

# Briding the information and communication GAP in the Mediterranean

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## 1. Introduction

**T**elecommunications in Africa is gaining a lot of momentum these days – Especially now that telecommunication is no longer seen as a luxury for developing countries, but as a prerequisite for their economic growth.

Communications development brings economic development. This has spurred regulatory liberalization and already the fruits of increased market growth and diversity are being realized. As telecommunications improves, so do opportunities for computer networking.

Telecommunications is bound to profoundly alter the economic, social and political landscapes of Africa. Africa is able to take advantage of the ICT revolution, seen by many as the last chance for developing countries to provide new job and income opportunities for the next generation, reduce poverty and help close the development gap between North and South. But obstacles remain, including lack of political and public awareness, limited infrastructure, small markets, low levels of education and skills, as well as a variety of policy barriers.

A concern that is often voiced by national policy makers when considering allocating resources to the use of ICTs is most easily summed up with the question: 'Why use scarce funds on new and unfamiliar technologies when needs for basic services such as fresh water and classrooms are not yet met?'. The answer to the question is threefold:

- ICTs are an enabling tool with a multiplier effect which can cut the costs, improve the quality and speed the delivery of basic infrastructure and services;

- ICTs offer many opportunities for rapid economic growth which will ultimately provide more finance for the many demands on the government coffers;

- ICTs have the potential to fundamentally transform the way governance operates, improving the ability of marginalised groups to participate.

Telecommunications indicators which were used in this study to rank countries, regions and sectors are the 'health' of their Internet related developments such as ISP, number of users , computer , fixed and mobile penetration rate .

Used data comes from updated reliable sources such as: IDRC Study [2],ITU/World Bank [ 8], as well as recent studies such as Internet Economic Toolkit for African Policy Makers [9], and Latest African Cellular Statistics [7].

## 2. Telecommunication indicators

North African countries that are culturally similar i.e. they share the same language, socio-cultural circumstances and historical background.

Assignment of points to the various activities and conditions in the countries and sectors produced an indicator system to rank countries, regions and sectors according to the 'health' of their Internet related developments. The following general data must be kept in mind for a fair comparison [ 2].

GENERAL DATA						
COUNTRY	ALGERIA (DZ)	TUNISIA (TN)	MOROCCO (MA)	LIBYA (LY)	MAURITANIA (MR)	EGYPT (EG)
Capital	Algiers	Tunis	Rabat	TRIPOLI	Nouakchott	Cairo
98 Population (M):	30.08	9.34	27.87	5.98	2.53	65.98
Currency:	DZD	TND	MAD	LD	MRO	EGP
Exch rate (/US\$):	0.0178	1.43	10.7		207.557	0.2944
97 GDP US\$/person:	1442.0	2144.0	1218.0	6579.0	455	1195.0
Local Stock Exchange:	No	No	Yes	No	No	Yes
Personal Safety:	1	4	17	0	2	40
ISDN:		No	Yes	No	No	No
VPN Services:		No	No	No	No	No

*Table 1 : Telecommunication indicators*

*Source : IDRC Study ;August 31st 1996*

### 3. Infrastructures and access in Africa

The total number of computers permanently connected to the Internet in Africa (excluding South Africa) finally broke the 10 000 mark at the beginning of 1999 and in Jan 2000 it stood at almost 12 000, an increase of 20% as measured by Network Wizards. The figure may actually be closer to 25 000 to 30 000 due to the measurement technique which cannot count hosts which are not referenced in domain name servers and those that are registered under the generic TLDs - .com, .net, .org. Nevertheless this still means Africa has about as many hosts on the Internet as a small Eastern European country such as Latvia, which only has a population of 2.5 million (compared to the 780m people in Africa's as estimated by Unicef 1998, about 13% of the total world population) [ 9].

Sub-Saharan Africa's teledensity has continued to remain at less than one per 200 inhabitants, most of the telecommunication network is analogue and many sections are highly unreliable, especially during the rainy season. Since the utility of the Internet depends to a great extent on the quality of the underlying telecommunication infrastructure, the poor quality of the network still remains a basic impediment to rapid developments in this area .

And that inevitably raises the subject of its telecoms infrastructure, because Internet traffic almost always travels down ordinary telephone lines, usually those of the public telephone network. This partly explains why the Internet has mushroomed in regions of the world with high telephone density: the network was already in place. It also goes some way to explaining why less than one percent of the world's Internet traffic currently reaches Africa: the telephone network hardly exists. Compare Sweden (with 68 telephone connections per 100 inhabitants), the USA (with 57), and the Netherlands (49) on the one hand to Zimbabwe (with 1.22), Ghana (0.3), and Chad (0.07) on the other.

In the 48 least developed countries (LDCs), telephone density (the number of telephone lines per 100 inhabitants) has increased from 0.19 to 0.29 in the past ten years. Over the same period, telephone density in all the other countries with low incomes has quadrupled. 29 LDCs are in Sub-Saharan Africa. The problem is so great that development aid can only make any sort of mark in specific, clearly defined cases. 70% of the world's population have to make do with 3% of



ICT INFRASTRUCTURE							ICT POLICIES					
COUNTRY	ALGERIA (DZ)	TUNISIA A (TN)	MOROCCO (MA)	LIBYA N (LY)	MAURITANIA NIA (MR)	EGYPT (EG)	ALGERIA IA (DZ)	TUNISIA (TN)	MOROCCO O (MA)	LIBYAN (LY)	MAURITANIA NIA (MR)	EGYPT (EG)
Fixed lines (K) '98:	1600	752	1515	500	15	3972	Competition in local loop:	Monopoly	Monopoly	Monopoly	Monopoly	Monopoly
97-98 % Fixed Line Growth:	0.14	0.15	9.2	0.32	0.12	0.15	Competition in telephone terminals:	No	Yes	No	Yes	Yes
98 Mobile Lines (K):	19	39	116	20	4	91	Independent regulator:	No	Yes	No	No	Yes
Cities with Internet POPs:	4	7	10	1	2	14	Private Wireless Data allowed:	No	No	No	No	No
Local Call National Internet:	No	Yes	Yes	No	Yes	No	Independent Internet VSAT Allowed:	No	No	No	No	No
Dialup Internet subscribers:	2000	30000	75 000	500	550	100 000	Satellite Phone access:	No	No	No	No	No
International Bandwidth (Kbps):	128	7020	8192	2048	128	26000	Private Phone Kiosks:	No	No	No	No	No
Internet Hosts:	26	53	961	2	1	1746	Public VOIP Allowed:	No	No	No	No	No
Local phone call cost (US\$/hr:	0.2	1.5	0.76		606	60						
Internet Access Providers	3	5	250	1	5	1.8						

Table 2. Compared ICT's infrastructures and policies in Northern Africa

All figures above in US Dollars (\$)

Source: AISI-Connect database

ITU/World Bank[ 8].

#### **4. African internet users**

While Internet access is now widespread in Africa in the sense that all countries are connected, the number of African Internet users is somewhere between 1.5 to 2 million out of a continental population of 750 million, and most of these (at least 1.5million) are resident in South Africa. Moreover, Internet access tends to be concentrated in capital cities where most users are employees of non-governmental organizations, universities, or private companies.

Despite the rapid growth of Internet access in Africa it has been largely confined to the capital cities, although a growing number of countries do have points of presence (POPs) in some of the secondary towns. In South Africa POPs are in about 100 cities and towns. In some countries the national telecom operators have made a special policy to provide local call Internet access across the whole country. To do this, the operator establishes a special 'area-code' for Internet access that is charged at local call tariffs, allowing Internet providers to immediately roll out a network with national coverage.

A key characteristic of information media in Africa--whether telephone, radio, television, newspapers, or the Internet--is sharing. Thus, a relatively large number of people will use a single phone, listen to a radio, watch a TV, read a copy of a newspaper, or share an E-mail address. This accounts for the development of community access to the Internet, in the form of private cybercafes and telecenters.

Hence it is difficult to measure actual numbers of Internet users, but figures for the number of dialup subscriber accounts to ISPs are more readily available, for which it is estimated that there are now over 1 000 000 subscribers in Africa. Of these, North Africa is responsible for about 200 000 and South Africa for 650 000, leaving about 150 000 for the remaining 50 African countries. But each computer with an Internet or email connection supports an average of three users, a recent study by the UN Economic Commission for Africa (ECA) has found. This puts current estimates of the number of African Internet users at somewhere around 3 million in total, with about 1 million outside of South Africa. This works out at about one Internet user for every 250 people, compared to a world average of about one user for every 35 people, and a North American and European average of about one in every 3 people [ 11].



Clearly a number of countries such as those in North Africa and Southern Africa have more highly developed economies and better infrastructures which would naturally result in larger populations of Internet users. Most of these countries were also among the first on the continent to obtain Internet access and so have had the most time to develop the market.

#### **4.1. Internet users in North Africa**

In North Africa, Tunisia is the leading country, followed by Algeria and Egypt and Morocco which are also relatively well advanced in their use of ICTs, The champion agencies in these countries are ATI (Tunisia), ONPT and the local Internet Society Chapter (Morocco), and IDSC/RITSEC (Egypt) [ 6].

Country	Full ISPs	Store/ Forward	Users	Internet / Bandwidth	Monopoly ISP	Population	Users Population (/m)
Algeria	16	2	5000	64	1	29	17
Egypt	25	3	20000	2000	0	61	328
Libya	0	0	0	0		5	0
Mauritania	1	1	100	128	0	2	50
Morocco	15	2	6000	2000	0	29	207
Tunisia	2	2	3500	512	0	9	389

**Table 3 : Internet users in North Africa**

**Source :** *Internet Economic Toolkit for African Policy Makers*

North African Internet Populations compared to Nigeria and South Africa									
Country	Dialup Internet Accounts	Internet Bandwidth (Kbps)	Public Access ISPs	ISP Monopoly	Call Cost (\$/hr)	Est 1998 Population (1000s)	Internet Density (Population/User)	96 GDP /Person	Speed (Users/Internat. Kbps)
Algeria	750	64	1	Yes		30175	40,233	1531	12
Egypt	40,000	2048	40	No	1.20	65675	1,642	973	20
Libya	50	256	1	Yes		5980	119,600	5498	0
Mauritania	100	128	1	No	6.60	2454	24,540	401	1
Morocco	20,000	8192	70	No	0.85	28012	1,401	1265	2
Nigeria	3,000	1152	12	No	0.40	121773	40,591	587	3
South Africa	250,000	80000	70	No	1.60	44296	177	3230	3
Tunisia	7,000	5120	2	No		9497	1,357	2030	1
"Users / Int Kbps" is the number of Internet users for every 1 Kilobit per second of the total International bandwidth									
"Population / User" is the number of people in the country per Internet User									
"Call Cost" is converted to US\$/hour									

**Table 4 : INTERNET users in North Africa compared with Nigeria and South Africa**

**Source :** Michael Jensen, [mikej@sn.apc.org](mailto:mikej@sn.apc.org) [ 4]

## 5. Mobile communications in North Africa

### 5.1. Cellular operators in North Africa [ 7]

Country	Standard	Startup	Operator	Notes
Algeria	NMT-900	12/89	Algerian PTT	
Algeria	GSM900	2/99	Algerian PTT	
Egypt	GSM900		ClickGsm	Cairo, Luxor, Alexandria, Aswan
Egypt	MATS	5/87	Arab Republic of Egypt Nat'l Telecom. Org.	
Egypt	GSM900	12/98	Mirsfone	



<i>Egypt</i>	GSM900	10/96	MobiNil	
<i>Libya</i>	GSM		ORBIT	
<i>Morocco</i>	GSM900	4/94	Itissalat Al-Maghrib S.A	Rabat, Casablanca
<i>Morocco</i>	NMT-450	1989	Office National des Postes et Telecom.	main cities and roads
<i>Morocco</i>	GSM 900	1999	Medi Telecom	
<i>Tunisia</i>	GSM900	end-96	Ministry of Communications	Tunis
<i>Tunisia</i>	GSM900	03/98	Tunisie Telecom	
<i>Tunisia</i>	NMT-450	4/85	Ministry of Communications	60% territory @ mid-95

**Table 5 : Cellular operators in North Africa**

**Source : Latest African Cellular Statistics**

<http://servedby.advertising.com/>

## 5.2. Analog networks in North Africa

Country	Standard	Startup	Subs	Subs Date	Operator	Coverage
<i>Algeria</i>	NMT-900	12/89	6900	6/96	Algerian PTT	
<i>Egypt</i>	MATS	5/87	12000	12/95	Arab Republic of Egypt Nat'l. Telecom. Org.	
<i>Morocco</i>	NMT-450	1989	35000	12/96	Office National des Postes et Telecom.	main cities and roads
<i>Tunisia</i>	NMT-450	4/85	8000	12/96	Ministry of Communications	60% territory @ mid-95

**Table 6 : Analog networks in North Africa**

**Source : Latest African Cellular Statistics**

### 5.3 – GSM Networks in North Africa [ 5]

Country	Type	Startup	Operator	Coverage
Egypt	GSM900	8/98	ClickGsm	Cairo, Luxor, Alexandria, Aswan
Egypt	GSM900	12/98	Mirsfone	
Egypt	GSM900		MobiNil	
Libya	GSM		ORBIT	
Morocco	GSM900	4/94	Itissalat Al-Maghrib S.A	Rabat, Casablanca
Tunisia	GSM900	end-96	Ministry of Communications	Tunis
Tunisia	GSM900	03/98	Tunisie Telecom	

**Table 7: GSM Networks in North Africa**

**Source :** <http://servedby.advertising.com/click/site=0000008641/mnum=0000018953/bnu=21> [3]

### 5.4- Biggest GSM markets in Africa

COUNTRY	Jun-97	Dec-97	Jun-98	Dec-98	Mar-99	Jun-99	Jun-00	Sep-00	Dec-00	May-01	%
Egypt	58,140	83,500	108,900	197,000	326,000	444,000	940,000	1,401,000			14
Morocco	56,200	73,720	95,130	116,080	121,500	150,000	884,000	1,530,000			16
SouthAfrica	1,110,980	1,466,020	2,050,600	2,552,900	3,210,800	3,800,000	6,100,000	6,700,000	7,06,000	9,100,000	46.5

**Table 8 : Biggest GSM markets in Africa**

## **6- Algeria's ICT profile**

### **6.1- Internet:**

The Centre d'Etude et de Recherche sur l'Information Scientifique et Technique (CERIST) in Algiers was for many years the only ISP. In 1998 the Algerian government opened the market and 18 ISPs have been licensed. However, only two -- Gecos and EEPAD -- are currently operative. Five new licenses were issued this year - Servant, Get, EURL Microcosm, Wont and IGT. Local POPs have also been established by CERIST in Constantine, Ouargla and Oran.

The European ISP, EUNET operates a UUCP store-and-forward mail service in Algiers.

#### **- ISP's**

ACI Net

EUnet Algeria Operates a UUCP store-and-forward mail service in Algiers.

General Computing Systems (GECOS) GECOS was originally a computer company. In 1997 it began creating web sites. Its customers are Algerian newspapers, businesses and ministries and government agencies. Gecos has formed a partnership with EuropOnline, a Luxembourg Internet by satellite provider [ 10]

SWAN Informatique Established in 1991 , well known for its well advanced awareness in information technology in general and Internet implementation techniques in particular, SWAN Informatique is Web-sat internet two way satellite connection sole distributor for Algeria. It is also an Internet hardware provider and algerian Cybercafé main suppliers

EEPAD A training agency and ISP with about 1500 accounts based in Annaba, EEPAd is a France Telecom partner and engages in a number of training programmes with european universities

Algerian Unix Users Group (ALUUG) Aims to promote open systems based on Unix. Interest in the Internet was a natural progression for the association which also administers the Algerian Internet top-level domain, .dz

ALUUG also works on making public domain software available and is experimenting with videoconferencing and electronic conferencing over the Internet.

## **6.2 -Telecommunications**

The Ministry of Post and Telecommunications (P&T) is the operating entity as well as the regulatory entity in Algeria. In 1990, the P&T started deregulating some of its activities, particularly procurement and distribution of equipment. Its role in the supply of consumer equipment is now limited to the definition of technical standards, and approval of imported equipment.

The Algerian telecoms network is in relatively good condition in most cities, availability of new lines is good. When oil revenues were higher in the 1970s and early 1980s, Algeria spent heavily to expand and upgrade its telecommunications infrastructure. While the existing network still requires both extension and modernization to keep up with demand; With a telephone density of approximately 4 percent, the domestic network includes over 44 domestic satellite earth stations. Algeria also has installed 2,500 kilometres of fibre optic links to form the core of north-south and east-west fibre optic backbone. The transmission network is 70% digital. Algeria currently has six submarine fiber optic cable links with France, Italy and Spain, and is also connected to SEA-ME-WE2 and is a member of ARABSAT, INTELSAT, AND INMARSAT.

The Algerian X25 network called Dz-pack is composed of four main switching exchanges located in Algiers, Oran, Costantine and Ourgla and serving most of the urban regions of Algeria. The total capacity of this network is around 4000 lines.

Algeria currently has one cellular telephone network, installed by Nokia of Finland in 1991.

### **Communications costs:**

Dialup internet access is 50 000 Dinars (877 USD) a year.

## **6.3 -Organizational activities in the ICT sector**

Ministere des Postes et Telecommunications (Algeria) It is the operating entity as well as the regulatory entity in Algeria.

### **Centre de Recherche sur l'Information Scientifique et Technique (CERIST)**

The only ISP in Algeria, as well as major networking institution. Has Dec/VAX equipment, plus PCs running Unix, Xenix, DOS and Windows. Local POPs have been established by CERIST in Constantine, Ourgla and Oran.

CERIST is currently providing Internet facilities to most research organizations in the country. There are 13 national research centres with varying levels of computerization and CERIST is planning to link them under a government project called the *Système National d'Information Scientifique et Technique*. This includes the development of regional nodes, sectoral/thematic networks and connection to international networks.

A leased line link from CERIST in Algiers was established in 1994, assisted in part through the RINAF project which provided equipment (router and modems) and training for maintaining the link which now connects at 64Kbps to the Ebone in Paris. Telecommunications costs are financed by the Algerian Government. About 40 computers and 10 routers are connected to the national network, most of which are inside CERIST.

There are a number of content development projects at CERIST:

- With the National Library it is working on a joint project to computerize the agency and to develop ICT tools for adding value to the country's intellectual resources stored there. The development of a multi-disciplinary, multilingual database on Algerian publications called *Algeriana*. The development of a database of scientific and research activities in the country called *Potentiel Scientifique et Technique (PST)*
- A trilingual database (english, french and arabic) of technical terms.
- Maintenance of the official 'home-page' for the country including listing of contact details of all 44 Universities, 60 research centres, 20 institutes and 12 polytechnics with contact details and their areas of speciality. Sites for the Office of Statistics, the Chamber of Commerce and Tourism office are also maintained.

#### **6.4- Arab satellite communications organization ( ARABSAT)**

The satellite covers the whole of Africa in the S band and north Africa in the C band. Despite its initial financial problems, ARABSAT still maintained its commitment to reducing costs for the broadcast media by leasing transponders for TV programme exchange at a fixed annual rate, regardless the number of broadcasts or participating earth stations. Also, four transponders are provided to transmit 20 TV stations in digital compressed mode at no extra charge.

### **7- Tunisia's ICT profile**

#### **7.1 -Internet:**

A new organisation - the Agence tunisienne internet (ATI) was recently set up to manage internet services in the country as part of its mandate to catalyse Tunisia's 'Information Society'.

Established in '96, ATI took over operation of Tunisia's national Internet backbone and the .tn top-level domain (TLD) from the Institut de recherche scientifique en informatique et télécommunication (IRSIT). ATI does not provide access to the end-user but provides access to the various suppliers who perform this function.

#### **- ISP's**

There are two ISPs providing private sector and personal access: Planet Tunisie and 3S Global Net (Standard Sharing Software):

ATI operates POPs in seven towns across the country and provides international connectivity via Sprint to the US and via Telecom Italia to Italy. Internet access is available via a local call across the whole country.

#### **7.2- Telecommunications :**

The telecommunications sector is regulated by the Ministry of Communications. The PTO and sole supplier of basic telecommunications services is the Office national des télécommunications (ONT), also called Tunisie Télécom.

The 9th economic development plan aims to install 450 000 new lines to connect 800 000 new subscribers and complete its creation of a 300 000 subscriber GSM mobile telephone network and tender for a second GSM licensee. Siemens, Alcatel and Ericsson are the major suppliers in the telecoms sector.



Tunisia is connected to a number of marine fibre optic telecom backbones, including a dedicated cable to Italy, the SEA-ME-WE and TAT networks. Terrestrial cable links connect Tunisia to Algeria, Libya and Morocco. An international ISDN link with Germany is in place and Tunipac provides X.25 data services for 1500 customers. A GSM cellular telephone service was started in 1998. Tunisia's domestic transmission network presently makes extensive use of microwave radio links, and also uses microwave links to communicate with its immediate neighbours, Algeria and Libya. Nationwide frame-relay and ATM services are being planned.

#### **- Communication Costs:**

The cost of Internet access is 21 Dinars per month (unlimited access), plus 40 Dinars for software and installation. (1 Dinar = 0.8USD)

Calls to the Internet are a fixed price throughout the country regardless of the distance dialled - 0.15FF per minute.

#### **7.3 - National ICT activities:**

EDI projects are being studied in various sectors such as banking, textiles and telecommunications. One of the main EDI projects is the "Single Batch" aimed at facilitating foreign trade procedure by setting up an EDI server center to allow various agents (trade organizations, customs, banks, forwarders etc...) to exchange foreign trade operations documents.

The Institut de recherche scientifique en informatique et télécommunication (IRSIT). IRSIT has a long history of ICT involvement and has established Réseau national pour la recherche et la technologie (RNRT) in '93 which connects 22 research institutions in Tunisia. RNRT is being developed in conjunction with the Secrétariat d'État à la recherche scientifique et la technologie (SERST). IRSIT is also the national focal point for the regional arab network RAITNET assisted by the Centre de la Ligue arabe.

The Centre de Calcul Khawarezmi, Campus Universitaire Tunis, is responsible for the universities network - the Réseau national Universitaire (RNU) which connects 87 higher academic institutions, including 21 via leased line.

INBMI's Education Network EDUNET has connected 350 (87%) of the secondary schools, and 50 technical schools. It aims to connect 500 primary schools in 1999.

CIMSP's Health Network RNS (Reseau National de Sante) provides connectivity to 64 hospitals, including all university Hospital centers and 10 regional hospitals. It aims to connect all hospitals by the end of 1999.

The National Agricultural Network (AGRINET) connects 14 higher agricultural institutes as well as 7 regional research centers. It also provides connectivity to the various departments of the Agriculture Ministry as well as its various representations throughout the country.

Centre de documentation nationale (CDN) is the IIP focal point for UNESCO, has developed a guide to information services in Tunisia and a number of databases including ITARAT on government, and ASSO on associations. CDN has also developed biographic data on informatics professionals.

The Centre national universitaire de documentation scientifique et technique (CNUDST) has a broad mandate to develop national policy in this area and to support the exchange of information in spheres of scientific research and technical and higher education.

Responsible to the Ministère de l'Enseignement supérieur et de la documentation scientifique et technique, CNUDST is the focal point for one of the 12 centres nationaux pilotes sectoriels (CNPS), each of which will build sectoral networks coming together as the Réseau national d'information et de documentation (RNID). CNUDST will be responsible for the Réseau universitaire d'information (REUNI) and also assists with the provision of access to CD-ROM and online databases.

The Centre national de documentation agricole (CNDA) provides access to agricultural databases and is the CNPS for its sector.

#### ***7.4- Organizational activities in the ICT sector:***

Regional Institute for Informatics and Telecommunications (IRSIT) Created in 1986, IRSIT promotes and develops the potentials and capacities in the fields of informatics, telecommunications and associated technologies. Relevant research and services include: Text-to-Speech synthesis, computer aided translation,

Arabic/Latin VideoTex, Internet Access, telephone network, Arab character recognition, management and multimedia development tools

Tunisian Ministry of Communications Responsible for national government ICT policies

Agence Tunisienne d'Internet The government agency charged with managing the national Internet backbone. This currently operates at 7Mbps and will be upgraded to 34Mbps by end of 2004.

## **8 - Libyan ICT profile**

### **8.1 - Internet:**

The PTO operates an internet hub in Tripoli with a 2MB International link via Teleglobe in Canada. Dialup and leased line facilities are available via Libya Telecom and Technology. The Centre National de l'Information et de la Documentation is the main networking agency in the country .

### **8.2 - Telecommunications:**

The telecommunications operator is the called General Posts and Telecommunications Company (GTPC) and there is also a cellular service based on the GSM standard, which is managed by Ericsson and Orbit Telecom for GPTC.

### **8.3-National Networking Activities:**

There is evidence of a relatively high level of support for the use of ICTs, however the trade embargo has debilitated the country over the last decade and held back development in this area.

UN sanctions restrict the development of international assistance programmes in Libya.

**Communication costs:** US\$45/month, includes 10 free hours / month. US\$4/hr for additional hours.

#### **8.4 - Organizational activities in the ICT sector:**

Centre National de l'Information et de la Documentation The main networking agency in the country, NIDA is in the process of establishing Internet connectivity. Currently its web site is hosted in the UK. NIDA is also the UNESCO IIP/RINAF focal point .

### **9 – Morocco's ICT profile**

#### **9.1 - Internet:**

The PTO, IAM, provides the international Internet hub via two independent links to the US and Europe for a large and diversified ISP sector. There are an estimated 40 000 Internet users and about 250 ISPs in the country.

MTDS Morocco Trade and Development Services S.A. is a telecommunications consulting firm located in Rabat, Morocco. It is the first Internet Service Provider in Morocco currently providing dial-up and leased line services. As a result of its success in the field of connectivity, the US Government selected MTDS to serve as senior consultants in the implementation of the Leland Initiative, an ambitious project to assist 22 African countries in establishing Internet infrastructure and access.

#### **- ISP's**

ACDIM ;AIM ;Athena Online ;AtlasNet ;AZURE ;CASA ;CBI ;CFC-ESG ;Cybermania; Diagone MarocNet ;Digiweb France / Maroc ;Dounia Net ;EBE ;ELAN ;EspaceNet ; FesNet ;Group Open SA ;L&L Technologies ;La Tangeroise ;MaghrebNet ;MicroAccess ; MultiMedia Marrakech ;Munisys ;PLV+ ;Prolec ;S2M ;Serinfor ;SIS ;SOMARC ; Wafanegoce; Winner

#### **9.2 - Telecommunications:**

Ministère de la communication is ultimately responsible for the telecommunications sector.

The telecommunications sector is regulated by the Agence nationale de reglementation des telecommunications.

In the largest privatization ever by an Arab country the ONPT was converted into a private company called Itissalat Al Maghrib .

Morocco has a relatively advanced and pervasive telephone network, video-conferencing services to 25 countries, an X.25 service (MAGHRIPAC). Both analogue and GSM cellular phone services are available.

**Communications costs:**

Local calls cost 0.47FF / 6 minutes. See <http://www.onpt.net.ma/iam-ta.htm> for full tariff list.

**9.3 - National ICT policy Activities:**

The Ministère de l'Education Nationale and the Ministère de l'Enseignement Supérieur, de la Recherche Scientifique et de la Formation des Cadres are responsible for universities and other centres of higher education.

Prime Minister's office in conjunction with the Ministère d'Enseignement Supérieure et de la Recherche and the PTO has established a 2Mbps backbone for all 9 provincial capitals. Access will be provided at cost for the academic/research sector and schools.

**9.4 -Organizational activities in the ICT secteur:**

Ecole Mohammadia d'Ingenieurs Operates an Internet service. Hosted by the Université Mohammed V in Rabat. It is the RINAF focal point and one of the leading networking organizations in the country

Itissalat Al Maghrib The PTO, in the largest privatisation ever by an Arab country, has been converted from the ONPT to IAM and its shares sold on the Casablanca Stock Exchange. IAM also provides the international Internet hub for a large ISP sector. The international link currently runs at 8Mbps to the US, Italy and France.

Royal Centre for Remote Sensing CRTS is co-ordinating Moroccan efforts to set up the Co-operation Information Network (COPINE) project launched by the United Nations Office for Outer Space Affairs.

## **10 –Mauritania's ICT profile**

### **10.1 -Internet:**

The companies selected by OPT are Top Technology, BITS, Informa Bull, CompuNet and SIG. Top Technology is the only ISP that is currently operational.

The OPT is the primary partner in the UNDP's recently approved IIA/SDNP project

### **10.2 -Télécommunications:**

The Ministère de l'Intérieur, des Postes et Télécommunications is responsible for the sector. There is no independent regulator - these functions are assumed by the Office des postes et des télécommunications (OPT) which is sole provider of basic telecommunications services as well as x.25 and Internet services.

Mauritania has a very under-developed telephone network of about 13 000 phone lines. Automatic dialling is only available in Nouakchott and Nouadhibou but has been expanded to 11 locations under contract with the telecom group Harris through a DOMSAT arrangement with Arabsat under a financial assistance programme with the Fonds arabe de développement économique et social (FADES).

There is no cellular telephone service in the country.

#### **Communication Costs:**

OPT. Dialup - US\$30 /month. 28.8Kbps leased line - US\$950 /month. 64Kbps \$2800 / mnth.

Local calls to the Internet cost 16 Ouguiya / minute before tax - US\$6.6/hour.

### **10.3 –National L ICT activities:**

(Some early networking activities took place several years ago between Mauritania and Algeria, under the Regional Informatics Network for the Arab States (RINAS) project. The RINAF project built on this relationship, as CERIST is the sub-regional RINAF co-ordinator for North Africa and is preparing to assist in organizing a Mauritanian training workshop and the supply of equipment which will be used to provide Internet access for students (1 PC UNIX server, 1 router, 1 leased line modem, 8 dialup modems).



#### ***10.4-Organizational activities in the ICT sector:***

**OPT Mauritania** The Ministère de l'Intérieur, des Postes et Télécommunications is responsible for the telecommunications sector. There is no independent regulator - these functions are assumed by OPT which is sole provider of basic telecommunications services as well as x.25 and Internet services. The OPT hosts the Afrinet web server (see separate entry for details and URL) under the ACCT assistance programme. It is expected to become the official national web server for the country

**Top Technology** The only ISP that is currently operational.

**Faculte des Sciences et Technologie** Part of the University of Nouakchott , it is the leading networking institution in the country.

**Afrinet** The OPT hosts the Afrinet web server under the ACCT assistance programme.

### **11 –Egptt's ICT profile**

#### ***11.1 -Internet***

IDSC/RITSEC took the Internet points of presence (PoPs) beyond the capital and to major cities in Egypt and this was reflected in the number of Internet users in Egypt which increased from around 25,000 in early 1997 to around 100,000 by mid 1998. The number of ISPs increased from 16 operational ISPs to around 40 in the same period. Around 70 percent of the Internet traffic between Egypt and the world passes through the network of IDSC/RITSEC.

IDSC/RITSEC maintains the Internet link in Egypt through dual 2.048 Mbps links to two top level IP providers in the US - MCI, and Global One.

#### **-ISP's**

AlexNet; Data Express; Datum; Egypt On Line; Egypt Web; Egyptian Information Services; ENSTINET; EUN; Eunet Egypt; Gega Net; ICOM; In Touch; Instinct; Internet Egypt; Internet Society (ISE); Link Egypt; PACC; Rite; RITSEC; SofiCom; Star Net; Way Out; BecOnLine; Techno Mina Comm; Sinainet; Infinity; Comm Net; Metal Soft; Internet Alexandria .

## **12- Possible solutions for a sustainable internet of development**

Most insiders seem to agree that telecommunications in Africa can only be improved by the free flow of capital, on which countries with a heavily regulated telecoms sector cannot rely. The Telecommunications and Informatics Division of The World Bank stopped giving aid for infrastructural improvements a few years ago. It now offers aid only when PTTs are being privatised and telecoms monopolies deregulated. The private sector is expected to do the rest.

The next key point of the strategy is to direct actions toward the most important priorities in order to ensure that efforts remain focussed and the available resources are not spread too thinly. The four critical areas that have been identified are:

Applications to support education processes and meet the needs of Africa's youth

Applications in support of the delivery of health care

Opportunities for business and trade

Creating the Enabling Policy Environment

Professional training and computer literacy

For Business to Business relationship to evolve, you need a LAN. To have a LAN, you need people who know how to build it, maintain it, and effectively build applications/services for the business to gain tangible benefits from this network. That means professional training.

Finally, there is a need for raising computer literacy in most countries if the continent should profit from the Internet. As young people are most apt to understand and use Internet technology, they should be the primer target people.

### **Role of the Public Sector**

Governments should favor the development of a national information and communication infrastructure which recognizes and guarantees the role of each component of the society.

### **Role of the Private Sector**

It should play its part in the development of the national information and communication infrastructure by taking part into privatization procedures and encourage local initiatives such as start-ups.

Penetration in rural areas: A universal & business issue

## Necessity of Internet exchange points/ISP's

### ISP/Etranger

Most African capitals now have more than one ISP and in early 2000 there were about 450 public ISPs across the region (excluding SA, where the market has consolidated into 2 major players with 90% of the market and 40-50 small players with the remainder). Some countries had 10 or more ISPs - Egypt, Algeria, Kenya, Morocco, Nigeria, South Africa, Tanzania and Zimbabwe - while 20 countries had only one ISP.

A growing number of African Internet sites are hosted on servers that are in Europe or the U.S. This is especially necessary for countries where ISPs operate their own independent international links without local interconnections (peering), such as in Kenya and Tanzania, which means that traffic between the subscribers of two ISPs in the same city must travel to the US or Europe and back.

While some Internet circuits in Africa connect to the United Kingdom and France, (as well as one to Italy), the majority connect to the USA where suppliers include AT&T, Global One, UUNET/AlterNet, MCI, NSN, Sprint and BBN. Nevertheless, France Telecom/FCR has more Internet connections into Africa than any other single supplier, largely because of its close ties with Francophone PTTs.

Internet infrastructure, local content, and E-Commerce are all inter-related. There is a direction relationship between the emergence of local Internet eXchange Points (IXPs) and content within a country. Thus, the ability of keeping local traffic local tends to be a key of success of Internet spreading. But are African countries in such situations? Though everyone agrees that using Europe as the place to exchange traffic for a country is the wrong thing to do, many ISPs are still going through these routes. As Barry Ravenburg from Cisco points it, African PTTs also like losing money, preferring not to sell local circuits of interconnection and/or blocking attempt by ISPs to build an IXP, instead of collaborating with international carriers and build interconnections.

### 13- Conclusion

The information revolution offers Africa a dramatic opportunity to leapfrog into the future, breaking out of decades of stagnation or decline. Africa must seize this opportunity, quickly. If African countries cannot make advantage of the information revolution and surf this great wave of technological change, they may be crushed by it. In that case, they are likely to be even more marginalized and economically stagnant in the future than they are today.

Major Internet related applications and projects are being implemented by international cooperation, namely the IDRC (Acacia project), ITU and Unesco (Multi purpose community Centers), UNDP (Sustainable Development Networking Programme, IIA and IT for Development), the USAID (Leland initiative, SchoolNet, EDDI...), ACCT and Francophony which has set up a special fund for sponsoring Internet related projects.

In the long run, a few on going infrastructure projects , namely submarine networks such as SAFE, SAT-3/WASC, the likely booming of the VSAT installations and the wireless possibilities may break the 'digital' isolation of the continent [ 1].

### DEFINITION OF TERMS AND ACRONYMS

**ICT** :Information and Communication Technologies

**ISP** :Internet Service Provider

**POP**:Point Of Presence

**OPT**:Office des Postes et Télécommunications.

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