Organization
RITSEC	Regional Information Technology and Software Engineering Centre
TE	Telecom Egypt

Annex 4: Selected Egyptian Web sites

Name	URL
Telecom operators	
Telecom Egypt	www.telecomegypt.com.eg
ClickGSM	www.clickgsm.com
MobiNil	www.mobinil.com.eg
E-commerce	
E-commerce Committee – Internet Society of Egypt	www.ecom.ise.org.eg
Education	
Information Technology Institute	www.iti.gov.eg
Ministry of Education	www.home.moe.edu
Egyptian Universities Network	www.sunsite.scu.eun.eg
Regional Information Technology Institute	www.riti.org
Non-governmental organizations	
Regional Information Technology and Software Engineering Center (RITSEC)	www.ritsec.com.eg
Internet Society of Egypt	www.ise.org.eg
Government	
Egyptian State Information Service	www.sis.gov.eg
Egyptian Parliament	www.parliament.gov.eg
Information Decision and Support Centre	www.idsc.gov.eg
Governorates Online	www.idsc.gov.eg/govern
Egyptian Presidency	www.presidency.gov.eg
Egyptian Economic Bulletin (provided by the IDSC)	www.economic.idsc.gov
Ministry of Foreign Affairs	www.mfa.gov.eg
MisrNet (Ministries Network)	www.misrnet.idsc.gov.eg
Health	
Health Net	www.health.egnet.net
Tourism	
TourismNet	www.tourism.egnet.net
Ministry of Tourism	www.touregypt.net
Major Internet Service Providers	
LinkdotNet	www.link.net
GegaNet	www.gega.net
Internet Egypt	www.internetegypt.com

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