International Telecommunication Union

Connect
Arab Summit 2012
Connecting the unconnected by 2015...

ICT adoption and prospects in the Arab region

International Telecommunication Union

ICT ADOPTION AND PROSPECTS IN THE ARAB REGION

2012

Original language of publication: English

International Telecommunication Union
Place des Nations
CH-1211 Geneva, Switzerland

Foreword

This report has been prepared as a background document for the ITU *Connect Arab Summit*, which takes place in Doha, Qatar from 5 to 7 March 2012. The main objective of the report is to provide an overview of the deployment and adoption of information and communication technologies (ICT) in the Arab region, and to carry out a needs assessment that will help policy makers in the Arab States to identify key ICT areas that require future action. The report in particular focuses on the ICT issues identified by the Arab States regional initiatives adopted by the World Telecommunication Development Conference (WTDC-10), such as broadband access, digital broadcasting, open-source software, Arabic digital content and cybersecurity.

Over the past five years, the Arab States region has made significant progress when it comes to ICT uptake. The number of mobile-cellular subscriptions in the region has almost tripled, from 126 million in 2006, to nearly 350 million by the end of 2011, when mobile-cellular penetration reached 97 per cent - ten per cent higher than the world average. At the same time, Internet usage, and in particular broadband Internet access, is still limited. Based on ITU estimates, less than 30 per cent of the population in the region were online at the end of 2011 and fixed-broadband penetration stood at just above two per cent, well below most other regions and the world average of around nine per cent. While most countries in the region have launched 3G mobile-broadband services, and more and more people are using the mobile network to access the Internet, the region's active-mobile broadband penetration – estimated at around 13 per cent – lies below the world average of 17 per cent.

To ensure that all citizens in the region can fully benefit from the potential of ICTs, there are a number of steps that governments could take. These include ensuring a transparent and predictable regulatory environment that fosters investment, increases competition in both fixed (wired) and wireless technologies and helps reduce prices for ICT services. Countries are further encouraged to formulate an ICT plan or strategy and set concrete targets which can help evaluate policies, track progress, and identify shortcomings in their markets.

In terms of the Arab States regional initiatives, a country-by-county comparison shows that one of the key challenges in the region is to further expand the roll-out of broadband networks, particularly to rural and remote areas. By fostering the digital switchover, governments can also take advantage of digital broadcasting technologies, including Mobile and Internet Protocol TV. This report highlights that the region has witnessed significant growth in the supply of Arabic digital content in the form of online portals and applications. Regulators are also progressing in establishing Arabic domain names, which will promote local content and languages, and help more people join the information society. To this end, governments are encouraged to provide regional media players, as well as local entrepreneurs, with incentives to increase the supply of local content. Finally, the report concludes that ICT developments in the region could be accelerated by enhancing the development of open-source software and improving cybersecurity. Some governments have been proactive and abundant opportunities remain to create more accessible, and safer applications and services.

I am confident that the findings of the report, as well as the resulting conclusions and recommendations, will provide useful inputs to the *Connect Arab Summit* and to the ITU membership at large.

Brahima Sanou
Director
Telecommunication Development Bureau (BDT)
International Telecommunication Union

Acknowledgements

ICT Adoption and Prospects in the Arab region was prepared as a background document for the Connect Arab Summit, which took place in Doha, Qatar from 5 to 7 March 2012. The report was prepared by the ICT Data and Statistics Division (IDS) within the Telecommunication Development Bureau of ITU, in coordination with the ITU Arab Regional Office. The team included Susan Teltscher (Head of Division), Vanessa Gray, Ivan Vallejo, Doris Olaya, Esperanza Magpantay and Lisa Kreuzenbeck, who contributed to the report during her internship with IDS. The main content of the report was provided by the Arab Advisors Group, and in particular Jawad Abbassi, consultant to ITU. The work was carried out under the overall direction of Cosmas Zavazava, Chief, Project Knowledge Management Department, Telecommunication Development Bureau.

Revisions on the final draft were made by Makhtar Fall, Nancy Sundberg and Youlia Lozanova from the Regulatory and Market Division, Marco Obiso from the ICT Applications and Cybersecurity Division and Carla Licciardello from the Corporate Strategy Division. Helpful comments were also received from the ITU colleagues in the Arab Regional Office.

The desktop publishing was carried out by Nathalie Delmas and the cover was designed by Ahone Njume-Ebong. Administrative support was provided by Herawasih Yasandikusuma.

Table of contents

Charts

Tables

List of abbreviations

2G	Second-generation (mobile technology)
3G	Third-generation (mobile technology)
3G+	Enhanced third-generation (mobile technology)
3.5G	Enhanced third-generation (mobile technology)
4G	Fourth-generation (mobile technology)
ACE	Africa Coast to Europe
ACICS	Arabian Conference on Information and Communications Security
ADSL	Asymmetric digital subscriber line
aeCERT	Computer Emergency Response Team (United Arab Emirates)
AED	Arab emirates dirham (currency)
AICTO	Arabic Information and Communication Technologies Organization
ANF	*Agence nationale des fréquences (Algeria)*
ANF	*Agence nationale des fréquences (Tunisia)*
ANRT	*Agence Nationale de Réglementation des Télécommunications (Morocco)*
APEBI	*Fédération des Technologies de l'information, des Télécommunications et de l'Offshoring (Morocco)*
ARPT	*Autorité de Régulation de la Poste et des Télécommunications (Algeria)*
AT	*Algérie Télécom*
ATI	*Agence Tunisienne d'Internet*
ATS	*Algérie Télécom Satellite*
AVC	Audiovisual Commission (Jordan)
Batelco	Bahrain Telecommunications Company
BD	Bahraini dinar (currency)
BOT	Build operate transfer
BWA	Broadband wireless access
CAIT	Central Agency for Information Technology (Kuwait)
CC	Creative Commons
ccTLD	Country code top-level domain
CD	Compact disc
CDMA	Code division multiple access
CDMA 1xEVDO	Code division multiple access 1 x evolution-data optimized
CDMA2000	Code division multiple access 2000
CERIST	*Centre de recherche sur l'information scientifique et technique (Algeria)*
CERT	Computer Emergency Response Team
CERT-SA	Computer Emergency Response Team (Saudi Arabia)
CIS	Commonwealth of Independent States
CITC	Communications and Information Technology Commission (Saudi Arabia)
CMC	Communication and Media Commission (Iraq)
CMCF-TICE	Morocco-Korean center for Training in ICT for Education
CSCA	*Conseil Supérieur de la Communication Audiovisuelle (Morocco)*
CSIRTs	Computer Security Incidents Response Teams

DAC	Digital arabic content
DID	Direct Inward Dialing
DNS	Domain Name System
DSL	Digital subscriber line
DSLAM	Digital Subscriber Line Access Multiplexer
DSP	Data service provider
DTH	Direct-to-home
DTT	Digital terrestrial television
DVB	Digital video broadcasting
DVB-H	Digital video broadcasting — Handheld
DVB-MS	Digital Video Broadcasting — Multipoint Video Distribution Systems
DVB-T	Digital Video Broadcasting — Terrestrial
DVD	Digital versatile (or video) disc
DZ	Algerian domain
EDGE	Enhanced data rates for GSM Evolution
EeG	Emirates eGovernment
ESIB	*Ecole Supérieure d'Ingénieurs de Beyrouth*
EVDO	Evolution-data optimized
FIRST	Forum of Incident Response and Security Teams
FOSS	Free and open-source software
FTA	Free To Air
FTTB	Fiber-to-the-building
FTTH	Fiber-to-the-home
FTTx	Fiber to the x
FWA	Fixed wireless access
FWT	Fixed wireless terminal
GCC	Gulf Cooperation Council
GDP	Gross domestic product
GNU	General public license
GPON	Gigabit passive optical network
GPTC	General Post and Telecommunications Company (Libya)
GSM	Global system for mobile communications
GTA	General Telecommunications Authority (Libya)
HACA	*Haute Autorité de la Communication Audiovisuelle (Morocco)*
HAPA	*Haute Autorité de la Presse et de l'Audiovisuel (Mauritania)*
HSPA	High speed packet access
HSPA+	Evolved high speed packet access
IANA	Internet Assigned Numbers Authority
IBRD	International Bank for Reconstruction and Development
ICANN	Internet Corporation for Assigned Names and Numbers
ICT	Information and communication technology
ICTDAR	ICT Development for Arab Region
IDA	Infocomm Development Authority (Singapore)

IDD	International direct dialing
iDEN	Integrated digital enhanced network
IDN	Internationalized domain names
I-HSPA	Internet high speed packet access
ILD	International long distance
INT	*Instance Nationale des Télécommunications (Tunisia)*
IP	Internet protocol
IPTV	Internet protocol television
ISC	Information Security Center (Syria)
ISP	Internet service provider
IT	Information technology
ITA	Information Technology Authority (Oman)
ITI	Information Technology Institute (Egypt)
ITIDA	Information Technology Industry Development Agency (Egypt)
ITPC	Iraq Telecommunications and Post Company
ITU	International Telecommunication Union
JADI	Cross-border fibre-optic cable
JANA	Jamahiriya News Agency, former Libyan News Agency
JMTS	Jordan Mobile Telephone Services company
JO-CERT	Computer Emergency Response Team (Jordan)
KD	Kuwaiti dinar (currency)
KOICA	Korean International Cooperation Agency
LLU	Local loop unbundling
LTE	Long term evolution
LTT	Libya Telecom and Technology
Mbps	Megabits per second
MCIT	Ministry of Communications and Information Technology (Egypt)
MCIT	Ministry of Communications and Information Technology (Saudi Arabia)
MEAOSS	Middle East and Africa Open-Source Software Technology Forum
MEC	Middle East Communications Corporation (Jordan)
MISOC	Moroccan Internet Society
MNO	Mobile network operator
MOC	Ministry of Communications (Kuwait)
MoICT	Ministry of Information and Communication Technology (Jordan)
MOSD	Ministry of Social Development (Bahrain)
MOSTI	Ministry of Science, Technology and Innovation (Malaysia)
MOT	Ministry of Telecommunications (Lebanon)
MoU	Memorandum of Understanding
MPEG	Moving Picture Experts Group
MPTIC	*Ministère de la Poste et des Technologies de l'Information et de la Communication (Algeria)*
MTIT	Ministry of Telecommunications and Information Technology (Yemen)
MVDS	Multipoint video distribution system

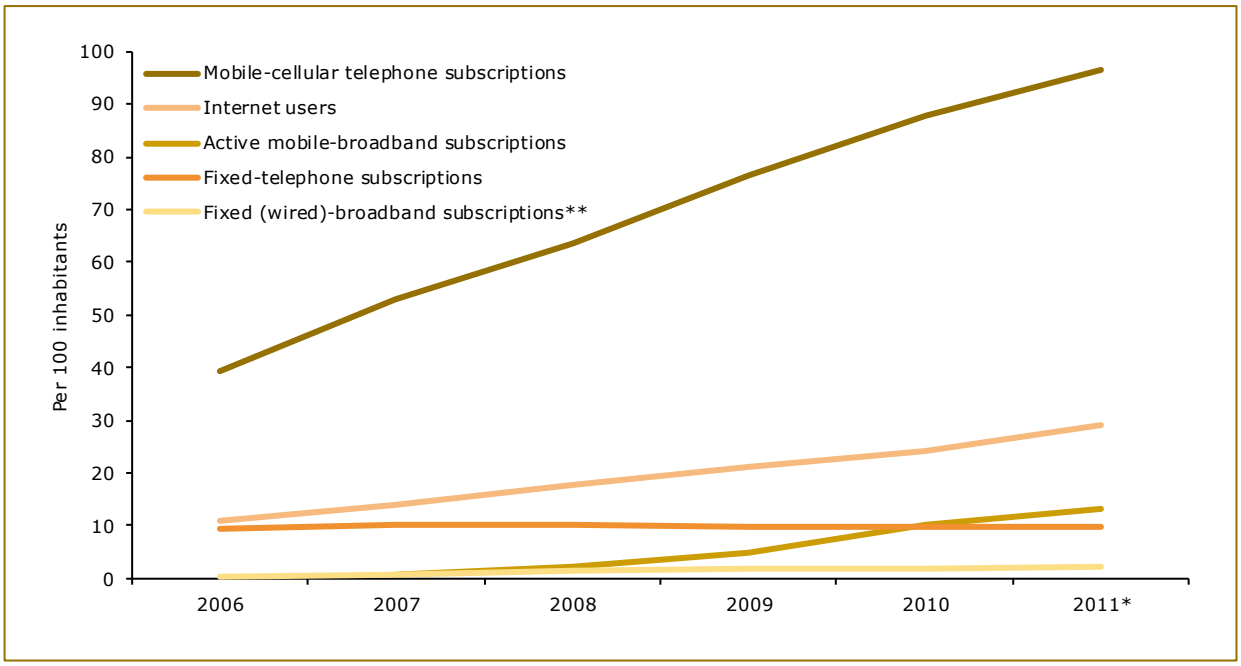
MVNO	Mobile virtual network operator
MyCERT	Malaysian Computer Emergency Response Team
NACS	National Agency for Computer Security (Tunisia)
NANS	National Agency for Network Services (Syria)
NBN	National broadband network
NFWS	National fixed wireless services
NGAN	Next generation access network
NGN	Next generation network
NGO	Non-governmental organization
NIACSA	National Information Assurance and Cybersecurity Agency (Jordan)
NIACSS	National Information Assurance and Cybersecurity Strategy (Jordan)
NIC	National Information Center (Yemen)
NITC	National Information Technology Center (Jordan)
NRA	National Regulatory Authority
NTC	National Telecommunication Corporation (Sudan)
NTCR	National Center for Technology (Sudan)
NTRA	National Telecommunication Regulatory Authority (Egypt)
OCERT	Oman National Computer Emergency Response Center
OGERO	*Organisme de Gestion et d'Exploitation de l'ex Radio Orient (Lebanon)*
OMSAR	Office of the Minister of State for Administrative Reform (Lebanon)
ONPT	*Office National des Postes et Télécommunications (Morocco)*
OTA	Orascom Télécom Algérie
OTN	Optical transport network
PABX	Private automatic branch exchange
PBX	Private branch exchange
PSTN	Public switched telephone network
PTC	Public Telecommunications Company (Yemen)
Q-CERT	Qatar Computer Emergency Response Team
QR	Qatari Riyal (currency)
R&D	Research and development
RAN	Radio access network
RCN	Regional cable network
Saudi NIC	Saudi Network Information Center
SLC	Smart Link Com
SME	Small and medium enterprises
SMS	Short message service
SNRT	*Société Nationale de Radiodiffusion et de Télévision (Morocco)*
STC	Saudi Telecom Company
STE	Syrian Telecommunications Establishment
SudaFOSS	Sudanese Free and Open-Source Society
SyTC	Syrian Telecommunications Company
TCU	Technical Cooperation Unit (Lebanon)
TD	Tunisian dinar (currency)

TDA	*Télédiffusion d'Algérie*
TE	Telecom Egypt
TIEC	Technology Innovation and Entrepreneurship Center
TRA	Telecommunication Regulatory Authority (Bahrain)
TRA	Telecommunications Regulatory Authority (Lebanon)
TRA	Telecommunications Regulatory Authority (Morocco)
TRA	Telecommunications Regulatory Authority (United Arab Emirates)
TRA	Telecommunications Regulatory Authority (Oman)
TRC	Telecommunications Regulatory Commission (Jordan)
TV	Television
UAE	United Arab Emirates
UDC	United Development Company
UHF	Ultra high frequency
UMTS	Universal mobile telecommunications system
UNDP	United Nations Development Programme
UNDP–ICTDAR	United Nations Development Programme – Information and Communication Technology for Development in the Arab Region
UNESCO	United Nations Educational, Scientific, and Cultural Organization
USA	United States of America
USB	Universal serial bus
USD	United States dollar (currency)
VoD	Video on demand
VoIP	Voice over Internet protocol
VSAT	Very small aperture terminal
W-CDMA	Wideband code division multiple access
Wi-Fi	Wireless fidelity
WiMAX	Worldwide interoperability for microwave access
WLL	Wireless local loop
WSA	World Summit Award
WTDC	World Telecommunication Development Conference
YahLive	Al Maisan Satellite Communications Company
ZTE	Zhongxing Telecom (Chinese Equipment Supplier)

Section I. Regional ICT overview

This section presents an overview of the regulatory status, information and communication technology (ICT) deployment and adoption of ICT services in the Arab States region.[1] The Arab region is a rapidly developing region in terms of ICTs and characterized particularly by strong growth in the area of mobile telephony over the last five years. The move towards commercially available 3G networks in almost all countries of the region has driven the number of active mobile-broadband subscriptions and helped bring more people online. ITU estimates that by the end of 2011, around 30 per cent of the population in the Arab States were using the Internet. Compared to mobile-cellular services (and in comparison to other regions) both fixed-telephone and fixed (wired)-broadband penetration rates in the region remain relatively low. The penetration for fixed-telephone subscriptions reached ten per cent at its highest and has been declining since 2008. The number of fixed (wired)-broadband subscriptions has grown from one million in 2006, to an estimated eight million in 2011, but penetration remains relatively low, at 2.2 per cent (Chart 1).

Chart 1. ICT developments, Arab region, 2006-2011*



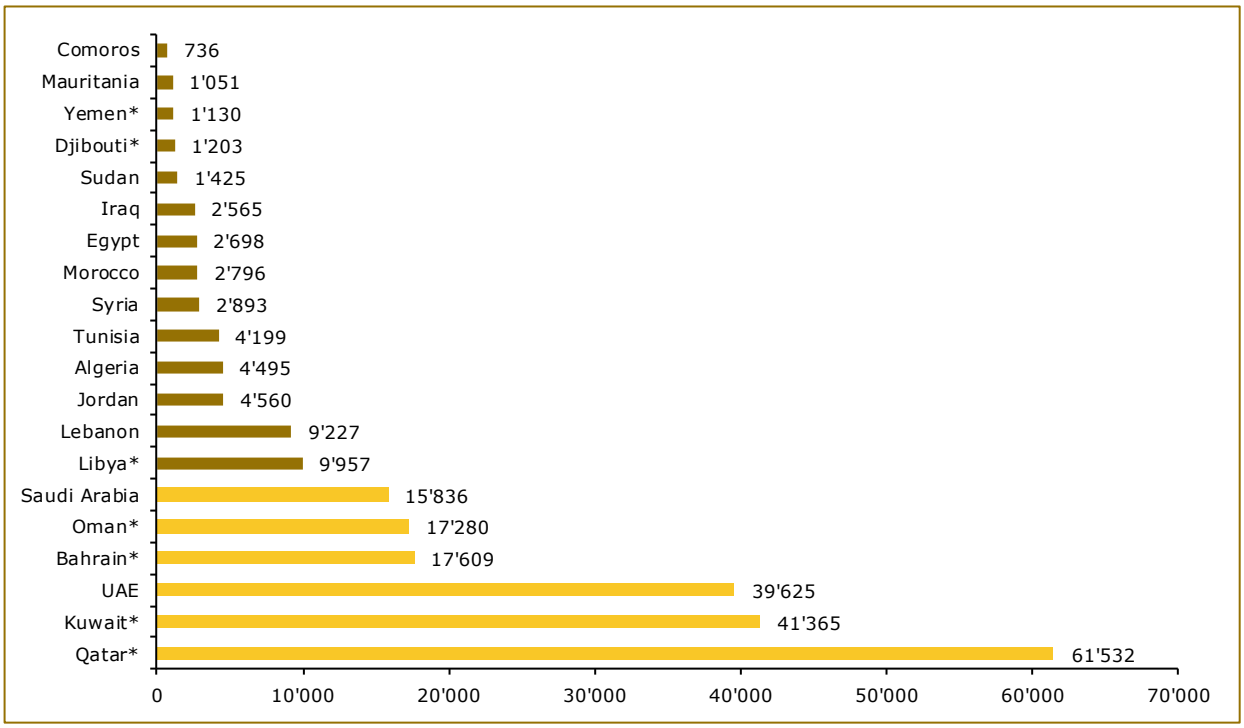
Note: * 2011 data are ITU estimates ** Data on fixed (wired)-broadband subscriptions exclude WiMAX subscriptions
Source: ITU World Telecommunication/ICT Indicators database

[1] The countries included in this report encompass the 21 ITU Member States of the Arab region: Algeria, Bahrain, Comoros, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, United Arab Emirates and Yemen. Data and information in this report refer to the situation in Sudan before the independence of South Sudan in July 2011.

In order to understand ICT developments within the Arab region, it is important to distinguish between ICT adoption and network deployments between the high-income GCC (Gulf Cooperation Council) countries on the one hand, and the non-GCC countries, on the other hand. Due to ample oil reserves, GCC countries have higher income levels, which tends to translate into higher ICT adoption, stronger and wider network coverage and early migration to Next Generation Access Networks (NGANs).

Chart 2 presents the 2010 GDP per capita in the Arab countries, with the six GCC countries ranking at the top, and GDP per capita levels above 15'000 USD. Qatar, with a GDP per capita of more than 61'000 USD has the highest income level in the region. Income levels in the non-GCC countries range from below 1'000 USD per capita in Comoros, to just under 10'000 USD in Libya, which also heavily relies on oil reserves. Despite a relatively high income level, Libya's ICT networks, projects and adoption have remained substandard in relation to its peers (in terms of national income), mainly due to a political environment in which the ICT market has been dominated by a state-owned monopoly, except for mobile-cellular (voice) services, where two state-owned operators are competing with each other.

Chart 2. GDP per capita (current USD) in Arab countries (GCC and non-GCC), 2010



Note: * Data refer to 2009
Source: World Bank (http://data.worldbank.org/indicator/NY.GDP.PCAP.CD)

While there is a strong link between income levels and ICT uptake, some non-GCC countries, including Morocco, Egypt, and Tunisia with much lower income levels than their GCC neighbours, have done relatively well in certain ICT developments. Morocco, for example, was a relatively early adopter of NGAN technologies and has been able to leverage on NGAN to provide more people and previously unconnected areas with Internet access, bringing its 2010 Internet penetration to close to 50 per cent, which is on par with the GCC average. In Tunisia, fixed-broadband penetration had reached 4.6 per cent by end 2010, similar to Saudi Arabia and Bahrain.

Regulatory Landscape

An overview of the regulatory landscape of key telecommunication services in the Arab States, demonstrates that there are important differences among countries in terms of the liberalization of services, as well as in the number of service providers operating each service (Table 1 and 2). The most liberalized ICT services sector in the region is the mobile-cellular market, where Comoros and Djibouti remain the only two countries with only one mobile-cellular operator. In both Libya and Lebanon, two operators are competing, but both operators are government-owned.

Table 1. Regulatory landscape for fixed-telephony and fixed Internet services, Arab countries, December 2011

	Fixed telephony		Fixed Internet[1]		
Country	**Regulatory landscape**	**Number of service providers**	**Regulatory landscape**	**Number of service providers**	**Number of infrastructure providers (excluding LLU)**
Algeria	Monopoly	1	Competitive	21	1
Bahrain	Competitive	More than 6	Competitive	More than 11	3 (including 2 WiMAX providers)
Comoros	Monopoly	1	Monopoly	1	1
Djibouti	Monopoly	1	Monopoly	1	1
Egypt	Monopoly	1[2]	Competitive	166[4]	1
Iraq	Competitive	7	Competitive	More than 7	N/A[9]
Jordan	Competitive	1[11]	Competitive	19[5]	9 (including 5 WiMAX providers)
Kuwait	Monopoly	1	Competitive	4	1
Lebanon	Monopoly	1	Competitive	More than 25 providers	5 (including fixed wireless technologies, such as pre-WiMAX and CDMA)
Libya	Monopoly	1	Monopoly	1	1
Mauritania	Duopoly	2	Competitive	More than 2[6]	2
Morocco	Competitive	3	Competitive	3[7]	3 (including 1 WiMAX provider)
Oman	Duopoly	2	Competitive	2	2
Qatar	Duopoly	2[3]	Duopoly	2	2
Saudi Arabia	Duopoly	2	Competitive	50[8]	3 (including 2 WiMAX providers)
Sudan	Duopoly	2	Competitive	More than 2	2
Syria	Monopoly	1	Competitive	12	1
Tunisia	Monopoly	1	Competitive	11	1
UAE	Duopoly	2	Duopoly	2	2
Yemen	Monopoly	1	Duopoly	2	2

Notes:
(1) In terms of the regulatory landscape, fixed Internet services in this table include WiMAX services. The numbers of fixed Internet service providers refer to November 2011.
(2) NTRA postponed the second licence tender scheduled during 2008 due to the global economic situation.
(3) Vodafone Qatar Soft launched its fixed voice services in Qatar to a limited region known as “the Pearl” during September 26, 2011.
(4) Egypt has 7 Class A licensed ISPs, 4 Class B, 154 Class C and 1 global peering licensed operators.
(5) In addition, eight VoIP operators provided Direct Inward Dialling Services in Jordan by November 2011. 16 ISPs in Jordan provide ADSL services, two other operators provide WiMax services exclusively and 1 ISP exploits a fibre-optic network exclusively, providing FTTx services. The count excludes companies that offer dial-up Internet exclusively.
(6) There are two major ISPs that own the infrastructure in Mauritania.
(7) The three Internet service providers mentioned represent the vast majority of the Internet market in Morocco.
(8) By November 2011, the Saudi Arabian telecommunication regulator, the CITC, has licensed 50 ISPs.
Source: National regulatory authorities, Arab Advisors Group

Of the fully liberalized markets, Qatar was the last country to introduce competition in its mobile-cellular market in 2008, through the granting of a second mobile telecommunication license.[2]

As for the fixed-telephone markets, nine countries retain a monopoly. These markets are Algeria, Comoros, Djibouti, Egypt, Kuwait, Lebanon, Libya, Syria, and Yemen. Despite this, there is a high level of competition in the provision of fixed Internet services in most markets in the region, as regional Internet Service Providers (ISPs) are authorized to resell the infrastructure provided by the incumbent. The fixed Internet markets in Comoros, Djibouti and Libya remain monopolistic.

Local loop unbundling (LLU), which is the regulatory process of allowing multiple telecommunication operators to use connections from the telephone exchange to the customer's premises, was regulated and operational in less than half of the Arab States by the end of December 2010. Nine countries, namely Bahrain, Egypt, Lebanon, Morocco, Sudan, Syria, Tunisia, UAE and Yemen had implemented LLU. Table 3 details the regulatory landscape of LLU in the Arab countries.

In about half of the countries in the Arab region, VoIP services are either regulated and legal, or operational (see Table 4 for an overview of the regulatory landscape of VoIP services). The main driver for VoIP adoption is the significantly lower cost of international direct dialing (IDD), especially in markets with limited competition among operators in international gateway access, such as the UAE, where both operators with an international gateway are state-owned. In Yemen and Libya only the incumbent fixed operators have international gateway access.

In those markets where further competition has been introduced in international gateway access, such as in Jordan, Algeria and Kuwait, VoIP services emerged, offering end users a cheaper alternative to IDD.

A VoIP grey/black market remains in part of the region. Illegal forms of service provision include local unlicensed VoIP operators, such as in Yemen, were local call centres provide end users with telephony services through VoIP, mainly used for IDD services. The other illegal form is subscribing to VoIP providers operating in western territories, such as the United States.

[2] See http://www.ictqatar.qa/en/news-events/news/second-fixed-telecom-license-announced.

Table 2. Regulatory landscape for mobile-cellular and mobile-broadband services, selected Arab countries, December 2011

	Mobile-cellular services		Mobile-broadband services	
Country	**Regulatory landscape**	**Number of service providers**	**Regulatory landscape**	**Number of service providers**
Algeria	Competitive	3	Service not available	0
Bahrain	Competitive	3	Competitive	3
Comoros	Monopoly	1	Service not available	0
Djibouti	Monopoly	1	N/A[6]	N/A[6]
Egypt	Competitive	3	Competitive	3
Iraq	Competitive	4[1]	Monopoly	1[7]
Jordan	Competitive	3	Duopoly	2[8]
Kuwait	Competitive	3	Competitive	3
Lebanon	Government-owned duopoly	2	Service not available	0[9]
Libya	Government-owned duopoly	2	Monopoly	1
Mauritania	Competitive	3	Competitive	3
Morocco	Competitive	3	Competitive	3
Oman	Competitive	2[2]	Duopoly[10]	2
Qatar	Duopoly	2	Duopoly	2
Saudi Arabia	Competitive	4[3]	Competitive	3
Sudan	Competitive	3	Competitive	3
Syria	BOT duopoly	2[4]	Duopoly	2
Tunisia	Competitive	3[5]	Monopoly	1[10]
UAE	Duopoly	2	Duopoly	2
Yemen	Competitive	4	Monopoly	1

Notes:
(1) Including Mobitel, which is a regional cellular operator in Iraq; it operates in the Kurdistan region, only.
(2) In addition, there exist five operational mobile virtual network operator (MVNO) licensees in the market, one of which is operating two brands.
(3) The competitive landscape in Saudi Arabia includes three GSM operators and a corporate sector-focused iDEN operator (Bravo) which operates under a build operates transfer (BOT) agreement with STC.
(4) In September 2010, the Ministry of Communications and Technology announced the tender for a third mobile license in Syria. Saudi Telecom Company and Qatar Telecom QSC submitted their bids on March 30, 2011. The Ministry did not further proceed with the tender procedures due to the political instability in the country.
(5) The third mobile operator, Orange Tunisia commercially launched its services in May 2010.
(6) N/A refers to not available.
(7) Mobitel, operating only in the Kurdistan region, is the sole 3G provider in Iraq.
(8) The third market entrant, Umniah, has applied for a 3G license, and is expected to launch 3G (mobile-broadband services) during 2012.
(9) During the fourth quarter of 2011, both mobile-cellular operators in Lebanon launched 3G services, which encompass mobile-broadband services.
(10) In August 2011, Tunisia Telecom launched 3G services and became the second mobile operator offering mobile-broadband services.
(11) Mobile-broadband operators in Oman only include Mobile Network Operators (MNO) offerings, while MVNOs are excluded.
Source: ITU, National regulatory authorities, Arab Advisors Group

Table 3. Regulatory landscape of local loop unbundling (LLU), selected Arab countries, December 2011

Country	LLU regulation	Service	Notes
Bahrain	Operational	Internet and voice services	Batelco offers full local loop unbundling and the rate is BD 4.090 (USD 10.878) per line. The service became operational during 2011.
Comoros	Not Available		
Djibouti	Not Available		
Egypt	Operational	Internet services	Egypt has implemented shared local loop unbundling since 2002. The following LLU types are available: • Raw copper (full unbundling) • Line sharing (or partial unbundling i.e. access to the high-frequency portion of the local loop)
Iraq	Not Available		
Jordan	Planned	Internet services	Based on regulatory decision (no. 15-13/2010) dated July 17, 2010 on the fixed-broadband market review issued by the TRC, Jordan Telecommunications Company issued a local loop unbundling reference offer, which was published by the TRC in September 2011.
Kuwait	Not Available		
Lebanon	Operational	Internet services	Shared local loop unbundling for DSL access has been operational since 2007
Mauritania	Not Available		
Morocco	Operational	Internet and voice services	The following LLU types are available: • Raw copper (full unbundling) • Line sharing (or partial unbundling i.e. access to the high-frequency portion of the local loop)
Oman	Not Available		
Qatar	Not Available		
Saudi Arabia	Planned		In May 2009 the regulator (CITC) issued the regulatory framework on LLU.
Sudan	Operational		The following LLU types are available: • Raw copper (full unbundling) • Bit stream (or wholesale) access
Syria	Operational		The following LLU types are available: • Bit stream (or wholesale) access • High frequency spectrum (or line sharing) of the local loop for the provision of ADSL systems and services • Raw fibre
Tunisia	Operational	Internet Services	The following LLU types are available: • Raw copper (full unbundling) • Line sharing (or partial unbundling i.e. access to the high-frequency portion of the local loop) • Bit stream (or wholesale) access
UAE	Operational		The following LLU types are available: • Bit stream (or wholesale) access
Yemen	Operational		The following LLU types are available: • Raw copper (full unbundling) • Bit stream (or wholesale) access

Source: ITU, national regulatory authorities, Arab Advisors Group

Table 4. Regulatory landscape of voice over IP (VoIP), selected Arab countries, December 2011

Country	VoIP Regulation	VoIP provider(s)	Notes
Algeria	Regulated and legal	Anwar Net, Djaweb, Icosnet, Smart Link communication, Vocalone, Webcom	
Bahrain	Regulated and legal	Include: 2Connect, Lightspeed, Etisalcom, Kalaam Telecom, Nuetel Communications	
Egypt	Regulated and legal	Vodafone Egypt, Yalla Misr	LinkdotNet has a license, but service is not operational.
Iraq	Operational		Itisaluna is providing VoIP services through its network.
Jordan	Regulated and legal	Viacloud, Batelco, Tarasol, Orange Fixed, Orange Internet, Zain, MetroBeam (Kulacom) and XOL (Mada)	Eight VoIP operators provided direct inward dialing services by November 2011. The TRC excluded international calling cards from the VoIP list.
Kuwait	Operational	Fast Telco, Qualitynet, Gulfnet	
Lebanon	Regulated and illegal		According to TRA, a regulatory review is in progress
Libya	Illegal		
Mauritania		No regulatory framework in place	
Morocco	Regulated and legal	Maroc Telecom, Wana, Meditel	
Oman	No regulatory framework in place, legal	Nawras	Class 1 licensees (namely Nawras and Omantel) have the right to offer VoIP services to end users. Currently Nawras is providing VoIP services through its WiMAX network.
Qatar	Regulated and legal	Qtel, Vodafone Qatar	
Saudi Arabia	Regulated and legal but only to fixed-line operators	Go	Only fixed licencees, namely STC and Go, have the right to offer VoIP to end users. Go is offering VoIP services, while STC is leveraging its PSTN network for voice services.
Sudan	No regulatory framework in place		
Syria	Illegal		
Tunisia	Regulated and legal	Orange Tunisie, Tunet	
UAE	Regulated and legal	Du, Etisalat	The regulator (TRA) published a VoIP policy in December 2009; only licensed providers can deliver services
Yemen	Illegal		Although illegal, certain call centers provide VoIP services to the public.

Source: ITU, national regulatory authorities, Arab Advisors Group

Wireless network deployments

In order to provide a regional outlook on NGANs and services, this section focuses on 3G, WiMAX and LTE network deployments in the region. Annex 1 of this report provides an overview of the main operators in the region, and the technologies they provide.

In terms of NGANs, the GCC countries tend to be the early adopters (Table 5 presents the launch date of different 3G technologies UMTS/ HSPA, WiMAX and LTE). Bahrain and UAE launched 3G services as early as 2003, and Kuwait, Qatar and Saudi Arabia followed in 2006. Kuwait, Saudi Arabia and UAE are currently the only countries to have launched LTE networks. The non-GCC countries that launched 3G services in 2006 are Egypt, Libya and Morocco. Morocco also launched WiMAX as early as 2006.

Table 5. Launch dates of wireless networks, selected Arab countries

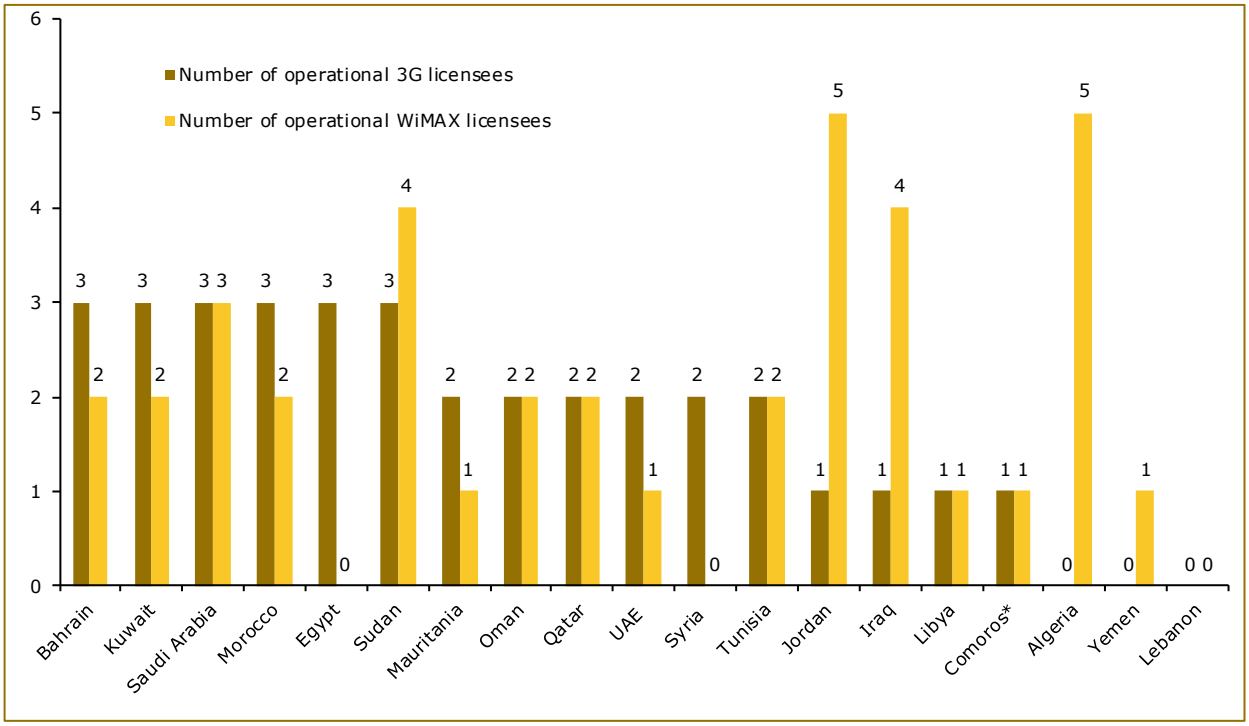
Country	Date of 3G (UMTS, HSPA) launch	Date of WiMAX launch	Date of LTE launch
Algeria	planned for 2012	April, 2007	Not launched yet
Bahrain	December 2003	September, 2007	Not launched yet
Egypt	July 2006	Not launched yet	Not launched yet
Iraq	February 2007*	2008	Not launched yet
Jordan	March 2010	November, 2007	Not launched yet
Kuwait	April 2006	July, 2006	December 2011
Lebanon	October 2011	February, 2008	Not launched yet
Libya	September 2006	January, 2009	Not launched yet
Mauritania	First half of 2009	N/A	Not launched yet
Morocco	July 2006	2006	Not launched yet
Oman	December 2007	May, 2010	Not launched yet (Omantel /Nawras licensed)
Qatar	2006	Qtel discontinued the service in July 2011	Not launched yet (Qtel and Vodafone Qatar licensed)
Saudi Arabia	June 2006	September 2008	September 2011
Sudan	2008	2011	Not launched yet
Syria	January 2009	Not launched yet	Not launched yet
Tunisia	May 2010	2006	Not launched yet
UAE	December 2003	September 2007	September , 2011
Yemen	Not launched yet	2010	Not launched yet

Note: * 3G is only available in the Kurdistan region
Source: ITU, national regulatory authorities, operators, Arab Advisors Group

Chart 3 below details the number of operational 3G and WiMAX networks by end 2010. It is noteworthy that there have been various 3G deployments during the year 2011. These network rollouts include the deployment of 3G by Lebanon's two mobile-cellular providers, Chinguitel in Mauritania, Zain in Jordan and Tunisie Telecom in Tunisia. On the other hand, 3G services have not been deployed yet in Algeria and Yemen. Although 3G is officially operational in Iraq, the only 3G operator is currently restricted to the Kurdistan region and the majority of Iraqis do not have access to 3G services.

As for WiMAX, Sudan launched a WiMAX network in 2011. The service is not yet available in Egypt and Syria.

Chart 3. Number of operational WiMAX and 3G licensees in Arab countries, 2011



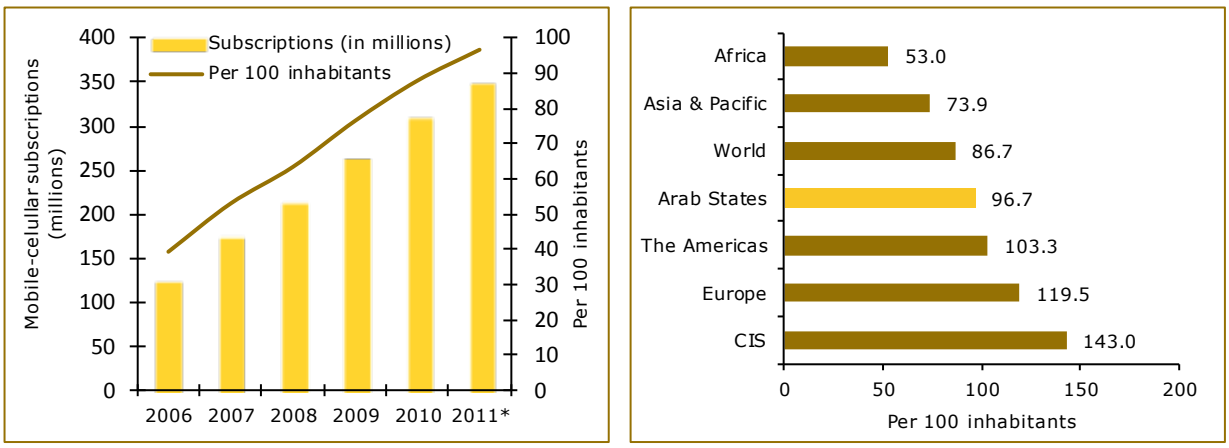
Note: *3G services were not available in 2011
Source: ITU, operators, Arab Advisors Group

Benchmarking ICT developments: the Arab States compared to other regions

In order to assess the achievements of the Arab States in terms of information and communication technologies, it is useful to compare the region's ICT penetration levels with other regions in the world, as well as to developed and developing countries and global penetration levels.

In terms of mobile-cellular penetration rates, ITU estimates that by the end of 2011, the Arab region had increased the number of mobile-cellular subscriptions to reach close to 350 million, from 126 million in 2006. This translates into a penetration rate of 96.7 per cent, which puts the region not only ahead of the world average (86.7 per cent) but also well ahead of Asia and the Pacific (73.9 per cent) and Africa (53 per cent). The Arab States lag behind the Americas, Europe and CIS, where penetration levels exceeded 100 per cent (Chart 4).

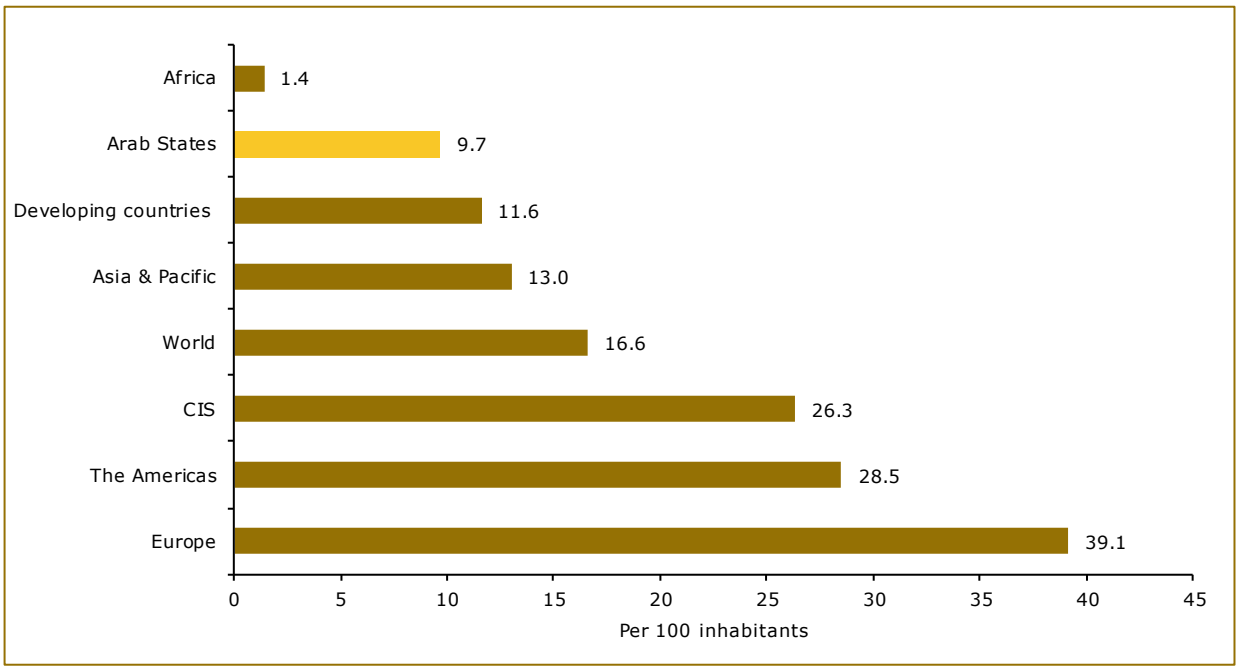
Chart 4. Mobile-cellular subscriptions: total numbers and penetration rates in the Arab region, 2006-2011* (left) and penetration rates, by region, 2011* (right)



Note: * 2011 data are ITU estimates
Source: ITU World Telecommunication/ICT Indicators database

The availability of fixed-telephone lines and fixed-telephone penetration in the Arab States, which peaked at around 10 per cent in 2008, has always been relatively limited. With the exception of Africa, all other developing regions have higher fixed-telephone penetration rates than the Arab States, which lag behind both, the global, as well as the developing country average of 16.6 per cent and 11.6 per cent, respectively (Chart 5).

Chart 5. Fixed-telephone subscriptions per 100 inhabitants, 2011*, by region

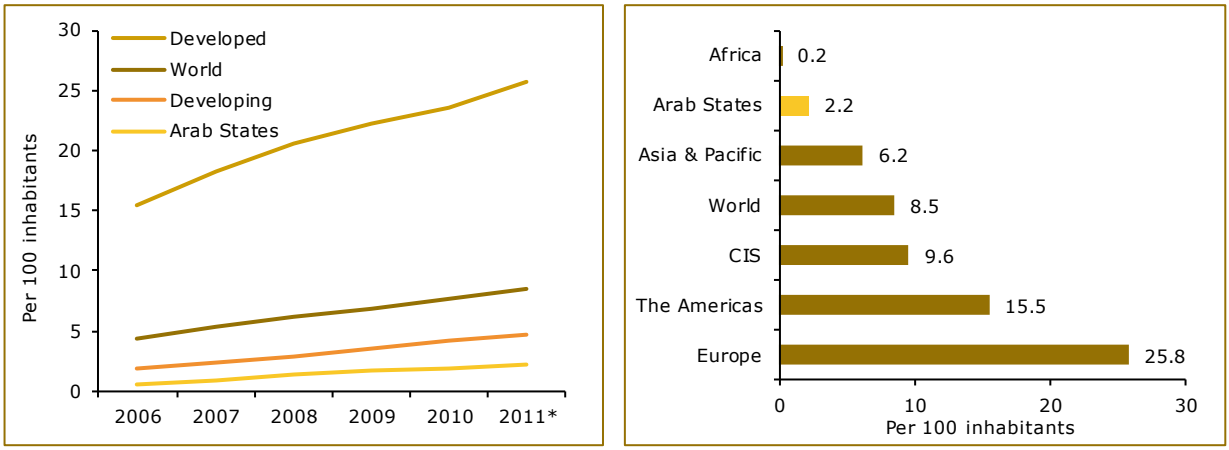


Note: * 2011 data are ITU estimates
Source: ITU World Telecommunication/ICT Indicators database

While mobile-cellular telephony has been able to replace the fixed-telephone network in terms of delivering basic voice services, the limited availability of a fixed-line telephone network has impacted the uptake of fixed-broadband Internet services, in particular via Digital Subscribers lines (DSL), the world's most popular fixed-broadband technology.

Since 2006 and compared to other world regions, including the world and the developing country average, the Arab States have lagged behind in terms of fixed-broadband penetration levels.[3] At the end of 2011, ITU estimates that fixed-broadband penetration in the Arab States stood at 2.2 per cent, compared to 6.2 per cent in Asia and the Pacific, 9.6 per cent in CIS, and 15.5 per cent and 25.8 per cent in the Americas and Europe, respectively. Africa's fixed-broadband penetration levels, at 0.2 per cent, remain well behind all the other regions (Chart 6).

Chart 6. Fixed (wired)-broadband subscriptions*, 2006-2011 (left) and 2011** (right)**

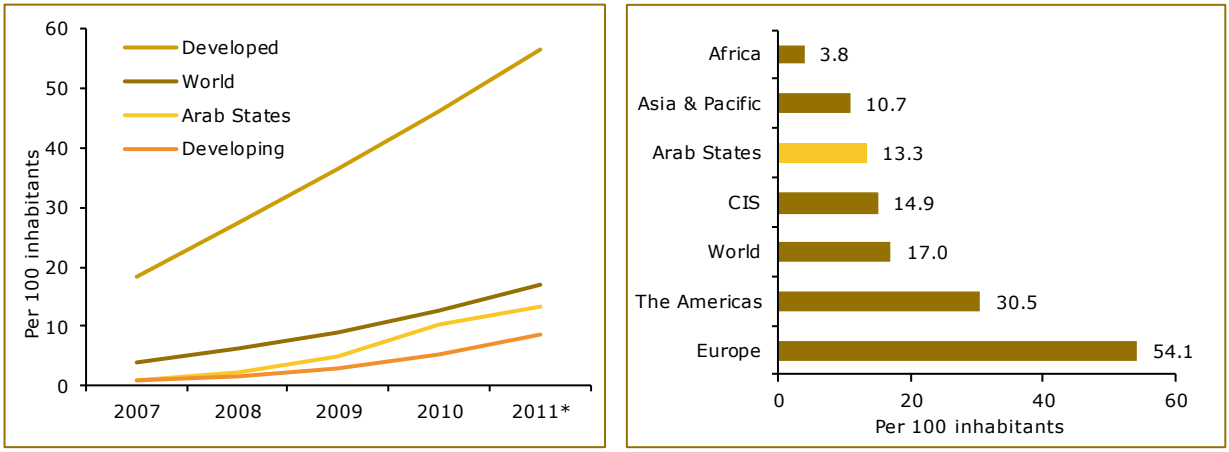


Note: * Data on fixed (wired)-broadband subscriptions exclude WiMAX subscriptions ** 2011 data are ITU estimates
Source: ITU World Telecommunication/ICT Indicators database

Compared to fixed-broadband services, the Arab States have done relatively better in terms of mobile-broadband services. With a number of relatively early adopters of 3G mobile-broadband technologies in the region, the number of active mobile-broadband subscriptions has grown rapidly from three million in 2007, to an estimated 48 million in 2011. Since 2007, mobile-broadband penetration rates in the Arab region have grown faster than in the developing countries overall, and by end 2011, ITU estimated that mobile-broadband penetration in the Arab region had reached 13.3 per cent, compared to 8.5 per cent in developing countries. The Arab region also has a higher mobile-broadband penetration rate than Asia and the Pacific and ranks only just behind the CIS region, where mobile-broadband penetration in 2011 had reached an estimated 14.9 per cent (Chart 7).

[3] It is important to note that since the 2010 revision of the ITU definitions of fixed (wired)- and wireless-broadband indicators, WiMAX subscriptions are part of the indicator *terrestrial fixed wireless broadband subscriptions*, which falls under the category of *wireless-broadband subscriptions*. Wireless-broadband subscriptions include three indicators: s*atellite broadband subscriptions*, *terrestrial fixed wireless broadband subscriptions* and *active mobile-broadband subscriptions*. Although ITU is collecting data on *wireless-broadband subscriptions*, data on *terrestrial fixed wireless broadband subscriptions* are provided by only a very small number of countries, so that international comparisons and regional aggregates are not yet available. For this reason, data for wireless-broadband subscriptions are currently only published on *active mobile-broadband subscriptions*. This effectively means that in the discussion on broadband subscription data, this report does not include data on WiMAX subscriptions. ITU is actively encouraging more countries to collect wireless-broadband data so that a more complete set of data, including terrestrial fixed-wireless broadband subscriptions, will be available soon. For more information on ITU wireless-broadband indicators, see: pp. 49-55 in ITU (2011b).

Chart 7. Active mobile-broadband subscriptions, 2007-2011* (left) and 2011* (right)



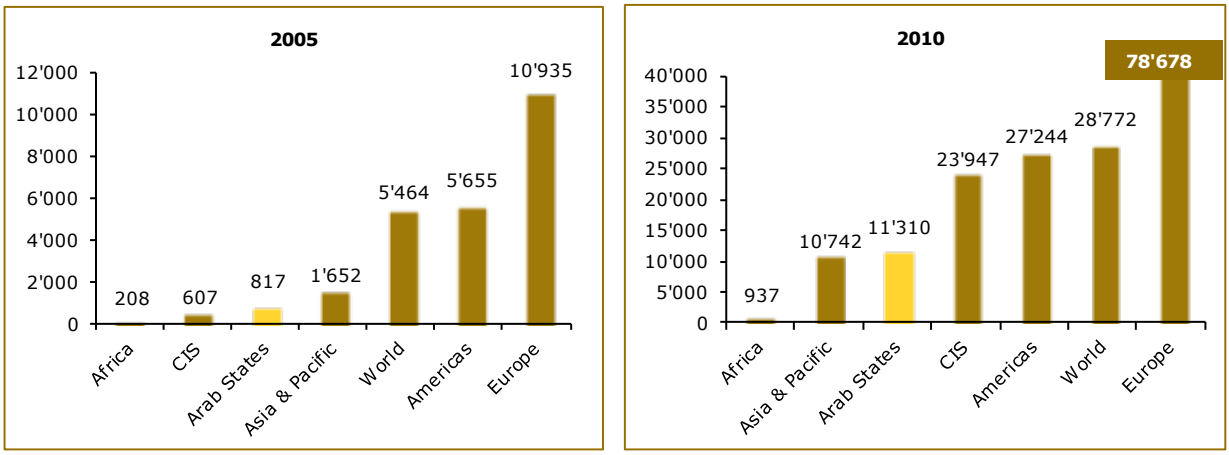
Note: * 2011 data are ITU estimates
Source: ITU World Telecommunication/ICT Indicators database

To bring more people online at high speed, all the building blocks of broadband access need to be in place and besides the roll-out of fixed and/or mobile end-user technologies, adequate bandwidth must be offered to individuals, homes and businesses. Sufficient access to international Internet bandwidth is a necessary requirement for delivering data-intensive applications and services through a high-speed Internet connection. A competitive bandwidth market, including the liberalization of international Internet gateways and the promotion of multiple international connections, is also important to guarantee reliable connectivity and to bring down ICT service prices that consumers pay.

Globally, international Internet bandwidth has increased tenfold over the last ten years and particularly between 2008 and 2010, when it almost doubled from 29'000 Gbit/s to 59'000 Gbit/s. Growth over that two-year period was somewhat stronger in developing countries (54 per cent) compared with developed countries (49 per cent), and between 2005 and 2010 developing countries increased their share of total international Internet bandwidth from 11 to 20 per cent.

A regional comparison of international Internet bandwidth per Internet user shows that, while all regions in the world have substantially increased Internet bandwidth per user since 2005, there are great disparities between regions. Europe, in particular, stands out for its very large amount of bandwidth capacity. In 2010, the average European Internet user enjoyed almost 80 000 bit/s of bandwidth, as against 1 000 bit/s for the average African Internet user. Internet users in the Arab States had on average around 11 000 bit/s at their disposal, just slightly more than Internet users in Asia and the Pacific. The Arab region lagged behind the other regions of CIS and the Americas, where Internet users enjoyed more than twice the amount of bandwidth (Chart 8).

Chart 8. International Internet bandwidth (bit/s per user), by region, 2005 and 2010



Source: ITU (2011a)

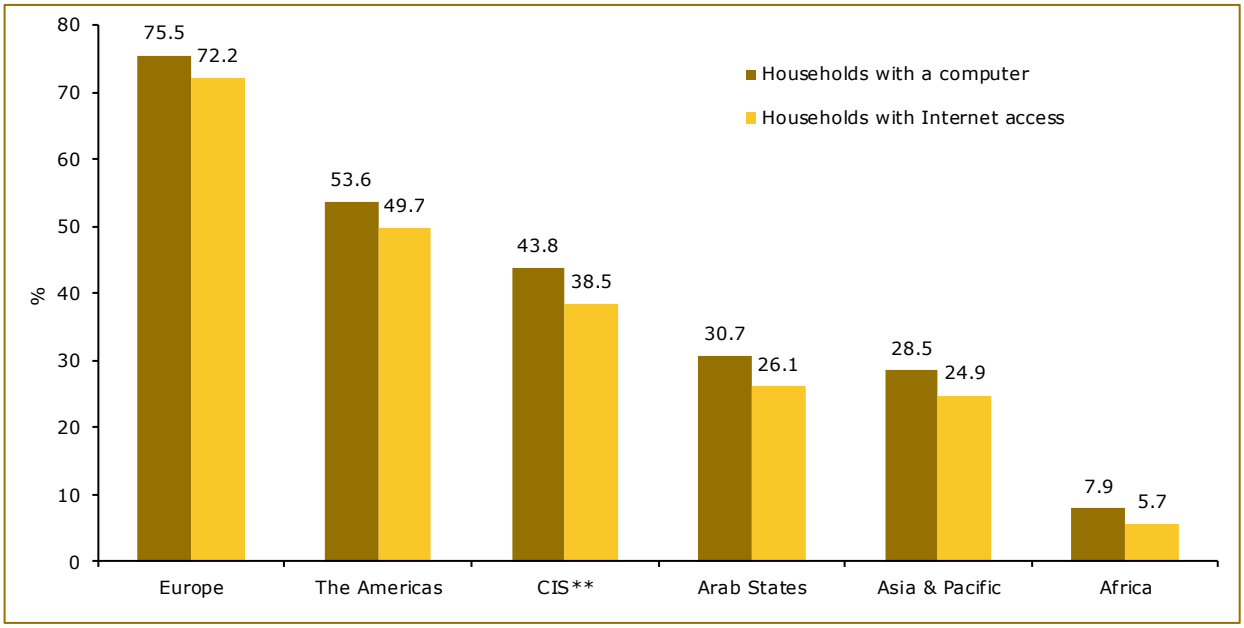
ICT access and use by households and individuals in the Arab region

ITU estimates that by end 2011, about 31 per cent of households in the Arab region had a computer, and that some 26 per cent of households had Internet access at home. Some efforts have to be made to connect more households in the region in order to achieve the Broadband Commission for Digital Development's target of having 40 per cent of households in developing countries with Internet access by 2015.[4]

While household ICT connectivity is slightly higher in the Arab States than in the Asia and the Pacific region, the region lies behind the world average and well behind the CIS and the Americas, where the percentage of households with Internet access is almost 40 and 50 per cent, respectively. In Europe, about three out of four households have a computer and Internet access at home. This stands in stark contrast to Africa, where less than one out of ten households are equipped with a computer and have Internet access (Chart 9).

[4] For more information, see: http://www.broadbandcommission.org/Documents/Broadband_Targets.pdf.

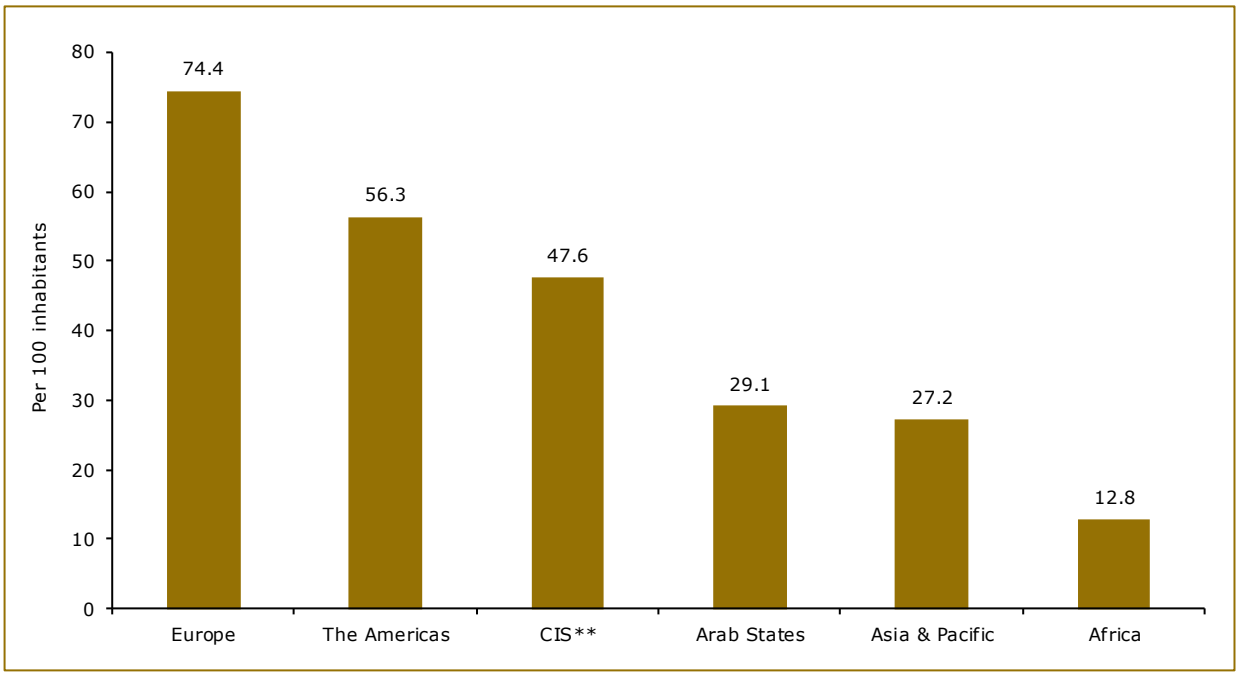
Chart 9. Proportion of households with a computer and with Internet access, by region, 2011*



Note: * 2011 data are ITU estimates ** Commonwealth of Independent States
Source: ITU World Telecommunication/ICT Indicators database

While by end 2011 ITU estimated that globally more than one third of the population was online, Internet user penetration in the Arab States is somewhat lower, at about 29 per cent. This compares to lower Internet penetration levels in Asia and the Pacific (27.2 per cent) and Africa (12.8 per cent) but puts the Arab region well behind the CIS (47.6 per cent), the Americas (56.3 per cent), and Europe (74.4 per cent) (Chart 10).

Chart 10. Proportion of individuals using the Internet, 2011*



Note: * 2011 data are ITU estimates ** Commonwealth of Independent States
Source: ITU World Telecommunication/ICT Indicators database

It is worth noting, however, that only a few countries in the Arab region produce Internet user estimates based on information collected through household surveys (see Box 1). Most of the countries make estimates based on administrative registries, which diminishes the reliability and accuracy of the information.

Box 1. Data availability on ICT access and use by households and individuals in Arab countries

An increasing number of countries are collecting ICT data through official household surveys in order to complement administrative data usually produced by telecommunication operators. Since ICT data collected through surveys help produce data on the actual access to, and use of, ICTs by households and individuals (but also governments, educational institutions etc), they provide important and reliable information necessary to analyze the uptake and impact of ICTs. They can also be broken down by characteristics such as age, income levels and gender, providing even more in-depth information for analysis. Hence the important role of national statistical offices in collecting ICT data through official surveys or the census, in order to guarantee a nationally representative, internationally comparable and meaningful set of data.

Indeed, recent (2008-2010) data on households with a computer and households with Internet access, and/or data on Internet users for countries in the Arab region are available for only a relatively small number of countries. Data have been collected by national statistics offices either through the 2010 population and housing census round, or through household surveys. Djibouti and Qatar have produced census-based data for some ICT indicators (see Box Table 1); although the data have not been reported to ITU[5]. Egypt has also produced data for ICT indicators based on an ICT household survey. Algeria and Jordan collected data on households with a computer and households with Internet access in both 2008 and in 2009. For Iraq, data for some household ICT access indicators are available for 2008 only, whereas Sudan included a question on households with a computer in its census in the same year.

Other government agencies from countries such as Morocco and Qatar have also conducted specific ICT household surveys. One important issue that needs to be addressed is the population represented by the survey. For example, in the case of Qatar only individuals 18 years old and above are considered, while in the case of Morocco, only individuals between 12 and 64 years are included. This causes a problem of comparability of the results, in particular when estimating the number of Internet users and other related ICT usage indicators, which should be representative of the total population of a country.

Box Table 1. Data availability for household ICT statistics based on surveys/censuses conducted by National Statistical Offices (NSOs)

Indicator	Household survey	Population and housing census
Proportion of households with a computer	Algeria (2008 and 2009) Jordan (2008 and 2009) Iraq (2008) Egypt (2009)	Algeria (2008) Sudan (2008) Djibouti (2009) Qatar (2010)
Proportion of households with Internet access	Algeria (2008 and 2009) Jordan (2008 and 2009) Iraq (2008) Egypt (2009)	Algeria (2008) Djibouti (2009) Qatar (2010)
Internet users	Egypt (2009)	Djibouti (2009) Qatar (2010)

Source: ITU

[5] None of the Arab states have reported census data to ITU, however, information on the questions that have been included in the questionnaires is available from the 2010 world population and housing census programme, at: http://unstats.un.org/unsd/demographic/sources/census/censusquest.htm.

The ITU ICT Development Index (IDI)[6]

To put ICT developments in the Arab region into context and to be able to benchmark the region's progress within a global context, it is also interesting to analyze the region's achievements using the ICT Development Index (IDI).

The IDI captures the level of ICT developments in 152 economies worldwide by combining 11 indicators into one benchmark measure and compares progress over time. The latest IDI, which is based on end 2010 data, shows that ICT uptake continues to accelerate worldwide, with all countries, including those in the Arab region, improving their IDI scores. Within the Arab States region, the highest-ranked country is the United Arab Emirates (UAE), which ranks 32nd globally. Other high-income economies of the Gulf Cooperation Council (GCC) that rank in the top 50 of the global IDI include Bahrain, Qatar and Saudi Arabia (see Table 6).

Table 6. ICT Development Index (IDI) 2010 and 2008, Arab countries

	Regional rank 2010	Global rank 2010	IDI 2010	Global rank 2008	IDI 2008	Global rank change 2008-2010
United Arab Emirates	1	32	6.19	32	5.63	0
Qatar	2	44	5.60	48	4.50	4
Bahrain	3	45	5.57	42	5.16	-3
Saudi Arabia	4	46	5.42	55	4.13	9
Oman	5	60	4.38	68	3.45	8
Jordan	6	73	3.83	73	3.29	0
Lebanon	7	79	3.57	77	3.12	-2
Tunisia	8	84	3.43	82	2.98	-2
Morocco	9	90	3.29	100	2.60	10
Egypt	10	91	3.28	92	2.73	1
Syria	11	96	3.05	96	2.66	0
Algeria	12	103	2.82	105	2.41	2
Yemen	13	127	1.72	127	1.49	0
Comoros	14	128	1.67	130	1.44	2
Djibouti	15	129	1.66	124	1.56	-5
Mauritania	16	131	1.58	126	1.50	-5
Regional average (simple)			3.57		3.04	

Source: ITU (2011a)

[6] The text in this section was adapted from ITU (2011a), chapter 2.

The low-income economies of the region, including Comoros, Djibouti, Mauritania and Yemen, occupy low positions in the regional as well as in the global IDI rankings. These disparities are reflected in a large variation in IDI values among countries in the region, which ranged from 6.19 in the United Arab Emirates to 1.58 in Mauritania. Both Mauritania and Djibouti fell five places in the 2010 IDI rankings in relation to 2008, with relatively little progress in most areas, including international Internet bandwidth and fixed telephony. Djibouti is one of the few countries in the world that has a mobile-cellular penetration of below 20 per cent.

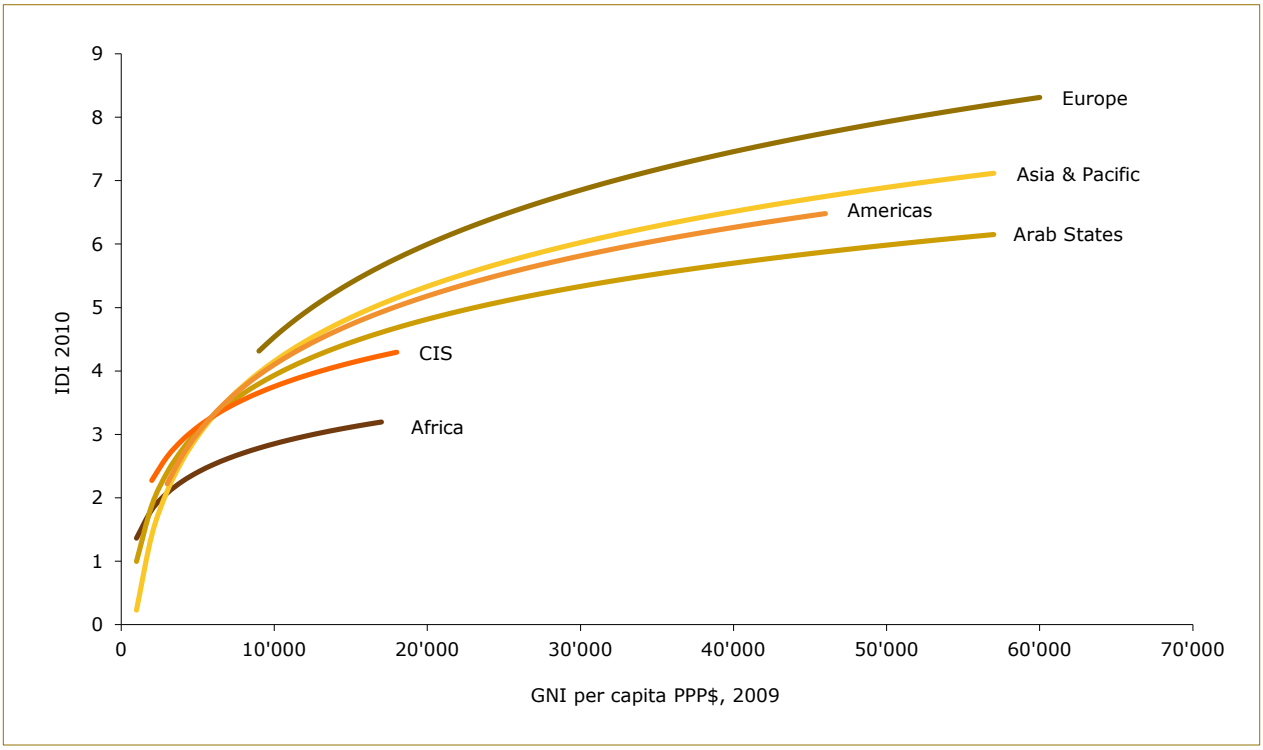
During the period 2008 to 2010, Morocco, Oman and Saudi Arabia registered the highest IDI rank increase within the region. These three countries are also among the most dynamic countries in the global IDI.[7] Morocco and Oman substantially increased the number of Internet users, together with the number of active mobile-broadband subscriptions, while Saudi Arabia made important progress in expanding international Internet bandwidth, and in terms of the number of mobile-broadband subscriptions, which increased from two million to almost 16 million between 2008 and 2010. By 2010, Qatar was leading the region in terms of the proportion of households with a computer and Internet, allowing the country to gain four places in the global rankings.

While the IDI findings confirm the link between ICT development levels on the one hand, and income levels on the other hand, a closer look at the correlation between these two factors also points to differences between regions. Chart 11 plots on a single chart the relation between IDI and GNI per capita in each one of the world's regions. The CIS and Africa have the weakest relation between the two variables, with both regions' curves lying below the others. For instance, a country with GNI per capita of PPP$ 10 000 in Africa will tend to have a lower IDI than a country with the same income from any other region. To a lesser extent, this also applies to CIS countries. This finding highlights the importance of effective ICT policies and efficient investment, which may make the difference in terms of achieving increased ICT development with the same (or similar) economic resources.

The countries with high income and high IDI appear at the other end of the chart. Of all regions which are home to countries with high GNI per capita, the Arab States region has the weakest relation between income and IDI. Indeed, the Arab States' curve lies below those for the Americas, Asia and the Pacific and Europe. This means that, for instance, a country with a GNI per capita of PPP$ 40 000 in the Arab region will tend to have a lower IDI than a country with the same income in the Americas, Asia and the Pacific or Europe. This suggests that, given their economic resources, the Arab States possess a high potential for further ICT development, at least to reach the ICT performance of countries with similar incomes in other regions. To achieve this objective, effective ICT policies will play a crucial role.

[7] See section 2.2 of ITU (2011a).

Chart 11. IDI and GNI per capita, by region



Source: ITU (2011a)

The ICT Price Basket (IPB)[8]

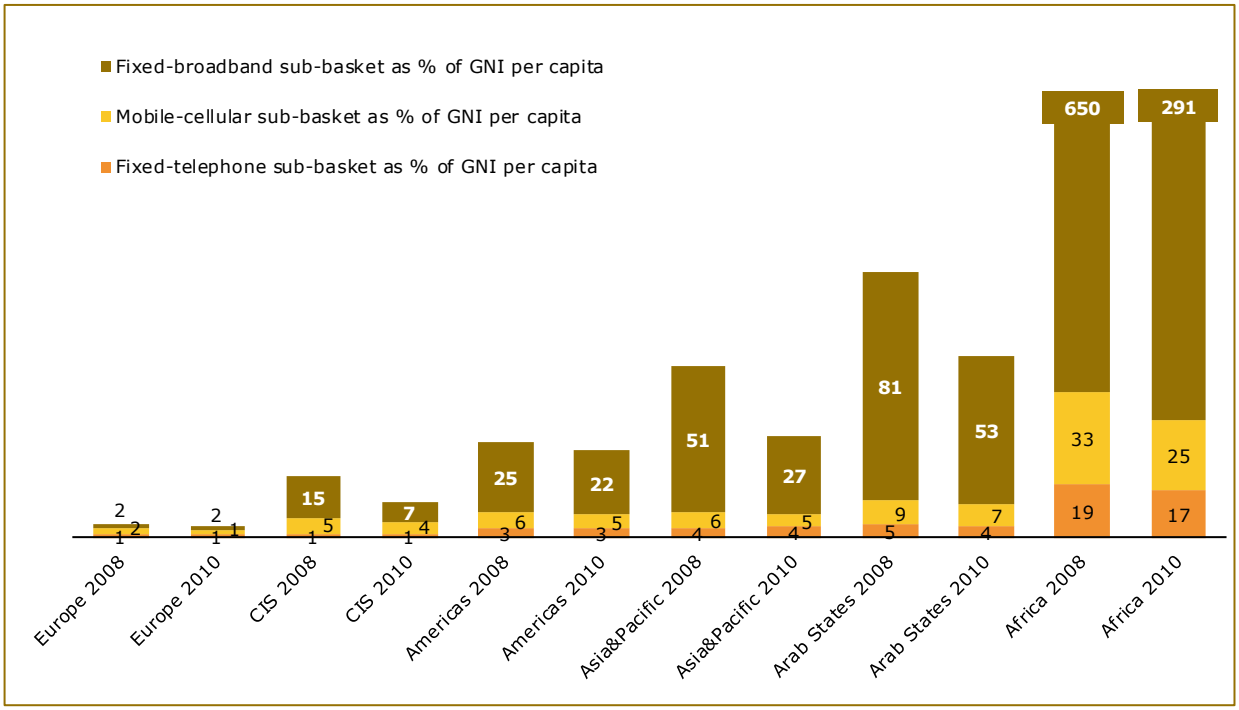
Besides understanding ICT trends in terms of such factors as infrastructure access and ICT skills, it is also important to analyze and track prices of ICT services. The cost and affordability of ICT services will influence and in some cases determine whether or not people will be able to subscribe to certain services and use ICTs. It is therefore useful to look at ICT trends in the Arab region in relation to ICT prices, using the ICT Price Basket (IPB).

The IPB is a composite basket based on the price for fixed-telephony, mobile-cellular telephony and fixed-broadband Internet services, and computed as a percentage of average income levels. The latest IPB includes 165 economies and provides a useful indication of how affordable services are across countries, regions, and over time.

The results of the latest IPB confirm that globally, as well as in the Arab region, the price for ICT services overall are falling, and becoming more affordable. Prices for fixed-broadband services, in particular, have dropped by over 50 per cent globally between 2008 and 2010, and by 35 per cent in the Arab region. At the same time, a regional comparison of the IPB suggests that prices in the Arab States remain relatively high and that by end 2010, only Africa presents relatively higher prices (Chart 12).

[8] The text in this section was adapted from ITU (2011a), chapter 3.

Chart 12. ICT Price sub-baskets by region and by level of development, 2008 and 2010



Source: ITU (2011a)

The results of the latest IPB also show that there are major differences in terms of the affordability of services within the region. All of the economies from the Arab States region that rank in the top 50 of the IPB (United Arab Emirates, Bahrain, Saudi Arabia, Oman) have relatively high-income levels. The UAE, which ranks fifth globally, has the relatively cheapest prices in the region, followed by Bahrain, Saudi Arabia and Oman, where the IPB represents less than two per cent of average monthly incomes. In Tunisia, Qatar, Algeria, Lebanon, Egypt and Jordan, the IPB represents less than four per cent of average monthly incomes. ICT services remain largely unaffordable (representing more than 20 per cent of incomes) in Comoros, Yemen, Djibouti and Mauritania[9] (Table 7).

[9] Djibouti was not included in the latest ICTPB, for lack of tariff data.

Table 7. ICT Price Basket and sub-baskets, Arab countries, 2010 and 2008

Global IPB rank	Regional IPB rank	Country	ICT Price Basket		Fixed-telephone sub-basket as a % of GNI per capita		Mobile-cellular sub-basket as a % of GNI per capita		Fixed-broadband sub-basket as a % of GNI per capita		GNI per capita, USD, 2009 (or latest available year)
			2010	2008	2010	2008	2010	2008	2010	2008	
5	1	United Arab Emirates	0.4	0.4	0.1	0.1	0.2	0.2	0.8	0.8	57'340
18	2	Bahrain	0.7	0.7	0.2	0.2	0.7	0.7	1.3	1.3	25'420
36	3	Saudi Arabia	1.1	1.5	0.6	0.6	1.0	1.1	1.8	2.7	17'700
39	4	Oman	1.2	1.1	0.9	0.7	0.6	0.7	2.1	2.1	17'890
65	5	Tunisia	2.5	3.1	0.8	1.0	3.2	4.3	3.4	4.1	3'720
70	6	Qatar	2.7	2.7	0.9	0.9	1.8	1.7	5.5	5.5	12'000
71	7	Algeria	3.0	3.5	1.5	1.3	3.4	4.4	4.0	4.8	4'420
72	8	Lebanon	3.0	3.8	1.5	1.8	4.1	5.7	3.4	4.0	8'060
78	9	Egypt	3.5	4.4	1.7	2.0	4.1	5.6	4.6	5.5	2'070
84	10	Jordan	3.9	4.4	2.9	3.1	3.2	3.4	5.7	6.7	3'980
107	11	Syria	7.1	N/A	0.6	N/A	9.9	N/A	10.8	N/A	2'410
117	12	Morocco	9.6	12.5	9.2	11.1	14.3	17.2	5.1	9.2	2'770
129	13	Mauritania	23.4	38.0	22.5	18.2	18.3	18.6	29.4	77.1	960
130	14	Djibouti	24.7	40.4	7.7	8.1	14.0	13.1	52.3	111.6	1'280
144	15	Yemen	36.8	37.4	1.2	1.0	9.2	11.0	134.9	281.6	1'060
158	16	Comoros	49.1	53.7	13.8	17.9	33.5	43.2	534.5	690.8	870

Source: Adapted from ITU (2011a)
Note: The following countries from the Arab region were not included in the IPB: Iraq, Kuwait, Libya, Somalia and Sudan

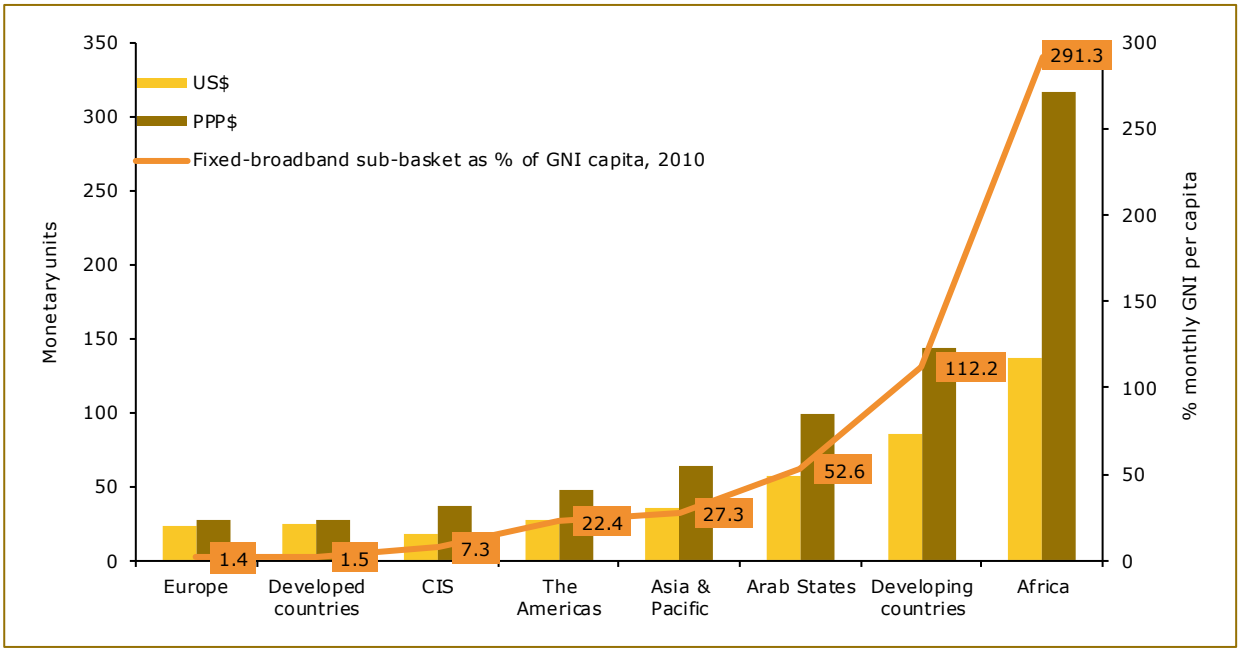
An analysis of the three sub-baskets (fixed-telephony, mobile-cellular-telephony, and fixed-broadband Internet) suggests that prices in the Arab States as a whole are relatively expensive, with only Africa showing higher prices in relative terms.

Based on the mobile-cellular sub-basket, Europeans pay on average as little as 1.6 per cent of their monthly income, compared to 4.1 and 4.6 per cent in the CIS and Asia and the Pacific, and 5.1 per cent in the Americas. In the Arab States, the mobile-cellular sub-basket averaged 7.4 per cent, only surpassed by Africa, where the sub-basket represents as much 24.6 per cent of average monthly incomes. While between 2008 and 2010 the prices for mobile-cellular services decreased by 15 per cent in the Arab States (and Europe), higher price drops of 25 per cent were recorded in Africa and CIS.

The Arab region's average value for the fixed-broadband sub-basket, in particular, remained relatively expensive, at almost 53 per cent of average incomes, compared to about half that value in Asia and the Pacific, and the Americas, and much less in CIS and Europe (Chart 13). It should also be noted that given relatively high prices in the region, the price drop for fixed-broadband Internet prices (at 35 per cent) was rather moderate between 2008 and 2010, especially in comparison to CIS and Asia and the Pacific, where fixed-broadband prices dropped by as much as 52 and 47 per cent. This finding suggests that more must be done to make ICT services, and fixed-broadband services in particular, more affordable in the region, especially if the region is to achieve the target set by the Broadband Commission for Development, which is "to make sure that by 2015, entry-level broadband services should amount to less

than five per cent of average monthly income".[10] By the end of 2010, in half of the Arab States included in the IPB, the price of an entry-level broadband service accounted for less than five per cent of monthly incomes. The relatively high price for fixed-broadband services for the Arab States is due mainly to the high prices for fixed-broadband services in a few countries. In Comoros and Yemen, for example, the price for a monthly fixed-broadband subscription actually exceeds the average monthly income.

Chart 13. Fixed-broadband sub-basket by region and by level of development, 2010



Source: ITU (2011a)

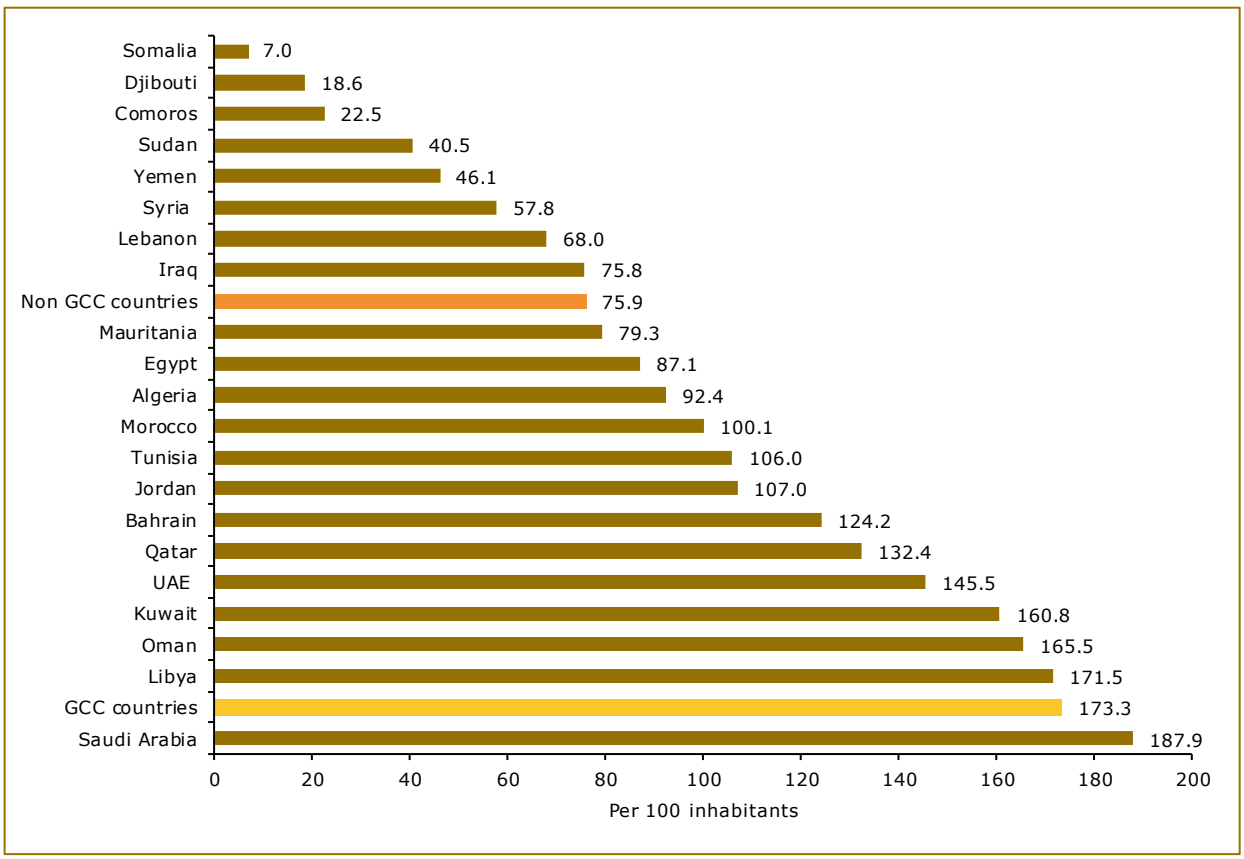
ICT uptake within the Arab region

The remaining part of this section will provide an overview on ICT adoption in each of the Arab countries, and highlights differences within the region. Detailed country-level information concerning mobile-cellular, fixed-telephone, and fixed-Internet services for each country are presented in section 2 of this report.

Mobile-cellular services in the region have expanded rapidly over the last decade and while penetration rates vary considerably between below 20 per cent in Somalia and Djibouti, to close to 190 per cent in Saudi Arabia, the large majority of countries, including Iraq and Mauritania, have reached penetration levels above 75 per cent. In some countries in the region, 2010 mobile-cellular penetration rates exceeded those of developed markets, such as Western Europe and North America and the GCC country average of 173 per cent was well above the developed world average of 114 per cent (Chart 14).

[10] For more information, see http://www.broadbandcommission.org/Documents/Broadband_Targets.pdf.

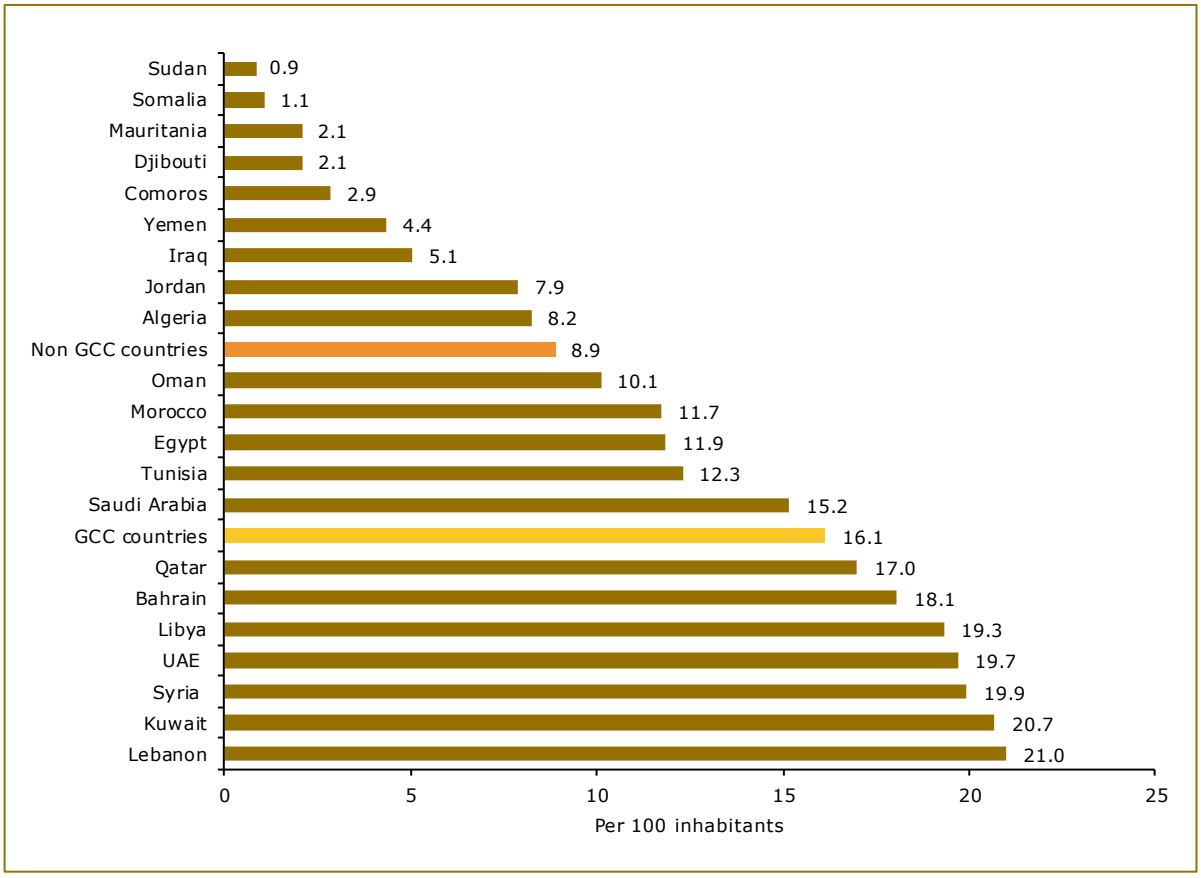
Chart 14. Mobile-cellular subscriptions in the Arab countries , 2010



Source: ITU World Telecommunication/ICT Indicators database

The number of fixed-telephone subscriptions is stagnant within the Arab States region and in 2010, the majority of countries in the region had a fixed-telephone penetration rate below the global average of 17 per cent. Penetration rates ranged from a very low 0.9 per cent in Sudan, to 21 per cent in Lebanon. Interestingly, a number of non-GCC countries, such as Lebanon and Syria, have higher fixed-telephone penetration rates than some GCC countries, including Qatar and Bahrain (Chart 15).

Chart 15. Fixed-telephone subscriptions in the Arab countries, 2010



Source: ITU World Telecommunication/ICT Indicators database

Unlike fixed-telephone subscriptions, the number of fixed- and mobile-broadband subscriptions in the region continues to grow. Fixed-(wired) broadband penetration rates are still relatively low. The service is hardly available in Comoros, Mauritania and Yemen, and the penetration rate in the country with the highest fixed (wired)-broadband connectivity – the UAE – is around 10 per cent. Qatar ranks second in the region, with a penetration rate of 8.2 per cent, followed by Saudi Arabia and Bahrain but also by non-GCC countries of Lebanon and Tunisia, which have been able to take advantage of their relatively high fixed-telephone penetration levels to roll out DSL.

In terms of mobile-broadband subscriptions, the GCC countries have clearly taken the lead. By end 2010, Kuwait, the UAE and Saudi Arabia had reached mobile-broadband penetration rates of above 50 per cent, followed by Qatar (28.4 per cent) and Bahrain (21.3 per cent). Morocco and Oman's mobile-broadband penetration levels stood at around 10 per cent. Levels remained very low, or services were not available, in Algeria, Comoros, Djibouti, Iraq, Lebanon, Syria, Tunisia and Yemen (Table 8).

Table 8. Fixed (wired)- and active mobile-broadband subscriptions per 100 inhabitants, Arab countries, 2010

	Fixed (wired)-broadband penetration rate	Active mobile-broadband penetration rate
Algeria	2.5%	0.0%
Bahrain	5.4%	21.3%
Comoros	0.0%	0.0%
Djibouti	0.9%	0.0%
Egypt	1.8%	6.4%
Iraq	0.0%	0.0%
Jordan	3.2%	2.4%
Kuwait	1.7%	63.5%
Lebanon	4.7%	0.0%
Libya	1.2%	42.7%
Mauritania	0.2%	3.1%
Morocco	1.6%	10.0%
Oman	1.6%	10.7%
Qatar	8.2%	28.4%
Saudi Arabia	5.5%	57.8%
Somalia	Not available	0.0%
Sudan	0.4%	3.1%
Syria	0.3%	1.3%
Tunisia	4.6%	1.1%
UAE	10.5%	58.4%
Yemen	0.4%	0.0%

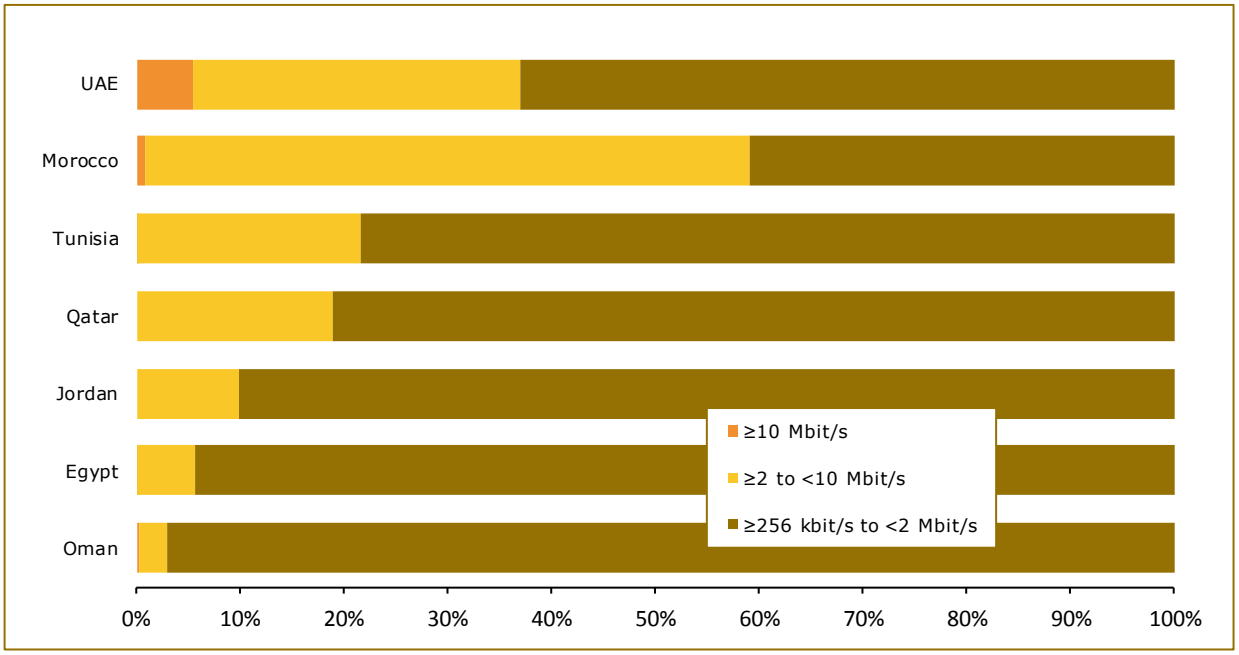
Source: ITU World Telecommunication/ICT Indicators database

To understand the potential economic and social impact of broadband it is important to look at broadband speeds. An increasing number of Arab countries are collecting data on fixed (wired)-broadband subscriptions broken down by advertized speed. This provides valuable additional information, since broadband speed greatly determines usage, and thus the potential impact of broadband. Despite the increasing availability of fixed (wired)-broadband speed data, the analysis is limited in the region to the seven countries currently reporting such data (Chart 16).

Available data suggest that the majority of fixed (wired)-broadband subscriptions in the region are below 2 Mbit/s. Morocco and the United Arab Emirates stand out for their higher speeds. Only in the United Arab Emirates more than one per cent of all fixed (wired)-broadband subscriptions provide speeds equal to, or above 10 Mbit/s; some 30 per cent of the country's subscriptions are advertized at between 2 to 10 Mbit/s. In Morocco, about 60 per cent of all fixed (wired)-broadband subscriptions have speeds between 2 Mbit/s and 10 Mbit/s, but only a very small percentage provide speeds above 10 Mbit/s. In Egypt, Jordan, Oman, Qatar and Tunisia, the vast majority of fixed (wired)-broadband subscriptions provide speeds between 256 kbit/s and 2 Mbit/s.

It can thus be concluded that low-speed fixed (wired)-broadband subscriptions are predominant in those Arab countries reporting the data. Even in the United Arab Emirates high-speed fixed (wired)-broadband connections are scarce compared with developed countries, since in most developed countries, more than 10 per cent of all fixed (wired)-broadband connections have speeds equal to, or above 10 Mbit/s.

Chart 16. Fixed (wired)-broadband subscriptions* by speed, 2011



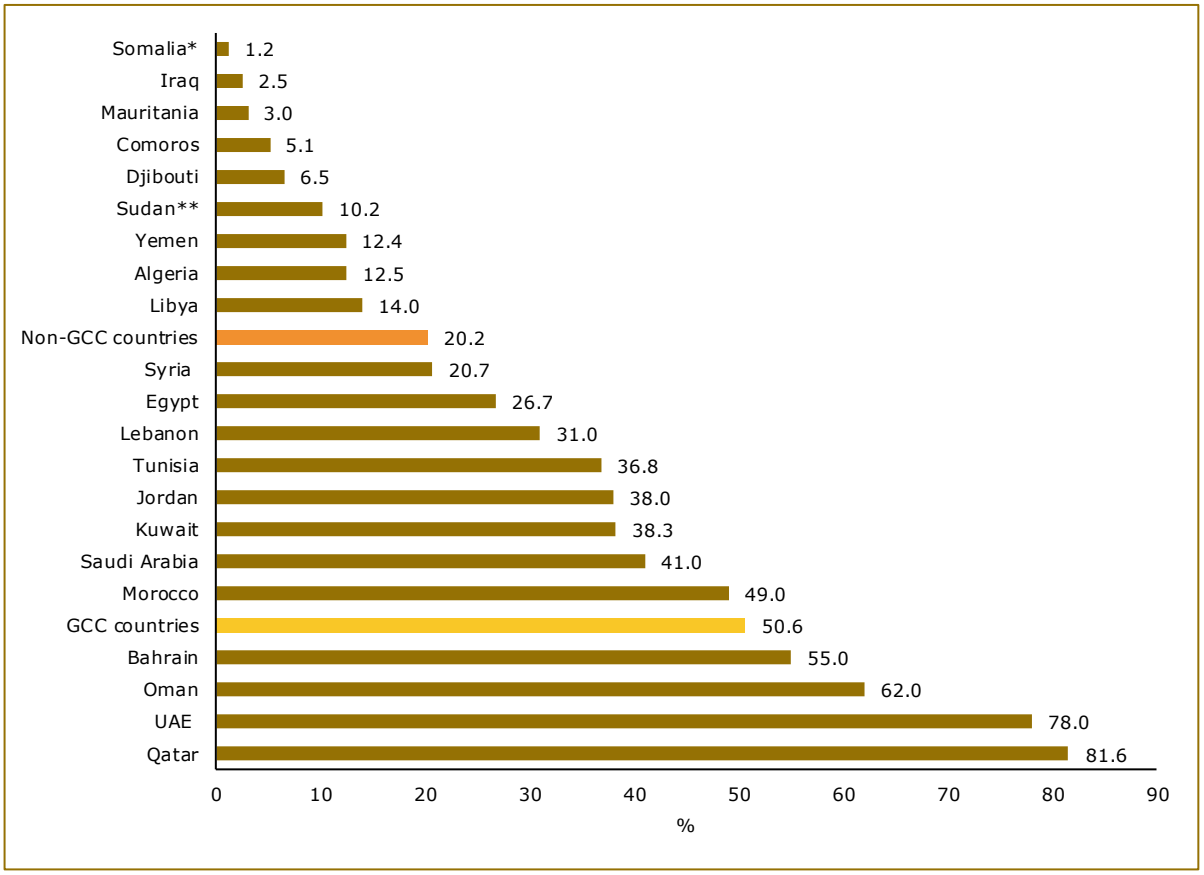
Note: Refers to advertised speeds * Data on fixed (wired)- broadband subscriptions exclude WiMAX subscriptions
Source: ITU World Telecommunication/ICT Indicators database

Finally, Internet user penetration levels in the Arab States vary from around 80 per cent in Qatar and UAE, to below five per cent in Mauritania, Iraq and Somalia. At just over 50 per cent, the GCC countries have reached Internet user penetration levels more than twice as high as the non-GCC countries. Selected economies, though, including Morocco, Jordan and Tunisia – where between one third and half of the population is using the Internet – have done comparatively well, given their relatively low income levels (Chart 17). As mentioned earlier in this section (Box 1), Internet usage data in the region are mostly estimates and require further improvements.

So far (by the end of 2011), only four Arab countries have achieved the Broadband Commission's 2015 target of ensuring that half of their population is online, although a number of countries – including Morocco and Saudi Arabia, are well positioned to meet the target.[11] Internet access in the region can be increased by bringing down prices, improving (ICT) literacy levels and skills, and making available relevant local content.

[11] For more information, see: http://www.broadbandcommission.org/Documents/Broadband_Targets.pdf.

Chart 17. Percentage of individuals using the Internet in the Arab countries, 2010



Note: *data refer to 2009 ** data refer to 2008
Source: ITU World Telecommunication/ICT Indicators database

Section II. Country-level analysis of ICT regulation, adoption and projects

The following section provides for each of the 21 Arab countries[12] an overview of the ICT market and presents ongoing ICT projects in the five areas identified under the ITU WTDC-10 Regional Initiatives for the Arab region[13]: broadband access networks, digital broadcasting, open-source software, Arabic digital content, and cybersecurity.

ALGERIA

Market overview

There are three main entities in charge of regulation of the ICT sector in Algeria: Autorité de Régulation de la Poste et des Télécommunications (ARPT), Agence nationale des Fréquences (ANF) and Ministère de la Poste et des Technologies de l'Information et de la Communication (MPTIC).

ARPT is in charge of regulating both the post and telecommunication markets. It was established in 2000, and commenced its operations in August 2001. ARPT is the sole government entity to issue telecom licenses, introduce access networks (through offering access network licenses), and impose obligations (such as quality of services obligations) on telecommunication service providers.[14]

ANF was established in 2002, and is responsible for managing the frequency spectrum.[15]

MPTIC is a governmental department which was formed as a result of the post and telecommunications reform of 2000. It is responsible for policy initiatives related to the ICT sector in Algeria.[16]

The national regulator responsible of Arabic digital content is CERIST (Research Center on Scientific and Technical Information), a public scientific and technological research center focused on the Internet market.[17]

In terms of digital broadcasting, the national regulator is TDA (*L'établissement public de Télédiffusion d'Algérie*), which is responsible for managing the terrestrial and satellite transmission and distribution of radio and TV programmes.[18]

[12] The countries included in this report encompass the 21 ITU Member States of the Arab region: Algeria, Bahrain, Comoros, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Qatar, Saudi Arabia , Somalia, Sudan, Syria, Tunisia, United Arab Emirates and Yemen. Data and information in this report refer to the situation in Sudan before the independence of South Sudan in July 2011..
[13] See www.itu.int/ITU-D/projects/docs/project-assistance/WTDC-2010-Res-17-Arab-Region.PDF.
[14] See www.arpt.dz.
[15] See www.anf.dz.
[16] See www.mptic.dz.
[17] See www.cerist.dz.
[18] See www.tda.dz.

In terms of digital media, the market is still a government monopoly, where all digital media providers are state-owned. All digital content providers are state-owned, though Algerian nationals can access content provided by regional service providers headquartered in other countries, althrough DTH/Satellite.

Table 9 presents the responsible entities for the five relevant topics identified under the ITU WTDC-10 Regional Initiatives for the Arab region: broadband access networks, digital broadcasting, open-source software, Arabic digital content, and cybersecurity.

Table 9. Algerian entities per regional initiative

	National entity responsible
Broadband access networks	ARPT
Digital broadcasting	ARPT, TDA
Open-source software	MPCIT
Arabic digital content	CERIST
Cybersecurity	MPCIT

Source: ITU, Arab Advisors Group Analysis

Fixed-telephone market

Algérie Télécom Group is currently the only fixed operator after its competitor, Lacom, stopped business in late 2008.[19] Algérie Télécom (AT) was created in August 2001 as a joint-stock company to take over the operation of fixed-line services and of the Global System for Mobile communication (GSM) network from MPCIT. Algérie Télécom officially started its activities – in its new legal structure – in January 2003.[20] Algérie Télécom operates a WLL/CDMA network, which was launched in October 2004.

By end 2010, there were almost 3 million fixed-telephone subscriptions, translating into a penetration rate of 8.2 per cent (Table 10).

Table 10. Algeria fixed-telephone subscriptions, 2010

	2010
Fixed-telephone subscriptions (000s)	2'923
Fixed-telephone penetration rate	8.2%

Source: ITU

Mobile-cellular market

Strong competition exists between the three GSM operators (Djezzy, Mobilis and Nedjma) in the Algerian mobile-cellular market. Algérie Télécom Mobile (Mobilis), the first mobile-cellular operator, served the market as the monopolist cellular operator (and as a subsidiary of the incumbent Algérie Télécom) until 2001. In December 2004, Mobilis launched the first 3G trial network based on the W-CDMA standard.[21]

[19] See http://ir.telecomegypt.com.eg/press%20releases/press%20releases/Telecom%20Egypt%20to%20Liquidate%20Investment%20in%20Algeria%20-Nov08.pdf.
[20] See http://www.algerietelecom.dz/AR/index.php?p=presentation.
[21] See Arab Advisors Group (2007a).

Mobilis's monopoly ended in July 2001, when the ARPT granted Orascom Telecom Algérie SPA (Djezzy) a license to provide cellular services. In April 2004, Djezzy succeeded in securing a VSAT license in addition to the GSM license.[22] Currently, there are some negotiations going on regarding the sale of Djezzy, and the Algerian government has expressed its interest in buying Djezzy.[23]

The third GSM license was granted to Wataniya Telecom Algérie (Nedjma) in December 2003. The operator announced the launch of its GSM network under the commercial name "Nedjma" in August 2004.[24]

Table 11 presents Algeria's mobile-cellular subscriptions and penetration rates for end 2010 and June 2011. By end 2010, the total market's mobile-cellular subscriptions amounted to 32.78 million, translating into a penetration rate of 92.4 per cent. By the end of June 2011, Algeria's total number of mobile-cellular subscriptions stood at an estimated 33.737 million lines, translating into a penetration rate of 94.4 per cent.

Table 11. Algeria mobile-cellular subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Mobile-cellular subscriptions (000s)	32'780	33'737
Added (000s)		957
Growth %		2.9%
Mobile-cellular subscriptions penetration rate	92.4%	94.4%

Source: ITU, Arab Advisors Group

Broadband Internet market

Algérie Télécom Group is the only DSL broadband Internet provider in Algeria. By end 2010, total fixed (wired)-broadband Internet subscriptions reached some 900'000. Mobile-broadband has not yet been launched in the country, since the regulator has not awarded 3G licenses to mobile operators. Table 12 presents Algeria's fixed- and mobile-broadband adoption by end 2010.

Table 12. Algeria broadband Internet subscriptions, 2010

	2010
Fixed (wired)-broadband Internet subscriptions (000s)*	**900**
Fixed (wired)-broadband Internet penetration	2.5%
Active mobile-broadband Internet subscriptions (000s)	**0.0**
Active mobile-broadband penetration	0.0%
Internet users (000s)	**4'433**
Internet user penetration	12.5%

Note: *Fixed (wired)-broadband Internet subscriptions do not include WiMAX subscriptions
Source: ITU

[22] See http://www.djezzy.com/propos/historique.asp.
[23] See http://www.radioalgerie.dz/fr/index.php?option=com_content&view=article&id=17982:vimpelcom-veut-vendre-djezzy-a-lalgerie-a-un-prix-qacceptableq&catid=64:a-la-une&Itemid=101.
[24] See http://www.nedjma.dz/extranet/web/espaces/a-propos.

Regional Initiatives

Broadband access networks

Currently there are a total of three commercial broadband access technologies in the Algerian market: DSL, FTTx and WiMAX. Algérie Télécom is the sole provider of DSL and FTTx services. As for WiMAX, there are four operators providing the service, Algérie Télécom, Anwar Net/ Max Net, Icosnet, and Smart Link Com.[25]

Recent broadband projects in the country include the deployment of FTTx fixed-broadband technology. Table 13 presents the main broadband projects and initiatives currently being carried out in Algeria.

Table 13. Broadband access network projects in Algeria

Broadband access network project	Status	Description
e-Algérie 2013	Ongoing	The e-Algérie strategy is based on several goals: boosting the use of ICTs in public administration and businesses; developing incentive mechanisms and measures to give citizens access to ICT equipment and networks; stimulating the development of the digital economy; strengthening high and very high speed telecommunication infrastructure; developing human competences and capacities; strengthening research, development and innovation; upgrading the national legal framework (legislation and regulation); recognizing the value of international cooperation; and establishing e-monitoring and evaluation mechanisms.
FTTH project	Ongoing	Algérie Télécom launched the FTTH project in 2007 which is still under process. The project targets four major provinces in Algeria: Alger, Constantine, Orang and Setif. Algérie Télécom has commissioned an FTTx platform of more than 50'000 connections in Algerie and Oran, and another 250'000 connections in other major cities (Constantine, Setif and Medea) in 2010. Algérie Télécom's target is to reach 1 million subscriptions by 2013.

Source: Algérie Télécom, MPTIC, ARPT

In September 2011, ARPT started a tender process for the provision of 3G cellular services in Algeria. ARPT expects 3G to be commercially launched during the first quarter of 2012.[26]

Digital broadcasting

By end 2011, all terrestrial and DTH satellite TV channels were state-owned. Algeria has three DTH satellite state-owned channels.[27] In September 2011, the Algerian Government allowed the licensing of private FM and TV stations.[28] With regard to digital terrestrial TV, the termination of analog television and full transition to digital transmission is scheduled to take place in 2015. Télédiffusion d'Algérie (TDA) is following a three-phased action plan. The first phase will cover three main centers: Chréa, Tessala and Kef Lakehel with high power DTT of 1.5 kW. The second phase will cover five other centers with high-power transmitters of 1.5 kW, Méchria, Ain N'sour, Bordj El Bahri, Megriss and M'Cid. The final phase will extend the coverage with the implementation of 93 large – and medium – power DTT stations, between

[25] See http://www.arpt.dz/fr/obs/prest/?c=fai.
[26] See http://www.arpt.dz/fr/doc/actu/avis/ac3g.pdf.
[27] See Arab Advisors Group (2011e).
[28] See Arab Advisors Group (2012).

50W and 1.5 kW. TDA announced that it has begun implementing the first phase of the project. Digital broadcasting is expected to be operational by the end of the first quarter of 2012.[29]

IPTV has been operational in the Algerian market since February 2010. The service is offered by Algérie Télécom Group. Table 14 below details the latest status of digital broadcasting technologies.

Table 14. Digital broadcasting technologies in Algeria, December 2011

Digital broadcasting technology	Market status	Service providers	Regulatory entity responsible for service
Digital Terrestrial TV	In progress	Telediffusion d'Algérie	TDA
DTH Satellite	Operational	three state-owned channels*	TDA
IPTV	Operational	Algérie Télécom Group	ARPT
Mobile TV (IP-Based)	Not operational	N/A	ARPT
Mobile TV (DVB)	Not operational	N/A	ARPT

Note: *DTH satellite service providers refer to channels and not broadcasters or operators, i.e. more than one channel can be operated by one broadcaster/operator. Data include free-to-air channels and correspond to April 2011
Source: Arab Advisors Group, national regulators

Open-source software

The National School of Computer Science (*l'Ecole Nationale Superieure d'Informatique*) launched the Open ESI initiative. Open ESI hosts several open-source projects and encourages researchers and students to participate and contribute ideas.[30]

Another initiative is the "Miftaah" memory stick, which was initiated by the UNESCO Office in Rabat (Morocco), in co-operation with UNDP/ ICTDAR. The initiative, which started in June 2009, targeted Algeria, Libya, Morocco and Tunisia. The "Miftaah" memory stick provides uses with access to free and open-source software (FOSS). It offers a customized and user-friendly interface, ensuring accessibility in Arabic, English and French.[31]

Arabic digital content

The e-Government portal (www.elmouwatin.dz) is part of the e-Algerie project by the Algerian Government, which is expected to be ready by end 2013. During May 2010, the Government officially launched the beta version of "The Citizen's Portal". The portal is presented in both Arabic and French and is solely dedicated to serving the citizens of Algeria. The website offers several features, such as a link to the official newspaper of Algeria, weather forecasts for major cities, the arrivals and departures of Algerian Airlines, job opportunities and polls.

After the introduction of Internationalized Domain Names (IDNs), Algeria submitted its application to the "IDN Fast Track" process in August 2010 to have the string "**الجزائر**", Arabic for Algeria, recognized as representing the country. This request was reviewed by the IDN Fast Track DNS Stability Panel, and approved in October 2010.[32]

[29] See http://www.tda.dz/francais/articles/article1.php?n_acc=1.
[30] See http://open.esi.dz/.
[31] See http://rabat.unesco.org/article.php3?id_article=1126.
[32] See http://www.iana.org/reports/2011/algeria-report-20110401.html.

In December 2011, ICANN received a request to delegate the .**الجزائر** domain as a country-code top-level domain to CERIST, which is responsible for the management of Algeria's ".DZ" top-level domain, since it was first delegated in 1995.[33]

Table 15 below presents the top twenty most visited online web portals by Internet users in Algeria. The table's source is Alexa, a Web information company. Alexa collects its data from Internet users who download Alexa's toolbar. The toolbar collects data on browsing behaviour and transmits the data back to Alexa. As shown in the table, the adoption of Arabic online content in the Arab region remains behind the adoption of content offered by global portals, such as Google, Facebook and Youtube. The pioneer local portal is an online news website, which is the seventh most visited site by Algerian Internet users.

Table 15. Rank of most visited websites in Algeria, December 2011

Rank	Website	Target users	Default language*	Description
1	google.com	Global	English	Global web search portal
2	Facebook.com	Global	English	Online social networking
3	Youtube.com	Global	English	Video sharing and broadcasting portal
4	google.fr	Global	French	Global web search portal
5	yahoo.com	Global	English	Miscellaneous online services
6	live.com	Global	English	E-mail portal
7	echoroukonline.com	Local	Arabic	Online news portal
8	babylon.com	Global	English	Translation software
9	blogspot.com	Global	English	Online blogging service
10	wikipedia.org	Global	English	Online Encyclopaedia
11	startimes.com	Regional	English	Miscellaneous online entertainment services
12	elkhabar.com	Local	Arabic	Online news portal
13	Djelfa.info	Local	Arabic	Online news portal
14	Elheddaf.com	Local	Arabic	Sports
15	google.dz	Global	French	Web search portal
16	msn.com	Global	English	Miscellaneous online services
17	ouedkniss.com	Local	French	Online advertising
18	Kooora.com	Regional	Arabic	Sports
19	Maktoob.com	Regional	Arabic	Miscellaneous online services
20	xnxx.com	Global	English	Adult content

Note: *The default language is the language that appears when first visiting the website
Source: Alexa

Cybersecurity

In May 2008, the government introduced a new cybercrime bill after reports stating that government websites receive about 4'000 hacking attempts per month and that websites of financial institutions criminalized online activities such as blackmailing, hacking, copyright infringement, stealing personal data, promoting terrorism and online crimes. In May 2009, the bill was followed by the creation of a new

[33] See http://www.icann.org/en/minutes/resolutions-21apr11-en.htm.

national security service which focused on cybercrime. The Cybercrime Bill establishes special rules for the prevention of crimes related to media technologies and communication.[34]

Articles 3, 4 and 7 give the state powers to censor Internet content and stipulate cases in which this would be required.

Articles 10 and 11 require Internet providers to store all communications and related information for a minimum of one year.

Article 13 and 14 introduce a new body for fighting cybercrime, by enforcing censorship. Article 14 of the decree makes ISP's responsible for the sites they host, and requires them to take all necessary steps to ensure constant surveillance of content to block access to material conflicting with public order and morality.

[34] See http://www.joradp.dz/JO2000/2009/047/A_Pag.htm.

BAHRAIN

Market overview

The Telecommunications Regulatory Authority (TRA) is the ICT regulatory body in Bahrain. TRA was set up in October 2002 as an independent body.

TRA is charged with promoting and balancing the interests of subscribers and other users, and promoting effective and fair competition among new and existing licensed operators. It is also responsible for granting new licenses and managing existing ones.[35]

In terms of digital broadcasting, TRA is responsible for regulating IPTV and mobile TV, while the Information Affairs Authority (IAA) is responsible for regulating digital terrestrial TV and DTH satellite as well for the radio and TV sectors in Bahrain.

Table 16 presents the responsible entities for the five relevant topics identified under the ITU WTDC-10 Regional Initiatives for the Arab region.

Table 16. Bahraini entities per regional initiative

	National entity responsible
Broadband access networks	TRA
Digital broadcasting	Ministry of Industry & Commerce, TRA, IAA
Open-source software	TRA
Arabic digital content	Ministry of Industry & Commerce
Cybersecurity	TRA

Source: ITU, Arab Advisors Group

Fixed-telephone market

According to TRA, the incumbent Batelco maintained its position as the dominant fixed-line operator in Bahrain by year-end 2010. The two licensed WiMAX operators Zain Bahrain and Mena Telecom compete with Batelco, as they also provide fixed-voice services over their WiMAX networks.

In January 2007, TRA granted two National Fixed Wireless Services (NFWS) licenses to Zain Bahrain and Mena Telecom. In September 2007, Zain Bahrain, the second mobile operator in Bahrain (formerly MTC-Vodafone Bahrain) launched voice and Internet services through its WiMAX technology, while Mena Telecom launched its WiMAX services in November 2008. There are a number of operators that provide fixed-voice services through VoIP technology in Bahrain: 2Connect, Lightspeed and Etisalcom.[36]

By end 2010, the total market's fixed-telephone subscriptions amounted to 228'000, translating into a penetration rate of 18.1 per cent.

[35] See http://www.tra.org.bh/.
[36] See Arab Advisors Group (2011b).

Table 17. Bahrain fixed-telephone subscriptions, 2010

	2010
Fixed-telephone subscriptions (000s)	228
Fixed-telephone penetration rate	18.1%

Source: ITU

Mobile-cellular market

The Bahraini mobile-cellular market hosts three cellular operators: Batelco, Zain and Viva. Bahrain Telecommunications Company (Batelco) is the incumbent and was established in 1981 as a Bahraini shareholding company. In 1995, Batelco launched its GSM services to become the first GSM operator in the country. The second GSM network is operated by Zain Bahrain which is a subsidiary of Zain Group. Zain Bahrain officially launched its services in December 2003. Viva Bahrain, the third mobile-cellular service provider, commercially launched its cellular services (including 3G) in March 2010.[37]

Table 18 presents the subscriptions data for the mobile-cellular market in Bahrain. Subscriptions dropped by 1.9 per cent during the first half of 2011. The country's total mobile-cellular subscriptions reached an estimated 1.537 million by the end of June 2011, down from 1.567 million by year-end 2010. This drop is the political unrest during that period, and the fact that cellular adoption is close to saturation levels. Mobil-cellular penetration in Bahrain reached an estimated 118.9 per cent by the end of June 2011, down from 124.2 per cent by year-end 2010.

Table 18. Bahrain mobile-cellular subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Mobile-cellular subscriptions (000s)	1'567	1'537
Added (000s)		-30.4
Growth %		-1.9%
Mobile-cellular subscriptions penetration rate	124.2%	118.9%

Source: ITU, Arab Advisors Group

Broadband Internet market

By end 2010, there were around 11 Internet Service Providers (ISPs) in Bahrain: Batelco, Mena Telecom, Zain Bahrain, 2Connect and Light Speed. The three major Internet services providers were Batelco, Zain Bahrain and Mena Telecom. Zain Bahrain and Mena Telecom are also offering WiMAX services.

Table 19 shows Bahrain's fixed- and mobile-broadband adoption. By end 2010, the total fixed (wired)-broadband Internet subscriptions amounted to 67'600 subscriptions, translating into a penetration rate of 5.4 per cent.[38]

All mobile operators in the market are offering 3G services, and mobile-broadband subscriptions amounted to 268'200 by end 2010, corresponding to a mobile-broadband penetration rate of 21.3 per cent.

[37] See Arab Advisors Group (2011c).
[38] According to the ITU definition, WiMAX subscriptions are not included in the number of fixed (wired)-broadband Internet subscriptions.

Table 19. Bahrain broadband Internet subscriptions (2010)

	2010
Fixed (wired)-broadband Internet subscriptions (000s)*	**67.6**
Fixed (wired)-broadband Internet penetration rate	5.4%
Active mobile-broadband Internet subscriptions (000s)	**268**
Active mobile-broadband penetration rate	21.3%
Internet users (000s)	**694**
Internet user penetration	55%

Note: *Fixed (wired)-broadband Internet subscriptions do not include WiMAX subscriptions.
Source: ITU.

Regional Initiatives

Broadband access networks

Currently there are a total of five commercial broadband access technologies in the Bahraini market, including the following fixed (wired) and wireless technologies: DSL, WiMAX, VSAT, FTTx and GSM 3G (UMTS/HSPA).

Zain Bahrain (MTC-Vodafone Bahrain) launched its 3G/3.5G services along with the launch of the operator in December 2003. Four years later, in December 2007, Batelco, the incumbent operator, launched its 3G/3.5G services. Viva has been offering 3G services since its launch in March 2010.[39]

The upcoming broadband technology in Bahrain is Long Term Evolution (LTE). All three mobile-cellular operators have invested in LTE. Zain Bahrain has invested USD 50 million in network upgrades in order to deploy LTE technology. LTE will enable Zain Bahrain customers to have faster data downloads, as a result of its transition to an all-IP, flat network through the introduction of Internet High Speed Packet Access (I-HSPA).[40] The incumbent, Batelco, has invested around USD 39 million to deploy LTE but has not yet launched the service.[41] Lastly, the third entrant, Viva Bahrain is planning to commercially launch LTE in Bahrain during 2012.[42]

Table 20 presents the main recent initiatives in Bahrain concerning broadband access network projects.

Table 20. Broadband access network projects in Bahrain

Broadband access network project	Status	Description
Viva's mobile services	Accomplished	Viva Bahrain commercially launched its cellular services (including 3G) on March 2010.
Zain's LTE project	Ongoing	Zain Bahrain has invested USD 50 million in network upgrade in order to deploy Long Term Evoluion (LTE) technology.
Viva Bahrain	Ongoing	The operator is planning to launch LTE during 2012. LTE is slated to be available commercially in selected areas, starting with Bahrain City Centre.
Batelco Bahrain	Ongoing	Batelco has invested around USD 39 million to deploy LTE. The operator has not yet launched the service.

Source: Zain, Viva

[39] See Arab Advisors Group (2011c).
[40] See http://www.bh.zain.com/portal/page/portal/AboutUs/aboutUs.
[41] See http://www.batelco.com/batelco_cms/NewsStory.aspx?nid=804.
[42] See http://www.viva.com.bh/static/CorporatePortal/English/Plans/Broadband/4G-LTE/index.htm.

Digital broadcasting

Currently, there is no single entity responsible for regulating the digital broadcasting market in Bahrain. Digital terrestrial TV is not operational in Bahrain. There are a total of 7 DTH satellite channels: three state-owned and four private-owned channels.[43]

IPTV is operational in the Bahraini market. Neutel launched IPTV services in February 2007, and by September 2011 it provided IPTV services only to Reef Island and Amwaj Island.[44] Batelco, the incumbent operator, launched its IPTV services in September 2011, but it is limited to two newly developed areas of Reef Island.[45]

Mobile TV is provided as an IP-based service in the Bahraini market. Currently, Viva, the third mobile operator, is the only operator that provides mobile TV services. Table 21 below details the status of digital broadcasting technologies in Bahrain.

Table 21. Digital broadcasting technologies in Bahrain, December 2011

Digital broadcasting technology	Market status	Service providers	Regulatory entity responsible for service
Digital Terrestrial TV	Not operational	N/A	IAA
DTH Satellite	Operational	3 state-owned and 4 private owned channels*	IAA
IPTV	Operational	Nuetel, Batelco	TRA
Mobile TV (IP-Based)	Operational	Viva	TRA
Mobile TV (DVB)	Not operational	N/A	TRA

Note: * DTH satellite providers refer to channels and not broadcasters or operators, i.e. more than one channel can be operated by one broadcaster/operator. Data include free-to-air channels and correspond to April 2011.
Source: Arab Advisors Group, national regulators

Open-source software

Bahrain has taken a number of steps to support the use of free and open-source software. In its long-term development plan "Vision 2030" the Kingdom aspires to "cut costs, increase flexibility and improve productivity through open-source solutions." In line with this, Bahrain's Ministry of Social Development (MOSD) has chosen Novells Open Enterprise Solutions, an open-source software.[46] This group provides presentations, forums and discussions on Linux and open-source software.[47] Furthermore, Bahrain participated in the first Middle East and Africa open-source software forum (MEAOSS) in 2010. The purpose of this event was to develop and support the usage of open-source technology in the ICT sector.[48]

Arabic digital content

The Bahraini regulator, TRA, has defined strategies to promote the Bahraini digital society and e-government, which has driven adoption of local content. Bahrain's eGovernment portal was launched in

[43] See Arab Advisors Group (2011a).
[44] See http://www.nue-tel.com/.
[45] See http://www.batelco.com/batelco_cms/NewsStory.aspx?nid=737.
[46] See http://www.itp.net/581814-bahrain-ministry-of-social-development-improves-it-management.
[47] See http://www.linuxbahrain.com.
[48] See http://meaossforum.com/.

May 2007, and is managed by the eGovernment Authority as part of Bahrain's national strategy to execute comprehensive eGovernment programmes.

Another example for the development of digital content is the Bahrain eContent Award which is organized by the eGovernment Authority and the Bahrain Internet Society. The award is inspired by WSA – the World Summit Award – and has the objective of selecting quality eContent and promoting innovative and creative new media applications.[49]

As for the support of Arabic domain names, in June 2010, TRA Bahrain led an initiative for the Arab League to apply for the .arab generic top-level domain names (in both the English and Arabic letters). According to TRA Bahrain, "this will encourage Internet use for those who cannot deal with Latin script and will encourage and increase the Arabic content on the Internet."[50] Currently, both .arab and .bahrain in the Arabic letters are not available yet.

Table 22 below presents the top twenty most visited online web portals by Internet users in Bahrain. As shown in the table, the adoption of Arabic online content in the Arab region remains behind the adoption of content offered by global portals, such as Google, Youtube and Facebook.

Table 22. Rank of most visited websites in Bahrain, December 2011

Rank	Website	Target users	Default language*	Description
1	google.com.bh	Global	Arabic	Web search portal
2	facebook.com	Global	English	Online social networking
3	youtube.com	Global	English	Video sharing and broadcasting portal
4	google.com	Global	English	Global web search portal
5	live.com	Global	English	E-mail portal
6	yahoo.com	Global	English	Miscellaneous online services
7	twitter.com	Global	English	Online social networking
8	wikipedia.org	Global	English	Encyclopedia
9	blogspot.com	Global	English	Online blogging service
10	maktoob.com	Regional	Arabic	Miscellaneous online services
11	msn.com	Global	English	Miscellaneous online services
12	mbahrain.net	Local	Arabic	Online forums
13	bahrainforums.com	Local	Arabic	Online forums
14	kooora.com	Regional	Arabic	Sports
15	alwasatnews.com	Local	Arabic	Online news portal
16	4shared.com	Global	English	Online storage
17	mediafire.com	Global	English	File sharing services
18	amazon.com	Global	English	E-commerce
19	babylon.com	Global	English	Translation software
20	t.co	Global	English	Twitter's sub domain

Note: *The default language is the language that appears when first visiting the website
Source: Alexa

[49] See http://www.bea.bh/default.asp?action=category&id=11.
[50] See http://www.tra.org.bh/en/pdf/arabDomainNamePressRelease_en.pdf.

Cybersecurity

Even if the legislative framework is mainly composed of e-commerce and copyright-related laws, in the last years, Bahrain has started to look up at different types of cybercrimes, including child online safety. In 2010, Bahrain's TRA launched the project 'SafeSurf' to raise awareness of cyberthreats, cyberbullying and online abuse among Internet users in Bahrain. The project provides a comprehensive analysis of Internet safety issues amongst adults and children, and sets out recommendations to ensure the safety of young people and adults navigating the Internet.

After consultation, TRA proposed the following:

- A legislative framework in the child protection area
- Cybercrime legislation
- Educational training for parents and children
- National media campaign to raise awareness

TRA proposed the establishment of a council to set out and ensure the implementation of the e-safety strategy and the establishment of a legislative framework to protect Internet users in Bahrain.[51]

[51] See Kingdom of Bahrain/ Telecommunications Regulatory Authority (2010).

COMOROS

Market overview

The two main entities in charge of regulating the ICT sector in Comoros are the *Ministère des Postes et Télécommunications, de la Promotion des Nouvelles Technologies de l'Information et de la Communication, chargé des Transports et du Tourisme* and the *Autorité Nationale de Régulation des Technologies de l'Information et de la Communication (*ANRTIC). Telecommunication licenses are technology and service neutral, authorizing licensed operators to provide any service, based on any technology. All services in the country are provided by Comores Telecom, the only telecommunication operator. Fixed-broadband services, which remain very limited in terms of the number of subscriptions as well as in terms of speeds, are provided via ADSL, only. Comoros Telecom is also offering high-speed Internet access via Mpessi, a fixed-wireless technology. Comoros Telecom is planning to offer 3G services starting in 2012.

Fixed-telephone market

By end 2010, total fixed-telephone subscriptions in Comoros amounted to 21'000, translating into a penetration rate of 2.9 per cent.

Table 23. Comoros fixed-telephone subscriptions, 2010

	2010
Fixed-telephone subscriptions (000s)	21
Fixed-telephone penetration rate	2.9%

Source: ITU

Mobile-cellular market

By end 2010, total mobile-cellular subscriptions amounted to 165'000, translating into a penetration rate of 22.5 per cent.

Table 24. Comoros mobile-cellular subscriptions, 2010

	2010
Mobile-cellular subscriptions (000s)	165
Mobile-cellular penetration rate	22.5%

Source: ITU

Broadband Internet market

By end 2010, total Internet users amounted to 38'000, corresponding to a penetration rate of 5 per cent. Fixed (wired)-broadband is almost negligible in the country.

Table 25. Comoros broadband Internet subscriptions, 2010

	2010
Fixed (wired)-broadband Internet subscriptions (000s)*	**0.2**
Fixed (wired)-broadband Internet penetration rates	0.02%
Active mobile-broadband Internet subscriptions (000s)	**0**
Internet users (000s)	**38**
Internet user penetration %	5%

Note: *Fixed (wired)-broadband Internet subscriptions do not include WiMAX subscriptions
Source: ITU

Regional initiatives

No particular initiatives or projects can be reported for Comoros in terms of broadband access networks, digital broadcasting, open-source software, Arabic digital content, and cybersecurity.

DJIBOUTI

Market overview

Djibouti does not have an independent regulatory authority and the ICT sector is overseen by the *Ministère de la Culture et de la Communication, chargé des Postes et des Télécommunications*. All telecommunication services are provided by Djibouti Telecom. Fixed-broadband services, which remain very limited in terms of the number of subscriptions, as well as in terms of speeds, are provided via ADSL, only. Djibouti Telecom is planning to offer 3G services starting in 2012.[52]

Fixed-telephone market

By end 2010, there were a total of 19'000 fixed-telephone subscriptions in Djibouti, translating into a penetration rate of 2.1 per cent.

Table 26. Djibouti fixed-telephone subscriptions, 2010

	2010
Fixed-telephone subscriptions (000s)	19
Fixed-telephone penetration rate	2.1%

Source: ITU

Mobile-cellular market

By end 2010, total mobile-cellular subscriptions amounted to 166'000, translating into a penetration rate of 18.7 per cent.

Table 27. Djibouti mobile-cellular subscriptions, 2010

	2010
Mobile-cellular subscriptions (000s)	166
Mobile-cellular penetration rate	18.7%

Source: ITU

Broadband Internet market

By end 2010, there were an estimated 58'000 Internet users, corresponding to a penetration rate of 6.5 per cent. Fixed (wired)-broadband is almost negligible in the country.

[52] See http://www.agenceecofin.com/operateurs/2209-1388-djibouti-telecom-va-lancer-le-premier-reseau-3g-a-djibouti.

Table 28. Djibouti broadband Internet subscriptions, 2010

	2010
Fixed (wired)-broadband Internet subscriptions (000s)*	8
Fixed (wired)-broadband Internet penetration rates	0.9%
Active mobile-broadband Internet subscriptions (000s)	**0**
Internet users (000s)	**58**
Internet user penetration %	6.5%

Note: *Fixed (wired)-broadband Internet subscriptions do not include WiMAX subscriptions
Source: ITU

Regional initiatives

No particular initiatives or projects can be reported for Djibouti in terms of broadband access networks, digital broadcasting, open-source software, Arabic digital content, and Cybersecurity.

EGYPT

Market overview

There are two main entities in charge of regulating the telecommunication sector in Egypt: the Ministry of Communications and Information Technology (MCIT), and the National Telecommunication Regulatory Authority (NTRA).

In terms of digital broadcasting, NTRA is responsible for the regulation of IPTV and mobile TV. MCIT is responsible for digital terrestrial TV and DTH satellite. Additionally, the Egyptian Radio and Television Union is the body responsible for the audio and audiovisual sector in Egypt; its responsibilities include: Radio and TV broadcast inside and outside the country, as well as planning, developing and producing local and international radio and TV programmes.

Table 29 presents the responsible entities for the five relevant topics identified under the ITU WTDC-10 Regional Initiatives for the Arab Region.

Table 29. Egyptian entities per regional initiative

	National entity responsible
Broadband access networks	NTRA
Digital broadcasting	MCIT, NTRA
Open-source software	ITIDA (Information Technology Industry Development Agency)
Arabic digital content	NTRA
Cybersecurity	Egypt Computer Emergency Team (ECERT)

Source: ITU, Arab Advisors Group

Fixed-telephone market

Telecom Egypt is the monopoly fixed-line incumbent operator. The Egyptian regulator (NTRA) was in the process of awarding a second fixed license in the country, but the process was interrupted in September 2008 without any new date being set. NTRA announced that the process had been postponed because "the ICT international markets in Europe and the United States are facing major fluctuations due to the increasing inflation rates and the increasing prices."[53]

Table 30 shows data for Egypt's fixed-telephone market. By end 2010, the total number of fixed-telephone subscriptions amounted to 9.618 million, translating into a penetration rate of 11.9 per cent. During the first six months of 2011, fixed-telephone subscriptions dropped by 3.7 per cent, where fixed-telephone subscriptions stood at 9.28 million, translating into a penetration rate of 11 per cent.

[53] See http://www.tra.gov.eg/english/news_newsdetails.asp?PID=36&ID=146.

Table 30. Egypt fixed-telephone subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Fixed-telephone subscriptions (000s)	9'618	9'275
Added (000s)		-343
Growth %		-3.7%
Fixed-telephone penetration rate	11.9%	11.0%

Source: ITU, NTRA

Mobile-cellular market

By the end of 2011, the Egyptian market had three operational mobile-cellular operators. Mobinil started operations in May 1998.[54] Competition commenced with the entrance of Vodafone Egypt in the same year, and was increased in May 2007 with the entrance of Etisalat Misr.[55]

Etisalat Misr started operating directly with a 3G license, while Mobinil and Vodafone Egypt received a separate 3G license in 2007. Vodafone Egypt launched its 3G/3.5G services in May 2007, while Mobinil launched its 3G/3.5G services in September 2008.[56]

By end 2010, the total mobile-cellular subscriptions amounted to 70.661 million, translating into a penetration rate of 87.1 per cent.

Table 31. Egypt mobile-cellular subscriptions (December 2010- June 2011)

	Q4 2010	Q2 2011
Mobile-cellular subscriptions (000s)	70'661	76'432
Mobile-cellular penetration rate	87.1%	96.6%

Source: ITU, NTRA

Broadband Internet market

The Internet market in Egypt is competitive. Data service providers are divided into three classes: Class A, Class B and Class C (virtual Operators). The licenses for the three classes were first awarded in 2000. By October 2011, the regulator had issued seven carrier Internet licenses (Class A) and four data service providers licenses (Class B), in addition to 154 service-based ISPs' licenses (Class C) and one global peering license. All three classes' licensees (A, B and C) can provide ADSL services. Table 32 presents the Internet licensing regime in Egypt.

[54] See http://www.mobinil.com.eg/aboutMobinil/companyprofile.aspx.
[55] See http://etisalat.com.eg/etisalat/Etisalat_Portal_En/about/corporate.htm?_pageid=42,1&_dad=portal&_schema=PORTAL&siteAlias=etisalat&sitePath=Etisalat_Portal_En&kpAlias=about&pageAlias=corporate.
[56] See Arab Advisors Group (2011c).

Table 32. Internet licensing regime in Egypt

License Class	Scope of the license	Licensed ISPs
A	Class A licensee may buy its own international bandwidth and deploy its own DSLAMS.	TE Data, Egy Net, Nile online, Link dot Net, Vodafone Data, Noor Communications, Yalla
B	Class B licensee may obtain international bandwidth from a Class A licensee and resell to other service providers.	Equant, Menanet, Soficom, Batelco
C	Provide IP services to end users through facilities obtained from class A licensees.	154 ISPs
Global Peering	Build and operate the infrastructure necessary for connecting between Class A and B licensees, electronic content providers, domain name providers, and data centers.	GPX

Source: NTRA, ISPs

ADSL was introduced in 2002, soon to be followed by shared local loop unbundling (LLU). This allowed ISPs to share the local loop with Telecom Egypt in order to provide broadband Internet using ADSL technology, while maintaining Telecom Egypt voice services' monopoly.[57]

By end 2010, total fixed (wired)-broadband Internet subscriptions reached 1.45 million, the vast majority being ADSL lines. The other prevalent broadband technology is 3G mobile-broadband.

Table 33. Egypt broadband Internet subscriptions, 2010

	2010
Fixed (wired)-broadband Internet subscriptions (000s)*	**1'450**
Fixed (wired)-broadband Internet penetration rates	1.8%
Active mobile-broadband Internet subscriptions (000s)	**5'155**
Active mobile-broadband penetration rates	6.4%
Internet users (000s)	**21'692**
Internet user penetration	27%

Note: *Fixed (wired)-broadband Internet subscriptions do not include WiMAX subscriptions
Source: ITU

Regional Initiatives

Broadband access networks

Currently there are a total of three commercial broadband access technologies in the Egyptian market; two fixed (wired)-broadband technologies, and one wireless-broadband technology. The fixed (wired)-broadband technologies are DSL and FTTx, while wireless-broadband services are offered based on UMTS/HSPA technology.

3G services have been commercially available in Egypt since May 2007, when Etisalat Misr launched cellular services (including 3G) in the country. It was shortly afterwards followed by Vodafone Egypt,

[57] See Arab Republic of Egypt Ministry of Communications and Information Technology/National Telecommunication Regulatory Authority (2011).

which started offering mobile-broadband services a few days after the launch of Etisalat Misr. Mobinil launched its 3G services in September 2008.[58]

As for fixed next generation access networks (NGANs), in October 2009, Telecom Egypt announced the launch of its first FTTH deployment in the Cairo suburb of Qaramiya.[59] By November 2010, Telecom Egypt had completed the deployment of FTTH in the Katameya Hills area in Cairo. The operator plans to further expand its network, which will be dependent on end-user demand.

Table 34 presents the main recent initiatives in Egypt concerning broadband access network projects.

Table 34. Broadband access network projects in Egypt

Broadband access network project	Status	Description
Telecom Egypt FTTx network	Ongoing	Project started in October 2009 to deploy FTTH in selected suburbs of Cairo. The operator has plans to expand its network, which will be dependent on end-user demand.
eMisr National broadband plan	Ongoing	A two-staged broadband development plan aimed at expanding population and geographical coverage including bringing broadband to rural areas.[60]

Source: TRA, Telecom Egypt

Digital broadcasting

Currently, MCIT oversees digital broadcasting through DTH/satellite. A large number of regional channels are headquartered in Egypt.[61] Moreover, mobile operators are offering mobile TV, and this market is regulated by the telecom regulator, NTRA. Table 35 details the current status of digital broadcasting technologies.

Table 35. Digital broadcasting market in Egypt

Digital broadcasting technology	Market status	Service providers	Regulatory entity responsible for service
Digital Terrestrial TV	Not operational	N/A	MCIT
DTH Satellite	Operational	67 privately-owned channels and 21 government-owned channels*	MCIT
IPTV	Not operational	N/A	NTRA
Mobile TV (IP-Based)	Operational	Mobinil, Etisalat Misr	NTRA
Mobile TV (DVB)	Not operational	N/A	NTRA

Note: * DTH satellite service providers refer to channels and not broadcasters or operators, i.e. more than one channel can be operated by one broadcaster/operator. Data include free-to-air channels and correspond to April 2011.
Source: Arab Advisors Group, National Regulatory Authorities

IPTV is not operational in the Egyptian market, although there are no regulatory hurdles for national fixed-broadband licensees to offer the service. The large offer of free DTH channels in the region is possibly a strong inhibitor for pay TV in general, including IPTV.

[58] See Arab Advisors Group (2011c).
[59] See http://ir.telecomegypt.com.eg/press%20releases/press%20releases/Telecom%20Egypt%20Announces%20The%20Launch%20of%20Its%20Fiber%20To%20The%20Home%20Services%20in%20Cairo.pdf.
[60] See http://www.tra.gov.eg/emisr/Summary_En.pdf.
[61] See Arab Advisors Group (2011a).

Mobile TV is provided as an IP-based service in the Egyptian market. Currently, all three mobile service providers (Mobinil, Vodafone Egypt and Etisalat Misr) provide 3G+ services, though only Mobinil and Etisalat are offering mobile TV services. Vodafone Egypt interrupted mobile TV services in 2008, and has not re-launched them since then.[62]

Open-source software

The Information Technology Industry Development Agency (ITIDA) supports private sector development of open-source software. Moreover, ITIDA plans to initiate a pilot project to spread the concepts of open-source software in collaboration with the Information Technology Institute (ITI) and the Technology Innovation and Entrepreneurship Center (TIEC).

According to ITIDA, in 2011, there were 47 local companies in Egypt specialized in open-source software, and 1'000 employees working as specialists in this field.[63]

Arabic digital content

In April 2010, NTRA concluded its review of all offers submitted to provide domain name registration services under the Arabic ccTLD of Egypt "**مصر.**". Three Egyptian companies have been granted a license: the incumbent ISP TE Data (the data services arm of Telecom Egypt, the fixed-line incumbent), Link (a local IT and webhosting company) and Vodafone Data.[64] In May 2010, Egypt launched the first Internet domain name using Arabic letters (**مصر.**, ".misr").[65]

Despite public initiatives to encourage local Arabic content, global websites remain the most popular online portals visited in Egypt. The table below presents the top twenty most visited online web portals by Internet users in Egypt. It shows that the adoption of Arabic online content remains behind the adoption of content offered by global companies, such as Google, Youtube and Facebook. The pioneer local portal is a local news website, which is the sixth most visited site by Egyptian Internet users.

[62] See Arab Advisors Group (2010a).
[63] See http://www.itida.gov.eg/PressReleases1/In%20His%20Meeting%20With%20SMEs%20Representatives%20Dr.Mohammed%20Salem.pdf.
[64] See http://mcit.gov.eg/MediaPressSer_Details.aspx?ID=514&TypeID=3.
[65] See http://www.icann.org/en/announcements/announcement-05may10-en.htm.

Table 36. Most visited sites in Egypt, December 2011

Rank	Website	Target users	Default language*	Description
1	Facebook.com	Global	English	Online social networking
2	google.com.eg	Global	Arabic	Web search portal
3	Youtube.com	Global	English	Video sharing and broadcasting portal
4	google.com	Global	English	Global web search portal
5	yahoo.com	Global	English	Miscellaneous online services
6	youm7.com	Local	Arabic	Online news portals
7	blogspot.com	Global	English	Online blogging service
8	fatakat.com	Regional	Arabic	Online forums
9	maktoob.com	Regional	Arabic	Miscellaneous online services
10	live.com	Global	English	E-mail portal
11	myegy.com	Global	Arabic	Miscellaneous online services
12	masrawy.com	Local	Arabic	Miscellaneous online services
13	ahram.org.eg	Local	Arabic	Online news portals
14	mediafire.com	Global	English	File sharing services
15	twitter.com	Global	English	Online social networking
16	xnxx.com	Global	English	Adult Content
17	elections2011.eg	Local	Arabic	Information about Egyptian elections
18	wikipedia.org	Global	English	Encyclopaedia
19	searchqu.com	Global	English	Web search portal
20	babylon.com	Global	English	Translation software

Note: *The default language is the language that appears when first visiting the website
Source: Alexa

Cybersecurity

Since April 2009, the Egyptian Computer Emergency Response Team (CERT) is responsible for dealing with online threats. CERT staff have received training which enables them to manage cybersecurity issues and respond to online crime.

In August 2009, the Egyptian telecom regulator, NTRA, signed a memorandum of understanding with the Malaysian Computer Emergency Response Team (MyCERT). The two entities agreed to set up a framework for bilateral cooperation to fight online crime.[66]

[66] See http://www.mcit.gov.eg/Media_Center/Press_Room/Press_Releases/1531.

IRAQ

Market overview

Iraq has a single-regulator approach to its ICT market. The Communication and Media Commission (CMC) is the sole entity responsible for regulating both the telecommunications and the media markets.

Concerning the telecommunication sector, "CMC has the right to grant licenses for telecommunication operations, receive fees and tariffs, and manage resources such as spectrum frequencies, right of way international communications, in addition to the activities supporting the universal access."[67]

CMC is also responsible for monitoring and evaluating the performance of Iraqi media, including digital media.[68] Furthermore, it is responsible for the regulation of broadband access networks and digital broadcasting in Iraq.

Currently, there is no holistic legislation regulating privacy rights, the protection of personal data and access to information. There are no substantive or procedural-related rules regarding cybercrimes.[69]

Fixed-telephone market

Taking into consideration the precarious state of fixed telecommunications infrastructure in Iraq, the Ministry of Communications (MoC) and CMC started '*the national campaign to revive the fixed-telephone*'. The campaign aims to renovate the fixed infrastructure and equipment all over Iraq.

MoC, through its offices in each governorate, has signed various contracts for the supply of main PBXs, cables, cabins and phone handsets in the country.

Moreover, MoC and its directorates worked on fixing and renovating the telecommunication infrastructure in all the governorates in Iraq.[70]

By year-end 2010, fixed–telephone subscriptions reached a total of 1.6 million in Iraq (Table 37).

Table 37. Iraq fixed-telephone subscriptions, 2010

	2010
Fixed-telephone subscriptions (000s)	1'600
Fixed-telephone penetration rate	5.1%

Source: ITU

Mobile-cellular market

Iraq has three national and one regional mobile-cellular operator. Zain, Asiacell and Korek Telecom are national operators, while Mobitel is a regional operator which provides 3G services to the Kurdistan region of Iraq.[71]

[67] See http://www.cmc.iq/.
[68] See http://www.cmc.iq/.
[69] See http://isper.escwa.un.org/Portals/0/Cyber%20Legislation/Documents/Models%20for%20Cyber%20Legislation%20Ar.pdf.
[70] See Arab Advisors Group (2011d).

The mobile-cellular market continued to grow during the first six months of 2011. Total mobile-cellular subscriptions reported by national operators reached 24 million by the end of June 2011 (Table 38).

Table 38. Iraq mobile-cellular subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Mobile-cellular subscriptions (000s)	24'000	24'247
Added (000s)		247
Growth %		1.0%
Mobile-cellular penetration rate	73.4%	75.4%

Source: ITU, Arab Advisors Group.

Broadband Internet market

The Internet market is not entirely regulated in Iraq. According to CMC, due to the difficult situation in Iraq in the previous years, a thorough regulation of the Internet market has not been possible. Nearly the entire Internet infrastructure has been damaged. Most users depended on VSAT, microwave links and WiFi systems from private companies, usually unlicensed. Moreover, some private companies provide Internet services through fibre cables leased from other private firms, but subscribers are very limited due to the high prices of these services. Some data users depend on fixed-wireless services which are offered by WLL and WiMAX licensed operators, such as Kalimat and IBN. At the same time, a few WiMAX providers are operating without a license, especially in Kurdistan.[72]

Table 39. Iraq broadband Internet subscriptions, 2010

	2010
Fixed (wired)-broadband Internet subscriptions (000s)*	**0.08**
% of total broadband	0.0%
Fixed (wired)-broadband Internet penetration rate	0.0%
Active mobile-broadband Internet subscriptions (000s)**	**0**
Active mobile-broadband penetration rate	0.0%
Internet users (000s)	**792**
Internet user penetration %	2.5%

Note: *Fixed (wired)-broadband Internet subscriptions do not include WiMAX subscriptions **Mobile-broadband subscriptions do not include those from regional operators in the Kurdistan region
Source: ITU.

[71] See Arab Advisors Group (2011e).
[72] See Arab Advisors Group (2011f).

Table 40. Licensed and unlicensed fixed-wireless providers in Iraq

Licensed (by CMC)	
Company	License
Itisaluna	National
Kalimat	National
ITPC (represented by the Ministry of Communication)	National
IBN (Banks)	Regional
Fanous	Regional
Unlicensed (by CMC)	
Company	Region
Media Telecom	Kurdistan
ZOZAK	Kurdistan
TeleTech	Kurdistan
Zaniar	Kurdistan
Al Awsat	Kurdistan
Al Zard	Kurdistan

Source: CMC

Regional initiatives

Broadband access networks

In 2011, Iraq Telecommunications and Post Company (ITPC), the incumbent fixed operator, announced that fixed-line users could access the Internet for free until the end of the year. Moreover, ITPC signed two contracts for the deployment and operation of two FTTH access network projects in Iraq. The first access network is for Baghdad, with 45'000 FTTH lines, and the second with 55'000 FTTH lines, for the governorates Basra, Wasit, Missan, Najaf and Ninwa. According to the operator, ITPC will continue its plan to connect the rest of the Iraqi governorates by 2012.[73]

As for 3G services in Iraq, currently they are only offered by Mobitel in the Kurdistan region.

Table 41 presents the main recent initiatives in Iraq concerning broadband access network projects.

[73] See Arab Advisors Group (2011f).

Table 41. Broadband access network projects in Iraq

Broadband access network project	Status	Description
ITPC FTTH	Ongoing	ITPC is carrying out two FTTH access network projects. The first access network is for Baghdad with 45'000 FTTH lines and the second with 55'000 FTTH lines for the governorates Basra, Wasit, Missan, Najaf and Ninwa. ITPC plans to connect the rest of the Iraqi governorates by 2012.
Baghdad International Airport optical cable	Accomplished	In July 2011, ITPC and its partner ScopeSky Company announced the accomplishment of Baghdad International Airport optical cable
Al-Basrah Airport optical cable	Ongoing	In July 2011, ITPC and its partner ScopeSky Company announced that a similar project to Baghdad International Airport with a bigger capacity is in process in Al-Basrah Airport and will be achieved in the near future.
Asiacell Network	Ongoing	In August 2011, Asiacell announced rolling out mobile voice, broadband and SMS services across re-mote communities in Iraq using the Altobridge lite-site™ solution.
Zain Iraq Network	Ongoing	In November 2011, Zain Iraq signed a USD 650 million five year outsourcing agreement which includes an upgrade of its network with a view to launching and supporting 3G services.

Source: Ministry of Telecommunication, Zain, Asiacell

Digital broadcasting

Currently, CMC regulates both media and communications in Iraq. In the field of communications, the Iraqi Government sets the strategy and passes legislation adoption, while CMC, as an independent regulator, is responsible for its implementation.[74]

Table 42. Digital broadcasting technologies in Iraq, December 2011

Digital Broadcasting Technology	Market Status	Service Providers	Regulatory entity responsible for service
Digital Terrestrial	Not operational	N/A	CMC
DTH Satellite	Operational	8 state-owned, 40 private owned and 1 mixed-ownership channels*	CMC
IPTV	Not operational	N/A	CMC
Mobile TV (IP-Based)	Not Operational	N/A	CMC
Mobile TV (DVB)	Operational	Mobision	CMC

Note: * DTH satellite service providers refer to channels and not broadcasters or operators, i.e. more than one channel can be operated by one broadcaster/operator. Data include free-to-air channels and correspond to April 2011
Source: Arab Advisors Group, Communications and Media Commission (CMC)

Using the digital video broadcasting handheld (DVB-H) technology, Mobision, part of Alsumaria Broadcasting Service Company, is the single Mobile TV (DVB) service provider in Iraq.[75]

[74] See http://www.cmc.iq/.
[75] See http://www.mobision.tv.

Open-source software

No particular initiatives or projects can be reported for Iraq in terms of FOSS.

Arabic digital content

The Sorouh for Sustainable Development Foundation, which is a non-governmental organization in Iraq, planned the "University Professor Website" project. The purpose of this project is to construct, design and launch a website for all university professors in Iraqi universities. The project aims to:

- Encourage university professors and academics to publish their research in Arabic.
- Establish a sustainable link to share information, experience and ideas between the universities and the professors.
- Bride the digital gap for scientific research production.
- Facilitate access to scientific content and research written in Arabic language for researchers and students.
- Increase the number of potential readers and researchers.[76]

The Iraqi E-governance programme's goal is to deliver public services online and allow its citizen an increased participation in decision-making processes. It also increases transparency and effectiveness in the state administration. The programme provides four main services:

- The Citizen Services Portal's Section is a gateway for Iraqi Citizens
- The Business Services Portal's Section is a gateway for Businesses in Iraq
- The Government Services Portal's Section is a gateway for Iraqi Government Organisation
- The Non-Government Organizations (NGO) Services Portal's Section is a gateway for NGOs operating in Iraq[77]

Table 43 below presents the top twenty most visited online web portals by Internet users in Iraq. As shown in the table, the adoption of Arabic online content remains behind the adoption of content offered by global companies, such as Google, Youtube and Facebook. The pioneer local portal is a local online blogging service, which is the 10th most visited site by Iraqi Internet users.

[76] See www.sorouh-iq.org.
[77] See http://www.egov.gov.iq.

Table 43. Most visited websites in Iraq, December 2011

Rank	Website	Target users	Default language*	Description
1	Facebook.com	Global	English	Online social networking
2	Youtube.com	Global	English	Video sharing and broadcasting portal
3	google.iq	Global	Arabic	Global web search portal
4	google.com	Global	English	Global web search portal
5	yahoo.com	Global	English	Miscellaneous online services
6	Kooora.com	Regional	Arabic	Sports
7	maktoob.com	Regional	Arabic	Miscellaneous online services
8	xnxx.com	Global	English	Adult content
9	4shared.com	Global	English	Online storage
10	blogspot.com	Local	English	Online blogging service
11	wikipedia.org	Global	English	Encyclopedia
12	babylon.com	Global	English	Translation software
13	Mediafire.com	Global	English	File sharing services
14	live.com	Global	English	Miscellaneous online services
15	google.ae	Global	Arabic	Global web search portal
16	Conduit.com	Global	English	File sharing
17	Yariga.net	Local	Kurdish	Sports
18	microsoft.com	Global	English	Microsoft products
19	Earthlinktele.com	Local	English	Telecom services
20	Traidnt.net	Regional	Arabic	File sharing/Forum

Note: *The default language is the language that appears when first visiting the website
Source: Alexa

Cybersecurity

There has been no initiatives reported for Iraq, whether government or private, addressing the issue of cybersecurity.

JORDAN

Market overview

The Telecommunications Regulatory Commission (TRC) was established in 1995, and charged with the task of regulating the telecommunication and information technology sectors in Jordan. The TRC performs its duties independently of the Ministry of Telecommunications and Information Technology (MoICT), but in compliance with the general policy of the government.[78]

In terms of digital broadcasting, TRC is responsible for regulating Cable TV, IPTV and mobile TV. The regulator responsible for digital terrestrial and DTH satellite is the Audiovisual Commission (AVC). AVC is also responsible for the audio and audiovisual sector including radio and TV broadcasting inside and outside the country.

Table 44 presents the responsible authority for the five relevant topics identified under the ITU WTDC-10 Regional Initiatives for the Arab Region.

Table 44. Jordanian entities per regional initiative

	National entity responsible
Broadband access networks	TRC
Digital broadcasting	TRC, AVC
Open-source software	MoICT
Arabic digital content	National Information Technology Center
Cybersecurity	MoICT

Source: ITU, Arab Advisors Group

Fixed-telephone market

By end 2011, Orange was the only PSTN service operator in the country. Several VoIP operators provided Direct Inward Dialling Services: Viacloud, Batelco, Tarasol, Orange, Zain, MetroBeam (Kulacom) and XOL (Mada). Other competitors provide prepaid calling cards. Orange Jordan stated that by end 2010, their share of the total fixed-telephone domestic market was 99 per cent.[79]

By end 2010, total fixed-telephone subscriptions amounted to 485’500, translating into a penetration rate of 7.8 per cent.

Table 45. Jordan fixed-telephone subscriptions, 2010

	2010
Fixed-telephone subscriptions (000s)	485
Fixed-telephone penetration rate	7.9%

Source: ITU

[78] See http://www.trc.gov.jo/index.php?option=com_content&task=view&id=16&Itemid=138&lang=english.
[79] See Orange Jordan (2010).

Mobile-cellular market

The Jordanian mobile-cellular market hosts three GSM cellular operators (Zain which is the incumbent, Orange and Umniah). Strong competition exists between the three operators.

Jordan Mobile Telephone Services company (JMTS/Zain) was founded in September 1995, with an operating license valid for 15 years. Competition commenced in the year 2000 with the entrance of MobileCom (now known as Orange)and was increased in June 2004 with the entrance of XPress (iDEN operator) to the market and in 2005, Umniah.[80] In October 2010, Xpress (in coordination with the TRC) announced that it had suspended its cellular services due to difficult financial conditions, maintaining only some services – such as direct connect (push-to-talk), XGPS and interconnect receiving calls – in Amman and Aqaba.[81]

Orange Mobile launched its 3G services in March 2010. A year later, Zain Jordan launched HSPA+/3G services.[82]

By end 2010, total mobile-cellular subscriptions amounted to 6.62 million, translating into a penetration rate of 107 per cent. During the first six months of 2011, mobile-cellular subscriptions increased by 10.2 per cent. By end June 2011, total mobile-cellular subscriptions stood at 7.169 million translating into a penetration rate of 116.6 per cent. Table 46 presents the mobile-cellular adoption in Jordan.

Table 46. Jordan mobile-cellular subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Mobile-cellular subscriptions (000s)	6'620	7'169
Added (000s)		549
Growth %		8.3%
Mobile-cellular subscriptions penetration rate	107.0%	116.0%

Source: ITU, TRC

Broadband Internet market

The Internet market in Jordan is competitive. By the end of November 2011, there were 16 operational ISPs in Jordan that provided ADSL services: Orange / Jordan Telecom, Zain ISP, Umniah / Batelco, MEC, NEXT, Cyberia, TEdata, Sama, Tarasol, JCS, Nuegroup, Kulacom, Blink, Mada Jordan, LaSilkee and VTEL. Out of the 16 ADSL ISPs, seven provide Leased Line services: Orange / Jordan Telecom, Zain ISP, Cyberia, Sama, Kulacom, Blink and LaSilkee. Five ISPs provide WiMAX services: Umniah / Batelco, Wi-Tribe, Kulacom, Mada Jordan and The Blue Zone. WiMAX operators are licensed to offer fixed voice (through WiMAX). JSC, Damamax, and Vtel provide broadband services through fibre optic.[83]

By end 2010, total fixed (wired)-broadband Internet subscriptions reached 195'800, corresponding to a fixed (wired)-broadband penetration rate of 3.2 per cent.

[80] See Arab Advisors Group (2009).
[81] See Arab Advisors Group (2010b).
[82] See Arab Advisors Group (2011c).
[83] See Arab Advisors Group.

Table 47. Jordan broadband Internet subscriptions, 2010

	2010
Fixed (wired)-broadband Internet subscriptions (000s)*	196
Fixed (wired)-broadband Internet penetration rate	3.2%
Active mobile-broadband Internet subscriptions (000s)	150
% of total broadband	43.4%
Active mobile-broadband penetration rate	2.4%
Internet users (000s)	**2'351**
Internet user penetration	38.0%

Note: *Fixed (wired)-broadband Internet subscriptions do not include WiMAX subscriptions
Source: ITU.

Regional initiatives

Broadband access networks

Currently, there are a total of four commercial broadband technologies in the Jordanian market: DSL, FTTx, WiMAX and GSM 3G (UMTS/HSPA).

In addition, and as a complement to broadband access networks currently deployed by commercial operators, MoICT is rolling out a national broadband network (NBN) across the country. The NBN is an open access network established by the government of Jordan to support the growth of traffic demand as the pace of technology diffusion accelerates. It has connected over 600 public schools and universities, in addition to 58 government entities. Several healthcare institutions and "Knowledge Stations" around the country were also connected with a fibre-optic network based on IP/Ethernet technologies. Future plans are being studied to utilize the network to support the business sector in Jordan.

Digital broadcasting

AVC is responsible for regulating the digital terrestrial and satellite broadcasting market in Jordan. TRC and AVC are both responsible for regulating IPTV. TRC is also responsible for regulating Mobile TV. Table 48 details the status of digital broadcasting technologies.

Table 48. Digital broadcasting technologies in Jordan, December 2011

Digital broadcasting technology	Market status	Service providers	Regulatory entity responsible for service
Digital Terrestrial	Not operational	N/A	AVC
DTH Satellite	Operational	1 state-owned and 28 private owned channels*	AVC
IPTV	Operational	Orange Jordan	TRC and AVC
Mobile TV (IP-Based)	Operational	Orange Jordan	TRC
Mobile TV (DVB)	Not operational	N/A	TRC

Note: * DTH satellite service providers refer to channels and not broadcasters or operators, i.e. more than one channel can be operated by one broadcaster/operator. Data include free-to-air channels and correspond to April 2011
Source: Arab Advisors Group, national regulators

Currently, Jordan has one terrestrial TV channel, which is also broadcast through satellite DTH. There are no current governmental initiatives to provide digital terrestrial TV channels in the near future. In addition to the single governmental DTH Satellite channel, 28 private DTH Satellite channels are broadcast.[84] Jordan has planned for the digital transition in two stages. The first stage consists of the main TV broadcasting stations (11 cities), beginning 2012 and completed by end of 2012. The second stage consists of transitioning in the rural and remote areas and will be implemented in 2013-2015. There will be one year of overlapping after the first stage between digital and analogue broadcasting to allow end users to upgrade their receivers. The Ministry of Planning and International Cooperation allocated a budget to Jordan radio and television for the transition for the years 2012 and 2013.[85]

IPTV is operational in the Jordanian market. Currently, Orange Jordan is the only IPTV provider. It commercially launched IPTV and VoD services in the last quarter of 2008.

Mobile TV is provided as an IP-based service in the Jordanian market. Orange Jordan is the only mobile TV service provider.

Open-source software

Jordan's government actively promotes open-source software and aims to become the region's 'open-source software hub'.[86] Jordan was the first country to sign a Memorandum of Understanding (MoU) with an open-source company to promote open-source software adoption in the country and its government agencies. Under the MoU, open-source software may be purchased by Jordanian government agencies and resources will be made available to further develop the open-source database. MoICT will be promoting local expertise and competencies in open-source software by establishing an open-source laboratory in a Jordanian University, and providing free training to certify individuals and government staff in open-source software. Arabic language training will be provided as well.[87]

Arabic digital content

The e-Government national programme has the objective to enhance the performance of the government in terms of service provision, efficiency, accuracy, time and cost effectiveness, transparency, customer satisfaction and cross-governmental integration. The official Jordanian e-Government portal (www.jordan.gov.jo) was launched in the last quarter of 2006.[88]

As for the support of Arabic domain names, in December 2009, Jordan submitted an application to ICANN for permission to develop IDN ccTLD top level domain names in Arabic. This was approved in April 2010 and is available for those utilizing the DNs servers. Delegation with IANA started in April 2010, and the IDN ccTLD .alordon (**الاردن.**) was delegated in the root in August 2010.[89] Many challenges were faced due to Arabic script which, unlike the English language, consists of many variables, prefixes and suffixes.

Table 49 presents the top twenty most visited online web portals by Internet users in Jordan. As shown in the table, the adoption of Arabic online content in the Arab region remains behind the adoption of content offered by global websites, such as Facebook, Google and Youtube. The pioneer local portal is an online news website, which is the tenth most visited site by Jordanian Internet users.

[84] See Arab Advisors Group (2011a).
[85] See Ministry of Planning and International Cooperation Jordan (2011).
[86] See Ministry of Information and Communications Technology (2011a).
[87] See moict.gov.jo/MoICT_StrategicAgreements.aspx.
[88] See Arab Advisors Group (2011g).
[89] Ministry of Information and Communications Technology (2011a).

Table 49. Rank of most visited websites in Jordan, December 2011

Rank	Website	Target users	Default language*	Description
1	Facebook.com	Global	English	Online social networking
2	google.jo	Global	Arabic	Global web search portal
3	Youtube.com	Global	English	Video sharing and broadcasting portal
4	google.com	Global	English	Global web search portal
5	yahoo.com	Global	English	Miscellaneous online services
6	live.com	Global	English	E-mail portal
7	maktoob.com	Regional	Arabic	Miscellaneous online services
8	Kooora.com	Regional	Arabic	Sports
9	blogspot.com	Global	English	Online blogging service
10	Sarayanews.com	Local	Arabic	Online news portal
11	wikipedia.org	Global	English	Encyclopedia
12	Khaberni.com	Local	Arabic	Online news portal
13	Twitter.com	Global	English	Online social networking
14	ammonnews.net	Local	Arabic	Online news portal
15	xnxx.com	Global	English	Adult content
16	msn.com	Global	English	Miscellaneous online services
17	4shared.com	Global	English	Online storage
18	babylon.com	Global	English	Translation Software
19	alrai.com	Local	Arabic	Online news portal
20	linkedin.com	Global	English	Career Network

Note: *The default language is the language that appears when first visiting the website
Source: Alexa

Cybersecurity

The cabinet approved the "Information Systems Crime Law" in August 2010. The law was ratified by the King and published in the official gazette in September 2010.[90]

A draft of the National Information Assurance and Cybersecurity Strategy (NIACSS) was presented by MoICT in September 2011. NIACSS was presented as a result of the government's review of the cybersecurity situation in Jordan. The review found a lack of standardization and insufficient cooperation with the private sector.

NIACSS presents the strategic objectives, national cybersecurity priorities, and the implementation road map required to ensure and maintain a resilient and trusted computing environment that supports national security, enhances the economy, and builds awareness and trust among citizens towards achieving national prosperity. MoICT identified nine major national cybersecurity priorities, which collectively contribute to achieving the strategic objectives and help prevent, deter, and protect national infrastructures against damage or attacks and minimize damage and recovery time from attacks. These are:

[90] Ministry of Information and Communications Technology (2011a).

- Risk Management Programme
- National Computer Emergency Response Team (JO-CERT).
- Security Awareness and Capacity Building Programme
- National Information Security Standards and Policies
- Legal and Regulatory Regime
- National Encryption System
- International Information Security Cooperation Programme
- Securing National Information Systems/Networks
- Critical National Infrastructure Protection (CNIP) Programme

NIACSS calls for the establishement of an overseeing organization called National Information Assurance and Cybersecurity Agency (NIACSA). NIACSA should serve as a central national entity for governmental and non-governmental organizations regarding issues relating to information assurance and cybersecurity.[91]

[91] See Ministry of Information and Communications Technology (2011b).

KUWAIT

Market overview

The Ministry of Communications (MOC) is the regulatory entity for the telecommunications sector in the country. ICT development plans are issued by MOC. Parliament's approval is essential for matters pertaining to operating licenses, liberalization policies and privatization issues.

To date, fixed-line local and international long distance (ILD) services remain a state-owned monopoly, while the cellular and Internet services markets are competitive. The Kuwaiti government owns minority interest in all cellular operators, while the Internet market is completely served by private sector companies.

Kuwait remains the only GCC country, and one of the few Arab countries, without an independent telecommunication regulatory body. In 2010, a draft law for the establishment of an independent telecommunications regulator was passed to the Kuwaiti parliament by the MOC for approval.[92]

Digital Terrestrial TV transmission is not operational in the country. However, the Kuwaiti government signed an agreement in 2006, according to which DVB-T technology will be implemented by 2015.[93]

As for DTH satellite, Kuwait had seven state-owned and 21 private channels by April 2011.[94]

IP-based mobile TV services are provided by two cellular operators, Zain Kuwait and Viva. A third operator, Wataniya, launched mobile TV services in May 2007, but discontinued the service in June 2008.[95]

Table 50 presents the responsible authority for the five relevant topics identified under the ITU WTDC-10 Regional Initiatives for the Arab Region.

Table 50. Kuwaiti entities per regional initiative

	National entity responsible
Broadband access networks	MOC
Digital broadcasting	Ministry of Information
Open-source software	Kuwait Central Agency for Information Technology (CAIT)
Arabic digital content	MoC
Cybersecurity	CAIT

Source: ITU, Arab Advisors Group

Fixed-telephone market

MOC is the sole fixed-telephone operator in Kuwait. International Long Distance (ILD) services are also monopolized by the Ministry.

[92] See Arab Advisors Group (2011h).
[93] See http://www.dvb.org/news_events/press_releases/press_releases/DVB_pr148%20RRC06%20Final.pdf.
[94] See Arab Advisors Group (2011a).
[95] See Arab Advisors Group.

By end 2010, Kuwait's fixed-telephone subscriptions amounted to 566'300, corresponding to a fixed-telephone penetration rate of 20.7 per cent.

Table 51. Kuwait fixed-telephone-subscriptions, 2010

	2010
Fixed-telephone subscriptions (000s)	566
Fixed-telephone penetration rate	20.7%

Source: ITU

Mobile-cellular market

Competition exists between the three GSM operators (Zain Kuwait, Wataniya and Viva). Zain Kuwait, which started operations in 1986, is the incumbent in the Kuwaiti mobile-cellular market. Wataniya Telecom was the second cellular operator to launch services, and started operations in 1999. Viva, the third entrant to the market, started operations in 2008.[96]

The three cellular operators offer 3G services: Zain Kuwait was the first operator to introduce 3G services in April 2006; Wataniya launched its 3G services in 2007; Viva's launch of 3G services was part of the launch of its operations in December 2008.[97]

The three mobile-cellular operators reported adding 399'000 cellular subscriptions during the first six months of 2011. By the end of June 2011, cellular subscriptions reached 4.799 million, thus increasing the country's cellular penetration to an estimated 172.8 per cent (Table 52).

Table 52. Kuwait mobile-cellular subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Mobile-cellular subscriptions (000s)	4'400	4'799
Added (000s)		399
Growth %		9.1%
Mobile-cellular penetration rate	160.8%	172.8%

Source: ITU, Arab Advisors Group

Broadband Internet market

The Kuwaiti Internet market has four major operators: Fast Telco, Quality Net, Gulfnet and Zajil KEMS. Technologies provided by these ISPs are DSL, WiMAX, FTTx and VSAT.

By end 2010, total fixed (wired)-broadband Internet subscriptions reached 46'000, corresponding to a fixed (wired)-broadband penetration rate of 1.7 per cent. Moreover, all three mobile operators are offer 3G services, and reported a total of 1.74 million active mobile-broadband Internet subscriptions by end 2010.

[96] See Arab Advisors Group.
[97] See Arab Advisors Group (2011c).

Table 53. Kuwait broadband Internet subscriptions, 2010

	2010
Fixed (wired)-broadband Internet subscriptions (000s)*	**46**
Fixed (wired)-broadband Internet penetration rates	1.7%
Active mobile-broadband Internet subscriptions (000s)	**1'738**
Active mobile-broadband penetration rates	63.5%
Internet users (000s)	**1'047**
Internet user penetration	38.3%

Note: *Fixed (wired)-broadband Internet subscriptions do not include WiMAX subscriptions
Source: ITU

Regional initiatives

Broadband access networks

Currently, there are a total of five commercial broadband technologies in the Kuwaiti market; DSL, FTTx, VSAT, WiMAX and GSM 3G (UMTS/HSPA).

The recent broadband projects in the country include the deployment of the FTTx network by the Kuwaiti Ministry of Communications. In June 2010, the Ministry announced that it had finished installing fibre-optic cables in 31 areas, following a GPON network architecture.[98]

MOC also signed an agreement with Advanced Technology Company to upgrade its telecommunications network to NGN. The duration of the project, which is valued at KD 4 million (USD 14.7 million), is 18 months.[99]

As for the mobile-cellular operators' recent broadband projects, they are currently planning the launch of LTE technology. In July 2010, Zain announced that it had started the experimental transmission process on the LTE network.[100]

Wataniya, the second cellular operator, had a trial of LTE technology during the period January-February 2011.[101]

In May 2010, Viva announced the launch of the initial phase of its optical infrastructure development project, which involved deploying multi-fibre optical cables. According to the operator, this step paved the way for the deployment of LTE technology.[102]

[98] See http://www.moc.kw/ksfdoclink/ae_doc2010_20.html.
[99] See www.moc.kw.
[100] See https://www.kw.zain.com/kw/af/core/content/newsBrowse.do?categoryId=-8400&contentId=11387&lang=en.
[101] See http://10.wataniya.com/mediacenter/newsroom/NewsDetails_en_gb.aspx?newsid=785_en_gb.
[102] See https://www.viva.com.kw/en/latest-news/-/asset_publisher/bP57/content/towards-4g-technology-in-kuwait-viva-enhances-network-with-fiber-infrastructure-deployment?redirect=https%3A%2F%2Fwww.viva.com.kw%2Fen%2Flatest-news%3Fp_p_id%3D101_INSTANCE_bP57%26p_p_lifecycle%3D0%26p_p_state%3Dnormal%26p_p_mode%3Dview%26p_p_col_id%3Dcolumn-2%26p_p_col_count%3D1%26_101_INSTANCE_bP57_advancedSearch%3Dfalse%26_101_INSTANCE_bP57_keywords%3D%26_101_INSTANCE_bP57_delta%3D10%26_101_INSTANCE_bP57_cur%3D5%26_101_INSTANCE_bP57_andOperator%3Dtrue.

In December 2011, Viva Kuwait launched the first commercial LTE network in Kuwait.[103]

The first 3G service in Kuwait was introduced by the cellular incumbent, Zain, in April 2006. Wataniya launched its 3G services in 2007 and Viva's launch of 3G services was part of the launch of its operations in Kuwait in December 2008.[104]

The Kuwaiti Internet market has four major players: Fast Telco, Quality Net, Gulfnet and Zajil KEMS. The four ISPs provide broadband Internet services through FTTH. As for WiMAX, it is offered by Fast Telco. In addition, Gulfnet also offers VSAT Internet services.

Table 54 presents the main recent initiatives in Kuwait concerning broadband access network projects.

Table 54. Broadband access network projects in Kuwait

Broadband access network project	Status	Description
Zain Kuwait's LTE Network	Ongoing	In July 2010, Zain commenced the experimental transmission process on the LTE network.
Wataniya's LTE Network	Ongoing	Wataniya had a trial of LTE technology during the period January-February 2011.
VIVA Kuwait LTE Network	Accomplished	Viva Kuwait announced the launch of LTE in December 2011. However, by January 2012, VIVA had still not offered any plans for LTE, although a subscriber with an LTE handset would get LTE speeds in areas that have LTE coverage.
MOC's FTTH Project	Ongoing	The ministry announced in June 2010 the completion of fibre optic cables installation in 31 areas. The Ministry uses the GPON technology in its project, which aims to renew the telecommunications infrastructure in Kuwait.
MOC's NGN Project	Ongoing	In March 2011, the Kuwaiti Ministry of Communications signed an agreement with Advanced Technology Company to upgrade its telecommunications network to NGN. The value of the project is KD 4 million (USD 14.7 million). The duration of the project is 18 months.

Source: Zain Kuwait, Wataniya, Viva

Digital broadcasting

Digital terrestrial broadcasting is currently not available in the country. However, Kuwait is committed to achieving the full transition to digital terrestrial broadcasting by 2015, as a signatory of the international agreement reached at ITU's Regional Radiocommunication Conference 2006.[105] Mobile TV is provided through two cellular operators, Zain Kuwait and Viva.[106]

[103] See https://www.viva.com.kw/en/latest-news/-/asset_publisher/bP57/content/viva-the-first-to-launch-the-4g-services-with-internet-speed-up-to-100-mbps?redirect=https%3A%2F%2Fwww.viva.com.kw%2Fen%2Flatest-news%3Fp_p_id%3D101_INSTANCE_bP57%26p_p_lifecycle%3D0%26p_p_state%3Dnormal%26p_p_mode%3Dview%26p_p_col_id%3Dcolumn-2%26p_p_col_count%3D1.
[104] See Arab Advisors Group (2011c).
[105] See ITU press release: http://www.itu.int/newsroom/press_releases/2006/11.html.
[106] See Arab Advisors Group.

Table 55. Broadband Digital broadcasting technologies in Kuwait, December 2011

Digital broadcasting technology	Market status	Service providers	Regulatory entity responsible for service
Digital terrestrial TV	Not operational	State-owned channels	Ministry of Information
DTH satellite	Operational	7 state-owned and 21 private channels*	Ministry of Information
IPTV	Not operational	N/A	Ministry of Communications
Mobile TV (IP-Based)	Operational	Zain Kuwait, Wataniya	Ministry of Communications
Mobile TV (DVB)	Not operational	N/A	Ministry of Communications

Note: * DTH satellite service providers refer to channels and not broadcasters or operators, i.e. more than one channel can be operated by one broadcaster/operator. Data include free-to-air channels and correspond to April 2011
Source: Arab Advisors Group, national regulators

Kuwait has seven state-owned channels and 21 private channels that broadcast through DTH satellite.[107]

As for IPTV, it is currently not operational in the market.

Mobile TV is provided as IP-based services offered by Zain Kuwait and Viva. Wataniya introduced mobile TV services in May 2007, but discontinued the service in June 2008. Both Zain Kuwait and Viva provide a monthly billing basis for their mobile TV service offerings.[108]

Open-source software

The Kuwait Central Agency for Information Technology (CAIT) provides training for some open-source applications, including Linux.[109]

Despite this, Kuwait does not currently announce any concrete plans to promote local development of open-source software. Moreover, the Kuwaiti private sector has not undertaken any major initiative to develop local open-source software.

Arabic digital content

In September 2004, Kuwait's Ministry of Communications signed a Memorandum of Understanding with Singapore for e-Government cooperation.

Under this MoU, the Infocomm Development Authority (IDA) of Singapore developed an implementation blueprint for the establishment of a new IT Entity and an e-Government blueprint for Kuwait. Kuwait and Singapore signed a second MoU which enabled further collaboration, where Singapore serves as an advisor to Kuwait on information technology and e-Government matters.

Kuwait's e-Government portal was officially launched in October 2008 under the leadership of CAIT.[110]

As for the support of Arabic domain names, this has not been officially addressed by Kuwait's Ministry of Communications or local online companies in the private sector.

[107] See Arab Advisors Group (2011a).
[108] See Arab Advisors Group.
[109] See http://www.cait.gov.kw.
[110] See Arab Advisors Group (2011g).

The Kuwait Foundation for the Advancement of Sciences, a private non-governmental organization established in 1976, presents the Kuwait e-Award, an award for developers of content in Arabic. The award covers the following areas: e-government, e-learning, e-heritage, e-science, e-content, e-entertainment, e-health and e-commerce.[111]

The Kuwaiti government also launched an award programme under the name "Sheikh Salem Al-Ali Al-Subah". The award aims at improving ICT skills and fostering the development of Arabic online content.[112]

Table 56 presents the top twenty most visited online web portals by Internet users in Kuwait. As shown in the table, the adoption of Arabic online content remains behind the adoption of content offered by global websites, such as Google, Youtube and Facebook. The pioneer local portal is a local online news portal, which is the eleventh most visited site by Kuwaiti Internet users.

Table 56. Rank of most visited websites in Kuwait, December 2011

Rank	Website	Target users	Default language*	Description
1	youtube.com	Global	English	Video sharing and broadcasting portal
2	google.com.kw	Global	Arabic	Web search portal
3	Facebook.com	Global	English	Online social networking
4	google.com	Global	English	Global web search portal
5	live.com	Global	English	E-mail portal
6	yahoo.com	Global	English	Miscellaneous online services
7	twitter.com	Global	English	Online social networking
8	blogspot.com	Global	English	Online blogging service
9	maktoob.com	Regional	Arabic	Miscellaneous online services
10	wikipedia.org	Global	English	Encyclopedia
11	alwatan.kuwait.tt	Local	Arabic	Online news portal
12	msn.com	Global	English	Miscellaneous online services
13	q8yat.com	local	Arabic	Online forum for women
14	Kooora.com	Regional	Arabic	Sports
15	youm7.com	Local	Arabic	Online news portal
16	t.co	Global	English	Domain used by twitter as part of a service to protect users from harmful activity
17	alraimedia.com	Local	Arabic	Online news portal
18	4shared.com	Global	English	Online storage
19	ahram.org.eg	Local	Arabic	Online news portal
20	amazon.com	Global	English	Online shopping

Note: *The default language is the language that appears when first visiting the website
Source: Alexa

[111] See http://www.kfas.org/kuwait-e-award.html.
[112] See http://www.alsabahaward.org/s3/informatic_award_categories.php.

Cybersecurity

CAIT is responsible for information and communications security systems in the country. In addition, the agency also monitors advances made by hackers and perpetrators of other e-crimes. [113]

In October 2011, CAIT held a conference on information security under the name Arabian Conference on Information and Communications Security (ACICS). The conference was held amid the Kuwaiti government's efforts to streamline government services and organizations in order to develop Kuwait's e-government initiatives. [114]

CAIT is also executing the Kuwait Information Net project, which connects 50 public institutions through one network of fibre optics; CAIT is responsible for implementing high levels of security and privacy in this project, by using modern coding systems and firewalls.

In 2008, CAIT issued new legislation regarding e-authentication in Kuwait. The legislation covered the infrastructure needed for e-authentication and the models for the process. Topics covered by the framework are risk assessment tools, models for e-authentication, cross certification, certification authorities, registration authorities, root certification authorities, bridge certification authorities, policies committee, electronic transaction act and e-crimes.

[113] See http://www.cait.gov.kw.
[114] See http://www.tra.gov.lb/Duties-and-regulatory-principles.

LEBANON

Market overview

The Telecommunications Regulatory Authority (TRA) was established in 2002, and is the entity responsible for regulating the telecommunications market in Lebanon.

The Technical Cooperation Unit (TCU) is a unit of the Office of the Minister of State for Administrative Reform (OMSAR), which is responsible for setting technical specifications and evaluating ICT projects. Furthermore, it provides advisory services to the Lebanese public administrations, and conducts technical studies.[115]

In terms of digital media, the market is regulated by the Ministry of Information.

Table 57 presents the responsible authority for the five relevant topics identified under the ITU WTDC-10 Regional Initiatives for the Arab Region.

Table 57. Lebanese entities per regional initiative

	National entity responsible
Broadband access networks	TRA
Digital broadcasting	Ministry of Information
Open-source software	N/A
Arabic digital content	N/A
Cybersecurity	N/A

Source: Arab Advisors Group

Fixed-telephone market

OGERO is the only fixed operator in Lebanon. Due to the high prices of international calling services, VoIP services are in some cases provided illegally in the country. Moreover, due to the outdated fixed network, there are no intelligent network services, such as fixed SMS, toll free calling and collect calls.[116]

By end 2010, there were a total of around 888'000 fixed-telephone subscriptions, corresponding to a penetration rate of21 per cent.

Table 58. Lebanon fixed-telephone subscriptions, 2010

	2010
Fixed-telephone subscriptions (000s)	887
Fixed-telephone penetration rate	21.0%

Source: ITU

[115] See http://www.tra.gov.lb/.
[116] See Arab Advisors Group.

Mobile-cellular market

Lebanon's mobile-cellular market is served by a duopoly controlled by the government. Lebanon's two cellular networks are operated through management contracts between the government and regional operators Orascom Telecom and Zain Group; Orascom Telecom operates Alfa, while Zain Group operates MTC Touch.

Alfa and MTC Touch added some 189'200 subscriptions during the first six months of 2011, reaching a total of 3.064 million subscriptions. This growth was reflected in a mobile-cellular penetration rate of 72.2 per cent by June.

In February 2011, the Lebanese government renewed both operators' contracts for one year.[117]

Table 59. Lebanon mobile-cellular subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Mobile-cellular subscriptions (000s)	2'875	3'064
Added (000s)		189
Growth %		6.6%
Mobile-cellular penetration rate	68.0%	72.2%

Source: ITU, Arab Advisors Group.

Broadband Internet market

Internet services are provided by the government-owned fixed operator "OGERO", which is under the supervision of the Ministry of Telecommunications (MOT). By year-end 2010, Internet and wireless-broadband services were provided by 16 licensed Internet service providers (ISPs) using the local wireless networks of four data service providers (DSPs) and offering residential and corporate solutions. ADSL services are provided by ISPs which access the local loop through bitstream services provided by the MOT or the four DSPs. In turn, the DSPs access the local loop of the Ministry through line sharing unbundling.[118]

In November 2011, MTC Touch launched its 3G services in the country, by upgrading 420 out of 850 sites. Areas covered include Beirut, Saida, Zahle and several parts of the Greater Beirut region. MTC Touch plans to further roll out its 3G services to cover the entire country by 2012.[119] Meanwhile, the second mobile operator, Alfa, launched its 3G services in October 2011. [120]

[117] Arab Advisors Group (2011i).
[118] See http://www.tra.gov.lb.
[119] See http://www.mtctouch.com.lb/autoforms/portal/home/Corporate%20Menu/Media%20Center/Press%20Releases/Latest/Official%20Launch%20of%203%209G.
[120] See http://www.alfa.com.lb.

Table 60. Lebanon broadband Internet subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Fixed (wired)-broadband Internet subscriptions (000s)*	**200**	**286**
Added (000s)		86.0
Growth %		43.0%
Fixed (wired)-broadband Internet penetration rates	4.7%	6.7%
Active mobile-broadband Internet subscriptions (000s)	**0.0**	**N/A**
Active mobile-broadband penetration rates	0.0%	
Internet users (000s)	**1'311**	**N/A**
Internet user penetration	31%	

Note: *Fixed (wired)-broadband Internet subscriptions do not include WiMAX subscriptions
Source: ITU, Arab Advisors Group

Regional initiatives

Broadband access networks

By February 2010, there were nine Data Service Providers (DSPs) in Lebanon. TRA released frequencies to seven out of the nine DSPs to offer broadband wireless access (BWA) services. However, only four licensees have operational infrastructures: Cable One, Cedarcom, GlobalCom Data Services (GDS) and Pesco. They offer wireless Internet access to households and business customers.[121]

Recent broadband projects in the country include the deployment of mobile-broadband technology and new ADSL and international bandwidth capacity. Alfa and MTC Touch have deployed mobile-broadband technology based on GSM 3G standards.

As for upcoming broadband technology, MTC Touch has future plans to equip 50 sites with Long Term Evolution (LTE) technology (4G) with a speed of 173 MB/second. During Q3 2010, the Ministry of Telecommunications launched a project for deploying a new optical-fibre platform that will serve as the main digital transport infrastructure for telecommunication services. The project is expected to span 18 months to complete and includes the provision of at least 300 fibre connections to ISPs, educational institutions and governmental institutions. It is not yet an FTTH deployment in itself, but the beginning of an extension of fibre connectivity to the last mile.[122]

Table 61 presents the main initiatives in Lebanon concerning broadband access network projects.

[121] See Arab Advisors Group.
[122] See Telecom Regulatory Authority, http://www.tra.gov.lb.

Table 61. Broadband access network projects in Lebanon

Broadband access network project	Status	Description
New ADSL and International Capacity offers	Accomplished	In October 2011, the Ministry of Telecommunications (MoT) offered new ADSL packages with speeds up to 8 Mbps. The offer also includes international bandwidth capacity improvements and lower rates.
FTTx	Ongoing	18-months project from the Ministry of Communications to deploy a fibre transport network. It was started in Q3 2010, and it has the objective to bring fibre connectivity closer to the last mile.
Alfa Network	Accomplished	In October 2011, Alfa launched 3G service
MTC Touch Network	Ongoing	MTC Touch launched its 3G services in November 2011, limited to certain locations, such as Beirut, Saida or Zahle. MTC Touch has an ambitious roll out plan to cover all Lebanon by beginning of 2012, as well as future plans to equip 50 sites with Long Term Evolution (LTE) technology (4G) with a speed of 173 MB/second.

Source: TRA, MTC Touch, Alfa

Digital broadcasting

Currently, the Ministry of Information is the entity responsible for regulating the digital broadcasting market in Lebanon. By April 2011, there were 21 privately-owned and one government-owned satellite service provider.[123] Table 62 provides further details on digital broadcasting technologies in Lebanon.

Table 62. Digital broadcasting technologies in Lebanon, December 2011

Digital broadcasting technology	Market status	Service providers	Regulatory entity responsible for service
Digital Terrestrial	Not operational	N/A	Ministry of Information
DTH Satellite	Operational	1 state-owned and 21 privatly-owned channels*	Ministry of Information
IPTV	Operational	Sofrecom in partnership with Orange Business Services	TRA
Mobile TV (IP-based)	Not operational	N/A	TRA
Mobile TV (DVB)	Not operational	N/A	Ministry of Telecommunications

Note: * DTH satellite service providers refer to channels and not broadcasters or operators, i.e. more than one channel can be operated by one broadcaster/operator. Data include free-to-air channels and correspond to April 2011
Source: Arab Advisors Group, national regulators, national ministries

Currently, the existing television services in Lebanon are delivered via:

- UHF free-to-air analogue TV
- MVDS in the 10 – 12 GHz band
- Unlicensed cable TV and wireless distribution
- DTH satellite TV

[123] See Arab Advisors Group (2011a).

Analogue transmission networks with multiple transmitter locations are being used by all UHF terrestrial television broadcasters. Most household television receivers are analogue-based, while the main digital television services are transmitted via satellite & DVB-MS operators.[124]

In May 2008, Sofrecom carried out, in partnership with Orange Business Services, an operational IPTV deployment for "Solidere" area, in downtown Beirut.[125]

Mobile TV is currently not operational in the Lebanese market.

Open-source software

The United Nations Educational, Scientific and Cultural Organization (UNESCO), and the United Nations Development Programme – Information and Communication Technology for Development in the Arab Region (UNDP–ICTDAR) jointly initiated MA3BAR, the Arab Support Center for Free and Open-source Software. MA3BAR's objectives are:

- Capacity building by providing the necessary training and assistance in developing skills and competences in the public and the private sectors, as well as in non-government organizations, and encouraging the inclusion of Free and Open-source Software (FOSS) courses as part of the standard course offerings in universities as well as networking the various FOSS communities that exist in the Arab Region.
- Supporting the creation of applications (or toolkits) that will meet the needs of the local market and lead to the strengthening of local and regional expertise.
- Raising awareness at the government and business levels on the potential and viability of open-source solutions and applications as solid alternatives to proprietary software.[126]

Arabic digital content

The United Nations Economic and Social Commission for Western Asia (ESCWA) sponsors a competition for Digital Arabic Content (DAC). It was launched in June 2008 in local partnership with Berytech and attracted dozens of meritorious projects. The winner benefits for a period of one year from the support of Berytech to develop the project.[127]

Table 63 presents the top twenty most visited online web portals by Internet users in Lebanon. As shown in the table, the adoption of Arabic online content remains behind the adoption of content offered by global players, such as Google, Youtube and Facebook. The pioneer local portal is a local online news portal, which is the ninth most visited site by Lebanese Internet users.

[124] See Republic of Lebanon/ Telecommunications Regulatory Authority (2008).
[125] See http://www.sofrecom.com/Solidere-Lebanon-IPTV-deployment.html.
[126] See MA3BAR, http://ma3bar.org/.
[127] See http://www.berytech.org/content/view/415/lang,en/.

Table 63. Most visited websites in Lebanon, December 2011

Rank	Website	Target users	Default language*	Description
1	Facebook.com	Global	English	Online social networking
2	google.com	Global	English	Global web search portal
3	google.com.lb	Global	Arabic	Web search portal
4	youtube.com	Global	English	Video sharing and broadcasting portal
5	live.com	Global	English	E-mail portal
6	yahoo.com	Global	English	Miscellaneous online services
7	wikipedia.org	Global	English	Encyclopedia
8	twitter.com	Global	English	Online social networking
9	tayyar.org	Local	Arabic	Online news portal
10	elnashra.com	Local	Arabic	Online news portal
11	msn.com	Global	English	Miscellaneous online services
12	blogspot.com	Global	English	Online blogging service
13	lebanonfiles.com	Local	Arabic	Online news portal
14	linkedin.com	Global	English	business-related social networking site
15	lebanese-forces.com	Local	Arabic	Online news portal
16	elnashrafan.com	Local	Arabic	Online news portal
17	alfa.com.lb	Local	English	Telecommunications mobile operator
18	nowlebanon.com	Local	English	Online news portal
19	kataeb.org	Local	English	Online news portal
20	mtctouch.com.lb	Local	English	Telecommunications mobile operator

Note: *The default language is the language that appears when first visiting the website
Source: Alexa

Cybersecurity

The Pan Arab Observatory for Cybersecurity was established in Lebanon with the collaboration of the Ministry of Justice, the Ministry of Interior, the Lebanese Association for Information Technology, TRA, the Antonine University, the Arab States League Judicial and Legal Research Center and Microsoft.

The objectives of the Pan Arab Observatory for Cybersecurity are:

- Produce a clear and consistent overview of the emerging cybersecurity needs of the Arab-speaking society
- Produce a clear and consistent overview of the legal and regulatory framework that should be dealt with
- Create a solid and clear framework for different countries to reach harmony in their legal and regulatory matters to secure the cyberspace for the government and its citizens
- Cover the commercial, economic, academic and social aspects of cybersecurity [128]

[128] See http://www.tra.gov.lb/NewsDetails.aspx?pageid=1947.

LIBYA

Market overview

The General Telecommunications Authority (GTA) is the telecommunications regulatory body in Libya.

GTA was established in 2006 and was headed by Muhammad Muammar Al Gaddafi, son of Libya's former president, who approved all decisions. The Authority was responsible for following up the services and activities of the post and telecommunication sector and the enforcement of related legislation, as well as preparing technical specifications and standards for communication systems, supervising telecommunications networks, systems and satellite services, and taking all legal measures against telecommunications and post service violations.[129]

In terms of digital media, the market was a government monopoly, where all digital media providers were state-owned, until January 2006, when the Libyan government decided to allow the establishment of private-owned media (newspapers, radio and television stations).[130]

The Libyan government has control over the entire communication and media market. This situation may be altered after the change in the political regime in the country.

Fixed-telephone market

The General Post and Telecommunications Company (GPTC), which is a state-owned entity created in 1984, is the sole operational provider of fixed services in Libya. Aljeel Aljadid is another licensed state-owned company which had plans to launch services in 2011.[131]

By end of 2010, total fixed-telephone subscriptions amounted to 1.228 million, translating into a penetration rate of 19.3 per cent.

Table 64. Libya fixed-telephone subscriptions, 2010

	2010
Fixed-telephone subscriptions (000s)	1228
Fixed-telephone penetration rate	19.3%

Source: ITU

Mobile-cellular market

Libya has two state-owned mobile-cellular companies: Almadar Aljadid and Libyana. Almadar Aljadid (previously known as Almadar), was established in 1996, and started operations in 1997. It is part of the fixed-line incumbent GPTC. Libyana launched services in 2004 and owns the majority market share in the Libyan mobile-cellular market. LTT, Libya's current ISP, announced its intention to launch cellular services in 2010 as a Mobile Virtual Network Operator (MVNO). In addition, a new state-owned operator, Aljeel

[129] See Arab Advisors Group (2011j).
[130] See http://armedforthequill.com/libyanews.php.
[131] See Arab Advisors Group (2010c).

Aljadid, which reportedly received its license in Q2 2008 stated its plans to launch its cellular services as a MVNO in April 2010.[132]

By end 2010, there were an estimated 10.9 million mobile-cellular subscriptions, translating into a penetration rate of 171.5 per cent.

Table 65. Libya mobile-cellular subscriptions, 2010

	2010
Mobile-cellular subscriptions (000s)	10'900
Mobile-cellular penetration rate	171.5%

Source: ITU estimates

Broadband Internet market

Libya Telecom and Technology (LTT) is the only operational ISP. LTT is a government-owned company established in 1997. It offers Internet through dial-up, WiMAX, ADSL and FTTH. Aljeel Aljadid is another licensed state-owned company to be launched in 2011.[133]

By end 2010, fixed (wired)-broadband Internet subscriptions amounted to 72'800, corresponding to a penetration rate of only 1.1 per cent. Libya's government leveraged mobile-broadband technology in order to compensate for the lack of fixed infrastructure. By end 2010, there were 2.7 million active mobile-broadband subscriptions in the country.

Table 66. Libya broadband Internet subscriptions, 2010

	2010
Fixed (wired)-broadband Internet subscriptions (000s)*	**73**
Fixed (wired)-broadband Internet penetration rates	1.1%
Active mobile-broadband Internet subscriptions (000s)	**2'714**
Active mobile-broadband penetration rates	42.7%
Internet users (000s)	**890**
Internet user penetration	14%

Note: *Fixed (wired)-broadband Internet subscriptions do not include WiMAX subscriptions
Source: ITU estimates

Regional initiatives

Broadband access networks

Libya's broadband market encompasses a variety of technologies. It provides fixed (wired)-broadband services through DSL, and wireless-broadband services through 3G technologies, such as GSM, as well as WiMAX.

In January 2009, LTT launched its WiMAX services covering 18 Libyan cities as a first phase. By end 2009, LTT's WiMAX network was expanded to cover an additional six cities. In April 2009, LTT signed a contract to deploy an FTTH network covering 800 buildings in Alzohor District, Tripoli, and expand the network

[132] See Arab Advisors Group (2010c).
[133] See Arab Advisors Group (2010d).

coverage to other districts in a second phase. The fibre infrastructure for the project was completed in June 2010.[134]

Due to the political unrest in Libya in the past few months, LTT services were halted. In October 2011, LTT started its maintenance work and carried out technical operations to reinstate their services in areas such as Misurata and Bani Waleed. LTT has set February 2012 as the deadline to return the service to its state prior to the Libyan revolution.[135]

Table 67 presents the main initiatives in Libya concerning broadband access network projects.

Table 67. Broadband access network projects in Libya

Broadband access network project (Starting 2009)	Status	Description
LTT WiMAX Network	Accomplished	LTT launched its WiMAX services in January 2009, covering 18 Libyan cities as a first phase. Later, by end 2009, an additional 6 cities were covered by LTT's WiMAX service network.
LTT FTTH Project	Accomplished	Project completed in June 2010 whereby LTT connected 800 buildings on the Airport Road in Alzohor District, Tripoli, with an FTTH network.
Al Jeel Al Jadeed's Fibre Project	Ongoing	Al Jeel al Jadeed plans to offer its Internet and fixed services by building a wide fibre to the premises network covering more than 13'000km of the Libyan territories.

Source: LTT, Al Jeel Al Jadeed

Digital broadcasting

In terms of digital media, the market was a government monopoly, where all digital media providers were state-owned through former Jamahiriya News Agency (JANA). In January 2009, the Libyan government decided to allow the establishment of privatly-owned media (newspapers, radio and television stations).

Regarding mobile TV in 2007, Libyana carried out a trial of DVB-H technology in Tripoli in cooperation with the French solution provider, Enensys.[136] Table 68 provides further details of digital broadcasting technologies in Libya.

Table 68. Digital broadcasting technologies in Libya

Digital broadcasting technology	Market status	Service providers	Regulatory entity responsible for service
Digital terrestrial TV	Not Operational	N/A	unregulated
DTH satellite	Operational	3 state-owned and 1 private owned channels*	Government
IPTV	Not operational	N/A	unregulated
Mobile TV (IP-Based)	operational	1 state-owned operator	State-owned
Mobile TV (DVB)	Not operational	N/A	unregulated

Note: * DTH satellite service providers refer to channels and not broadcasters or operators, i.e. more than one channel can be operated by one broadcaster/operator. Data include free-to-air channels and correspond to April 2011
Source: Arab Advisors Group, national regulators

[134] See Arab Advisors Group (2010c) and (2010d).
[135] See http://www.ltt.ly/LTT%20P-R%2001.pdf.
[136] See http://www.enensys.com/news-and-press/press-releases/libyana-mobile-phone-dvb-h-trial-entrusted-to-enensys.html.

Open-source software

In Libya, there are several online groups that are interested in open-source software (such as Linux and Fossil). These groups provide online material on open-source software and conduct workshops. For example, the Tripoli Linux User Group established in 2009 is an online group that conducts free workshops, seminars and courses in Linux.[137]

Arabic digital content

Table 69 presents the top twenty most visited online web portals by Internet users in Libya.

Table 69. Rank of most visited websites in Libya, December 2011

Rank	Website	Target users	Default language*	Description
1	Facebook.com	Global	English	Online social networking
2	Google.com.ly	Global	Arabic	Web search portal
3	Youtube.com	Global	English	Video sharing and broadcasting portal
4	yahoo.com	Global	English	Miscellaneous online services
5	Google.com	Global	English	Global web search portal
6	Maktoob.com	Regional	Arabic	Miscellaneous online services
7	Babylon.com	Global	English	Online dictionary and translator
8	Kooora.com	Regional	Arabic	Sports
9	blogspot.com	Global	English	Online blogging service
10	Opensooq.com	Regional	Arabic	Online selling market
11	Mediafire.com	Global	English	File sharing services
12	libyanyouths.com	Local	Arabic	Cultural Forum and Debate website
13	Wikipedia.org	Global	English	Encyclopedia
14	4shared.com	Global	English	Online storage
15	conduit.com	Global	English	Network of web and mobile app publishers
16	microsoft.com	Global	English	Product support and information
17	Tagged.com	Global	English	Social Networking
18	M5zn.com	Regional	Arabic	Online storage
19	Xnxx.com	Global	English	Adult content
20	Twitter.com	Global	English	Social networking

Note: *The default language is the language that appears when first visiting the website
Source: Alexa

Cybersecurity

There is no information on any major cybersecurity initiative in Libya.

[137] See http://tlug.ly/.

MAURITANIA

Market overview

The *Autorité de Régulation* is a multi-sector regulatory body in Mauritania, responsible for the regulation of activities in the areas of water, electricity, telecommunications and post.[138]

In terms of digital broadcasting, IPTV and mobile TV are not operational in Mauritania. The regulator responsible for digital terrestrial TV and DTH satellite is Haute Autorité de la Presse et de l'Audiovisuel (HAPA). HAPA, created in 2006, is an independent regulatory authority in charge of the press and the audiovisual sector.[139]

Table 70 presents the responsible authority for the five relevant topics identified under the ITU WTDC-10 Regional Initiatives for the Arab Region.

Table 70. Mauritanian entities per regional initiative

	National entity responsible
Broadband access networks	Autorité de Régulation
Digital broadcasting	Autorité de Régulation, Haute Autorité de la Presse et de l'Audiovisuel
Open-source software	NA
Arabic digital content	NA
Cybersecurity	NA

Source: Arab Advisors Group

Fixed-telephone market

The Mauritanian fixed market hosts two operators: Mauritel and Chinguitel. Mauritel is the incumbent operator in the Mauritanian fixed market. On August 2007, Chinguitel (a subsidiary of Sudatel) officially launched its fixed-telephone services in Mauritania, ending the monopoly of Mauritel.[140] By end 2010, the total market's fixed-telephone subscriptions amounted to 72'000, translating into a penetration rate of 2.1 per cent.

Table 71. Mauritania fixed-telephone subscriptions, 2010

	2010
Fixed-telephone subscriptions (000s)	72
Fixed-telephone penetration rate	2.1%

Source: ITU

[138] See http://www.are.mr/.
[139] See http://www.hapa.mr/index.php.
[140] See http://www.expressotelecom.com/en/african-presence/mauritania/.

Mobile-cellular market

There are three mobile-cellular operators: Mauritel, Mattel and Chinguitel. In August 2007, Chinguitel officially launched its cellular services in Mauritania, ending the duopoly of Mauritel and Mattel, which launched their services in 2000.[141] By end 2010, total mobile-cellular subscriptions amounted to 2.745 million, translating into a penetration rate of 79.3 per cent.

Table 72. Mauritania mobile-cellular subscriptions, 2010

	2010
Mobile-cellular subscriptions (000s)	2'745
Mobile-cellular penetration rate	79.3%

Source: ITU

Broadband Internet market

The two major ISPs that own the infrastructure are: Mauritel and Chinguitel. Mauritel is the incumbent operator in the fixed Internet market. By end 2010, total fixed (wired)-broadband Internet subscriptions amounted to 6'600, translating into a fixed (wired)-broadband penetration rate of 0.2 per cent. Mobile-broadband subscriptions partly compensated for the low fixed (wired)-broadband uptake, as mobile-broadband subscriptions amounted to 108'400 subscriptions by end 2010.

Table 73. Mauritania broadband Internet subscriptions, 2010

	2010
Fixed (wired)-broadband Internet subscriptions (000s)*	**7**
Fixed (wired)-broadband Internet penetration rate	0.2%
Active mobile-broadband Internet subscriptions (000s)	**108**
Active mobile-broadband penetration rates	3.1%
Internet users (000s)	**104**
Internet user penetration	3%

Note: *Fixed (wired)-broadband Internet subscriptions do not include WiMAX subscriptions
Source: ITU

Regional initiatives

Broadband access networks

Currently, there are a total of four commercial broadband technologies in the Mauritanian market; one fixed (wired)-broadband technology (DSL), and three wireless-broadband technologies (WiMAX, UMTS/HSPA and CDMA 1xEVDO).

In August 2007, Chinguitel (a subsidiary of Sudatel) officially launched its cellular and fixed services. Upon its launch in 2007, Chinguitel (which had acquired a technology-neutral license in August 2006) launched its CDMA 1xEVDO services.[142] Later, in May 2011, the operator launched its GSM/3G+ services.[143] The incumbent operator, Mauritel, launched its 3G services in the first half of 2009 after having acquired a

[141] See Arab Advisors Group (2011c).
[142] See Arab Advisors Group (2011c).
[143] See http://www.expressotelecom.com/en/african-presence/mauritania/.

3G license in August 2006. The third mobile-cellular operator in the Mauritanian market, Mattel, recently launched its 3G services.[144]

Digital broadcasting

Currently, there is no single entity responsible for regulating the digital broadcasting market in Mauritania. As shown in Table 74, IPTV and Mobile TV (both IP-Based and DVB) are not operational in the country. By December 2011, Mauritania had one state-owned digital terrestrial channel and one state-owned DTH satellite channel.

Table 74. Digital broadcasting technologies in Mauritania, December 2011

Digital broadcasting technology	Market status	Service provider	Regulatory entity responsible for service
Digital terrestrial TV	Operational	One state-owned channel*	Haute Autorité de la Presse et de l'Audiovisuel
DTH satellite	Operational	One state-owned channel*	Haute Autorité de la Presse et de l'Audiovisuel
IPTV	Not operational	N/A	Autorité de Régulation
Mobile TV (IP-Based)	Not operational	N/A	Autorité de Régulation
Mobile TV (DVB)	Not operational	N/A	Autorité de Régulation

Note: * DTH satellite service providers refer to channels and not broadcasters or operators, i.e. more than one channel can be operated by one broadcaster/operator. Data include free-to-air channels and correspond to April 2011
Source: Arab Advisors Group, national regulators

Open-source software

There is no information on any major initiative concerning open-source software in Mauritania.

Arabic digital content

There have been no major initiatives in Mauritania for the promotion of Arabic digital content. As for the support of Arabic domain names, this also has not been officially addressed by Mauritania's regulator or the local private sector.

Table 75 presents the top twenty most visited online web portals by Internet users in Mauritania. As shown in the table, the adoption of Arabic online content remains behind the adoption of content offered by global players, namely: Google, Youtube and Facebook. However, it is noteworthy that 50 per cent (10 out of 20) of Mauritania's top 20 visited websites (according to Alexa) are targeting local Internet users. This percentage is among the highest in the Arab region.

[144] See Arab Advisors Group (2011c).

Table 75. Rank of most visited websites in Mauritania, December 2011

Rank	Website	Target users	Default language*	Description
1	facebook.com	Global	English	Online social networking
2	google.com	Global	English	Global web search portal
3	youtube.com	Global	English	Video sharing and broadcasting portal
4	alakhbar.info	Local	Arabic	Online news portal
5	yahoo.com	Global	English	Miscellaneous online services
6	taqadoumy.com	Local	Arabic	Online news portal
7	saharamedias.net	Local	Arabic	Online news portal
8	ani.mr	Local	Arabic	Online news portal
9	essirage.net	Local	Arabic	Online news portal
10	mauritanid.net	Local	Arabic	Online news portal
11	tawary.com	Local	Arabic	Online news portal
12	live.com	Global	English	E-mail portal
13	aqlame.com	Local	Arabic	Online news portal
14	souhoufi.com	Local	Arabic	Online news portal
15	google.ae	Global	Arabic	Web search portal
16	google.fr	Global	French	Web search portal
17	xnxx.com	Global	English	Adult content
18	ami.mr	Local	Arabic	Online news portal
19	blogspot.com	Global	English	Online blogging service
20	aljazeera.net	Regional	Arabic	Online news portal

*The default language is the language that appears when first visiting the website.
Source: Alexa

Cybersecurity

In 2008, a project law on cybercrime was adopted. However, there is no information on any further cybersecurity initiative in Mauritania.

MOROCCO

Market overview

While the *Agence Nationale de Réglementation des Télécommunications* (ANRT) is responsible for regulating the telecommunications market, the High Authority for Audiovisual Communication (HACA) regulates the digital media market. [145]

Table 76 presents the responsible entities for the five relevant topics identified under the ITU WTDC-10 Regional Initiatives for the Arab Region.

Table 76. Moroccan entities per regional initiative

	Responsible entity
Broadband access networks	ANRT
Digital broadcasting	HACA / Conseil Supérieur de la Communication Audiovisuelle (CSCA)
Open-source software	N/A
Arabic digital content	Ministry of Industry, Trade and New Technologies
Cybersecurity	N/A

Source: Arab Advisors Group

Fixed-telephone market

Three operators serve Morocco's fixed-line market: Maroc Telecom (the incumbent), Meditel, and Wana. Maroc Telecom was the sole provider of fixed-line services until Meditel commenced its fixed-line services in November 2006. The third entrant, Wana, entered Morocco's fixed-line market in February 2007.[146]

The three operators provide fixed-telephone services through different technologies. Maroc Telecom provides fixed telephony through its legacy copper-based PSTN network, while Meditel and Wana use wireless technologies; Meditel provides fixed telephony through its WiMAX network, while Wana uses CDMA.

Morocco's fixed market reached a total of 3.6 million fixed-telephone subscriptions by the end of June 2011, a decline of 2.7 per cent over year-end 2010. The decline is due to the drop in residential subscriptions and public fixed-telephone subscriptions (Table 77).

Table 77. Morocco fixed-telephone subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Fixed-telephone subscriptions (000s)	3'749	3'646
Added (000s)		-103.1
Growth %		-2.7%
Fixed-telephone penetration rate	11.7%	11.4%

Source: ITU, ANRT

[145] See www.anrt.ma.
[146] See Arab Advisors Group (2011k).

Mobile-cellular market

Maroc Telecom was the only operational mobile-cellular operator until March 2000, when Médi Télécom (Méditel) started providing its services in the country. The third entrant –Wana – started offering mobile-cellular voice services over its 3G network (based on its existing national CDMA2000 1xEV-DO network) in July 2008. In February 2010, Wana commercially launched its 'Inwi' 2G-GSM brand in the Moroccan market.

Morocco's mobile-cellular subscriptions increased by nearly three million in the first six months of 2011, reaching close to 35 million subscriptions by June 2011. This corresponds to a remarkable growth rate of 9.4 per cent in the six-month period. The mobile-cellular penetration rate thus reached 109 per cent by the end of June 2011 (Table 78).

Table 78. Morocco mobile-cellular subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Mobile-cellular subscriptions (000s)	31'982	34'975
Added (000s)		2'993
Growth		9.4%
Mobile-cellular penetration rate	100.1%	108.9%

Source: ITU, ANRT

Broadband Internet market

The broadband market in Morocco is dominated by Maroc Telecom, Meditel and Wana; other ISPs have a very small market share. Meditel is the only operational WiMAX operator. It commercially launched WiMAX service in 2006. DSL subscriptions constitute the vast majority of total fixed Internet subscriptions. According to ANRT, the subscription-free Internet dial-up service has almost disappeared, and so nearly all current customers subscribe to always-on DSL connections.[147]

By end 2010, fixed (wired)-broadband Internet subscriptions amounted to 498'700, corresponding to a fixed (wired)-broadband penetration rate of 1.6 per cent. Active mobile-broadband subscriptions amounted to 3.2 million by end 2010 (Table 79). By June 2011, the number of fixed (wired)-broadband subscriptions had increased to 528'000.

Table 79. Morocco broadband Internet subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Fixed (wired)-broadband Internet subscriptions (000s)*	**499**	**528**
Added (000s)		29.3
Growth		5.9%
Fixed (wired)-broadband Internet penetration rates	1.6%	1.6%
Active mobile-broadband Internet subscriptions (000s)	**3'203**	**N/A**
Active mobile-broadband penetration rates	10.0%	
Internet users (000s)	**15'656**	**N/A**
Internet user penetration	49%	

Note: *Fixed (wired)-broadband Internet subscriptions do not include WiMAX subscriptions.
Source: ITU, ANRT

[147] See Arab Advisors Group (2011k).

Regional initiatives

Broadband access networks

Currently there are three commercial broadband technologies in Morocco; one fixed (wired)-broadband technology (DSL), and two wireless-broadband technologies (WiMAX and UMTS/HSPA). Fibre access is not available to end-users.

All three mobile operators (Maroc Telecom, Meditel and Wana) provide 3G services. Meditel is the only operational WiMax operator in Morocco and by Q1 2011, there were 1'685 WIMAX subscriptions.

In addition to 3G mobile-cellular services, Wana also provides fixed services with limited mobility since July 2008.[148]

In March 2011, Meditel completed the installation of a fibre-optic infrastructure between Settat and Beni Mellal. In total Meditel built 2'425 km of fibre-optic network to complement the national infrastructure consisting of traditional BTS antennas, microwave and 3G antennas.[149]

Table 80 presents the main initiatives in Morocco concerning broadband access network projects.

Table 80. Broadband access network projects in Morocco

Broadband access network project	Status	Description
Meditel 3G Network	Accomplished	In May 2011, Meditel's 3G coverage was extended to new towns and suburban and rural communities and 27 new locations have been covered in recent months.
"PACTE" programme	Ongoing	The "PACTE" program provides widespread access to telecommunications to all parts of Morocco. Maroc Telecom is committed to extending network coverage to 7'338 localities between 2008 and 2011. Meditel and ANRT signed an agreement in the PACTE programme to serve 1'316 localities.
INJAZ programme	Accomplished	Financed by the Telecommunications Universal Service Fund (Fonds du Service Universel des Telecommunications). The INJAZ programme provides mobile-broadband Internet access and laptop computers to master's students in engineering, sciences, and information and communication technologies. By December 2010, around 11'646 students had been equipped.

Source: Maroc Telecom, Meditel, ANRT

Digital broadcasting

HACA and *Conseil Supérieur de la Communication Audiovisuelle* (CSCA) are the responsible entities for regulating the digital broadcasting market in Morocco.[150] The *Société Nationale de Radiodiffusion et de Télévision* (SNRT) provides both digital terrestrial and mobile TV (DVB) broadcast[151], while mobile operators (Maroc Telecom and Meditel) are providing mobile TV through 3G.

[148] See Arab Advisors Group (2011k).
[149] See http://corporate.meditel.ma/servletPublication?tache=PageDetail&idPub=277.
[150] See www.haca.ma.
[151] See www.snrt.ma.

Table 81 details the status of digital broadcasting technologies.

Table 81. Digital broadcasting technologies in Morocco, December 2011

Digital broadcasting technology	Market status	Service providers	Regulatory entity responsible for service
Digital terrestrial	Operational	SNRT	HACA/ CSCA
DTH satellite	Operational	6 state-owned, 1 private owned and 1 mixed-ownership channel*	HACA/ CSCA
IPTV	Operational	Maroc Telecom/Meditel	CSCA
Mobile TV (IP-based)	Operational	Maroc Telecom	ANRT
Mobile TV (DVB)	Operational	SNRT	HACA

Note: * DTH satellite service providers refer to channels and not broadcasters or operators, i.e. more than one channel can be operated by one broadcaster/operator. Data include free-to-air channels and correspond to April 2011
Source: Arab Advisors Group, national regulators

Both Maroc Telecom and Meditel provide IPTV. Mobile TV service is provided both through IP and DVB in the Moroccan market. Currently, Maroc Telecom is the sole provider of IP-based mobile TV,[152] while (SNRT) offers mobile TV through DVB.[153]

Open-source software

Morocco has taken a number of steps towards promoting open-source software. Since 1999, the Moroccan Mohammadia School of Engineers (*Ecole Mohammadia d'Ingénieurs*) organizes an annual GNU/Linux meeting in order to promote free and open-source software (FOSS) in Morocco. This provides an environment for individuals and professionals to exchange information and raise awareness regarding FOSS.[154]

Another example is the Morocco-Korean Center for Training in ICT for Education (CMCF-TICE) which was established by the Department of School Education (DES) of the Ministry of National Education, Higher Education, Professional Training, and Scientific Research, in partnership with the Korean International Cooperation Agency (KOICA). This center includes a lab specifically for open-source software.[155]

Arabic digital content

As part of the government's National Strategy for Information Society and Digital Economy the programme *Maroc Numeric 2013* has been developed. *Maroc Numeric 2013* is based on four strategic priorities: providing citizens with high-speed Internet, connecting users and government agencies, encouraging the computerization of SMEs and developing national digital content. The following actions will be taken by the government to achieve these goals:

- Adopt a policy to systematically translate public websites into Arabic

[152] See www.iam.ma.
[153] See www.snrt.ma.
[154] At the 2008 GNU/Linux party, "Miftaah", a memory stick containing free and open-source software as well as storage capacity for personal data was presented to the participants. "Miftaah" wasinitiated by the UNESCO Office in Rabat, in co-operation with UNDP/ ICTDAR. See http://rabat.unesco.org/article.php3?id_article=1255.
[155] See http://cmcf.men.gov.ma/.

- Support the Moroccan media, within the framework of public-private partnerships, to provide and disseminate updated information in real and interactive time
- Mobilise private operators (TV and Radio) to offer attractive content on the Internet through the implementation of video on demand (VOD) and providing the right of access to podcast
- Bring Moroccan cultural heritage (museums, public libraries) online, with the contribution of national and international partners
- Create educational content platforms [156]

Since August 2006, the technical management of ".MA" is carried out by ANRT. In December 2007, ANRT joined the "Arabic domain names pilot project" during which "some experimental Arabic domain names under "**المغرب**" were created and tested". The participation in this project allowed ANRT "to gain a good practical experience related to IDN domain names". In October 2010, the "IDN Fast Track" approved the request received from Morocco to have the string "**المغرب**" recognized as representing Morocco. In December 2010, ANRT requested ICANN to delegate "**المغرب**" as a top-level domain.[157]

Table 82 presents the top twenty most visited online web portals by Internet users in Morocco. As shown in the table, the adoption and popularity of Arabic online content remains behind the adoption of content offered by global websites, such as Google, Youtube and Facebook. The pioneer local portal is a newspaper website, which is the sixth most visited website by Moroccan Internet users.

Table 82. Most visited websites in Morocco, December 2011

Rank	Website	Target users	Default language*	Description
1	facebook.com	Global	English	Online social networking
2	youtube.com	Global	English	Video sharing and broadcasting portal
3	google.co.ma	Global	French	Web search portal
4	google.com	Global	English	Global web search portal
5	live.com	Global	English	E-mail portal
6	hespress.com	Local	Arabic	Newspaper
7	google.fr	Global	French	Web search portal
8	kooora.com	Regional	Arabic	Sports
9	blogspot.com	Global	English	Online blogging service
10	yahoo.com	Global	English	Miscellaneous online services
11	wikipedia.org	Global	English	Encyclopedia
12	xnxx.com	Global	English	Adult content
13	msn.com	Global	English	Miscellaneous online services
14	startimes.com	Local	Arabic	Online forums
15	babylon	Global	English	Translation software
16	hibapress.com	Local	Arabic	Newspaper
17	inwi.ma	Local	French	Telecom operator portal
18	iam.ma	Local	French	Telecom operator portal
19	alwadifa-maroc.com	Local	Arabic	Online forum
20	maktoob.com	Regional	Arabic	Miscellaneous online services

Note: *The default language is the language that appears when first visiting the website
Source: Alexa

[156] See Kingdom of Morocco/ Ministry of Industry, Trade and New Technologies (2009).
[157] See www.anrt.ma.

Cybersecurity

Cybersecurity Malaysia, the national cybersecurity centre which is part of the Ministry of Science, Technology and Innovation Malaysia (MOSTI) has signed a Memorandum of Understanding (MoU) with the Department of Post, Telecommunications, and New Technologies in the Ministry of Industry, Trade and New Technology of Morocco. The MoU was signed in January 2010 at the occasion of the Regional Cybersecurity Conference held in Morocco. It covers: critical information infrastructure protection, cybersecurity framework development, capacity building, training and awareness.[158]

[158] See http://www.cybersecurity.org.my/en/knowledge_bank/news/2010/main/detail/1878/index.html.

OMAN

Market overview

The Telecommunications Regulatory Authority (TRA) is responsible for regulating the telecommunications market in Oman, while the Information Technology Authority (ITA) regulates the IT market.

TRA was established in 2002, and is the sole government entity to issue telecom licenses, promote access networks, manage frequency spectrum, and impose obligations on telecommunication service providers.[159]

ITA was set up in 2006 and is responsible for implementing national IT infrastructure projects and supervising all projects related to the implementation of the Digital Oman Strategy and other e-government initiatives.[160]

In terms of digital media, there are four privately-owned and two public-owned DTH/satellite channels operating in Oman. Moreover, mobile operators are offering mobile-TV services. IPTV is still not operational in the Omani market, although there are no barriers preventing operators from launching the service.

Table 83 presents the responsible entities for the five relevant topics identified under the ITU WTDC-10 Regional Initiatives for the Arab Region.

Table 83. Omani entities per regional initiative

	National entity responsible
Broadband access networks	TRA
Digital broadcasting	Ministry of Information
Open-source software	ITA
Arabic digital content	ITA
Cybersecurity	ITA / Oman National Computer Emergency Response Center (OCERT)

Source: Arab Advisors Group

Fixed-telephone market

By June 2011, Omantel and Nawras were the only fixed-telephone licensees in the Sultanate. Omantel's monopoly of fixed services ended as Nawras began its fixed operations in May 2010. The incumbent operator, Omantel, provides fixed-telephone services through circuit switching via its PSTN. The second fixed entrant, Nawras, provides fixed voice services through VoIP Packet switching, via its WiMAX network. The licenses are technology neutral, authorizing the two operators to provide fixed services (voice and data) through any fixed technology.

By end 2010, there were 282'000 fixed-telephone subscriptions in Oman, translating into a penetration rate of 10.1 per cent. During the first six months of 2011, fixed-telephone subscriptions dropped slightly

[159] See http://www.tra.gov.om/newsite1/aboutTRA.aspx?Menu_ID=19.
[160] See http://www.ita.gov.om/ITAPortal/ITA/About_ITA.aspx.

by 0.9 per cent. By the end of June 2011, Oman's total fixed-telephone subscriptions stood at 279'300, corresponding to a penetration rate of 9.9 per cent (Table 84).

Table 84. Oman fixed-telephone subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Fixed-telephone subscriptions (000s)	282	279.3
Added (000s)		-2.5
Growth		-0.9%
Fixed-telephone penetration rate	10.1%	9.9%

Source: ITU, TRA

Mobile-cellular market

Strong competition exists between the two MNOs (Nawras and Omantel) spurred by five operational MVNO licensees. Indeed, in 2009 the market entered into a more competitive phase with the launch of three MVNOs: Renna, Friendi and Mazoon.[161] They were joined in August 2009 by Samatel, an MVNO offering both residential and business services. Additionally, the parent firm of Friendi operates another MVNO brand, Halafoni, which targets the country's youth segment.

By end 2010, there were a total of 4.6 million mobile-cellular subscriptions, translating into a penetration rate of 165.5 per cent. During the first six months of 2011, mobile-cellular subscriptions dropped by 0.6 per cent, "due to clean-up of un-authorized SIMs, according to TRA."[162] In June 2011, Oman's total mobile-cellular subscriptions stood at 4.6 million subscriptions, translating into a penetration rate of 162.7 per cent (Table 85). During the first six months of 2011, there was a migration of subscriptions from MNOs to MVNOs, as MNO subscriptions dropped, and MVNO subscriptions grew significantly. The drop in subscriptions was mitigated in the second quarter of the year, and MNOs were also able to record growth. This suggests that the Omani market is indeed close to saturation levels.

Table 85. Oman mobile-cellular subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Mobile-cellular subscriptions (000s)	4'606	4'579
Added (000s)		-27
Growth		-0.6%
Mobile-cellular penetration rate	165.5%	162.7%

Source: ITU, TRA

Broadband Internet market

By end 2010, there were a total of 45'000 fixed (wired)-broadband subscriptions, corresponding to a fixed (wired)-broadband penetration rate of 1.6 per cent. Moreover, active mobile-broadband subscriptions amounted to 298'300 by the end of 2010, corresponding to a mobile-broadband penetration rate of 10.7 per cent (Table 86).

[161] See Arab Advisors Group (2011l).
[162] See http://www.tra.gov.om/newsite1/Portal/Upload/Documents/473_2011Q1.pdf.

Table 86. Oman broadband Internet subscriptions, 2010

	2010
Fixed (wired)-broadband Internet subscriptions (000s)*	**45**
Fixed (wired)-broadband Internet penetration rates	1.6%
Active mobile-broadband Internet subscriptions (000s)	**298**
Active mobile-broadband penetration rates	10.7%
Internet users (000s)	**1'725**
Internet user penetration	62%

Note: *Fixed (wired)-broadband Internet subscriptions do not include WiMAX subscriptions
Source: ITU, Arab Advisors Group

Regional initiatives

Broadband access networks

Currently there are three commercial broadband technologies available in the Omani market; one fixed (wired)-broadband technology (DSL), and two wireless-broadband technologies (WiMAX and UMTS/HSPA).

Recent broadband projects in the country include the deployment of mobile-broadband technology by Omantel (UMTS/HSPA), and the roll-out of WiMAX by Nawras.

Omantel, the incumbent fixed and mobile operator launched its 3G network 15 months after the 3G launch of its competitor Nawras. In March 2009, Omantel launched 3G to the public, stratifying the broadband offerings to Omani end users.[163] It is noteworthy that Omantel did not need a license to offer 3G services, as the licenses of both mobile operators are technology neutral, allowing operators to provide mobile services through any mobile technology.

Nawras launched the country's only WiMAX network in May 2010. The operator won the bid for the country's second fixed license in November 2008 which it was awarded in June 2009.[164] The operator is licensed to offer voice and data services through any fixed technology. Nawras chose to deploy a WiMAX network, offering voice service through VoIP, in addition to broadband services.

The upcoming broadband technology in Oman is FTTx and the infrastructure deployment is ongoing through the sewage network of the Omani Water Services Company (Haya Waters). In 2008, the utility company had expressed its wish to use its infrastructure to deploy a fibre-optic network. The company conducted a feasibility study on best practice to use Haya Waters' existing and future ducts to lay fibre optics cables and started the project in late 2008. The project's target is to facilitate FTTx connectivity across 80 per cent of units in the Muscat governorate by 2018. The fibre-optic network is government-owned and is not assigned to any service provider yet. The commercial implementation of the fibre-optic network is expected to begin during 2012. The ideal candidates to buy dark fibre capacities are the two licensed fixed line operators (Omantel and Nawras), who are the only operators licensed to offer fixed voice and data services.

Table 87 presents the main initiatives in Oman concerning broadband access network projects.

[163] Arab Advisors Group (2011c).
[164] See http://www.nawras.om/about_nawras_media_centre_press_releases_010_36.shtml.

Table 87. Broadband access network projects in Oman

Broadband access network project	Status	Description
Omantel 3G Network	Accomplished	In March 2009, Omantel launched the country's second 3G network. The operator did not need an independent license to deploy 3G, since class 1 mobile licenses in Oman are technology neutral.
Nawras WiMAX Network	Accomplished	In November 2008, Oman's TRA granted Nawras Telecom the second 'class-one' fixed license in Oman. Nawras commenced its business fixed operations in May 2010, and its residential fixed operations in July 2010.
Oman Water Services Company installing Fibre	Ongoing	Oman's Water Services Company is installing a fibre network in its sewage ducts in order to lease these connections to telecommunication operators (most probably Omantel and Nawras). FTTx is slated to become commercial in Oman during 2012.

Source: Omantel, Nawras, Oman Water Services

Digital broadcasting

Currently, there are six Omani channels broadcasting through DTH satellite, while the mobile operators (Nawras and Oman) are providing mobile TV through 3G.

Table 88 details the status of digital broadcasting technologies.

Table 88. Digital broadcasting technologies in Oman, December 2011

Digital broadcasting technology	Market status	Service providers	Regulatory entity responsible for service
Digital terrestrial TV	Not operational	N/A	N/A
DTH satellite	Operational	4 privately and 2 state-owned channels.*	Ministry of Information
IPTV	Not operational	N/A	TRA
Mobile TV (IP-Based)	Operational	Omantel, Nawras	TRA
Mobile TV (DVB)	Not operational	N/A	TRA

Note: * DTH satellite service providers refer to channels and not broadcasters or operators, i.e. more than one channel can be operated by one broadcaster/operator. Data include free-to-air channels and correspond to April 2011.
Source: Arab Advisors Group, national regulators

Currently, Oman is the only country in the region that does not have terrestrial TV. All local channels are broadcasted through satellite DTH.

IPTV is not operational in the Omani market, although there are no regulatory hurdles for operators to offer the service.[165] The large offer of free DTH channels in the region is probably a strong inhibitor for the development of pay TV in general, including IPTV.

Mobile TV is provided as an IP based service. Currently, the two MNOs, Nawras and Omantel, provide 3G+ services. Nawras was the first operator to launch mobile TV services in January 2009, followed by the incumbent, Omantel in March of the same year. Table 89 presents the operators that provide the service, and their basis of billing.

[165] See Arab Advisors Group.

Table 89. Operator comparison for mobile TV services in Oman

Cellular operator	Basis of billing	Monthly fee	Notes
Nawras	Per day	No	Per channel access
	Per month	Yes	Per package of channels
Oman Mobile	Per minute	No	
	Per week	No	For unlimited usage
	Per month	Yes	For unlimited usage

Source: Operators

Open-source software

Oman's IT regulator, ITA, has conducted training workshops and conferences to promote the use of free and open-source software.[166] There is no further information on other initiatives to promote local development of open-source software in the country.

Arabic digital content

ITA has set strategies to promote the Omani digital society and e-government, with the objective of driving local content. Strategies include promoting the e-government portal (www.oman.om), and maintaining the national e-payment gateway, which includes eight local members (enterprises and charity organizations). Omani residents can utilize the national e-payment gateway to make secure online payments of bills and services.

As for the support of Arabic domain names, this has not been officially addressed by ITA or by the Omani private sector.

Table 90 presents the top twenty most visited online web portals by Internet users in Oman. As shown in the table, the adoption of Arabic online content remains behind the adoption of content offered by global sites, such as Google, Youtube and Facebook. The pioneer local portal is a forum website, which is the sixth most visited site by Omani Internet users.

[166] See http://www.ita.gov.om/ITAPortal/Pages/Page.aspx?NID=443&PID=1772&LID=91.

Table 90. Most visited online portals in Oman

Rank	Website	Target users	Default language*	Description
1	google.com.om	Global	Arabic	Web search portal
2	Youtube.com	Global	English	Video sharing and broadcasting portal
3	Facebook.com	Global	English	Online social networking
4	google.com	Global	English	Global web search portal
5	live.com	Global	English	E-mail portal
6	s-oman.net	Local	Arabic	Online forums
7	yahoo.com	Global	English	Miscellaneous online services
8	msn.com	Global	English	Miscellaneous online services
9	maktoob.com	Regional	Arabic	Miscellaneous online services
10	wikipedia.org	Global	English	Encyclopedia
11	moe.gov.om	Local	Arabic	Online portal of the Ministry of National Economy
12	blogspot.com	Global	English	Online blogging service
13	4shared.com	Global	English	Online storage
14	Kooora.com	Regional	Arabic	Sports
15	omaniaa.net	Local	Arabic	Online forums
16	babylon	Global	English	Translation software
17	forum.moe.gov.om	Local	Arabic	Online forum of the Ministry of National Economy
18	Mediafire.com	Global	English	File sharing services
19	squ.edu.om	Local	English	Online portal of Sultan Qabous University
20	conduit.com	Global	English	Network of web and mobile app publishers

Note: *The default language is the language that appears when first visiting the website
Source: Alexa

Cybersecurity

In March 2009, ITA signed a contract with a Singapore-based IT security firm to set up the Oman National Computer Emergency Response Center (OCERT).

OCERT's mission is to build cybersecurity capabilities and raise awareness among public and private sector organizations as well as citizens. The objectives of OCERT are:

- Resolve ICT security incidents
- Build trust among Omani residents and businesses in using government e-services
- Increase cybersecurity awareness in the Omani Internet space
- Build Omani cybersecurity capabilities to handle security incidents
- Provide accurate and timely information on current and emerging security threats.[167]

[167] See http://www.ita.gov.om/ITAPortal/MediaCenter/NewsDetail.aspx?NID=307.

QATAR

Market overview

The government body responsible for setting ICT policy and regulation in Qatar is the Supreme Council of Information and Communication Technology (ictQATAR). ictQATAR was established in 2004 with the objective of introducing competition in the Qatari telecommunications sector, initially by issuing new licenses.[168]

At that time Qatar's telecommunications market was officially closed to all but Qtel. Qtel's monopoly ended with the award of a new mobile license and a new fixed license. In December 2007 the second mobile licence was awarded to the consortium formed by Vodafone and Qatar Foundation. In September 2008, the ictQATAR board decided to award the second fixed telecommunications licence also to the Vodafone and Qatar Foundation Consortium, permitting them to compete against Qtel for mobile, fixed line and Internet subscribers.[169]

Vodafone Qatar commercially launched its mobile-telecommunication services in July 2009. The operator first offered broadband services to the island of "The Pearl" in July 2010, and launched its fixed voice service in September 2011.[170]

ictQATAR is also the regulator responsible for IPTV and mobile TV is, whereas the entity in charge of digital terrestrial TV and DTH satellite is Qatar Media Corporation. Qatar Media Corporation is also responsible for the audiovisual sector in Qatar; its responsibilities include radio and TV broadcasting inside and outside the country, as well as planning, developing, and producing local and international radio and TV programmes.[171]

Table 91 presents the responsible authority for the five relevant topics identified under the ITU WTDC-10 Regional Initiatives for the Arab Region.

Table 91. Qatari entities per regional initiative

	Entity responsible
Broadband access networks	ictQATAR
Digital broadcasting	ictQATAR, Qatar Media Corporation
Open-source software	ictQATAR
Arabic digital content	ictQATAR
Cybersecurity	ictQATAR

Source: Arab Advisors Group

Fixed-telephone market

By end 2010, there were around 298'000 fixed-telephone subscriptions in Qatar, translating into a penetration rate of 17 per cent. By the end of June 2011, Qatar's total fixed-telephone subscriptions stood at 298'119, translating into a penetration rate of 16.4 per cent (Table 92)

[168] See http://www.ictqatar.qa.
[169] See Arab Advisors Group (2011m).
[170] See Arab Advisors Group (2011n).
[171] See http://english.mofa.gov.qa/details.cfm?id=114.

Table 92. Qatar fixed-telephone subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Fixed-telephone subscriptions (000s)	298	298.1
Added (000s)		0.059
Growth		0.01%
Fixed-telephone penetration rate	17%	16.4%

Source: ITU, Arab Advisors Group

Mobile-cellular market

By end 2010, total mobile-cellular subscriptions amounted to 2.329 million, translating into a penetration rate of 132.4 per cent.

Table 93. Qatar mobile-cellular subscriptions, 2010

	2010
Mobile-cellular subscriptions (000s)	2’329
Mobile-cellular penetration rate	132.4%

Source: ITU

Broadband Internet market

By end 2010, there were 144’100 fixed (wired)-broadband subscriptions in Qatar, corresponding to a fixed penetration rate of 8.2 per cent. Active mobile-broadband subscriptions amounted to around 500’000, translating into a mobile-broadband penetration rate of 28.4 per cent.

Table 94. Qatar broadband Internet subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Fixed (wired)-broadband Internet subscriptions (000s)*	**144**	**152**
Added (000s)		8.3
Growth %		5.7%
Fixed (wired)-broadband Internet penetration rate	8.2%	8.4%
Active mobile-broadband Internet subscriptions (000s)	**499**	**N/A**
Active mobile-broadband penetration rate	28.4%	
Internet users (000s)	**1’435**	**N/A**
Internet user penetration	81.6%	

Note: *Fixed (wired)-broadband Internet subscriptions do not include WiMAX subscriptions
Source: ITU, Arab Advisors Group.

Regional initiatives

Broadband access networks

Currently there are four commercial technologies in Qatar capable of offering broadband speeds; two fixed (wired)-broadband technologies (DSL and FTTx), and two wireless-broadband technologies (UMTS/HSPA and VSAT).

During 2006, Qtel launched its first 3G service (local video calling) followed shortly by the launch of its second 3G service (mobile-broadband Internet). Upon launch of its mobile services in 2009, Vodafone Qatar also launched its 3G/3.5G services. Qatar's two cellular operators provide a number of 3G/3.5G services to their subscribers, including video calling, mobile Internet, mobile TV and video monitoring.[172]

Recent broadband projects include Vodafone Qatar's launch of its fixed-broadband services for The Pearl, in July 2010, and its project to extend FTTx coverage to other parts of the country.

In September 2010 Qtel announced that it had begun the implementation of its FTTH program. The operator has allocated QR 600 million (USD 165 million) for the first phase of the network roll-out, which will be executed in collaboration with ictQATAR.[173] As part of the FTTH programme, existing copper connections will be replaced by high-speed fibre connections.[174] By September 2011, Qtel had laid out over 1'200 kilometres of fibre optic throughout Doha providing the infrastructure for connecting more than 60'000 households.[175]

Qtel has completed the trial phase for its LTE implementation in July 2011. In October 2011, the company announced the launch of its LTE programme and the deployment of almost 900 base stations across Qatar. Qtel's investment amounts to more than QR 200 million (USD 55 million).As part of the roll-out 4G, coverage will be expanded across the country, starting with highly populated urban areas, such as Doha. [176]

Table 95 presents the main and most recent initiatives in Qatar concerning broadband access network projects.

Table 95. Broadband access network projects in Qatar

Broadband access network project	Status	Description
Vodafone Qatar's 3G services	Accomplished	Vodafone Qatar commercially launched its cellular services (including 3G) in July 2009.
Vodafone Qatar Next Generation Access (NGA) infrastructure at the Pearl	Accomplished	In May 2010, Vodafone Qatar and United Development Company (UDC) announced a partnership that allowed Vodafone to provide total communication solutions to the man-made island "The Pearl-Qatar". This partnership built on UDC's already deployed infrastructure as well as Vodafone's network at The Pearl.
Vodafone Qatar's FTTH	Ongoing	Vodafone Qatar is extending its FTTH network to other areas in Qatar, integrating it with Vodafone Qatar's existing mobile network through a IP multimedia subsystem (IMS) solution.
Qtel's FTTH project	Ongoing	In September 2010, Qtel announced that it has begun the implementation of its FTTH program. By September 2011, Qtel field teams had laid out over 1'200 kilometers of fibre cable throughout Doha.
Qtel's LTE project	Ongoing	In October 2011, Qtel announced the launch of an LTE program which will deploy nearly 900 Base Stations across the country.

Source: Vodafone Qatar, Qtel

[172] See Arab Advisors Group (2011c).
[173] See http://www.qtel.qa/QODPPortal/portal/qodp_portal_press_rel_item?_nfpb=true&section=press&locale=en&detailId=28901_EN.
[174] See http://www.qtel.qa/en/qodp_portal_consumer_detail?detailId=DP_FTTX_OVERVIEW_EN&section=consumer&lang=en#.
[175] See http://www.qtel.qa/QODPPortal/portal/qodp_portal_press_rel_item?_nfpb=true&section=press&lang=en&detailId=FIBRE_MILESTONE_2011_EN.
[176] See http://www.qtel.qa/QODPPortal/portal/qodp_portal_press_rel_item?_nfpb=true&section=press&lang=en&detailId=PR_QTELS_LAUNCH_4G_NETWORK_EN.

Digital broadcasting

Currently, there is no single entity responsible for regulating the digital broadcasting market. Digital terrestrial TV is not operational in the country. Qatar has a total of 15 DTH satellite channels; 13 state-owned and two private-owned channels.[177]

IPTV and mobile TV (IP-based) services are operational in the Qatari market. The incumbent operator, Qtel, is the operator that provides both of these services. Table 96 details the status of digital broadcasting technologies in the country.

Table 96. Digital broadcasting technologies in Qatar, December 2011

Digital broadcasting technology	Market status	Service providers	Regulatory entity responsible for service
Digital terrestrial TV	Not operational	N/A	Qatar Media Corporation
DTH satellite	Operational	13 state-owned and 2 privately-owned channels*	Qatar Media Corporation
IPTV	Operational	Qtel	ictQATAR
Mobile TV (IP-Based)	Operational	Qtel	ictQATAR
Mobile TV (DVB)	Not operational	N/A	ictQATAR

Note: * DTH satellite service providers refer to channels and not broadcasters or operators, i.e. more than one channel can be operated by one broadcaster/operator. Data include free-to-air channels and correspond to April 2011
Source: Arab Advisors Group, national regulators

Open-source software

IctQATAR has conducted training workshops and forums to support the use of FOSS in the country. In October 2010, ictQATAR and Creative Commons (CC) hosted the "Digitally Open: Innovation and Open Access Forum", which covered issues from digital content rights, the open cloud, open-source software to government transparency. A workshop addressing web developers was conducted as part of the forum.[178] A subsequent workshop was held in September 2011.[179]

Arabic digital content

IctQATAR, has developed strategies to promote the Qatari digital society, including the promotion of Arabic digital contents.

Moreover, in 2007 ictQATAR established the e-government portal "Hukoomi" to provide government information and services as well as an electronic payment gateway for citizens, business and visitors.[180]

Qatar Domains Registry manages all country specific domains, including the Arabic domain and domains such as .qa, .com.qa, .net.qa.[181] According to ictQATAR: "Qatar's Internet Identity (.قطر) is a strong

[177] Arab Advisors Group (2011a).
[178] See http://mobile.ictqatar.qa/en/news-events/news/sharing-digital-content-arab-world.
[179] See http://www.ictqatar.qa/en/news-events/news/cc-qatar-and-ictqatar-qatar-hold-open-source-workshop.
[180] See www.gov.qa/wps/portal.
[181] See http://www.ictqatar.qa/en/department/regulatory-authority/qatar-internet-domain-names.

platform to create local Arabic digital content and is an important mechanism to expand Qatar's digital footprint regionally and internationally".[182]

Table 97 presents the top twenty most visited online web portals by Internet users in Qatar. As shown in the table, the adoption of Arabic online content in the Arab region remains behind the adoption of content offered by global companies, such as Google, Youtube and Facebook. The pioneer local portal is an information portal about Qatar, which is the eleventh most visited site by Qatari Internet users.

Table 97. Rank of most visited websites in Qatar, December 2011

Rank	Website	Target users	Default language*	Description
1	google.com.qa	Global	Arabic	Web search portal
2	facebook.com	Global	English	Online social networking
3	youtube.com	Global	English	Video sharing and broadcasting portal
4	google.com	Global	English	Global web search portal
5	yahoo.com	Global	English	Miscellaneous online services
6	live.com	Global	English	E-mail portal
7	blogspot.com	Global	English	Online blogging service
8	maktoob.com	Regional	Arabic	Miscellaneous online services
9	wikipedia.org	Global	English	Encyclopedia
10	twitter.com	Global	English	Online social networking
11	qatarliving.com	Local	English	Information portal
12	msn.com	Global	English	Miscellaneous online services
13	fatakat.com	Regional	Arabic	Online forums
14	babylon.com	Global	English	Translation software
15	ahram.org.eg	Local	Arabic	Online news portal
16	youm7.com	Local	Arabic	Online news portal
17	linkedin.com	Global	English	Online social networking
18	4shared.com	Global	English	Online storage
19	flickr.com	Global	English	Photo sharing services
20	conduit.com	Global	English	Network of web and mobile app publishers

Note: *The default language is the language that appears when first visiting the website
Source: Alexa

Cybersecurity

The Qatar Computer Emergency Response Team (Q-CERT) is a national government-sponsored organization under the auspices of ictQATAR, which was founded in 2005 in cooperation with the Carnegie Mellon's Software Engineering Institute (CERT/CC). Q-CERT works with government agencies, private and public sector entities and citizens to safeguard the country's ICT infrastructure. The organization is member of FIRST (International Forum of Incident Response and Security Teams). Its partners share information on threats and vulnerabilities[183] In addition, in 2010, the government has drafted a cybercrime law through the establishment of a multi-stakeholder committee.

[182] See http://www.ictqatar.qa/en/news-events/news/internationalized-domain-names-2011-workshop-internet-governance-forum.
[183] See http://www.qcert.org/EN/About/Pages/About.aspx.

SAUDI ARABIA

Market overview

The Communications and Information Technology Commission (CITC) is the ICT regulator in Saudi Arabia. CITC is responsible for granting licenses to provide ICT services, manage tariffs, prepare policies, regulatory frameworks and studies of the ICT sector in Saudi Arabia, as well as managing the frequency spectrum.[184]

Table 98 presents the responsible authority for the five relevant topics identified under the ITU WTDC-10 Regional Initiatives for the Arab Region.

Table 98. Responsible entities per regional initiative in Saudi Arabia

	Entity responsible
Broadband access networks	CITC
Digital broadcasting	CITC
Open-source software	CITC
Arabic digital content	CITC Saudi Network Information Centre King Abdullah Initiative for Arabic Content
Cybersecurity	Computer Emergency Response Team (CERT-SA)

Source: Arab Advisors Group

Fixed-telephone market

The Saudi market is served by two fixed operators, STC and GO (Etihad Atheeb Telecom). STC provides fixed telephony over PSTN, while GO provides fixed services over WiMAX.

By end 2010, there were 4.166 million fixed-telephone subscriptions in Saudi Arabia, translating into a penetration rate of 15.2 per cent. During the first six months of 2011, fixed-telephone subscriptions increased by 7.8 per cent, as 324'200 lines were added. By the end of June 2011, Saudi Arabia's total fixed-telephone subscriptions stood at 4.49 million, corresponding to a penetration rate of 16.2 per cent (Table 99).

Table 99. Saudi Arabia fixed-telephone subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Fixed-telephone subscriptions (000s)	4'166	4'490
Added (000s)		324.2
Growth		7.8%
Fixed-telephone penetration rate	15.2%	16.2%

Source: ITU, Arab Advisors Group

[184] See www.citc.gov.sa.

Mobile-cellular market

The Saudi market is served by three GSM/3G operators – STC, Mobily and Zain – in addition to an iDEN operator focused on the corporate sector (Bravo). All three GSM operators have launched LTE services in 2011.[185]

By end 2010, there were 51.6 million mobile-cellular subscriptions in the country, translating into a penetration rate of 187.9 per cent. During the first six months of 2011, mobile-cellular subscriptions increased by 6.7 per cent, as 3.444 million subscriptions were added. By the end of June 2011, Saudi Arabia's total mobile-cellular subscriptions stood at 55 million. This corresponds to a penetration rate of 198.1 per cent, which is the highest in the Arab region and among the highest in the world.

Table 100. Saudi Arabia mobile-cellular subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Mobile-cellular subscriptions (000s)	51'564	55'008
Added (000s)		3'444
Growth		6.7%
Mobile-cellular penetration rate	187.9%	198.1%

Source: ITU, Arab Advisors Group.

Broadband Internet market

By December 2011, the three GSM operators (STC, Mobily and Zain) provided fixed- and mobile-broadband Internet. Both STC and Mobily provided FTTx and ADSL services.

By end 2010, fixed (wired)-broadband Internet subscriptions reached some 1.5 million, most of which were ADSL lines. Fixed (wired)-broadband Internet penetration stood at 5.5 per 100 inhabitants.

At the same time, the three mobile operators were reporting a total of 15.9 million active mobile-broadband subscriptions.

Table 101. Saudi Arabia broadband Internet subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Fixed (wired)-broadband Internet subscriptions (000s)*	**1'497**	1'700
Added (000s)		203.4
Growth		13.6%
Fixed (wired)-broadband Internet penetration rates	5.5%	6.1%
Active mobile-broadband Internet subscriptions (000s)	**15'855**	**N/A**
Active mobile-broadband penetration rates	57.8%	
Internet users (000s)	**11'254**	**N/A**
Internet user penetration	41%	

Note: *Fixed (wired)-broadband Internet subscriptions do not include WiMAX subscriptions.
Source: ITU, Arab Advisors Group

[185] See Arab Advisors Group (2011c).

Regional initiatives

Broadband access networks

Currently there are five commercial broadband technologies in the Saudi market; two fixed (wired)-broadband technologies (DSL, FTTx), and three wireless-broadband technologies (WiMAX, UMTS/HSPA and LTE).

STC and Mobily were granted their 3G licenses separately from their GSM licenses, in July 2005 and August 2004 respectively. Both STC and Mobily commercially launched their 3G services in June 2006. As for Zain Saudi Arabia, the operator received a technology-neutral mobile license in March 2007, allowing it to offer 3G services.[186]

Recent broadband projects in the country include the deployment of LTE. During the second half of 2011, each of the three operators in Saudi Arabia launched LTE. Mobily and Zain Saudi Arabia provide LTE technology through USB dongles only, while STC provides the service through both USB dongles and mobile handsets; STC, however, does not currently offer LTE handsets.

Both Mobily and STC provide fixed (wired)-broadband services through FTTH networks. On the other hand, Zain Saudi Arabia won the bid for the Universal Service Fund project launched by CITC. As a result, it has started to execute projects to deliver voice and mobile-broadband services to 500 residential compounds in the North and South of the country.

Digital broadcasting

Digital terrestrial broadcasting transmissions began in Saudi Arabia in June 2006. The first phase of DTT transmission included 40 cities. By June 2011 there were 75 privately-owned and 10 state-owned DTH channels in Saudi Arabia.[187]

As for IPTV, STC was the first operator to deploy IPTV and triple-play services through its FTTH network. In August 2010, STC announced the launch of "Invision", a triple-play service which includes IPTV, broadband Internet and fixed telephony in one bundle.[188] Table 102 details the status of digital broadcasting technologies in Saudi Arabia.

[186] See Arab Advisors Group (2011c).
[187] See Arab Advisors Group (2011a).
[188] Arab Advisors Group (2010e).

Table 102. Digital broadcasting technologies in Saudi Arabia, December 2011

Digital broadcasting technology	Market status	Service providers	Regulatory entity responsible for service
Digital Terrestrial	Operational	State-owned channels	Ministry of Culture and Information
DTH Satellite	Operational	75 private channels 10 state-owned channels	Ministry of Culture and Information
IPTV	Operational	Mobily STC	CITC
Mobile TV (IP-Based)	Operational	STC Zain Saudi Arabia Mobily	CITC
Mobile TV (DVB)	Not operational	N/A	CITC

Note: * DTH satellite service providers refer to channels and not broadcasters or operators, i.e. more than one channel can be operated by one broadcaster/operator. Data include free-to-air channels and correspond to April 2011
Source: Arab Advisors Group, CITC

Mobile TV services are provided by the three cellular operators. STC offers its subscribers 28 channels , Zain Saudi Arabia offers 23 channels, while Mobily offers 15 channels.[189] Table 103 below presents the operators that provide the service, and their basis of billing.

Table 103. Operator comparison of mobile TV services in Saudi Arabia

Cellular operator	Basis of billing	Notes
STC	Per hour	
	Per day	
	Per month	
Mobily	Per month	This monthly fee includes a certain amount of data to be used, any additional data usage will be charged separately
	Per MB	
	Per hour	
	per day	
Zain Saudi Arabia	Per MB	
	Per day	
	Per 3 days	
	Per week	
	Per month	This monthly fee includes a certain amount of data to be used, any additional data usage will be charged separately

Source: Operators

Open-source software

The Saudi Network Information Center (Saudi NIC), a government agency operated by CITC since 2006, has developed open-source software for internal as well as external use.[190] The Saudi NIC is actively engaged with open-source projects and participates in workshops to promote FOSS in Saudi Arabia.

[189] Arab Advisors Group (2011c).
[190] See http://www.nic.net.sa/page.php?page=82&lang=1.

Arabic digital content

CITC in conjunction with the Ministry of Communications and Information Technology (MCIT) and the Ministry of Finance, established Saudi Arabia's e-government portal (www.saudi.gov.sa). The portal provides general information about the Kingdom and its government agencies.

As for the support of Arabic domain names, the Saudi NIC provides the service of registration with Arabic domain names. Moreover, King Abdulaziz City for Sciences and Technology has been in charge of supervising the King Abdullah Initiative for Arabic Content which works on several projects to develop Arabic content.[191]

Table 104 presents the top twenty most visited online web portals by Internet users in Saudi Arabia. As shown in the table, the adoption of Arabic online content in the Arab region remains behind the adoption of content offered by global companies, such as Google, Youtube and Facebook. The pioneer local portal is a local newspaper website, which is the eighth most visited site by Saudi Internet users.

Table 104. Most visited websites in Saudi Arabia, December 2011

Rank	Website	Target users	Default language*	Description
1	google.com.sa	Global	Arabic	Web search portal
2	Youtube.com	Global	English	Video sharing and broadcasting portal
3	Facebook.com	Global	English	Online social networking
4	google.com	Global	English	Global web search portal
5	live.com	Global	English	E-mail portal
6	maktoob.com	Regional	Arabic	Miscellaneous online services
7	yahoo.com	Global	English	Miscellaneous online services
8	sabq.org	Local	Arabic	Online news portal
9	blogspot.com	Regional	English	Online blogging
10	twitter.com	Global	English	Online social networking
11	msn.com	Global	English	Miscellaneous online services
12	mediafire.com	Global	English	Online storage
13	travian.com.sa	Regional	Arabic	Online gaming
14	hawaaworld.com	Regional	Arabic	Women lifestyle
15	eqla3.com	Local	Arabic	Online forums
16	4shared.com	Global	English	Online storage
17	wikipedia.org	Global	English	Encyclopedia
18	kooora.com	Regional	Arabic	Sports
19	conduit.com	Global	English	Network of web and mobile app publishers
20	babylon.com	Global	English	Translation software

Note: *The default language is the language that appears when first visiting the website
Source: Alexa

Cybersecurity

The Computer Emergency Response Team of Saudi Arabia (CERT-SA) is the entity responsible for cybersecurity at the national level.

[191] See http://www.econtent.org.sa/Pages/Default.aspx.

CERT-SA 's mission is to manage cyber attacks and incidents and increase the cybersecurity awareness level in Saudi Arabia. The objectives of CERT-SA are:

- To coordinate national efforts towards promoting cybersecurity best practices and creating trust among the cybercommunity
- To help managing cybersecurity attacks and incidents in the Kingdom of Saudi Arabia
- To be the reference point in cybersecurity for the cybercommunity in the Kingdom of Saudi Arabia
- To build Saudi talent and human capacity in the field of cybersecurity in the Kingdom of Saudi Arabia
- To provide a trusted environment for e-transactions [192]

[192] See www.cert.gov.sa .

SOMALIA

Market overview

Somalia does not have an independent regulatory authority. Telecommunication services are officially overseen by the Ministry of Information, Posts and Telecommunications. Hardly any information is available on licensing and regulation, and the country has not recently provided any ICT statistics so that ITU data are largely estimates based on previous year data. Telecommunication services seem to be provided by a number of operators: Telecom Somalia, which was the country's first private telecommunications company, offers a range of wireless services. Fixed-telephone and GSM mobile-cellular services are provided by Hormuud and NationLink. Recent entrant Somafone offers GSM and GPRS/EDGE mobile telecommunication services.[193]

By end 2010, there were an estimated 100'000 fixed-telephone subscriptions, translating into a penetration rate of 1.1 per cent.

Table 105. Somalia fixed-telephone subscriptions, 2010

	2010
Fixed-telephone subscriptions (000s)	100
Fixed-telephone penetration rate	1.1%

Source: ITU

By end 2010, there were an estimated 648'000 mobile-cellular subscriptions, translating into a penetration rate of 7.0 per cent.

Table 106. Somalia mobile-cellular subscriptions, 2010

	2010
Mobile-cellular subscriptions (000s)	648
Mobile-cellular penetration rate	7.0%

Source: ITU

By end 2009, estimated total Internet users amounted to 106'000, corresponding to a penetration rate of 1.2 per cent.

Table 107. Somalia Internet users, 2009

	2009
Internet users (000s)	106
Internet user penetration %	1.2%

Source: ITU

Regional initiatives

There is no information on particular initiatives or projects initiated in Somalia concerning broadband access networks, digital broadcasting, open-source software, Arabic digital content, and cybersecurity.

[193] See http://online.wsj.com/article/SB10001424052748704608104575220570113266984.html.

SUDAN[194]

Market overview

The National Telecommunications Corporation (NTC) is responsible for regulating the telecommunications market, as well as the IT market.

NTC was formed in September 1996 to provide an effective regulatory framework and adequate safeguards to ensure fair competition and protection of consumer interests.[195]

In terms of digital media, the market is still a government monopoly, where all digital media providers are state-owned, although content from regional providers headquartered in other countries is available through DTH/satellite.

Table 108 presents the responsible entities for the five relevant topics identified under the ITU WTDC-10 Regional Initiatives for the Arab Region.

Table 108. Sudan entities per regional initiative

	National entity
Broadband access networks	NTC
Digital broadcasting	No assigned regulator
Open-source software	NTC
Arabic digital content	NTC
Cybersecurity	NTC

Source: Arab Advisors Group

Fixed-telephone market

By December 2011, Sudatel and Canar were the only fixed-telephone operators. Sudatel's monopoly of fixed services ended as Canar began its operations in April 2005. Both operators provide fixed voice through PSTN technology.[196]

By end 2010, there were an estimated 375'000 fixed-telephone subscriptions in Sudan, translating into a penetration rate of 0.9 per cent.

Table 109. Sudan fixed-telephone subscriptions, 2010

	2010
Fixed-telephone subscriptions (000s)	375
Fixed-telephone penetration rate	0.9%

Source: ITU estimates

[194] Data and information in this report refer to the situation in Sudan before the independence of South Sudan in July 2011.
[195] See www.ntc.gov.sd.
[196] See www.canar.sd/canar-profile.html.

Mobile-cellular market

Strong competition exists between the three mobile-cellular operators: Zain, Sudatel and MTN. By end 2010, total mobile-cellular subscriptions amounted to 17.6 million, translating into a penetration rate of 40.5 per cent. During the first six months of 2011, mobile-cellular subscriptions increased by 0.54 per cent, as 4'428 subscriptions were added. By the end of June 2011, Sudan's total mobile-cellular subscriptions stood at just over 22 million, corresponding to a penetration rate of 50.1 per cent.

Table 110. Sudan mobile-cellular subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Mobile-cellular subscriptions (000s)	17'654	22'082
Added (000s)		4'428
Growth		25.1%
Mobile-cellular penetration rate	40.5%	50.1%

Source: ITU, Arab Advisors Group

Broadband Internet market

By end 2010, there were an estimated 165'000 fixed (wired)-broadband Internet subscriptions, corresponding to a penetration rate of 0.40 per cent.

Table 111. Sudan fixed (wired)-broadband Internet subscriptions 2010

	2010
Fixed (wired)-broadband Internet subscriptions (000s)	165
Fixed (wired)-broadband Internet penetration rate	0.4%

Note: *Fixed (wired)-broadband Internet subscriptions do not include WiMAX subscriptions
Source: ITU

Regional initiatives

Broadband access networks

Currently, there are three commercial broadband technologies in Sudan; one fixed (wired)-broadband technology (DSL), and two wireless-broadband technologies (UMTS/HSPA and CDMA 1xEVDO).

DSL has been deployed by Sudatel and Canar, while MTN and Zain have deployed 3G networks. MTN Sudan launched its 3G/3.5G services in 2007, followed by Zain Sudan and Sudatel in 2009.[197]

Digital broadcasting

Currently, there is no entity responsible for regulating the digital broadcasting market in Sudan. The government is the only entity offering digital broadcasting services through DTH satellite. Table 112 below details the status of digital broadcasting technologies.

[197] See Arab Advisors Group (2011c).

Table 112. Digital broadcasting technologies in Sudan, December 2011

Digital broadcasting technology	Market status	Service providers	Regulatory entity responsible for service
Digital terrestrial TV	Not operational	N/A	Government owned
DTH satellite	Operational	17 state-owned channels and 1 mixed-ownership*	Government owned
IPTV	Not operational	N/A	National Telecommunication Corporation
Mobile TV (IP-Based)	Not operational	N/A	National Telecommunication Corporation
Mobile TV (DVB)	Not operational	N/A	National Telecommunication Corporation

Note: * DTH satellite service providers refer to channels and not broadcasters or operators, i.e. more than one channel can be operated by one broadcaster/operator. Data include free-to-air channels and correspond to April 2011
Source: Arab Advisors Group, national regulators

Sudan has 18 terrestrial TV channels, 17 of which are government owned and While one (Blue Nile) with mixed-ownership. Moreover, all DTH satellite channels broadcasting in Sudan are government-owned channels.

IPTV is not operational, although there are no regulatory hurdles for national fixed and mobile licensees to offer the service. The large offer of free DTH channels in the region is probably a strong inhibitor for the development of pay TV in general, including IPTV.

Mobile TV is not provided in the Sudanese market. NTC did not disclose any new initiative regarding the adoption of mobile TV.

Open-source software

Open-source software is being developed by the National Center for Technology (NTCR). NTCR was established in 2007 as the first center for applied research and development (R&D) in most of the fields of ICT, electronics, and geographic information systems. The center is owned by NTC. NTCR has adopted a strategy to promote and implement open-source software in Sudan.[198]

The Sudanese Free and Open-source Society (SudaFOSS) was created in 2010. SudaFOSS is run by volunteers who work for the promotion and distribution of open-source software, as well as supporting and enlarging the open-source community. The society sponsors related projects with the following objectives:

- Construct and develop national operating systems.
- Contribute to the formation of infrastructure for FOSS.
- Define basic rules for FOSS.
- Design criteria for FOSS.
- Support users of FOSS.
- Support transition to FOSS and find alternative solutions.[199]

[198] See http://www.nctr.sd/.
[199] See http://www.nctr.sd/nctr-en/index.php?n=b3B0aW9uPWNvbV9jb250ZW50JnZpZXc9YXJ0aWNsZSZpZD0xMDkmSXRlbWlkPTEyNA%3D%3D.

Arabic digital content

NTC is promoting the creation of e-government websites and donated 800 computers to the different governorates of Sudan. The objective is to establish data centers in order to ensure the governorates are connected to the National Information Center. [200]

As for the support of Arabic domain names, this has not been officially addressed by Sudan's IT regulator or local online service providers in the private sector.

Table 113 presents the top twenty most visited online web portals by Internet users in Sudan. As shown in the table, the adoption of Arabic online content remains behind the adoption of content offered by global websites, such as Google, Youtube and Facebook.

Table 113. Most visited websites in Sudan, December 2011

Rank	Website	Target users	Default language*	Description
1	facebook.com	Global	English	Online social networking
2	Google.com	Global	English	Global web search portal
3	Youtube.com	Global	English	Video sharing and broadcasting portal
4	windowslive.com	Global	English	E-mail portal
5	Yahoo.com	Global	English	Miscellaneous online services
6	maktoob.com	Regional	Arabic	Miscellaneous online services
7	Babylon.com	Global	English	Translation software
8	msn.com	Global	English	Miscellaneous online services
9	Alrakoba.net	Local	Arabic	E-newspaper
10	Kooora.com	Regional	Arabic	Sports
11	Mywebsearch.com	Global	English	Global web search portal
12	Blogspot.com	Global	English	Online blogging service
13	Sudaneseonline.com	Local	Arabic	E-newspaper
14	Mediafire.com	Global	English	File sharing services
15	Wikipedia.com	Global	English	Encyclopedia
16	Ask.com	Global	English	Global web search portal
17	alintibaha.net	Local	Arabic	Newspaper
18	myegy.com	Regional	Arabic	Video sharing
19	Google.com.sa	Global	Arabic	Global web search portal
20	Microsoft.com	Global	English	Microsoft corporation website

Note: *The default language is the language that appears when first visiting the website
Source: Alexa

Cybersecurity

The Sudan Computer Emergency Response Team (CERT) was established as part of the NTC. CERT acts as first responder when cyberattacks occur. It guides various parties on the methodology to protect their networks and represents the advisory body to the citizens and companies in information security before

[200] See http://ntc.gov.sd/index.php?n=b3B0aW9uPWNvbV9jb250ZW50JnZpZXc9YXJ0aWNsZSZpZD0yMyZJdGVtaWQ9MzAmbGFuZz11aw%3D%3D.

and after cyberattacks. It also traces criminals of cyberattacks, and hands them over for trial under existing laws. CERT's responsibilities include:

- Assist in the development of advanced security technologies.
- Promote security awareness throughout the country.
- Provide information related to security and publish information on the latest malware (viruses, worms, Trojan, spy-ware,etc.) and anti-viruses.
- Detect vulnerability and threats. Assist to protect major applications of vital organizations, and prevent/detect attacks aimed at constituent's infrastructure. Provide penetration testing.
- Provide preliminary warning and advice to constituents. Gather information from constituents regarding incidents within their own operating environments. Support the victim of an attack in the repairing and data recovery process. Act as focal point during cyberspace attacks on critical national infrastructure.[201]

[201] See http://www.cert.sd/.

SYRIA

Market overview

The Syrian Telecommunication Establishment (STE) is responsible for regulating the telecommunication market and providing telecommunication services according to plans and policies approved by the Ministry of Communication and Technology.

According to the Syrian Telecommunication Law of 2010, a new regulatory authority named the *Telecommunications Regulatory Authority* will be established in the Syrian Arab Republic. The *Syrian Telecommunications Establishment* will be replaced by a joint stock company called the *Syrian Telecommunications Company* (SyTC). The law has not been enforced yet. [202]

Table 114 presents the responsible entities for the five relevant topics identified under the ITU WTDC-10 Regional Initiatives for the Arab Region.

Table 114. Syria entities per regional initiative

	National entity
Broadband access networks	STE
Digital broadcasting	Ministry of Information
Open-source software	Syrian Computer Society
Arabic digital content	National Committee "Nohood" National Agency for Network Services
Cybersecurity	National Agency for Network Services

Source: Arab Advisors Group

Fixed-telephone market

STE is the sole fixed-service provider, providing mainline services over its own network. It is a state-owned company.

By end 2010, there were 4.069 million fixed-telephone subscriptions, translating into a penetration rate of 19.9 per cent. During the first six months of 2011, fixed-telephone subscriptions increased by 3.1 per cent, as 128'000 subscriptions were added. By the end of June 2011, Syria's total fixed-telephone subscriptions stood at 4.197 million, corresponding to a penetration rate of 20.4 per cent (Table 115).

Table 115. Syria fixed-telephone subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Fixed-telephone subscriptions (000s)	4'069	4'197
Added (000s)		128
Growth		3.1%
Fixed-telephone penetration rate	19.9%	20.4%

Source: ITU, Arab Advisors Group

[202] See www.ste.gov.sy/index.php?m=7.

Mobile-cellular market

There are two mobile-cellular operators in Syria: Syriatel and MTN. Both companies obtained a BOT agreement from STE to establish a network covering the country.

In September 2010, the Ministry of Communications and Technology announced the tender for the third mobile license. From a short list of five operators, Saudi Telecom Company and Qatar Telecom QSC submitted bids for the tender.[203] The process has been postponed due to political unrest in the country.

By end 2010, total mobile-cellular subscriptions amounted to 11.8 million, translating into a penetration rate of 57.8 per cent. During the first six months of 2011, 521'000 mobile-cellular subscriptions were cancelled. By the end of June 2011, Syria's total mobile-cellular subscriptions stood at 11'278 subscriptions, corresponding to a penetration rate of 54.8 per cent.

Table 116. Syria mobile-cellular subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Mobile-cellular subscriptions (000s)	11'799	11'278
Added (000s)		-521
Growth		-4.4%
Mobile-cellular penetration rate	57.8%	54.8%

Source: ITU, Arab Advisors Group

Broadband Internet market

By December 2011, there were 13 operational ISPs: Syrian Telecom (190.sy and Tarassul), Aya, SCS, Sawa, INTE, Rannet, Tarnet, Elecom, Syriatel, Zaad, MTN Syria and Best Italia (satellite Internet provider). It is noteworthy that all fixed-line ISPs are reselling services offered through the network of the incumbent fixed operator, STE.[204]

By end 2010, fixed (wired)-broadband Internet subscriptions reached 67'600, corresponding to a fixed (wired)-broadband Internet penetration rate of only 0.3 per cent. During the first six months of 2011, the fixed (wired)-broadband market grew by 60.7 per cent, adding 40'800 subscriptions. Despite the rise in broadband accounts, Syria remains a primarily dial-up market.

As for the mobile-broadband market, by end 2010, active mobile-broadband Internet subscriptions amounted to 256'242, corresponding to a mobile-broadband penetration rate of 1.3 per cent.

[203] See Arab Advisors Group (2011o).
[204] See Arab Advisors Group.

Table 117. Syria broadband Internet subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Fixed (wired)-broadband Internet subscriptions (000s)*	**68**	**108.01**
Added (000s)		40.8
Growth		60.7%
Fixed (wired)-broadband Internet penetration rates	0.3%	0.5%
Active mobile-broadband Internet subscriptions (000s)	**256.2**	**N/A**
Active mobile-broadband penetration rates	1.3%	
Internet users (000s)	**4'225**	**N/A**
Internet user penetration	20.7%	

Note: *Fixed (wired)-broadband Internet subscriptions do not include WiMAX subscriptions
Source: ITU, Arab Advisors Group

Regional initiatives

Broadband access networks

Currently there are three commercial broadband technologies in the Syrian market; one fixed (wired)-broadband technology (DSL), and two wireless technologies capable of offering broadband speeds (UMTS/HSPA and VSAT).

Syriatel and MTN are the only mobile-cellular operators; they have deployed 3G mobile-broadband technology. STE announced in May 2011 that it will be working with the mobile-cellular operators to expand 3G networks. Moreover, Syriatel held a trial of HSPA+ technology in April 2011. The new technology enables Internet speeds of up to 20 Mbps, compared with the current Syriatel 3G service speed of up to 7.2 Mbps. [205]

As for other wireless-broadband technologies, VSAT services are provided by the ISP Best Italia. In March 2011 STE announced that it aims to employ technologies such as WCDMA, and that it will prepare for LTE trials according to contracts with mobile-cellular operators.[206]

Concerning fixed (wired)-broadband projects, STE is working to complete the requirements needed for FTTB technology.

Table 118 presents the main initiatives in Syria concerning broadband access network projects.

[205] See www.moct.gov.sy/moct/?q=ar/node/215.
[206] See www.ste.gov.sy/index.php?m=7.

Table 118. Broadband access network projects in Syria

Broadband access network project	Status	Description
STE-New Generation Network	Ongoing	On February 2010, STE signed a contract to start the migration of its network to NGN
STE-ADSL ports	Ongoing	STE added 38'050 ADSL ports in 2010, making up 70 per cent of the total lines that were planned to be added during the year. The total of ADSL ports on the network reached 68'500, most of which are in Damascus and Aleppo. STE planned to install 100'000 ports in 2011.
STE-The third rural project	Ongoing	The project aims to deliver fixed-telephone services and broadband Internet services to 4300 villages. Wireless technologies are used in order to reduce the usage of copper wires. By end 2010, there were 123'000 subscribers to these services.
MTN and Ericsson contract to LTE compatible base station	Accomplished	The cellular operator MTN has signed a deal with a network equipment provider to install GSM/EDGE, WCDMA/HSPA and LTE compatible base stations.

Source: STE, Ministry of Communication and Technology, MTN

Digital broadcasting

In terms of digital media, services such as IPTV, IP-based mobile TV services and DVB mobile TV are not operational. The Ministry of Information had plans to start the switch of terrestrial channels from analog to digital by mid-2011; however the commencement of the project has been delayed.[207]

By June 2011, there were three state-owned and four privately-owned DTH satellite channels.[208] Table 119 details the status of digital broadcasting technologies.

Table 119. Digital broadcasting technologies in Syria, December 2011

Digital broadcasting technology	Market status	Service providers	Regulatory entity responsible for service
Digital terrestrial TV	Not operational	N/A	Ministry of Information
DTH satellite	Operational	3 state-owned channels 4 privately-owned channels *	Ministry of Information
IPTV	Not operational	N/A	Unregulated
Mobile TV (IP-Based)	Not Operational	N/A	Unregulated
Mobile TV (DVB)	Not operational	N/A	Unregulated

Note: * DTH satellite service providers refer to channels and not broadcasters or operators, i.e. more than one channel can be operated by one broadcaster/operator. Data include free-to-air channels and correspond to April 2011
Source: Arab Advisors Group, Ministry of Information

Open-source software

The Syrian Computer Society, established in 1989, has conducted training workshops and lectures to support the use of FOSS. There is no information on plans to promote local development of open-source software on a national level.[209]

[207] See www.moct.gov.sy/moct/?q=ar/node/175.
[208] See Arab Advisors Group (2011a).

Arabic digital content

The Ministry of Communication and Technology initiated the *E-government Gate* to help provide online services in cooperation with several state ministries and institutions. The project envisages to set up portals and public online services to serve as main access points for both citizens and government agencies. Work on the e-government project started in mid-2004 and was expected to be completed in 2008. However, Syria still has not yet completed the launch of its e-government website and the government portal (www.egov.sy) is still under in a trial period.[210]

As for the support of Arabic domain names, registration services are provided by the National Agency for Network Services (NANS), established in 2009.

The *Nohood Committee* was established in 2009 to identify and implement strategies and action plans in order to promote the development of Arabic digital content.[211]

Cybersecurity

NANS founded the Information Security Center (ISC), which has the mission to build cybersecurity capabilities and increase the capacity of security incident detection and emergency responses to such incidents.

Moreover, the agency is responsible for ensuring cybersecurity awareness in both private and public sectors by:

- Handling ICT security incidents
- Early warning from possible cyberthreats
- Evaluating current and emerging security threats
- Coordinating nationally and internationally in the domains of cybersecurity. [212]

[209] See www.scs.org.sy.
[210] See Arab Advisors Group.
[211] See www.moct.gov.sy/moct/?q=ar/node/203.
[212] See www.nans.gov.sy.

TUNISIA

Market overview

The Ministry of Industry and Technology along with the National Telecommunication Commission (*Instance Nationale des Télécommunications* -INT) and the National Agency for Frequencies (ANF) are responsible for the regulatory framework of the telecommunications market in Tunisia. Moreover, the Internet market is regulated through the *Agence Tunisienne d'Internet* (ATI), which was established in 1996.

The Ministry is mainly in charge of licensing. INT is responsible for arbitration and handling disputes between operators, as well as overseeing the interconnection framework. Lastly, ANF is responsible for controlling and managing the frequencies. While the three entities are independent, the Ministry of Industry and Technology remains the regulatory umbrella.[213]

In terms of digital media, the Tunisian market is regulated through the National Broadcasting Corporation.

Table 120 presents the responsible entities for the five relevant topics identified under the ITU WTDC-10 Regional Initiatives for the Arab Region.

Table 120. Tunisia entities per regional initiative

	National entity
Broadband access networks	Ministry of Industry and Technology / ATI
Digital broadcasting	National Broadcasting Corporation
Open-source software	Ministry of Industry and Technology
Arabic digital content	Ministry of Industry and Technology
Cybersecurity	National Agency for Computer Security

Source: Arab Advisors Group

Fixed-telephone market

Tunisie Telecom was the only fixed operator in Tunisia until Orange launched its "Flybox" service in December 2010. The "Flybox" service offers customers a fixed-line and a WiFi Internet connection. Orange Tunisie obtained its fixed and 2G/3G mobile telecommunication licenses from the (previous) Ministry of Communication Technologies in June 2009. Orange Tunisie provides its fixed-telephone services over its GSM network. [214]

Tunisia's fixed-telephone subscriptions declined by 7.1 per cent during the first six months of 2011. Fixed-telephone subscriptions decreased by 91'200 lines to reach around 1.198 million by the end of June 2011. This corresponds to a penetration rate of 11.4 per cent, down from 12.3 per cent year-end 2010 (Table 121).

[213] See Arab Advisors Group.
[214] See Arab Advisors Group.

Table 121. Tunisia fixed-telephone subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Fixed-telephone subscriptions (000s)	1'290	1'198.40*
Added (000s)		-91.2
Growth		-7.1%
Fixed-telephone penetration rate	12.3%	11.4%

Note: *Estimated
Source: ITU, Arab Advisors Group

Mobile-cellular market

Competition exists between the three GSM operators: Tunisie Telecom, Tunisiana and Orange Tunisie. Tunisie Telecom is the incumbent in the Tunisian mobile-cellular market, and it was the first operator to deploy a GSM network in 1998.

Tunisiana is the second mobile operator in Tunisia, launching its commercial operations in December 2002. The third entrant, Orange Tunisie, launched its 3G mobile-cellular services in May 2010. The operator was granted a one-year of exclusivity for 3G services, staring from the date of license. Accordingly, Tunisie Telecom obtained a 3G license in September 2010, and launched 3G services in August 2011.[215]

The three Tunisian mobile-cellular operators reported adding 363'750 mobile-cellular subscriptions during the first six months of 2011. By the end of June 2011, mobile-cellular subscriptions had reached 11.478 million, thus increasing the country's mobile-cellular penetration to 108.9 per cent.

Table 122. Tunisia mobile-cellular subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Mobile-cellular subscriptions (000s)	11'114	11'478
Added (000s)		363.75
Growth		3.3%
Mobile-cellular penetration rate	106.0%	108.9%

Source: ITU, Arab Advisors Group

Broadband Internet market

The Tunisian Internet market has 11 ISPs: six are government-owned and the other five are privately-owned. The five privately-owned ISPs are: Orange Tunisie, Global Net, HexaByte, Topnet and Tunet.

By end 2010, fixed (wired)-broadband Internet subscriptions reached 484'400, corresponding to a fixed (wired)-broadband penetration rate of 4.6 per cent. As for the mobile-broadband market, Orange Tunisie was the sole mobile-broadband provider by end 2010. The operator's active mobile-broadband Internet subscriptions amounted to 111'900, translating into a mobile-broadband Internet penetration rate of 1.1 per cent.

[215] Arab Advisors Group (2011c).

Table 123. Tunisia broadband Internet subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Fixed (wired)-broadband Internet subscriptions (000s)*	**482**	**505**
Added (000s)		23
Growth		4.9%
Fixed (wired)-broadband Internet penetration rate	4.6%	4.8%
Active mobile-broadband Internet subscriptions (000s)	**112**	**N/A**
Active mobile-broadband penetration rate	1.1%	
Internet users (000s)	**3'857**	**N/A**
Internet user penetration rate	36.8%	

Note: *Fixed (wired)-broadband Internet subscriptions do not include WiMAX subscriptions
Source: ITU, Arab Advisors Group

Regional initiatives

Broadband access networks

Currently there are five commercial broadband technologies in the Tunisian market; two fixed (wired)-broadband technologies (DSL, FTTx), and three wireless technologies capable of offering broadband speeds (WiMAX, UMTS/HSPA and VSAT).

Recent broadband projects in the country include the deployment of mobile-broadband technologies by Orange Tunisie and Tunisie Telecom.[216] In April 2011, Tunisiana reached an agreement with an equipment provider to transform its mobile network to IP, as a step in its preparation to evolve to 3G and LTE technologies.[217]

Broadband services based on FTTx networks are offered by three ISPs: HexaByte, Topnet and Tunet. The service is offered to enterprises and provides speeds up to 100 Mbit/s. WiMAX is also offered by these three ISPs, as well as by Orange Tunisie. VSAT Internet services are offered by four ISPs: HexaByte, Topnet, Tunet and Global Net.

Table 124 presents the main recent initiatives concerning broadband access network projects.

[216] See Arab Advisors Group (2011p).
[217] See http://www.alcatel-lucent.com/wps/portal/!ut/p/kcxml/04_Sj9SPykssy0xPLMnMz0vM0Y_QjzKLd4x3tXDUL8h2VAQAURh_Yw!!?LMSG_CABINET=Docs_and_Resource_Ctr&LMSG_CONTENT_FILE=News_Releases_2011/News_Article_002410.xml.

Table 124. Broadband access network projects in Tunisia

Broadband access network project	Status	Description
Orange Tunisie's 3G network	Accomplished	In May 2010, Orange Tunisie launched the country's first 3G network. The operator had a one-year exclusivity period for 3G services.
Orange Tunisie's fixed telephony and Internet services	Accomplished	In December 2010, Orange Tunisie launched its "Flybox" service, which includes a fixed line and Wi-Fi Internet.
Tunisie Telecom's 3G network	Accomplished	The Tunisian cellular incumbent, Tunisie Telecom, launched its 3G network in August 2011. The operator obtained its 3G license in September 21, 2010.
Tunisiana's network evolution	Ongoing	In April 2011, Tunisiana announced that it is upgrading its network to an IP-based one in order to prepare for the adoption of 3G and LTE technologies.

Source: Orange Tunisie, Tunisie Telecom, Tunisiana

Digital broadcasting

The country has implemented digital terrestrial TV in a two-phased deployment. The first phase, which was started in 2001, included the experimental implementation of a digital TV broadcasting unit using DVB-T system and MPEG-2 compression in Boukornine, in order to ensure the coverage of Greater Tunis (accounting for 25 per cent of the population). The second phase of the project is again divided into two parts: one which covers the digitization of the transmission network between production studios and different broadcasting stations, which was completed in 2009 for a total investment of TD 27 million. The second part includes the terrestrial broadcasting network to viewers. The contract to deploy the 17 DTTV stations has been awarded, comprising a total investment of TD 13 million.[218]

Concerning DTH TV services, by April 2011, Tunisia had three state-owned channels and a privately-owned channel broadcasting through DTH technology.

IPTV is not operational in the Tunisian market yet, although Tunisie Telecom announced that it is in the process of upgrading its network to start providing services including IPTV.[219]

IP-based mobile TV is operational in the market. In December 2011, the service was provided only by Orange Tunisie.[220]

Table 125 presents the different digital broadcasting technologies in Tunisia.

[218] See http://www.telediffusion.net.tn/index.php?dvben.
[219] See http://www.alcatel-lucent.com/wps/portal/!ut/p/kcxml/04_Sj9SPykssy0xPLMnMz0vM0Y_QjzKLd4w3MfQFSYGYRq6m-pEoYgbxjgiRIH1vfV-P_NxU_QD9gtzQiHJHR0UAAD_zXg!!/delta/base64xml/L0lJayEvUUd3QndJQSEvNElVRkNBISEvNl9BX0U4QS9lbl93dw!!?LMSG_CABINET=Docs_and_Resource_Ctr&LMSG_CONTENT_FILE=News_Releases_2007/News_Article_000724.xml.
[220] See Arab Advisors Group (2010d).

Table 125. Digital broadcasting technologies in Tunisia

Digital broadcasting technology	Market status	Service providers	Regulatory entity responsible for service
Digital terrestrial TV	Operational	VNet (Talfazti)	National Broadcasting Corporation
DTH satellite	Operational	3 state-owned and 1 private channel*	National Broadcasting Corporation
IPTV	Not operational	Tunisie Telecom	
Mobile TV (IP-Based)	Operational	Orange Tunisie	Ministry of Industry and Technology
Mobile TV (DVB)	Not operational	N/A	

Note: * DTH satellite service providers refer to channels and not broadcasters or operators, i.e. more than one channel can be operated by one broadcaster/operator. Data include free-to-air channels and correspond to April 2011.
Source: Arab Advisors Group, national regulators

Open-source software

Tunisia's open-source software initiatives are implemented by the Ministry of Industry and Technology. Tunisia's open-source software plan was initiated in July 2001. The Ministry promotes the use and development of open-source software, creating new open-source services for ICT companies, enhancing human resource skills and competencies in IT, in addition to making open-source software a catalyst for the development of the software industry and for strengthening the competitiveness of ICT companies.[221]

The initiatives undertaken by the Ministry of Industry and Technology to promote open-source software include:

- The issuing of a tender for the development of digital spaces for the promotion of open-source software in Tunisia. This tender includes the development of an e-marketplace service and editorial webmastering and redesigning of open-source software.[222]
- The launch of a national competition on open-source software. This competition aims to reward the best Tunisian open-source projects carried out by enterprises, associations and university clubs in the field of open government, open data and open content.[223]
- The organization of a training session in April 2011 for the benefit of the administrative and technical staff of the public sector.[224]

The Tunisian Ministry of Industry and Technology and ITU are currently in the process of signing a cooperation agreement on the establishment of an open-source software support network as part of the Arab Regional Initiative for open-source software development. Tunisia, which is the only Arab country with a FOSS unit in their ICT administration, will be host to the model center of this open-source initiative. It is planned that in the future further centers will be opened in the region so as to foster FOSS developments. The center's mission will be to promote FOSS and to manage a FOSS resource and news portal in Arabic. Furthermore, the center will provide e-learning tools to FOSS users.[225]

[221] See http://www.opensource.tn/index.php?id=24&L=2.
[222] See http://www.opensource.tn/index.php?id=65&L=2.
[223] See http://www.opensource.tn/index.php?id=41&L=2&tx_ttnews[tt_news]=266&tx_ttnews[backPid]=19&cHash=129ceec719.
[224] See http://www.opensource.tn/index.php?id=53&L=2#c231.
[225] ITU.

Arabic digital content

The current version of the e-government portal (www.tunisie.gov.tn) was launched in June 2009. A previous version of the e-government portal was launched in 2005 under the domain name "bawaba.tn", which was then combined with the Ministries' portal (ministeres.tn) to form the new portal. Citizens can also utilize the portal to pay online for various public services through e-Dinar, a service offered by the Tunisian Post entity.

As for the support of Arabic domain names, the ATI issued a tender for the selection of consultants of the Arabic domain name project. The project was financed through a loan from the International Bank for Reconstruction and Development (IBRD). Tunisia has the Arabic domain name Tunisia (تونس).[226]

The Arabic Information and Communication Technologies Organization (AICTO) is a governmental organization working under the guidance of the league of Arab States. AICTO, which is headquartered in Tunisia, executes a number of activities, including the endorsement of Arab ICT solutions, innovations and software, collecting and researching information related to identifying the future needs of Arab States in the field of ICT, organizing periodic conferences and exhibitions and promoting the exchange of ICT personnel across the Arab world. The organization has a number of projects and initiatives regarding the ICT sector.[227]

Table 126 presents the top twenty most visited online web portals by Internet users in Tunisia. As shown in the table, the adoption of Arabic online remains behind the adoption of content offered by global websites, such as Google, Youtube and Facebook. The pioneer local portal is a local forum website, which is the tenth most visited site by Tunisian Internet users.

Table 126. Rank of most visited websites in Tunisia, December 2011

Rank	Website	Target users	Default language*	Description
1	Facebook.com	Global	English	Online social networking
2	Google.tn	Global	Arabic	Web search portal
3	YouTube	Global	English	Video sharing and broadcasting portal
4	google.com	Global	English	Global web search portal
5	Google.fr	Global	French	Web search portal
6	Yahoo.com	Global	English	Miscellaneous online services
7	blogspot.com	Global	English	Online blogging service
8	live.com	Global	English	email portal
9	wikipedia.org	Global	English	Encyclopedia
10	tunisia-sat.com	Local	Arabic	Online forums
11	babylon.com	Global	English	Translation software
12	mosaiquefm.net	Local	French	Portal of Mosaique FM radio
13	twitter.com	Global	English	Online social networking
14	conduit.com	Global	English	Network of web and mobile app publishers
15	kooora.com	Regional	Arabic	Sports
16	MSN.com	Global	English	Miscellaneous online services
17	babnet.net	Local	French/Arabic	Miscellaneous online services
18	attounissia.com.tn	Local	Arabic	Online news portal
19	commentcamarche.net	Global	French	Miscellaneous online services
20	xnxx.com	Global	English	Adult content

Note: *The default language is the language that appears when first visiting the website
Source: Alexa

[226] See http://www.ati.tn/en/index.php?id=88.
[227] See http://www.aicto.org/index.php?id=169.

Cybersecurity

In 2004, the National Agency for Computer Security (NACS) was established with the objectives of:

- Ensuring the execution of national strategies and the general strategy in the field of information systems and networks security.
- Keeping up with the execution of plans and programmes related to computer security in the public sector (except particular applications of Defence and National Security), and to insure the coordination between different actors.
- Raising awareness in the computer security field.
- Establishing computer security specific norms, elaborate technical guides and publish them.
- Encouraging the development of national solutions in the field of computer security and to promote them to go hand-in-hand with priorities and with programmes that will be fixed by the agency.
- Contributing to the consolidation of training and recycling in the field of computer security.
- Ensuring the execution of rules related to the obligation of a periodical audit over the security of computer systems and the networks.
- The Agency is also responsible for the tunCERT, the Tunisian Computer Emergency Response Team.[228]

[228] See http://www.ansi.tn/en/about_agency/about_nacs_en.html.

UNITED ARAB EMIRATES

Market overview

The Telecommunications Regulatory Authority (TRA) is the entity responsible for regulating the telecommunications market and digital broadcasting in the United Arab Emirates (UAE).

TRA's main objectives are organization building and formulating a regulatory framework to enable competition in the UAE telecommunication sector. Among other tasks, it issues general guidance and instructions for the telecommunication sector, awards telecommunication licences, and determines fees for licenses, among other tasks.[229]

Table 127 presents the responsible entities for the five relevant topics identified under the ITU WTDC-10 Regional Initiatives for the Arab Region.

Table 127. UAE entities per regional initiative

	National entity
Broadband access networks	TRA
Digital broadcasting	TRA
Open-source software	TRA
Arabic digital content	TRA - The Domain Administration (.aeDA)
Cybersecurity	TRA - Computer Emergency Response Team (aeCERT)

Source: Arab Advisors Group

Fixed-telephone market

Etisalat and du are the only fixed-telephone operators in UAE. In 2010 the TRA confirmed that Etisalat and du have agreed to provide voice, Internet, data and TV services across each other's copper and fibre networks using bitstream access technology.[230] Although the commercial launch of the service was scheduled for December 2011, it has been delayed. However, a soft (or limited) launch of the services took place in July 2011.[231]

By end 2010, there were a total 1.480 million fixed-telephone subscriptions, translating into a penetration rate of 19.7 per cent. During the first six months of 2011, fixed-telephone subscriptions increased by 18 per cent. By the end of June 2011, UAE's total fixed-telephone subscriptions stood at 1.745 million, translating into a penetration rate of 22.1 per cent.

[229] See www.tra.ae.
[230] See www.tra.ae/news_Under_Supervision_from_the_Telecommunications_Regulatory_Authority_%28TRA%29-175-19.php.
[231] See www.tra.ae/news_UAE_telecommunications_market_to_experience_choice_in_fixed_lines_services_by_year_end-320-6.php.

Table 128. UAE fixed-telephone subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Fixed-telephone subscriptions (000s)	1'480	1'745
Added (000s)		265
Growth		18%
Fixed-telephone penetration rate	19.7%	22.1%

Source: ITU, TRA

Mobile-cellular market

Both Etisalat and du provide cellular services. du launched mobile telecommunication services in February 2007, after nearly 30 years of telecommunication monopoly led by Etisalat.

By end 2010, total mobile-cellular subscriptions amounted to 10.926 million, translating into a penetration rate of 145.5 per cent. During the first six months of 2011, mobile-cellular subscriptions grew by 2.3 per cent, as 254'000 subscriptions were added. By the end of June 2011, UAE's total mobile-cellular subscriptions stood at 11.18 million, translating into a penetration rate of 145.2 per cent.

Table 129. UAE mobile-cellular subscriptions (December 2010 – June 2011)

	Q4 2010	Q2 2011
Mobile-cellular subscriptions (000s)	10'926	11'180
Added (000s)		254
Growth		2.3%
Mobile-cellular penetration rate	145.5%	145.2%

Source: ITU, TRA

Broadband Internet market

In September 2008, du launched its broadband Internet service for both residential and business subscribers, thus ending the monopoly of Etisalat in UAE's Internet market.[232] Both Etisalat and du have exclusive service areas inside the UAE. However, this is going to change once the agreement between the two operators to share their networks through bitstream access becomes operative.

By end 2010, fixed (wired)-broadband Internet subscriptions reached 787'000, while active mobile-broadband Internet subscriptions reached 4.38 million.

[232] See Arab Advisors Group.

Table 130. UAE broadband Internet subscriptions (December 2010 – June 2011)

	Q4 2010	Q22011
Fixed (wired)-broadband Internet subscriptions (000s)*	**787**	**825.2**
Added (000s)		38.4
Growth		4.9%
Fixed (wired)-broadband Internet penetration rates	10.5%	10.7%
Active mobile-broadband Internet subscriptions (000s)	**4'384**	**N/A**
Active mobile-broadband penetration rates	58.4%	
Internet users (000s)	**5'859**	**N/A**
Internet user penetration	78%	

Note: *Fixed (wired)-broadband Internet subscriptions do not include WiMAX subscriptions
Source: ITU, Arab Advisors Group

Regional initiatives

Broadband access networks

Currently there are six commercial broadband technologies in the UAE; two fixed (wired)-broadband technologies (DSL and FTTH), and four wireless technologies capable of providing broadband speeds (VSAT, WiMAX, UMTS/HSPA and LTE).

Recent broadband projects in the country include the deployment of FTTH technology. Indeed, Etisalat achieved its target of making Abu Dhabi city fully connected with FTTH by end 2010, and the operator plans to raise the number of FTTH connections to cover the whole UAE by end 2012.[233] du's FTTH network is currently only available in limited areas of Dubai city.

In September 2011, Etisalat launched its LTE services, with 700 base stations equipped with LTE technology.[234] du conducted and completed its first pilot on LTE in April 2011. The service has not been commercially launched yet.

Table 131 presents the main initiatives in the UAE concerning broadband access network projects.

[233] See www.etisalat.ae/index.jsp?lang=en&type=content&currentid=10c8e15c0b56a010VgnVCM1000000a0a0a0a____&contentid=d038c34568d80310VgnVCM1000000c24a8c0RCRD&parentid=fa58800d1f52a010VgnVCM1000000a0a0a0a.
[234] See www.etisalat.ae/index.jsp?lang=en&type=content&currentid=10c8e15c0b56a010VgnVCM1000000a0a0a0a____&contentid=b25aad5e920a2310VgnVCM1000000c24a8c0RCRD&parentid=fa58800d1f52a010VgnVCM1000000a0a0a0a_.

Table 131. Broadband access network projects in UAE

Broadband access network project	Status	Description
Etislat- UAE smart hub Microsoft agreement	Ongoing	In October 2011, Etisalat signed an agreement with Microsoft to improve Etisalat's Smart Hub in UAE.
du- Gigabit-capable Passive Optical Network	Ongoing	In August 2011 du announced its plans to deploy a GPON fiber-optic network .
Etisalat's LTE network	Accomplished	Etisalat launched LTE commercially in September 2011, being the first operator in the country to offer these services.
du's LTE network	Ongoing	du has rolled out an LTE network, but has not commercially launched the service. The operator expects to launch it during 2012.

Source: TRA, Etisalat, du

Digital broadcasting

In December 2009, TRA published the "Terrestrial Digital Switchover" plan. According to the plan, which is organized in four phases, the existing analog TV broadcasting operators shall have switched off their analogue TV transmitters by December 2013.

In August 2011, TRA awarded Al Maisan Satellite Communications Company (YahLive) a ten-year satellite service license. This license enables YahLive to transmit DTH satellite television services from UAE. The license states that Al Maisan Satellite Communications Company will provide DTH satellite services to free-to-air and pay-TV broadcasters in this region.[235]

In October 2009, TRA granted a license to the "Emirates Mobile Television Corporation" consortium. UAE was the first country in the region to issue such a mobile TV license.[236] The licence has a duration of 10 years, five of which are exclusive. DVB-H has been selected as the technology for the provision of mobile TV services. [237]

As for IP-based mobile TV, both Etisalat and du launched services in February 2007. Etisalat's service is available for all 3G/3.5G users –postpaid and prepaid- and provides an array of news, sports, and entertainment channels. In October 2011, Etisalat's mobile TV service enabled users to watch live TV streaming for 20 channels. In conjunction with the beginning of its mobile operations in February 2007, du launched mobile TV services to its prepaid and post-paid customers, offering 28 channels.[238]

Etisalat offers IPTV through its subsidiary E-Vision, which was established in April 2000. du's IPTV service was introduced with the operator's launch in 2007 under the name "Home Plus Package".

Table 132 presents the digital broadcasting technologies in the UAE.

[235] See www.tra.gov.ae/news_The_TRA_grants_Al_Maisan_Satellite_Communications_Company_a_Satellite_Transmission_Services_License-325-5.php.
[236] The consortium is composed of Emirates Telecommunications Corporation "Etisalat", Emirates Integrated Telecommunications Company "du", Abu Dhabi Media Company, Dubai Media Incorporated, Emirates Communications and Technologies Company (a subsidiary of TECOM Investment) and MBC FZ-LLC "mbc".
[237] See http://www.tra.gov.ae/news_Telecom_and_Media_Companies_Join_Hands_to_Bid_for_Mobile_TV_License_issued_by_Telecommunications_Regulatory_Authority_%28TRA%29-113-24.php.
238 See Arab Advisors Group (2011q).

Table 132. Digital broadcasting technologies in UAE, December 2011

Digital broadcasting technology	Market status	Service providers	Regulatory entity responsible for service
Digital terrestrial TV	Not operational	N/A	TRA
DTH satellite	Operational	19 state-owned channels 48 private channels 2 mixed-ownership channels*	TRA
IPTV	Operational	du Etisalat	TRA
Mobile TV (IP-Based)	Operational	du Etisalat	TRA
Mobile TV (DVB)	Operational	"Emirates Mobile Television Corporation" consortium	TRA

Note: * DTH satellite service providers refer to channels and not broadcasters or operators, i.e. more than one channel can be operated by one broadcaster/operator. Data include free-to-air channels and correspond to April 2011
Source: Arab Advisors Group, du, Etisalat, TRA

Open-source software

In October 2011, the regulatory body and registry operator for the ".ae" domain administration standardized its registry infrastructure ".aeDA" to Red Hat Enterprise Linux 5 operating system, with support from Red Hat Network Satellite.

The domain administration was instructed by TRA to develop .ae Country Code Top Level domain (ccTLD) registry.[239]

Arabic digital content

Emirates eGovernment (EeG) is the entity responsible for formulating and overseeing the implementation of the eGovernment strategy for the entities at the federal level and for providing government services to the public. EeG publishes guidelines and documents on social media usage, open data, eParticipation and Web content. [240] EeG is supervised by TRA, and is also responsible for the setting and enforcement of all policies pertaining to the operation of ".ae" country code Top Level Domain (ccTLD).

As for the support of Arabic domain names, TRA launched the Arabic domain name (dotEmarat) with the objective to enable Arabic speakers to make the most out of the Internet and its various channels.[241]

Cybersecurity

In 2006, the government approved a federal law on combatting information technology crimes. The UAE Computer Emergency Response Team (aeCERT) was launched by TRA in 2008.

aeCERT's mission is to protect ICT infrastructure against a broader range of cybersecurity threats, and to build a secure cyberculture in the UAE.

[239] See www.aeda.ae/eng/news.php?id=104.
[240] See www.tra.gov.ae/tra_initiatives.php.
[241] See www.tra.gov.ae/tra_initiatives.php.

Moreover, the agency is responsible for raising cybersecurity awareness in the public and private sector organizations and among the population. The objectives of aeCERT are:

- Enhance the cybersecurity law and assist in the creation of new laws.
- Enhance cybersecurity awareness across UAE.
- Build national expertise in cybersecurity, incident management and computer forensics.
- Provide a central trusted point of contact for cybersecurity incident reporting.
- Establish a national center to disseminate information about threats, vulnerabilities, and cybersecurity incidents.
- Foster the establishment of and provide assistance to sector-based computer security incidents response teams (CSIRTs).
- Coordinate with domestic and international CSIRTs and related organizations.
- Become an active member of recognized security organizations and forums. [242]

[242] See www.aecert.ae/about-us.php.

YEMEN

Market overview

Formerly known as the Ministry of Communications, the Ministry of Telecommunications and Information Technology (MTIT) is responsible for formulating policies and plans to encourage investment, regulation of frequencies, issuing licenses, implementing a national numbering plan, implementing telecommunication agreements, monitoring the activities of all licensed entities, and other regulatory activities.[243]

Table 133 presents the responsible authority for the five relevant topics identified under the ITU WTDC-10 Regional Initiatives for the Arab Region.

Table 133. Yemeni entities per regional initiative

	National entity
Broadband access networks	MTIT
Digital broadcasting	Yemen General Corporation for Radio and TV / MTIT
Open-source software	No assigned regulator
Arabic digital content	National Information Center
Cybersecurity	National Information Center

Source: Arab Advisors Group

Fixed-telephone market

The fixed-line market is monopolized by the Public Telecommunications Corporation (PTC), through Yemen Telecom. PTC was created in 1981, as a fully government-owned, public establishment. Under the Ministry's supervision, PTC handles all aspects of Yemen's fixed-line services and expansion projects. In 1990, with the unification of North and South Yemen, the PTC of Sana'a and the Telecommunications Commission of Aden merged to form one body covering all governorates of Yemen. In 1999, PTC handed the responsibility for regulating the telecommunications sector to MTIT, allowing PTC to focus solely on providing fixed-line services.[244]

Yemen's fixed-telephone subscriptions amounted to around 1.046 million by year-end 2010, translating into penetration of 4.4 per cent (Table 134).

Table 134. Yemen fixed-telephone subscriptions, 2010

	2010
Fixed-telephone subscriptions (000s)	1'046
Fixed-telephone penetration rate	4.4%

Source: ITU

[243] See Arab Advisors Group (2010f).
[244] See Arab Advisors Group (2010f).

Mobile-cellular market

Yemen's mobile-cellular market has four operators: Yemen Mobile, Sabafon, MTN Yemen and Y Telecom. Yemen Mobile provides cellular services through a CDMA network, while the other operators use GSM technologies.

Yemen Mobile currently offers 3G services through EV-DO Rev A technology, but is limited to three locations: Aden, Al-Amanah and Huqoul Al-Nift (Oil fields).[245]

By end 2010, mobile-cellular subscriptions amounted to 11.085 million. This translated into a penetration rate of 46.1 per cent (Table 135).

Table 135. Yemen mobile-cellular subscriptions, 2010

	2010
Mobile-cellular subscriptions (000s)	11'085
Mobile-cellular penetration rate	46.1%

Source: ITU

Broadband Internet market

Yemen's Internet market is a duopoly, controlled by Yemen Net and TeleYemen's YNet, which are both governmental entities. Both operators provide broadband services through DSL, and Yemen Net also through WiMAX. Yemen Net (owned by PTC), which controls more than 80 per cent of the Internet market, also provides dial-up, leased lines, web hosting, domain registration and network security services.[246]

By end 2010, total fixed (wired)-broadband Internet subscriptions amounted to 84'000, and the penetration rate stood at 0.3 per cent. Mobile-broadband was not yet available by end 2010, as only recently Yemen Mobile has begun offering 3G services through EVDO technology (Table 136).

Table 136. Yemen broadband Internet subscriptions, 2010

	2010
Fixed (wired)- broadband Internet subscriptions (000s)*	**84.0**
Fixed (wired)-broadband Internet penetration rates	0.4%
Active mobile-broadband Internet subscriptions (000s)	**0.0**
Active mobile-broadband penetration rates	0.0%
Internet users (000s)	**2'971**
Internet user penetration	12.4%

Note: *Fixed (wired)-broadband Internet subscriptions do not include WiMAX subscriptions
Source: ITU

[245] See Arab Advisors Group (2011c).
[246] See Arab Advisors Group (2010f).

Regional initiatives

Broadband access networks

Currently there are four commercial broadband technologies in Yemen; one fixed (wired)-broadband technology (DSL), and three wireless-broadband technologies (CDMA EVDO, WiMAX and another terrestrial fixed wireless broadband technology).

Recent broadband projects in the country include Yemen Mobile's launch of 3G services, although limited to three locations (see above).

Another recent project announced by MTIT, in September 2011, is the upgrade of its PSTN network to NGN. In addition, the Ministry also announced the expansion of the ADSL network with 70'000 additional ports, and the expansion of the WiMAX network.[247]

Yemen's sole provider of PSTN services, PTC, also uses terrestrial fixed wireless technologies other than WiMAX for a number of remote locations.

Table 137 presents the main recent initiatives in Yemen concerning broadband access network projects.

Table 137. Broadband access network projects in Yemen

Broadband access network project	Status	Description
Yemen Mobile's 3G Network	Ongoing	Yemen Mobile currently provides 3G services over EV-DO Rev A technology in three locations in Yemen: Aden, Al-Amanah and Huqoul Al Nift (Oil fields).
MTIT's Network upgrade project	Ongoing	In September 2010, MTIT announced a plan to upgrade its PSTN network to NGN. It also announced the expansion of its ADSL networks with 70'000 extra ports, and the enlargement of the WiMAX network.

Source: Yemen Mobile, Ministries

Digital broadcasting

Yemen is still behind when it comes to digital broadcasting, as only DTH satellite services are operational in the country. Yemen has four governmental channels and two private channels broadcasting using this technology.

IPTV is not provided in the Yemeni market. Neither is mobile TV, as Yemen Mobile, currently the only provider of 3G services in the country , does not offer mobile TV services.[248]

Table 138 presents the status of digital broadcasting technologies in the country.

[247] See http://www.ptc.gov.ye/ytp/%D8%A7%D9%84%D9%85%D8%AC%D9%85%D9%88%D8%B9%D8%A9/%D8%A7%D9%84%D8%AE%D8%B7%D8%B7%D9%88%D8%A7%D9%84%D9%85%D8%B4%D8%A7%D8%B1%D9%8A%D8%B9/tabid/131/language/ar-YE/Default.aspx.

[248] See Arab Advisors Group (2011a).

Table 138. Digital broadcasting technologies in Yemen, December 2011

Digital broadcasting technology	Market status	Service providers	Regulatory entity responsible for service
Digital terrestrial TV	Not operational	N/A	Yemen General Corporation for Radio and TV
DTH satellite	Operational	4 state-owned and 2 private channels*	Yemen General Corporation for Radio and TV
IPTV	Not operational	N/A	Ministry of Telecommunications and Information Technology
Mobile TV (IP-Based)	Not operational	N/A	Ministry of Telecommunications and Information Technology
Mobile TV (DVB)	Not operational	N/A	Ministry of Telecommunications and Information Technology

Note: * DTH satellite service providers refer to channels and not broadcasters or operators, i.e. more than one channel can be operated by one broadcaster/operator. Data include free-to-air channels and correspond to April 2011.
Source: Arab Advisors Group, national regulators

Open-source software

There is no information available on major governmental initiatives undertaken regarding open-source software. However, some open-source initiatives have been carried out through the Yemeni Free Software and Open Source Association (YFOSA). The association's activities include the organization of awareness campaigns and seminars on FOSS, as well as the contribution to the development of GNU/Linux and BSD. YFOSA also plans a number of multimedia DVD and CD productions covering Yemen's heritage, geography, arts and culture.[249]

Arabic digital content

Yemen's e-government portal (www.yemen.gov.ye) was officially launched in 2010. The portal is presented in Arabic only and offers general information about Yemen, the Prime Ministry, ministries, governorates and government agencies. The portal also provides several publications from different ministries and governmental entities, in addition to a number of electronic services.[250]

As for the support of Arabic domain names, there is no information available on major initiatives carried out or planned by MTIT or the Yemeni private sector.

Yemen is part of the ESCWA project for the development of Arabic digital content. The project is executed through the Aden ICT incubator in the University of Aden. Three new ICT companies have been created in the context of the ESCWA project.[251]

Yemen's National Information Center (NIC) manages an electronic library that aims to provide various types of electronic content to individuals and enterprises. The project also aims to archive and organize the country's heritage. NIC has invested USD 3.25 million in the project.[252]

Table 139 presents the top twenty most visited online web portals by Internet users in Yemen. As shown in the table, the adoption of Arabic online content remains behind the adoption of content offered by

[249] See http://www.yfosa.org/about.html.
[250] Arab Advisors Group (2011g).
[251] See http://css.escwa.org.lb/ICTD/1107/2-1.pdf.
[252] See http://www.yemen-nic.info/NIC/detail.php?ID=1311&print=Y.

global websites, such as Google, Youtube and Facebook. The pioneer local portal is a local online news portal, which is the seventh most visited site by Yemeni Internet users.

Table 139. Rank of most visited websites in Yemen, December 2011

Rank	Website	Target users	Default language*	Description
1	google.com	Global	English	Web search portal
2	Facebook.com	Global	English	Online social networking
3	youtube.com	Global	English	Video sharing and broadcasting portal
4	live.com	Global	English	E-mail portal
5	yahoo.com	Global	English	Miscellaneous online services
6	blogspot.com	Global	English	Online blogging service
7	sahafah.net	Local	Arabic	Online news portal
8	maktoob.com	Regional	Arabic	Miscellaneous online services
9	taiz-press.net	Local	Arabic	Online news portal
10	Kooora.com	Regional	Arabic	Sports
11	almasdaronline.info	Local	Arabic	Online news portal
12	Mediafire.com	Global	English	File sharing services
13	twitter.com	Global	English	Online social networking
14	wikipedia.org	Global	English	Encyclopedia
15	msn.com	Global	English	Miscellaneous online services
16	yemen-press.com	Local	Arabic	Online news portal
17	4shared.com	Global	English	Online storage
18	al-tagheer.com	Local	Arabic	Online news portal
19	aljazeera.net	Regional	Arabic	Online news portal
20	microsoft.com	Global	English	Main site for product information, support, and news.

Note: *The default language is the language that appears when first visiting the website
Source: Alexa

Cybersecurity

NIC is in charge of cybersecurity in the country. Responsibilities of the center include: proposing guidelines for information security, monitoring the execution of these guidelines, and keeping a back-up of the different governmental entities. The Yemeni government also issued legislations in order to ensure that governmental entities enforce the necessary measures to grant the security of their information.[253]

[253] See http://www.yemen-nic.net/NIC/about/detail.php?ID=7502.

Section III. Conclusions and recommendations

Based on the findings of sections I and II of this report, this section draws some conclusions and makes specific recommendations for the countries in the Arab States region. Special focus is on the five topics identified under the ITU WTDC-10 Regional Initiatives for the Arab region: broadband access networks, digital broadcasting, open-source software, Arabic digital content and cybersecurity.[254]

Broadband access networks

As highlighted in the report, the availability and deployment of fixed (wired)- and mobile-broadband next-generation access networks (NGANs) varies between countries within the Arab States region. Table 140 provides an overview of the key NGANs for the majority of Arab countries.

Although fibre-optic infrastructure is available in most countries in the region, FTTx coverage remains limited to urban areas and high-income customers.[255] The majority of countries have launched WiMAX and 3G networks and the number of mobile-broadband subscriptions is increasing rapidly, although network coverage varies. Countries with particularly limited broadband access network deployment include Algeria, Comoros, Djibouti, Iraq, Mauritania, Somalia, Sudan, Syria and Yemen. In those countries, key reasons for the lack of broadband network projects are low income levels, as well as political and regulatory instabilities.

A number of governments and operators in the region have developed broadband connectivity plans that include specific targets to be achieved by a certain date (Table 141). These projects are supported through a variety of public policies and programmes, including device subsidies, universal service funds, e-government services and training programmes. GCC governments have been more aggressive in promoting strategies to support broadband adoption, especially by implementing e-government services. At the same time, the online community has played an important role in stimulating broadband deployment in Arab countries due to its growing demand for high-speed Internet access and online services. As highlighted in section II of this report, social media sites and video sharing portals, including Facebook and Youtube, are among the most visited websites in the region.

Recognizing the potential economic and social benefits of broadband, most regulators in the region have placed high importance on enhancing broadband connectivity and access in their countries.

[254] See http://www.itu.int/ITU-D/projects/docs/project-assistance/WTDC-2010-Res-17-Arab-Region.PDF.

[255] Exceptions include the UAE, where by the end of 2010, Abu Dhabi city was fully connected with FTTH, with plans to connect the entire country by end 2012, see http://www.etisalat.ae/index.jsp?parentid=fa58800d1f52a010VgnVCM1000000a0a0a0a____&contentid=11724b71ac620310VgnVCM1000000c24a8c0RCRD&currentid=10c8e15c0b56a010VgnVCM1000000a0a0a0a____&lang=en&type=content.

Table 140. Available next-generation access networks (NGANs) in Arab countries, December 2011

Country	WiMAX	3G (HSPA, UMTS)	FTTx
Algeria	Commercially launched	Not available	Commercially launched
Bahrain	Commercially launched	Commercially launched	Commercially launched
Egypt	Network not available	Commercially launched	Commercially launched
Iraq	Commercially launched	Launched but only available in the Kurdistan region	Installing phase
Jordan	Commercially launched	Commercially launched	Commercially launched
Kuwait	Commercially launched	Commercially launched	Commercially launched
Lebanon	Commercially launched	Commercially launched	Installing phase
Libya	Commercially launched	Commercially launched	Commercially launched
Mauritania	Commercially launched	Commercially launched	Network not available
Morocco	Commercially launched	Commercially launched	Network not available
Oman	Commercially launched	Commercially launched	Installing phase
Qatar	The network has been deactivated	Commercially launched	Commercially launched
Saudi Arabia	Commercially launched	Commercially launched	Commercially launched
Sudan	Network not available	Commercially launched	Network not available
Syria	Network not available	Commercially launched	Network not available
Tunisia	Commercially launched	Commercially launched	Commercially launched
UAE	Commercially launched	Commercially launched	Commercially launched
Yemen	Commercially launched	Limited availability EVDO	Network not available

Source: Arab Advisors Group Analysis, operators, national regulatory authorities

Table 141. Broadband plans announced by selected Arab countries/operators

	Broadband plans and targets	Date
Countries		
Egypt	22% of households with a fixed (wired)-broadband connection of at least 2 Mbit/s	End of 2015
	10% mobile-broadband penetration rate	End of 2016
	40% of households with a fixed (wired)-broadband connections of at least 2 Mbit/s	End of 2021
	15% mobile-broadband penetration rate	End of 2021
Qatar	90% of households and businesses with a fixed (wired)-and/or mobile-broadband connection	End of 2015
Kuwait	Fibre access availability in all Kuwaiti cities (though not necessarily to each household in each city)	End of 2014
Operators		
Etisalat (UAE)	100% of households in the UAE passed with fibre*	End of 2012
Algérie Télécom (Algeria)	20% of fixed (wired)-broadband penetration (8 million subscriptions) to be provided by Algérie Telecom	End of 2014

Note: *Although 100% of UAE households are slated to have fibre availability, this does not mean that every household will necessary subscribe to the service.
Source: National regulatory authorities, Arab Advisors Group

The region's broadband leaders are not necessarily those with the most liberalized and competitive markets since broadband uptake and penetration depends on a number of factors, including operators' investment policies and their ability to leverage economies of scale, countries' purchasing power and income levels, education and computer literacy levels, as well as government policies. Full liberalization, in the absence of other necessary success factors for broadband, may not be sufficient to yield optimal results. Investment opportunities, in particular, tend to play an important role in stimulating service uptake. The UAE, for example, has a duopoly market in which two operators have been very aggressive in FTTH deployments, driven by user demand and a high-income environment. In Jordan, most high-income neighbourhoods of Amman have an abundance of competing broadband providers (five WiMAX operators, two 3G networks, plus an ADSL and fibre-optic network in some areas), whereas many towns with lower income levels have access to medium-speed ADSL services at best.

The following steps could help drive broadband deployment in the region, especially in currently underserved areas:

By creating a regulatory environment that fosters investment and increases competition in both fixed (wired)- and mobile-broadband markets, policy makers can help bring down prices and increase the number of broadband users. This includes encouraging competition in all areas of broadband infrastructure, including international Internet connectivity, and providing a fair and transparent regulatory framework where all service providers, whether private or public, face equal and predictable conditions.

While most countries have deployed different and competing broadband access networks and technologies, these are not yet available in all geographic areas and only a limited number of citizens can actually benefit and chose from different services. Governments have an important role to play in the expansion of broadband coverage to other (usually rural and remote) areas, either through the promotion of public-private partnerships or by directly supporting strategic public investment in broadband networks. Governments could also leverage universal service funds to ensure broadband access in rural and underdeveloped regions, especially in countries with low urbanization rates.

In low-income countries with a weak fixed-network infrastructure, such as Yemen, Comoros, and Djibouti, national regulatory authorities could leverage the potential of wireless networks, such as HSPA and WiMAX, in disseminating broadband access. To take advantage of mobile-broadband technologies and to increase competition between fixed (wired)- and mobile-broadband technologies, governments are encouraged to efficiently regulate and assign spectrum.

Governments can learn from other countries to identify liberalization and regulatory strategies best suited to their national context. Governments and operators are further encouraged to analyze regional and global experiences in terms of offering value-added services to customers, taking into consideration local needs.

Governments are encouraged to formulate a broadband plan or strategy to help guide them in identifying optimal policies, track progress, and identify shortcomings. In order to monitor policies and strategies, governments need to track ICT developments**,** coverage, and quality of service, and set measurable targets.

In particular, they should collect key broadband data from operators, including on fixed (wired)- and wireless-broadband uptake, broken down by technology, and speed. They could further monitor the transparency of services that operators are providing to end users, in terms of the price and quality of service. Effective monitoring and measurement mechanisms will help governments identify current ICT levels, and based on these, set concrete targets and objectives for the future.

Few countries in the region currently collect data on ICT access and use by households, businesses and individuals. Governments are encouraged to collect demand-side ICT data through official household and business surveys, and in cooperation with national statistical offices. These survey data will complement administrative data and produce valuable information on the use of ICTs, and a country's path towards becoming an information society.

Digital broadcasting

Table 142 provides an overview of the availability of mobile TV, DTH satellite broadcasting, and IPTV, and of the status of the transition towards digital terrestrial broadcasting. In the Arab states, DTH Satellite is the prevalent digital broadcasting technology in terms of viewership rate, since the majority of channels are free-to-air channels. A relatively high level of content piracy seems to be an inhibitor to further developments towards digital broadcasting in the region, which is not yet widely available.[256]

Twelve countries in the Arab region have deployed, or have transition plans for deploying digital terrestrial broadcasting. Most of these countries have frequency plans, and have chosen to deploy the DVB-T standard. However, only few countries seem to have a legal and regulatory framework in place. The duration of the transition ranges from 18 to 91 months. With the exception of Morocco and Saudi Arabia, most of these countries have a limited number of DVB-T transmitters on air.[257]

Digital satellite TV broadcasting is available and well established in the region. It is widely used and there are several providers of DTH satellite platforms. Free-to-air satellite is widespread across the region, and satellite pay TV is also popular, but widely pirated. On the other hand, terrestrial TV viewership in the region has fallen drastically, as households switch to the wider choices and richer content of satellite TV. IPTV and mobile TV are not as widespread or widely adopted, although IPTV and video on demand (VOD) are popular in densely populated and well-connected cities like Dubai and Doha.

Satellite TV is beyond the power of national regulators, whereas IPTV and mobile TV are within the scope of national operators. However, regulators in the region may play an important role in the transition from analogue to digital terrestrial broadcasting, and in helping reap the benefits of the digital dividend. By fostering the digital switchover, governments will be able to make more spectrum available, which can be used to accelerate the development of wireless-broadband technologies in the region.

End users in the region are, for the most part, not used to paying for content due to the plethora of free broadcasting content, and piracy remains a problem. Countries in the region could benefit from a more rigid enforcement of copyright and anti-piracy laws, thus paving the way for investors to produce more content and provide a greater choice of digital broadcasting networks.

[256] Arab Advisors Group research.
[257] Arab Advisors Group.

Table 142. Digital broadcasting in the Arab region

Country	Mobile TV broadcasting (whether DVB or IP-based)	DTH satellite broadcasting*	IPTV	Digital terrestrial broadcasting
Algeria	Service not available	3 state-owned channels	Commercially launched	Partial launch
Bahrain	Commercially launched	3 state-owned and 4 privately-owned channels	Commercially launched	Not operational
Egypt	Commercially launched	67 privately-owned channels and 21 state-owned channels	Service not available	Not operational
Iraq	Commercially launched	8 state-owned, 40 privately-owned and 1 mixed-ownership channel	Service not available	Not operational
Jordan	Commercially launched	1 state-owned and 28 privately-owned channels	Commercially launched	Not operational
Kuwait	Commercially launched	7 state-owned and 21 privately-owned channels	Service not available	Not operational
Lebanon	Service not available	1 state-owned and 21 privately-owned channels	Commercially launched	Not operational
Libya	Commercially launched	3 state-owned and 1 privately-owned channel	Service not available	Not operational
Mauritania	Service not available	Only one state-owned channel	Service not available	Operational
Morocco	Available	6 state-owned , 1 privately-owned and 1 mixed-ownership channel	Commercially launched	Operational
Oman	Commercially launched	2 state-owned and 4 privately-owned channels	Service not available	Not operational
Qatar	Commercially launched	13 state-owned and 2 privately-owned channels	Commercially launched	Not operational
Saudi Arabia	Commercially launched	10 state-owned channels and 75 privately-owned channels	Commercially launched	Operational
Sudan	Service not available	17 state-owned channels and 1 mixed-ownership channel	Service not available	Not operational
Syria	Service not available	3 state-owned and 4 privately-owned channels	Service not available	Not operational
Tunisia	Commercially launched	3 state-owned and 1 privately-owned channel	Service not available	Operational
UAE	Commercially launched	19 state-owned, 48 privately-owned and 2 mixed-ownership channels	Commercially launched	Not operational
Yemen	Service not available	4 state-owned and 2 privately-owned channels	Service not available	Not operational

Note: *DTH Satellite service providers include the FTA (free-to-air) channels (not broadcasters or operators) by April 2011. FTA channels constitute the vast majority of channel viewership rate in the Arab region. Moreover, more than one FTA channel can be operated by one broadcaster/operator.
Source: Arab Advisors Group Analysis, satellite channels, operators

Open-source software

Open-source software usage and dissemination remains limited in the Arab region and the prevalence of software piracy and limited enforcement of copyright laws in most of the Arab countries remains an inhibitor to open-source software. Therefore, national regulatory authorities have started to promote open-source software and most of the governments in the region have launched open-source software initiatives.

As detailed in section II of this report, regional private-public sector initiatives in the open-source software front are limited. Thus, in order to create a platform for the promotion of open-source software, it is recommended that the Arab countries establish linkages between the private sector, multinational companies, international corporations and educational institutions. Moreover, in three countries, namely Mauritania, Libya and Yemen, open-source software has not yet been promoted by government agencies. In order to have the right environment for open-source software adoption it is important that governments are proactive in supporting the development and use of open-source software, as well as enforcing copyright laws.

Arabic digital content

As previously shown in the report, the most popular websites that Internet users in the region access are international websites, often in the English language. At the same time, local regulators are progressing in establishing Arabic domain names, which are written in Arabic letters. In May 2010, Egypt was the first Arab country to introduce Arabic domain names on the Internet.[258] As shown in the table below, all countries except for Iraq, Kuwait, Lebanon, Mauritania, Oman, Sudan and Yemen, have engaged in initiatives to launch Arabic domain names on the Internet.

The region is undergoing a boom in the supply of Arabic digital content in the form of online portals and applications, including for smart-phone users. To leverage on this opportunity, governments could provide major global and regional media players with incentives to increase the supply of regional and local high-quality content, including by enforcing copyright and anti-piracy laws. Moreover, to enhance the Arab region's digital content, there is a need for young and innovative entrepreneurship. It would therefore be advisable for governments to encourage and support young entrepreneurs by promoting industry clusters, and by offering tax exemptions to exports of digital content and services (such as animation, translation or video production).

[258] See http://www.ntra.gov.eg/english/News_NewsDetails.asp?PID=36&ID=164.

Table 143. Arabic domain names initiatives in the Arab region, 2011

Country	Official initiatives to launch Arabic domain names on the Internet (عربي.)	Notes
Algeria	Yes	In April 2011, the delegation of the .الجزائر top-level domain to CERIST was approved
Bahrain	Yes, but not yet available	In June 2010, TRA Bahrain led an initiative for the Arab League to apply for the .arab generic top-level domain names (in both the English and Arabic letters).
Egypt	Yes	In May 2010, Egypt launched the Arabic domain (.مصر)
Iraq	No	
Jordan	Yes	The IDN ccTLD .alordon (.الاردن) was delegated in the root in August 2010
Kuwait	No	
Lebanon	No	
Libya	Yes	Plans may be delayed due to political instability.
Mauritania	No	
Morocco	Yes	In December 2010, the ANRT made a request to ICANN for the delegation of "المغرب" as a top-level domain.
Oman	No	
Qatar	Yes	The Arabic domain .Qatar has been launched
Saudi Arabia	yes	Saudi Network Information Center is progressing to launch Arabic domain names in the country.
Sudan	No	
Syria	yes	The National Agency for Network Services (NANS) is progressing to launch Arabic domain names in the country.
Tunisia	Yes	Tunisia launched the domain name .Tunis (تونس)
UAE	yes	The Domain Administration (.aeDA), a TRA subsection, has launched Arabic domain names.
Yemen	No	

Source: Arab Advisors Group Analysis, national regulatory authorities

Cybersecurity

The majority of countries in the Arab region have engaged in cybersecurity initiatives. These include passing related laws and establishing CERTs (Computer Emergency Response Teams))/ CIRTs (Computer Incident Response Teams). Seven countries in the region – Egypt, Oman, Qatar, Saudi Arabia, Sudan, Tunisia, and the UAE – have established CERTs/CIRTs. The regulators of the remaining countries, except for Iraq, Libya and Mauritania, have a framework for cybersecurity, but have not yet established CERTs/CIRTS.

Both offline and online identity management strategies are imperative for increasing cybersecurity. Many countries in the region still suffer from a lack of identity management, which makes it more difficult to stop or reduce online crimes. In Egypt and other countries with low urbanization rates, end users do not have personal IDs nor are personal IDs requested for obtaining telecommunication services, especially in prepaid-dominated markets such as most mobile-cellular markets.

Finally, the issue of cybersecurity remains an inhibitor for the adoption of online services in the region. For example, research carried out by the Arab Advisors Group reveals that between 52 to 75 per cent of Internet users in Jordan, Egypt, UAE and Saudi Arabia do not consider e-commerce transactions to be safe.[259] This suggests that Internet users lack confidence in online security due to limited legislation and its effective implementation by local regulators.

Table 144. Cybersecurity initiatives in the Arab region, 2011

Country	Whether local regulators have a framework for cybersecurity	Whether local regulators have established CERTs/CIRTs
Algeria	Yes	No
Bahrain	Yes	No
Egypt	Yes	Yes
Iraq	No	No
Jordan	Yes	No
Kuwait	Yes	No
Lebanon	Yes	No
Libya	No	No
Mauritania	No	No
Morocco	Yes	No
Oman	Yes	Yes
Qatar	Yes	Yes
Saudi Arabia	Yes	Yes
Sudan	Yes	Yes
Syria	yes	No
Tunisia	Yes	Yes
UAE	Yes	Yes
Yemen	Yes	No

Source: Arab Advisors Group Analysis, National regulatory authorities

[259] Arab Advisors Group (2007b), Arab Advisors Group (2010g), Arab Advisors Group (2010h), Arab Advisors Group (2011r).

Annex 1. Technologies by operator in the Arab region, December 2010

Country	Operator	Fixed						Mobile					
								CDMA		GSM			
		PSTN	DSL	Fixed Wireless (CDMA)	WiMAX	FTTx	VSAT	CDMA 2000	EVDO	2G (GPRS, EDGE)	3G (UMTS, HSPA)	LTE	iDEN
Algeria	Algerie Telecom												
	Mobilis												
	Nedjma / Wataniya Telecom Algerie												
	Djezzy / Orascom Telecom Algerie												
	Djaweb												
	Algérie Télécom ATS												
	Divona Algérie (Monaco télécom)												
	Orascom Télécom Algérie - OTA												
	Satlinker												
	Anwar Net / MaxNet												
	Icosnet												
	Smart Link Com (SLC)												
	Webcom												
	Cetic												
Bahrain	Batelco												
	Viva												
	Zain												
	Mena Telecom												
	Nuetel												
Egypt	Etisalat Misr / EgyNet / Nile Online												
	Mobinil												
	Vodafone / Vodafone Data												
	Telecom Egypt												
	TE Data												
	Link dot Net												
	Noor Communications												
	Yalla												
	Egy Sat Telecom												
	African Waves												
	Mobiserve												
	Alkan												

Country	Operator	Fixed						Mobile					
								CDMA		GSM			
		PSTN	DSL	Fixed Wireless (CDMA)	WiMAX	FTTx	VSAT	CDMA 2000	EVDO	2G (GPRS, EDGE)	3G (UMTS, HSPA)	LTE	iDEN
Iraq	Zain												
	Asiacell												
	Korek												
	Itisaluna												
	Kalimat												
	ITPC												
	ITPC/Alnakheel												
	ITPC/Furatphone												
	Fanoos												
	Mobitel												
	Dijlanet												
Jordan	Orange / Jordan Telecom												
	Zain												
	Umniah / Batelco Jordan												
	Blink												
	Cyberia												
	JCS												
	Damamax / Neugroup												
	VTEL												
	Jordan Bell Telecom												
	Kulacom (MetroBeam)												
	LaSilkee												
	Mada Jordan												
	MEC												
	Next												
	Sama												
	Tarasol												
	TE Data												
	The Blue Zone												
	Wi-Tribe												
Kuwait	Ministry of Communications												
	Zain Kuwait												
	Wataniya												
	Viva												
	Zajil KEMS												
	Gulfnet												
	Fast Telco												
	Quality Net												

Country	Operator	Fixed						Mobile					
								CDMA		GSM			
		PSTN	DSL	Fixed Wireless (CDMA)	WiMAX	FTTx	VSAT	CDMA 2000	EVDO	2G (GPRS, EDGE)	3G (UMTS, HSPA)	LTE	iDEN
Lebanon	Ogero												
	Alfa												
	MTC Touch												
	Cyberia												
	IDM												
	NewCom Fibrelink												
	Sodetel												
	GlobalCom Data Services (GDS)												
	Cable One												
	Cedarcom												
	Solidere												
	Trisat												
	LCNC												
	Waves												
Libya	GPTC												
	Libyana												
	LTT												
	Al madar al jaded												
Mauritania	Mauritel												
	Chinguitel												
	Mattel												
Morocco	Maroc Telecom												
	Meditel												
	Wana												
Oman	Nawras												
	Omantel												
	MVNOs												
Qatar	Qtel												
	Vodafone Qatar												
Saudi Arabia	STC												
	Mobily												
	Zain KSA												
	Bravo												
	Atheeb												
	Alharbi Telecom												
Sudan	Zain												
	Sudatel												
	MTN												
	Canar												
Syria	Syriatel												
	MTN -Syria												
	Syrian Telecom												
	Best Italia												

Country	Operator	Fixed						Mobile					
								CDMA		GSM			
		PSTN	DSL	Fixed Wireless (CDMA)	WiMAX	FTTx	VSAT	CDMA 2000	EVDO	2G (GPRS, EDGE)	3G (UMTS, HSPA)	LTE	iDEN
Tunisia	Tunisie Telecom												
	Tunisiana												
	Orange Tunisie												
	Global Net												
	HexaByte												
	Topnet												
	Tunet												
UAE	Du												
	Etisalat												
Yemen	PTC												
	Yemen Mobile												
	MTN Yemen												
	Sabafon												
	Y Telecom												
	Y Net (TeleYemen)												
	YemenNet												

Source: Operators, Arab Advisors Group Analysis

List of references

Arab Advisors Group (2007a), 'Algeria Communications Projections 2007', December 2007.

Arab Advisors Group (2007b), 'UAE Internet users and e-commerce survey 2007', September 2007

Arab Advisors Group (2009) 'Jordan Telecom Market Landscape', October 2009.

Arab Advisors Group (2010a), 'Mobile TV in Egypt: Mobinil and Etisalat Misr offer the service while Vodafone has not re-launched it yet', July 2010.

Arab Advisors Group (2010b), 'Jordan's loses its 4th cellular operator: Xpress Telecommunications winds down its cellular services in Jordan', October 2010.

Arab Advisors Group (2010c), 'Libya Telecom Market Landscape', June 2010.

Arab Advisors Group (2010d), 'Libya's LTT's WiMAX project is well underway, yet Libya's planned IPO of its telecommunications companies is delayed', December 2010.

Arab Advisors Group (2010e), 'Saudi Telecom launches the first IPTV service in Saudi Arabia', August 2010.

Arab Advisors Group (2010f), 'Yemen Telecom Market Report 2010', August 2010.

Arab Advisors Group (2010g), 'Jordan Internet users and e-commerce survey 2010', September 2010.

Arab Advisors Group (2010h), 'Egypt Internet users and e-commerce survey 2010', April 2010.

Arab Advisors Group (2011a), 'Satellite TV in the Arab World 2011', June 2011.

Arab Advisors Group (2011b), 'Batelco's fixed lines decline during 2010, while broadband lines register slight growth', March 2011.

Arab Advisors Group (2011c), 'LTE & 3G/3.5G Cellular Services in the Arab World', December 2011.

Arab Advisors Group (2011d), 'An Overview on the Public Payphones and Fixed services status in Iraq', March 2011.

Arab Advisors Group (2011e), 'Iraq's national cellular operators' lines grew by 2.5% in H1 2011', October 2011.

Arab Advisors Group (2011f), 'An Overview on the Internet status in Iraq', March 2011.

Arab Advisors Group (2011g), 'Electronic Government Initiatives in the Arab World 2011', January 2011.

Arab Advisors Group (2011h), 'Kuwait Telecom Market Landscape', August 2011.

Arab Advisors Group (2011i), 'Lebanon's cellular market grew by 7.8% in the first half of 2011', October 2011.

Arab Advisors Group (2011j), 'Information and Communications Technology in the Middle East Situation as of 2010 Annex', February 2011.

Arab Advisors Group (2011k), 'Morocco Telecom Market Landscape 2011', August 2011.

Arab Advisors Group (2011l), 'Oman's cellular market continued its growth in 2010', March 2011.

Arab Advisors Group (2011m), 'Qatar Telecom Market Landscape 2011', May 2011.

Arab Advisors Group (2011n), 'Qatar's triple play boom: Market grew by 52.12% during the first three quarters of 2011',December 2011.

Arab Advisors Group (2011o), 'Two operators submitted their bids for the third cellular license in Syria, whose cellular lines grew by 13% during 2010', April 2011.

Arab Advisors Group (2011p), 'Tunisia's ADSL market grew by 2.4% while fixed lines declined by 12% in Q1 2011', June 2011.

Arab Advisors Group (2011q), 'An update on the Mobile TV offerings in the UAE by mid October', October 2011.

Arab Advisors Group (2011r), 'Saudi Arabia Internet Users and e-commerce Survey 2011', January 2011.

Arab Advisors Group (2012), 'FM Radio in the Arab World 2012', January 2012.

Arab Republic of Egypt Ministry of Communications and Information Technology/National Telecommunication Regulatory Authority (2011), 'eMisr. National Broadband Plan: A Framework for Broadband Development, Phase 1'. Available at: http://www.tra.gov.eg/emisr/Presentations/Plan_En.pdf.

ITU (2011a), 'Measuring the Information Society 2011', ITU, Geneva.

ITU (2011b), 'Handbook for the Collection of Administrative Data on Telecommunications/ICT', ITU, Geneva.

Kingdom of Bahrain/ Telecommunications Regulatory Authority (2010), 'State of the Nation Review of Internet Safety'. Available at: http://www.tra.org.bh/en/pdf/SafeSurf_TRA_Report.pdf.

Kingdom of Morocco/ Ministry of Industry, Trade and New Technologies (2009). 'Digital Morocco 2013. The National Strategy for Information Society and Digital Economy'. Available at: http://www.egov.ma/SiteCollectionDocuments/Morocco%20Digital.pdf.

Ministry of Planning and International Cooperation Jordan (2011), 'Executive Development Program 2011-2013'. Available at: http://www.mhplants.gov.jo/uploads/22011.pdf.

Ministry of Information and Communications Technology (2011a), 'Response of the Hashemite Kingdom of Jordan in the Implementation of the Recommendation Concerning the Promotion and Use of Multilingualism and Universal Access to Cyberspace', January 2011. Available at: http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CI/CI/pdf/2nd_report_jordan.pdf.

Ministry of Information and Communications Technology (2011b), 'National Information Assurance and Cyber Security Strategy (NIACSS) Draft Copy'. Available at: www.moict.gov.jo/pdf_files/NIACSS%20Draft%20-%20Public%20Consultation.pdf.

Orange Jordan (2010), 'Annual Report'. Available at: http://jordantelecomgroup.jo/jtg/group/annual-report-2010-En-Final.pdf.

Republic of Lebanon/ Telecommunications Regulatory Authority (2008), 'Digital Migration Strategy for TV Broadcasting', November 2008. Available at: http://www.tra.gov.lb/Library/Files/Uploaded%20files/Broadcasting_Migration_Plan.pdf.

Telecom Egypt (2008), 'Telecom Egypt to Liquidate Investment in Algeria', November 2008. Available at: http://ir.telecomegypt.com.eg/press%20releases/press%20releases/Telecom%20Egypt%20to%20Liquidate%20Investment%20in%20Algeria%20-Nov08.pdf.

International Telecommunication Union
Place des Nations
CH-1211 Geneva 20
Switzerland
Telephone: +41 22 730 6039
Fax: +41 22 730 5933 / 730 5939
E-mail: pressinfo@itu.int
www.itu.int

Printed in Switzerland
Geneva, 2012