BROADBAND STRATEGIES TOOLKIT

BROADBAND IN MOROCCO

POLITICAL WILL MEETS SOCIO-ECONOMIC REALITY

World Bank

IFC International Finance Corporation
World Bank Group

infoDev
www.infoDev.org

BROADBAND IN MOROCCO

POLITICAL WILL MEETS SOCIO-ECONOMIC REALITY

AN *info*DEV PUBLICATION PREPARED BY:
Samantha Constant
2011

infoDev
Information for Development Program

1818 H Street NW
Washington DC 20433
Telephone: 202-473-1000
Internet: www.worldbank.org
E-mail: *feedback@worldbank.org*

Cover design by *info*Dev

To cite this publication:
Samantha Muwafaq Constant , 2011. Broadband in Morocco: Political will meets socio-economic reality. Washington, D.C: infoDev / World Bank. Available at http://www.broadband-toolkit.org/.

Table of Contents

List of Figures

List of Tables

List of Boxes

Acknowledgements

Samantha Muwafaq Constant of Wolfensohn Family Foundation drafted this report with significant contributions by Abdesselam El Omari of Softkey Solutions and Michael Minges, who directed the case studies for the Broadband Strategies Toolkit. The author wishes to acknowledge the support of Bachir Badaym and Samia Melhem of the World Bank, Samira Khallouk of ANRT, Said Boulisfane of WORMITEC, and Khalid Hannafi of Shabakkat as well as thank all the local counterparts who participated during interviews in Morocco. The supervision of Tim Kelly (infoDev) and Carlo Rossotto (TWICT), for their direction on the overall project, is also acknowledged, as is Samhir Vasdev for editing and preparing the document for publication.

The Handbook and its case studies are generously funded by the Korean Trust Fund (KTF) on Information and Communications for Development (IC4D). The KTF is a partnership between the government of the Republic of Korea and the World Bank Group whose purpose is to advance the ICT4D agenda to contribute to growth and reduce poverty in developing countries. The KTF, as well as Philippe Dongier, Sector Manager (TWICT) and Valerie D'Costa, Program Manager (infoDev), are owed the author's gratitude for their support and guidance on this project.

Acronyms

2G	Second Generation mobile telecommunications system
3G	Third Generation mobile telecommunications system
ADSL	Asymmetric Digital Subscriber Line
ANRT	*Agence National de Réglementation des Télécommunication* (National Telecommunications Regulatory Agency)
GB	Gigabyte
Gbit/s	Gigabit per Second
GDP	Gross Domestic Product
GHz	Gigahertz
GNI	Gross National Income
GPRS	General Pack Radio Service
HCP	*Haut-Commissariat au Plan* (High Commission for Planning)
HSDPA	High Speed Downlink Packet Access
ICT	Information and Communications Technology
IP	Internet Protocol
IPTV	Internet Protocol Television
ISP	Internet Service Provider
ITU	International Telecommunications Union
kbit/s	Kilobits per second
MAD	Moroccan Dirham. Conversions to United States dollars have been carried out on the basis of US$1 = MAD 7.83, the rate of 1 September 2011
MENA	Middle East and North Africa
Mbit/s	Megabit per Second
MHz	Megahertz
NGN	Next Generation Technologies
ONCF	*Office National des Chemins de Fer* (National Office of Railroads)
ONE	*Office National de l'Electricité* (National Office of Electricity)
POP	Point of Presence
PSTN	Public Switched Telephone Network
SEPTI	*Secrétariat d'Etat aux Postes et Technologies de l'Information* (State Secretariat for Posts and Information Technology)
SMEs	Small and Medium Enterprises
SMS	Short Message Service
SMW3	South-East Asia - Middle East - Western Europe 3
US$	United States Dollar
USF	Universal Service Fund
VAT	Value Added Tax
VoIP	Voice of Internet Protocol
VSAT	Very Small Aperture Terminals (satellite)
WCDMA	Wideband Code Division Multiple Access
Wi-Fi	Wireless Fidelity
WiMAX	Worldwide Interoperability for Microwave Access

Executive Summary

This report presents the broadband landscape in Morocco and the approach by which the country has advanced its ICT sector over the past fifteen years. Despite being constrained by human development challenges and regional political uncertainty in today's "Arab Spring," Morocco has emerged as a trailblazer in certain areas with particularly impressive mobile broadband results.

This would not have been possible without early visioning. Morocco was one of the first countries in the Middle East and North Africa region that institutionalized a regulatory environment for promoting competition in the telecom sector and as such made great strides in leveling the playing field for private operators to enter and succeed in the market. As early as 1999, a national strategy was developed to lay out the country's ICT vision which later became the foundation for subsequent plans such as *e-Morocco* and now *Digital Morocco*. By 2006, both the fixed and mobile markets had become competitive with the award of operator licenses focused on quality rather than price.

As a result, Morocco's broadband share of total Internet subscribers was over 99 percent by 2008, exceeding that of its neighboring Arab states. Today, the country boasts a quarter of households equipped with broadband, significantly higher than two percent in 2004. Almost half the country uses the Internet, demonstrating public demand in virtual networking and communicating via the World Wide Web.

Overall, the report finds that three factors contributed to Morocco's success:

- Prioritizing ICT at an early stage so that subsequent planning could build on previous experiences;
- A youthful and eager population first getting online at the widespread cyber cafes and later wireless broadband; and
- Expanding private competition and opting for an emphasis on technical requirements, innovation, quality, and access.

The mobile industry is a big spotlight in Morocco's broadband achievements. The introduction of third generation wireless technology in 2007 led to substantive growth of overall Internet subscriptions. This however has come at the cost of investment in fixed infrastructure. There is a need to boost fiber deployment in both local access and backbone networks. Understandably, such civil works require financing that will only happen if the private sector is confident it will see a return in its investments.

In order for Morocco to meet its ICT vision, the following three areas merit attention:

- Incentives that encourage a well-balanced, broadband infrastructure and greater investments in both fiber backhaul and local access networks;
- The prioritization of broadband in universal access policies including concrete efforts for dealing with affordability and awareness issues; and
- Programs to develop digital literacy among the older and rural population in addition to those that can effectively cultivate a next generation of e-content and software producers and developers.

Going beyond its initial broadband success and making broadband sustainable and transformational will be a challenge for Morocco. Deeping broadband access must find a way to deal with the social and economic reality of a lower-middle-income country. This will require fresh and innovative solutions including more emphasis on bottom-up initiatives.

1 Socio-economic overview

The Kingdom of Morocco is a lower-middle-income economy situated in the northwest of Africa with a large coast bordering both the Atlantic Ocean to the west and the Mediterranean Sea to the north.

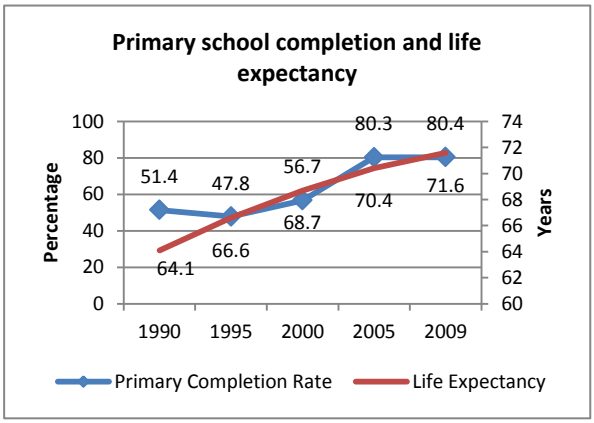
The population of Morocco was estimated at 31.9 million in 2010 distributed over 16 districts, with 57 percent living in urban areas.[i] Rabat is the capital and lies 88 kilometers north of Casablanca, the country's financial center and largest city of three million inhabitants. Moroccans are a fused society of Arabs and Berbers. Arabic and very recently (since July 3rd 2011) Tamazight and Hassani are the official languages with French operating as language of government and business. The local dialect of *Darija* is a mix of Berber, Arabic and French.

Over the past two decades, the country has demonstrated progress in human development and economic indicators. It achieved a primary school completion rate of 80 percent in 2009 up from 51 percent in 1990 (Figure 1-1, left). Life expectancy increased from 64 years in 1990 to 72 in 2009.

In 2009, Morocco's GDP annual growth rate was 4.9 percent and GNI per person doubled between 2003 and 2010 reaching US$ 2,950 (Figure 1-1, right). Economic diversification as well as climate vulnerabilities resulting in frequent droughts have contributed to a gradual increase of non-agricultural activities, led by the services sector constituting 55 percent of GDP in 2009. Despite this progress, the country continues to be vulnerable to economic shocks, high unemployment and low literacy rates, as well as increasing pressure on natural resources.

While Morocco weathered the economic crisis relatively well, pre-crisis challenges persist. Primary enrollment has improved, but secondary enrollment stood at 56 percent in 2009, and the literacy rate is still low at 58 percent. Young people continue to suffer from lack of economic opportunities and gainful employment. Youth unemployment (ages 15-24) was 18% in 2009 with almost one third of urban youth without a job. Additionally, while the agriculture sector is shrinking, it employs 41 percent of the nationally active population, demonstrating a mismatch of available skills and labor market demand. Finally, these figures do not take into consideration the number of people who are underemployed or working for the informal sector, where security and social safety nets are not available.

Historic changes are taking place in Morocco and the wider Middle East and North Africa region.[ii] Yet, the country has emerged relatively stable from the "Arab Spring" compared to the dramatic events that have transformed the political landscapes of neighboring Egypt, Libya, and Tunisia. The government has responded to the call for reforms with a new constitution that proposes drastic changes to diffuse the power of the King and give greater legislative power to the parliament. With elections due on November 24th 2011, outcomes are yet to be seen but expectations from citizens remain high. Similar to their fellow Arab neighbors, Moroccans are becoming increasingly more demanding of their government to develop effective policies that translate into concrete accomplishments.



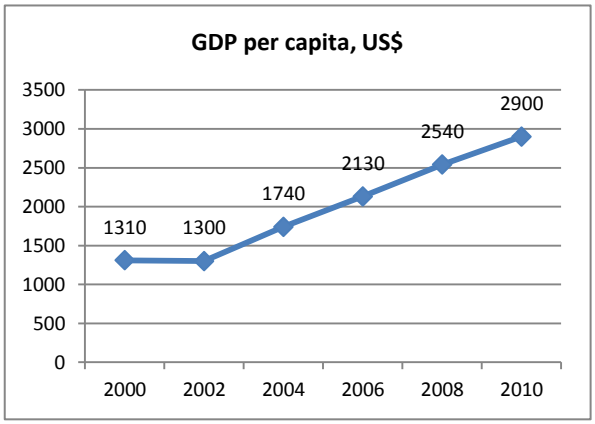


Figure 1-1: Morocco, Socio-economic indicators

2 Regulatory and institutional framework of the ICT sector

2.1 Background

Morocco experienced important reforms in its ICT sector starting in 1995, when access to the World Wide Web became available to the public. At the time, telecom and postal operations along with the administering of Internet access was carried out through the state-owned institution *Office National des Postes et Télécommunications* (*ONPT*).

During the period 1995-2000, the Moroccan government instituted a series of reform efforts that continued to build and evolve into the millennium, leading up to the present-day national ICT plan *Maroc Numeric* 2013 (Digital Morocco). At the time however, the most significant measure was the passing of Law 24-96 in 1997.[iii] This law led to the separation of ONPT into three entities: i) the creation of a new regulating authority *Agence Nationale de Réglementation des Télécommunications* (ANRT); ii) the formation of Maroc Telecom (*Itisaalat al Magreb*) as a limited liability company; and iii) the restoration of Poste Maroc (*Bareed al Maghreb*) which retained its national state-owned identity dedicated solely for postal and some financial services.

In addition, a secondary level of efforts was carried out in 1997-1998. The Ministry of Industry and Trade created an independent group to hold a seminar on the role of teleservices in June of 1997, which then later emerged into a formal body in 1998 as the *Secrétariat d'Etat aux Postes et Technologies de l'Information* (SEPTI), responsible for developing strategies specific to the ICT sector. In parallel, the Committee for Information Technologies Monitoring (CITM), a public private partnership, was formed in 1999 to support SEPTI and the result was a report analyzing the sector and strategies for moving forward. Building on this analysis, Morocco produced a five-year visioning document (1999-2003) outlining the potential of ICT and this became the basis for future strategy making across the sector at that time.[iv] Since then, three additional plans have been developed, *e-Morocco 2004,* updated in 2010, and *Digital Morocco*.

Hence with this early planning, Morocco was one of the first in the MENA region to put in place and enforce a competitive timeline for liberalization of its telecom sector. It was ahead of its neighbors in establishing an independent regulating authority and a partially privatized telecommunications operator (by 1998) and also ahead in instituting competitive markets in both the fixed and mobile industry as well as the launch of third generation (3G) mobile services.

All of this translated into concrete results. As early as 2008, Morocco's broadband share of total Internet subscribers was over 99 percent, exceeding that of neighboring Arab states (Figure 2-1). Today, Internet usage is estimated at 49 percent of the population, higher than Tunisia, Jordan and Saudi Arabia.[v] Overall, the role of the government has been central in gaining successes and between 2008-2010 the country moved up 10 positions in the International Telecommunication Union (ITU) ICT Development Index (IDI).[vi]

At the same time, the government has faced challenges. Impact on the ground has been mixed, with questions about the effectiveness of the sector's governance. In the most recent study carried out by the World Economic Forum and INSEAD benchmarking countries for national readiness in adaptation of ICT, Morocco ranks 83, down thirteen positions from 2006-2007 and trailing Egypt, Jordan, and Tunisia.[vii] When it comes to the perception of laws related to ICT, institutional effectiveness, and government ICT prioritization, Morocco falls behind the world mean and trails peer countries despite its advanced policy positioning (Figure 2-2). This suggests that not only is there is a divergence between government ICT strategies and the opinion of business leaders in the country but that other peer governments are just as absorbed as Morocco in actively promoting ICT.

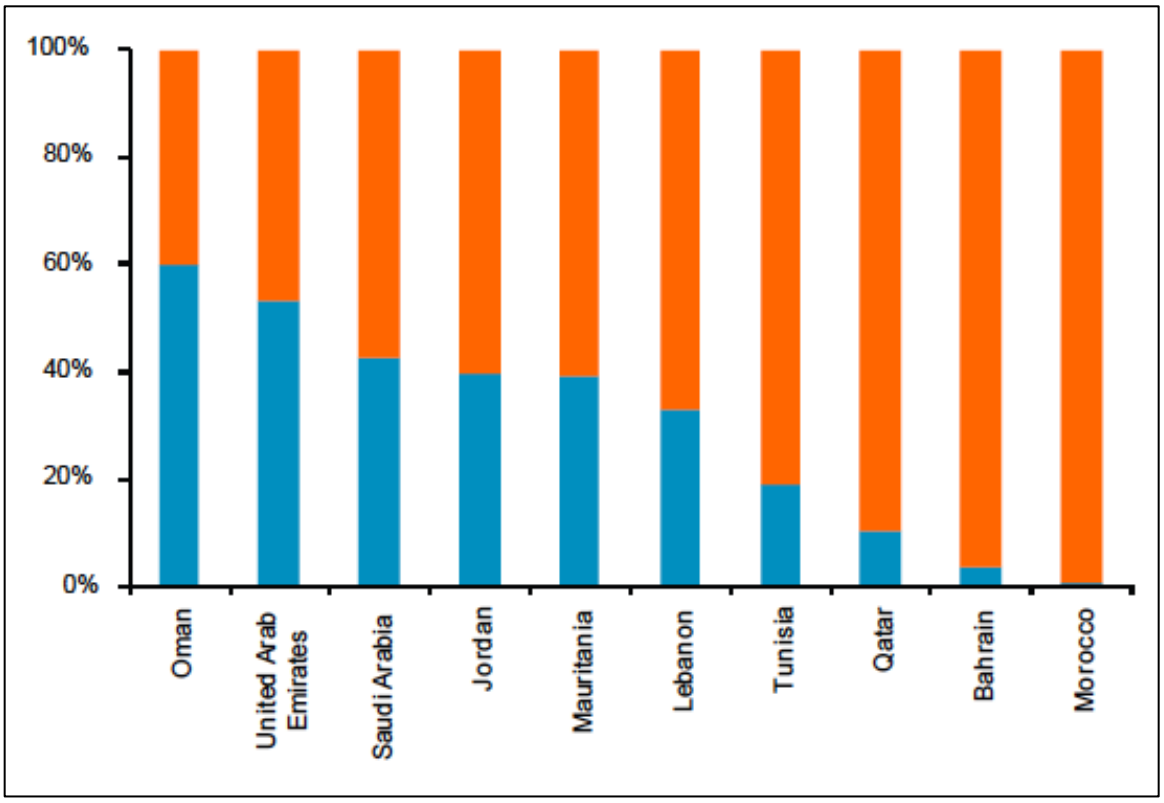


Figure 2-1: Dial-up and broadband shares of total Internet subscribers in the Arab states, 2008 (*Source:* ITU 2009, Information Society Statistical Profiles 2009: Arab States)

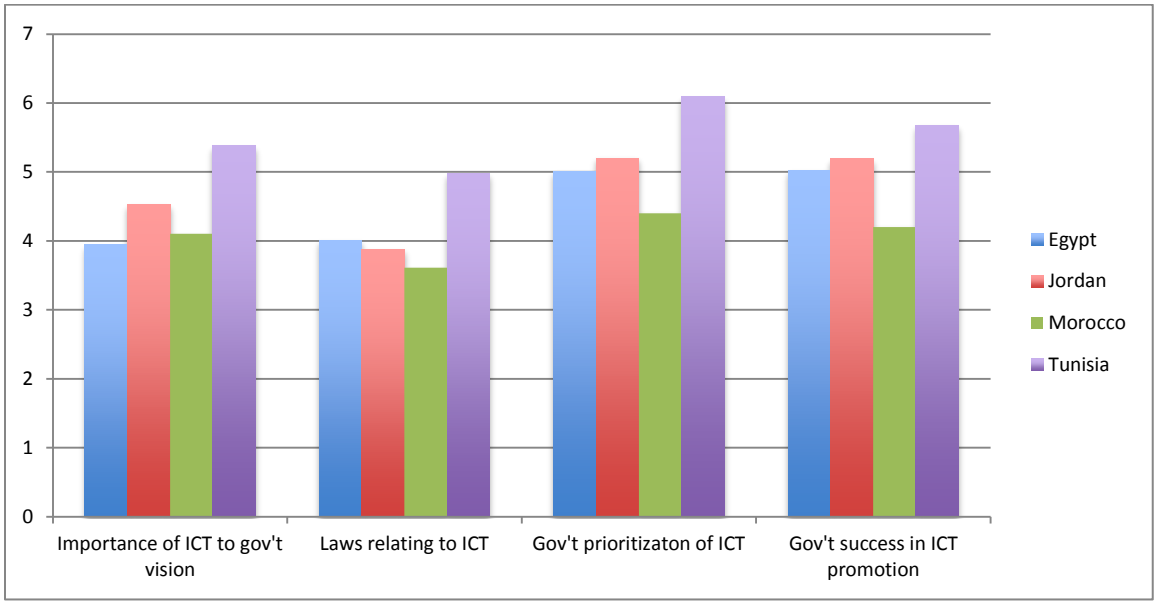


Figure 2-2: Morocco's score in ICT sector governance performance, 2010-2011. *Note*: Out of a 1-7 (best) scale. This indicator is derived from the World Economic Forum's Executive Opinion Survey. (*Source:* INSEAD and WEF. *The Global Information Technology Report 2010-2011)*

A possible factor for Morocco's relatively low sector governance perception could be attributed to the high turnover in the ministries responsible for ICT policy (Table 2-1). Since September 2007, ICT policies and planning in Morocco have been designed and carried out by the *Ministry of Industry, Trade and New Technologies* while the *Ministry of Communications,* which had previously handled the ICT sector, is now responsible for governmental internal and external affairs, media relations, support in the development of communication sector and partnering on audiovisual efforts ratified by the office of the Prime Minister. While the Ministry of Communications is not in charge of ICT, it has an important role to play in advancing broadband and is an active partner in the governing structure of *Digital Morocco*.

Ministerial changes are common in many developing countries, and where these do create challenges in areas of governance they also create opportunities. Two complimentary tactics emerged in Morocco that helped the country continue its focus on ICT – the backing of the sector from the highest national level (the Prime Minister office, and His Majesty King Mohammed VI) and from municipal ICT strongholds (such as the example in Fez (see chapter 4). While this report primarily focuses on broadband access, the country has demonstrated considerable commitment to development of ICT in the business sector notably with the establishment of Casablanca Technopark and the expansion of offshore services such as call centers, both of which are creating employment, attracting private (foreign and domestic) investment, and driving demand for high quality, high speed Internet.

2.2 The regulator

The *Agence Nationale de Réglementation des Télécommunications* (ANRT) was established in1998 under Article 27, Law 29-06 as the national regulatory authority responsible for the drafting and enforcing of laws related to the telecom sector, including licensing, pricing, compliance, and fair competition. While it is entitled to financial autonomy and has its own legal status, ANRT presides in the office of the Prime Minister and is subject to state supervision. The agency consists of three main bodies:

i. *Conseil d'Administration*, chaired by the Prime Minister and consisting of government representatives along with five key ICT experts from the private and public sectors. It sets the strategy, fiscal envelop, and carries implementation oversight;
ii. *Comité de Gestion*, appointed by the *Conseil d'Administration* and on a five year rotation to consider all affairs decided upon by the council; and
iii. *Directeur Général* which houses four major operations of the ANRT – the department of Monitoring and

Year	Official body
June 1994-January 1995	Ministry of Postal Services and Telecommunications
February 1995– February 1998	Ministry of Postal Services and Telecommunications
	Ministry of Communications
March 1998 – August 2000	Ministry of Communications
	Prime Minister Office, Department of Post, New Technologies, and Communications (SEPTI)
September 2000 – September 2002	Ministry of Culture and Communications
	Prime Minister Office, Department of Postal Services, Media, and Communications Technologies
November 2002 – May 2004	Ministry of Trade, Industry, and Communications
June 2004 – August 2007	Ministry of Communications
September 2007-Present	Ministry of Trade, Industry and New Technologies

Table 2-1: ICT policy-making bodies from 1994-present

(*Source*: Adapted from the "History of Moroccan Government" section of the official Moroccan website (in Arabic) at http://www.maroc.ma)

Competition, Technical Department, the General Secretariat, and National Institute of Posts and Telecommunications.[viii]

Under Law 29-06, Articles 2-28 establish the regulatory framework by which ANRT is authorized to carry out its responsibilities including licensing of public telecommunications networks operating in the public domain or using radio frequency service, authorization of independent networks, assignment of radio frequency spectrum and approval of radio facilities and terminal equipment connected to public networks. It also enforces compliance measures to ensure conditions outlined in the Law are adhered to, including fees, validity period of the licensing, zoning in terms of coverage, leasing of lines, and technical requirements for licensing.

Since its establishment in 1998, ANRT has progressively increased its institutional capacity. It has pushed sector liberalization, enhanced the consultative process, increased transparency through online availability of sector laws and regulations and monitors ICT development through regular statistical reports and analysis. Early in 2010, ANRT released an orientation note covering its perspectives on the sector through 2013 in areas such as regulation and legislation, liberalization, development of broadband, and universal access.[ix] A select number of measures highlighted in the note include inter-network tariffication rules that favor small-scale operators, the ability for customers to change operators while maintaining the same number, and development of new models to incentivize wholesale traffic. Further, a study to allocate frequencies for 4G technologies by end of 2011 is under review along with new policy levers to support VSAT viability, including a plan to issue new licenses for VSAT and GMPCS networks. In addition to its domestic efforts, ANRT also pursues active cooperation with Arab and francophone regulators and according to a World Bank study, "ANRT's excellence is recognized on a regional scale."x

2.3 Policies and national strategies

In 1998, when liberalization efforts were underway with the splitting up of the ONPT, the government instituted a ministerial level body to design strategies that would help advance Morocco's ICT position. The formation of *Secretariat d' Etat aux Postes et Technologies de l'Information* (SEPTI) was not significant in of itself as its principal role was to design a strategy before it was then rebranded as a new department after two years of existence. SEPTI's importance lay in the fact that it set the stage for strategic national planning, with both international and domestic ICT visioning. On the international front, its 1999-2005 strategy focused on building a knowledge-based economy and developing human resources to compete with an increasingly globalized world; on the domestic level, the strategy highlighted the need for the government to be a model for the rest of the country in terms of new technology usage and delivering of services.

It was not until 2004, with the passing of Law 55-01, incorporating addendums to Law 24-96 that guidelines were introduced to further open the market, expand competition and enhance universal access.[xi] The major reform measures related to Law 55-01 include:

- Strengthening the role of ANRT in terms of compliance, monitoring and enforcement of fair competition. This includes managing the numbering system, regulating prices and imposing reporting requirements on operators.
- Expansion of the definition of universal service to include value added services such as the Internet. A key goal is to ensure that all areas especially rural and low-density regions are covered. However, as it stands universal access can be done via 2G mobile networks at less than broadband speeds.
- The possibility for companies to lease their infrastructure to telecom enterprises and for operators to share infrastructure if requested. This is of particular significance considering the incumbent Maroc Telecom owns most of the fixed infrastructure.
- The creation of the Fund of Universal Telecoms Service (FUTS) and a reduction of contribution by telecom operators of two percent of revenues (net of taxes and interconnection payments).
- The establishment of a special fund for research and development. The fund depends on contributions from licensed

operators of 0.25% of net turnover (excluding interconnection charges).

The multiple policy efforts that were underway early on were a positive sign of government commitment. However they proved a challenge given that duplication and divergence of activities became inevitable.[xii] For example, as discussed earlier, government turnover was frequent (the ministerial bodies related to the sector alone changed seven times in a decade) hence not all policies designed were implemented. Further, some regulatory measures have created artificial constraints for the operators as well as the regulator such as a specific rather than generic licensing framework as in the case of some wireless services being restricted to limited mobility.

Nevertheless Morocco has come a long way in a little over a decade, from a government-owned monopoly to the creation of an independent regulator and a competitive market driven by three private operators (Figure 2-3). Further it is continually exploring new solutions. For example, this past year, ANRT commissioned two major studies, currently underway, to look into an effective approach to national planning of broadband[xiii] and accelerating growth of high speed Internet in new project developments.[xiv]

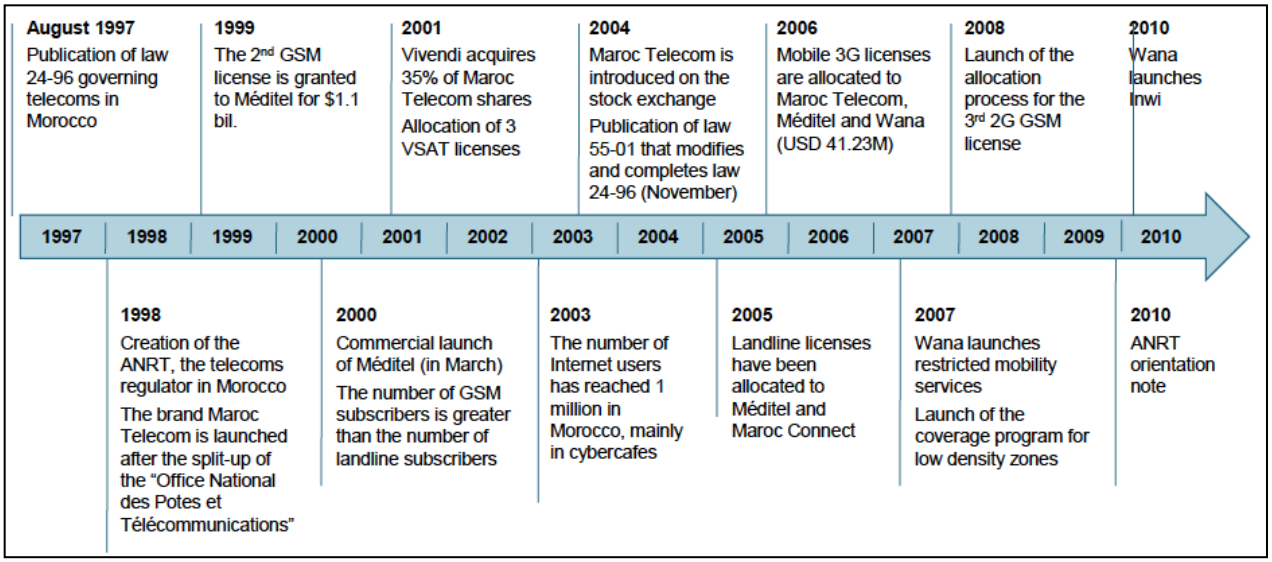


Figure 2-3: Main stages in the Moroccan telecom market, 1997-2010 (*Source*: Roland Berger, *Acceleration in deployment of High Speed in new planning zones in Morocco, 2011*)

2.4 From e-Morocco to Digital Morocco

The government's vision for the ICT sector has been guided by a series of holistic plans. The first *e-Morocco* strategy was launched in 2001, followed by a second updated version in 2005 laying out the vision until 2010. Drawn from the SEPTI strategy of 1999-2005, the themes of e-Morocco focused on closing the digital divide and positioning Morocco globally as a key ICT player. The premise was to create an ecosystem of good governance and enabling regulation that fosters competition, knowledge production and ICT exportation.[xv] Major programs such e-governance, e-commerce services, social and health care provision to citizens, NGO/youth portals, community access centers and equipping schools with computers among many others were introduced early in the e-Morocco planning and either continue to date, were merged with other programs, or re-prioritized in future strategy making.

At the heart of Morocco's modern-day ICT vision is *Digital Morocco 2013: The National Strategy for Information and Digital Economy 2009-2013* (better known as *Maroc Numeric*) released by the Ministry of Industry, Trade, and New Technologies.[xvi] The strategy focuses on umbrella areas – the governance structure, the beneficiaries and program, and the budget allocation to fund proposed strategies and recommendations.

Digital Morocco stands out from earlier e-Morocco strategies primarily for two reasons. The first is its emphasis on broadband, which for the first time is not only explicitly articulated but is the first pillar in the strategy. The second is the country's demonstrated commitment -- endorsed by His Majesty King Mohammed VI -- to advance the sector and engage cross-sectoral governance bodies to support ANRT in its regulatory mandate and oversee implementation of planned activities.

Built on the principals of creating momentum, strategic prioritization, governance reform and smart resource distribution, and long-term action planning, *Digital Morocco* is designed around four strategic priorities:

1) Expanding citizen access to broadband with an emphasis on knowledge;
2) Focusing on e-government and public service provision that is user-oriented;
3) Promoting computerization across small and medium enterprises to increase productivity; and
4) Supporting local actors to develop IT markets and build greater potential for sector exports.

The importance of interacting economic gains with social needs supported by a multi-sectoral governance body and an enabling environment resonates in the strategy set forth by the Moroccan government. (Figure 2-4) demonstrates the conceptual visioning of these aforementioned components, and how the country sees the objectives fit in to meet its goal to place itself on the forefront of the ICT field.

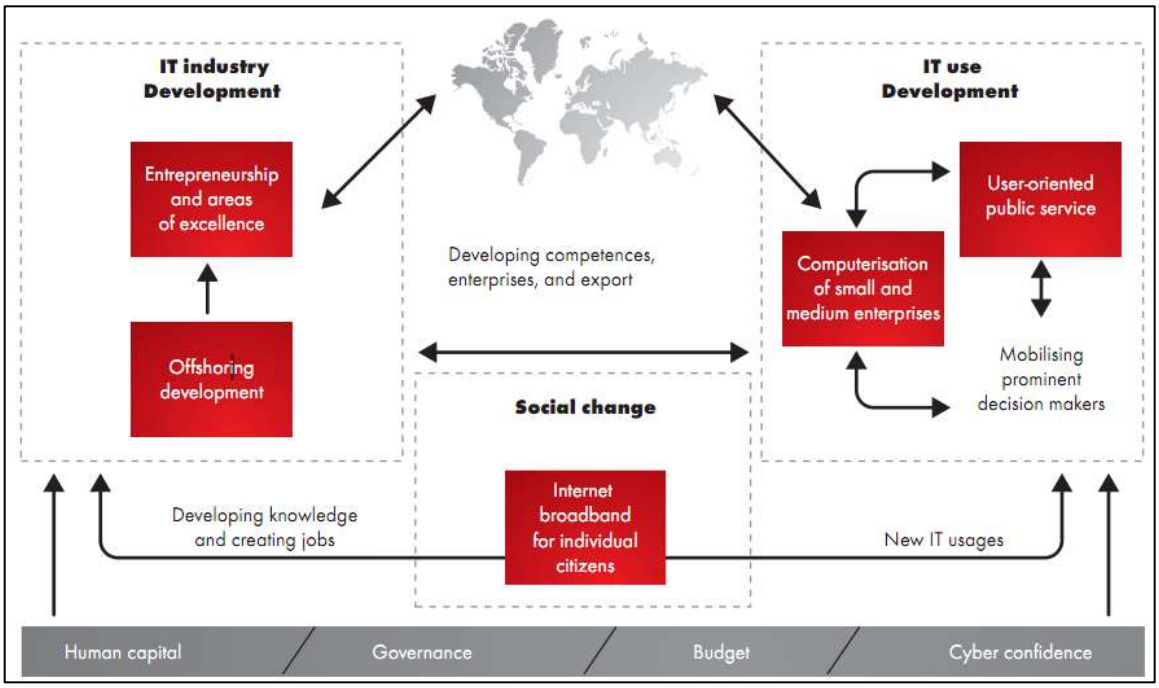


Figure 2-4: Digital Morocco vision for the advancement of ICT in Morocco

(*Source:* Digital Morocco 2013)

3 The broadband market

3.1 Background

Broadband became available to the Moroccan public via the introduction of ADSL in mid-2003, and users had options in obtaining high-speed Internet at speeds ranging from 128, 256, 512, or 1024 kbit/s. At the time, the broadband market consisted of ADSL and leased lines, which were sold to businesses and ISPs. Today, ADSL is available at downlink speeds of 2, 4, 8, and 20 Mbit/s.

The mobile market was built from the GSM standard later evolving to GPRS and EDGE and then 3G through Wideband CDMA (WCDMA) and High Speed Downlink Packet Access (HSDPA) with speeds ranging from 1.8 to 7.2 Mbit/s. Fixed wireless technologies such as WiMAX[xvii] and CDMA 2000 1X EV-DO were also introduced.

There are three major companies operating in the Moroccan telecommunications services sector market: Maroc Telecom, Méditel and INWI. As a result of Law 29-06, the incumbent *Maroc Telecom* was created as a limited liability company and partially privatized in 2001 when 35% was sold to the French company Vivendi.[xviii] Since then there was an additional sale to Vivendi and in 2007, part of Maroc Telecom was offered to the public through a listing on the Casablanca Stock Exchange. At the end of 2010, Vivendi owned 53% of the shares, the Kingdom of Morocco 30% and the public 14%. Maroc Telecom is also a strategic investor in West Africa with holdings in incumbent telecommunication operators in Burkina Faso, Gabon, Mali and Mauritania.

Maroc Telecom is the only company that owns the copper fixed line telephone network (local loop unbundling is available). It has a 49% share of the mobile market, a 57% share of the overall Internet market and a 45% of the 3G market. It offers ADSL, leased lines and fiber optic in the fixed broadband market and GSM and HSDPA in the mobile market. It also provides IPTV service.

	Total		Per 100 people	
	2010	June 2011	2010	June 2011
Population	31,851,000	32,187,000	—	—
Fixed telephone subscriptions	3,749,364	3,646,318	11.9	11.3
- of which fixed wireless	2,493,336	2,383,290	7.9	7.4
Mobile subscriptions	31,982,279	34,975,076	101.5	108.6
Total Internet subscriptions	1, 866,963	2,345,725	5.9	7.3
- of which ADSL	497,640	527,016	1.6	1.6
- of which 3G	1,366,472	1,816,792	4.3	5.6
-- of which data cards	...	1,281,616	...	4.0
Total broadband (ADSL + 3G)	1,864,112	2,343,808	5.8	7.3
			% of households 2010	
Households with Internet access			25	
Households with a PC			34	
Households with a mobile phone			84	
Households with a classic (wired) fixed line			13	
Households with a fixed wireless line			29	
Households with electricity			92 (2009)	
Households with a television			90 (2009)	
Households with a satellite dish			65 (2009)	

Table 3-1: Key ICT indicators

(*Source*: Adapted from ANRT, HCP, *Les Indicateurs sociaux du Maroc*, 2009)

Until the year 2000, Maroc Telecom was the sole operator providing telephony and Internet services in country with the exception of a limited number of small-scale ISPs.[xix] After being awarded the second GSM license in 1999, *Méditel* began to operate on March 2000 leading to a major evolution in Morocco's mobile history. Méditel original owners were Portugal Telecom, Telefónica (Spain) and local investors. Portugal Telecom and Telefónica sold their shares in 2009 and the following year France Telecom bought 40 percent.[xx] The two local shareholders are Caisse de Dépôt et de Gestion (CDG) and FinanceCom.[xxi] Méditel's offerings include corporate leased line and fiber access, GSM and HSDPA mobile and WiMAX. In June 2011, its mobile market share was 32% and its 3G market share stood at 24%.

Rebranded in early 2010, *INWI* is also referred to as Wana Corporate. Formerly a subsidiary of France Telecom, Wana Corporate became the third operator when it was awarded a landline license in 2005 under the name of Maroc Connect. It was awarded a 3G license in 2006 and later a GSM mobile license. In 2009, 31% of the company was opened to a joint venture between the Zain Group and Al Ajial Investment Fund Holding leading to a rebranding of Wana Corporate to INWI.[xxii] The company offers leased lines and fiber for corporate clients, ADSL (through local loop unbundling), CDMA 2000 1x fixed wireless, EV-DO broadband and GSM mobile. Its share of the fixed market (copper line and limited mobility wireless subscriptions) stood at 66% in June 2011 with its mobile market share at 19% and its share of the 3G market at 31%.

3.2 International connectivity

The country's geography with over 3,000 kilometers of coastline facing both the Atlantic Ocean and Mediterranean Sea ensures access to a number of international fiber optic submarine cable systems. Maroc Telecom obtains access to international bandwidth through two gateways in Casablanca and Rabat, and four submarine fiber optic cables: SMW3, Estepona-Tetouan, Eurafrica and more recently Atlas Offshore. In addition, Maroc Telecom is investing in a new fiber optic network to connect its operations in Mauritania, Burkina Faso, Gabon and Mali.[xxiii] Since 2003, Méditel has been using its own international gateway. INWI leases international bandwidth mainly through operators in Spain.

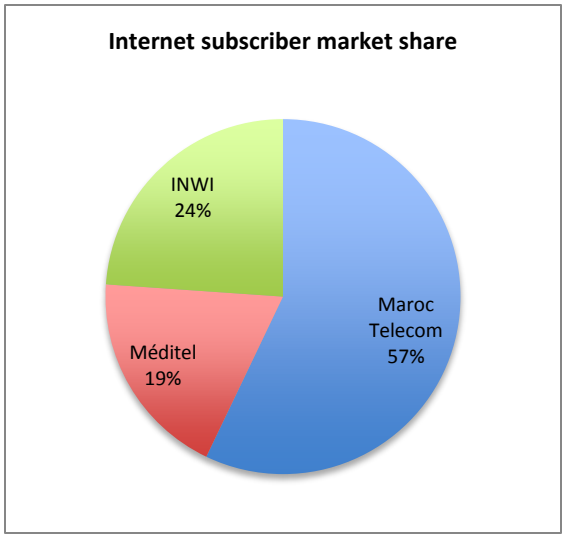


Figure 3-1: Internet market shares, June 2011 (*Source*: ANRT)

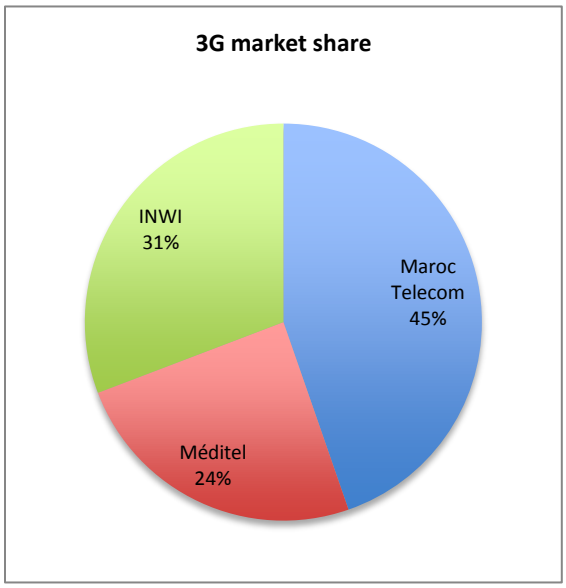


Figure 3-2: 3G market share, June 2011 2011 (*Source*: ANRT)

During 2002 – 2010 Morocco increased its international bandwidth capacity from 200 Mbit/s to 75,000 Mbit/s, with 25 percent increase in the last year alone. In 2010, there was 2,461 bits per person in Morocco, higher than Algeria and Egypt, similar to Jordan but significantly below Tunisia (Table 3-2).

Country	Gbit/s	Bits per second per person		
	2010	2008	2009	2010
Egypt	94	348	1,143	1,196
Jordan	15	833	1,899	2,581
Morocco	73	861	1,704	2,461
Algeria	35	98	601	1,164
Tunisia	50	1,170	2,830	5,096

Table 3-2: International Internet bandwidth (*Source*: ANRT and regional regulatory authorities)

3.3 In-country backbone infrastructure

As the incumbent, Maroc Telecom has the widest coverage of fiber in country with a 24,440-kilometer network.[xxiv] With the awarding of their fixed licenses in 2005, Méditel and INWI have the option to either build their own backbone or lease infrastructure from others. This includes utilities such as the *Office National d'Électricité* (ONE) with nationwide coverage of 4,000 kilometers of fiber and the *Office National de Chemin de Fer* (ONCF), the national railway operator, which has 1,100 km of fiber.[xxv]

There are also alternative wholesalers such as the Marais Group (via its subsidiary Finetis Maroc) having deployed 1,200 km of fiber in 2008 currently available for use.[xxvi] For example, INWI leases fiber from ONE and Marais. In 2006, Méditel established a long-term partnership with ONCF to construct fiber optics along the rail connecting major cities in Morocco and has installed around 2,500 kilometers of fiber backbone to support its mobile base stations and fixed wireless systems.

With concerns that the current infrastructure is limiting or controlled tightly by the incumbent, there are high-level discussions led by ANRT among various institutional actors regarding deployment of new cables. Since the cost of deploying new fiber cables is prohibitive, improving existing networks is always an option but reaching rural and remote areas still without coverage remains a problem. At the time of this report, ANRT is planning to carry out an operational study to assess the feasibility and cost of running 500 kilometers of fiber and then proposing to the three operators that they share 75 percent of the cost (25 percent each) with ANRT paying the remaining quarter and selecting one to manage the network. If agreement can only be reached with two operators, an alternative strategy would be a one third cost share.

3.4 Penetration of broadband

3.4.1 Wireline broadband

The fixed infrastructure in Morocco's delivery of broadband to the home is based on the copper network that was inherited by Maroc Telecom from ONPT. With the introduction of ADSL in 2003, there came new Internet billing options that made access more affordable than traditional dial-up, and hence led to an accelerated rate of take up. At the end of December 2003, four percent of Internet subscriptions were ADSL. This figure jumped to 61 percent by the end of 2004, and continued to grow until the introduction of mobile broadband. Narrowband access has decreased to a negligible amount accounting for less than 1,000 subscriptions by June 2011. Fiber to the premises is limited to mainly commercial use with home fiber access basically non-existent. Broadband via cable modem never developed in Morocco due to a preference for direct to home satellite for the delivery of multichannel television.

Leased lines accounted for 1,003 Internet subscriptions in June 2011 but have been dropping. Maroc Telecom started offering leasing lines in 1995 and at the time lines were copper. Today, leased lines are all fiber but in time entities that were leasing started switching to ADSL. Several reasons can explain the declining figures: i) The introduction of static IP addresses to ADSL subscribers in 2005 which until then were available only via leased lines, 2) around the clock service guarantee with ADSL subscriptions, inspiring greater confidence among customers, and 3) cost of leased lines are high compared to ADSL lines. However, government agencies and big banks continue to see value in renting fiber optic lines to run Wide Area Networks (WAN) as do other businesses who want to control their own servers directly.

By June 2011, there were 527,016 ADSL subscriptions in the country, almost all of which are provided by Maroc Telecom. The rate of

ADSL subscriptions grew rapidly following launch with penetration reaching 1.5 percent of the population by 2007 (Figure 3-3). Since then growth has been negligible due to the impact of the introduction of 3G. As demand for services that require greater bandwidth and speed increased, ADSL has experienced a slightly upward trend recently. This might continue if the environment and infrastructure is right. This is especially true with enterprises that require fixed technology to operate effectively. Nevertheless, the long-run potential for ADSL broadband will inevitably remain constrained due the limited number of wired telephone lines. Only two in five households have a "fixed" telephone line and this number is inflated since it includes fixed wireless subscriptions. Just 13% of households have a classic copper-based fixed line.

As of March of 2011, the majority of ADSL subscribers access at speeds between 1 and 4 Mbit/s, much faster than mid-2008 when most were well below 1 Mbit/s (Figure 3-4). One reason is the need for bandwidth is increasing as users become more interested in downloading photos, videos, etc. On the other hand, the incumbent has been increasing bandwidth while keeping the price stable. In July 2011 Maroc Telecom removed the 1 Mbit/s connection and today the entry-level bandwidth a subscriber receives is 2 Mbit/s.

The incumbent, Maroc Telecom had a monopoly over the fixed infrastructure network until landline licenses were allocated to Méditel (the second operator) and Maroc Connect (which later became Wana Coporate and now INWI) in 2005. However they choose not to invest in *wired* telephone lines. In order for the other operators to offer broadband using ADSL they have to purchase it through local loop unbundling which did not go into effect until 2007 (partial)/2008 (full), and is still very limited. When Méditel and Wana received their landline licenses, ANRT was keen to have them invest in fixed infrastructure; however, the financial burden was much higher than investing in wireless networks. The return on investment for deployment of large-scale, intensive civil works is not apparent, and continues to be a challenge today especially with the mobile market being so robust. For this reason, ANRT is exploring incentives for the operators to further invest in building fixed networks.

3.4.2 Broadband on the move

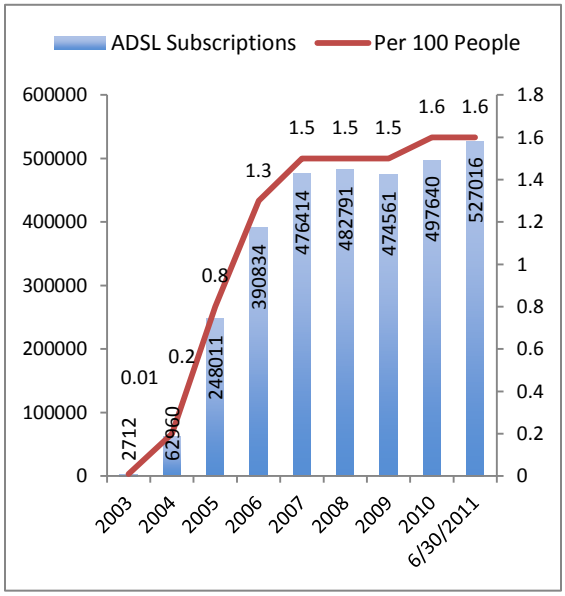


Figure 3-3: ADSL subscriptions (*Source*: Adapted from ANRT)

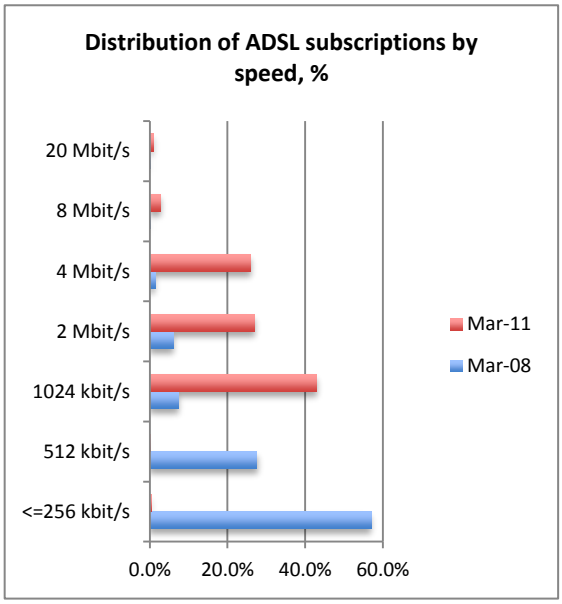


Figure 3-4: ADSL distribution by speed, March 2008 and 2011 (*Source*: Adapted from ANRT)

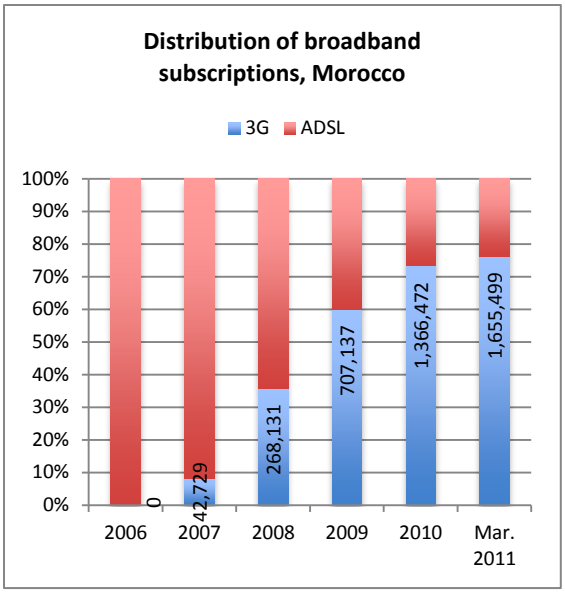


Figure 3-5: Distribution of broadband subscriptions, Morocco (*Source*: Adapted from ANRT)

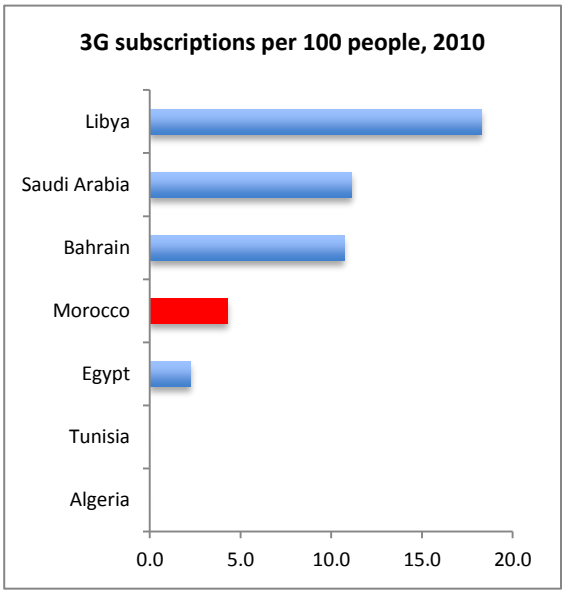
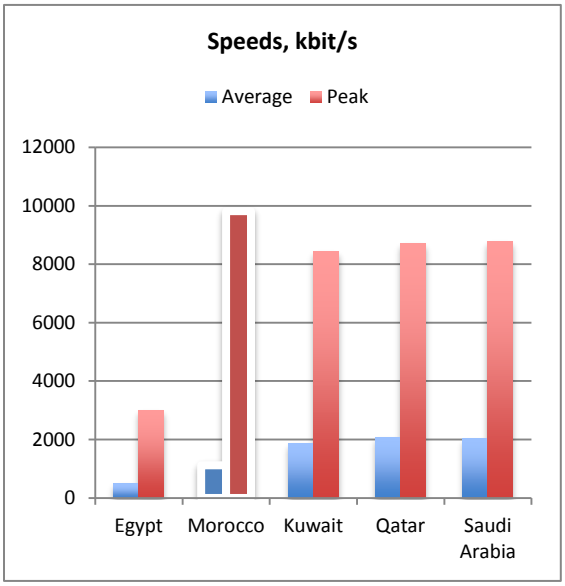


Figure 3-6: 3G subscriptions per 100 people, selected economies, 2010 (*Source*: Adapted from ANRT, GSM, TRA Bahrain, CITC Saudi Arabia)

Morocco was one of the first countries in the MENA region to award 3G frequencies in 2006. Unlike most other countries that awarded 3G spectrum through an auction, Morocco chose a beauty contest, resulting in lower costs for operators. Spectrum was awarded to a new operator, shaking up the existing duopoly and triggering intense competition in the mobile broadband market (Box 3-1). As a result, mobile broadband, which launched in 2007, surpassed fixed broadband connections by 2009 and made up almost three quarters of all broadband connections in 2010 (Figure 3-5).

The number of 3G subscriptions in Morocco stood at 4.3 per 100 people in December 2010. It is difficult to make comparisons to peers due to definitional issues and the lack of data. Among MENA countries for which data is available, wealthier upper income nations such as Bahrain, Libya and Saudi Arabia have a higher 3G penetration than Morocco (Figure 3-6). However,



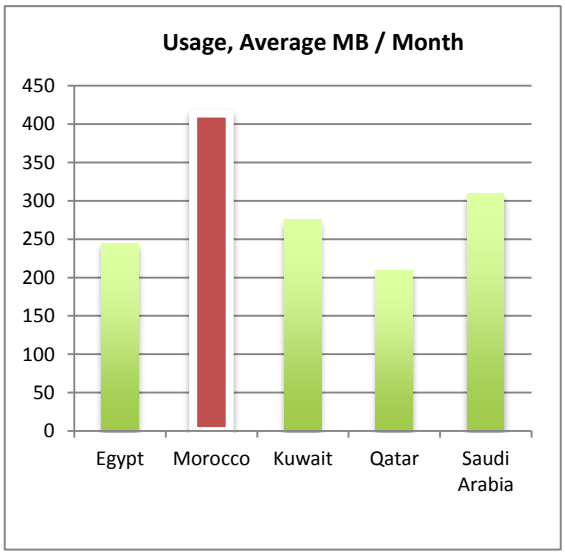


Figure 3-7: Speeds and usage of mobile broadband networks, Q1 2011 (*Source*: Akamai, *State of the Internet 1st Quarter, 2011 Report*)

except for Libya, Morocco had the highest 3G penetration among North African countries (by the end of 2010, Algeria and Tunisia had yet to commercialize mobile broadband according to the GSM Association).[xxvii]

It is revealing to compare the assessed speed and usage of mobile broadband networks in Morocco with peer countries. According to monitoring of mobile networks in five MENA countries carried out in the first quarter of 2011, users in Morocco consumed the most data on a monthly basis (414 MB) (Figure 3-7, right). This is a reflection of the operator's liberal mobile data consumption policies. Further though Morocco was not top-ranked for average speeds, it did rank first for peak speeds with bandwidth surging up to 9.8 Mbit/s (Figure 3-7, left). This is somewhat surprising given that the highest speed advertised by Moroccan mobile operators is 7.2 Mbit/s.

Currently two variations of 3G broadband technology are used in Morocco. Maroc Telecom and Méditel have deployed WCDMA with HSDPA extensions whereas INWI uses CDMA 2000 1x EV-DO technology. Méditel has a WiMAX network used to offer fixed wireless broadband services. According to ANRT's General Orientation Note for the sector, 4G LTE spectrum will be allocated prior to 2013.

Overall Internet subscriptions grew 300 percent in less than three years largely due to 3G. Growth might be even greater if 3G coverage was higher. Although 2G networks cover over 95% of the population, the rate for 3G is much lower (Table 3-3). For example, while Maroc Telecom covers practically the entire population with 2G the corresponding figure for 3G was 46.4% coverage in 2010. When mobile broadband users are outside the range of 3G, speeds drop to 2G technologies (GPRS/EDGE or CDMA 2000 1x).

Operator	2nd Generation Technology	3rd Generation Technology
MAROC TELECOM	6,336	3,099
MEDI TELECOM	3,500	1,000
WANA CORPORATE	1,939	1,635
TOTAL	**11,775**	**5,734**

Table 3-3: Number of mobile base stations, 2011 (*Source*: ANRT, July 2011)

3.5 Retail broadband prices

Moroccan retail prices for fixed broadband are competitive compared to other countries in the region. In a benchmarking survey covering 200 ADSL services across 18 Arab countries, Morocco had the lowest prices for low and medium speeds and the second cheapest for very high speed (after Saudi Arabia).[xxviii] Maroc Telecom's entry-level ADSL package provides the highest speed and lowest prices compared to other Arab countries (Table 3-4). Also, it is the only Arab operator outside the Gulf that offered high-speed options (i.e., > 15 Mbit/s).

In respect to 3G prices, there are both prepaid and postpaid options (Table 3-5). Ninety six percent of the population use pre-paid tariffs that tend to be structured around duration (one day, one week or one month). In respect to postpaid, pricing differences revolve around the download speed of the package. Maroc Telecom has a relatively liberal download limit (5 GB per month);

Band-width (Down-link)	Algeria	Egypt	Jordan	Morocco	Tunisia
Entry level > 256 kbit/s	31.76 (256 kbit/s)	27.26 (256 kbit/s)	59.51 (512 kbit/s)	23.53 (256 kbit/s)	38.24 (512 kbit/s)
4 Mbit/s	N/A	N/A	102.27	46.04	86.04
> 15 Mbit/s	N/A	N/A	N/A	136.07 (20 Mbit/s)	N/A

Table 3-4: Regional comparison of ADSL residential pricing, 2011, US$.
Note: Moroc Telecom quotes the following ADSL rates to its customers: 2, 4, 8, 20 Mbit/s at 99, 149, 199, 499 MAD (12.54, 18.87, 25.21, 63.21 US$) respectively.
(*Source:* Adapted from Teligen)

Pre-Paid			
Duration in days	**Maroc Telecom**	**Méditel**	**INWI**
1	MAD 10 ($1.27)	MAD 10 ($1.27)	MAD 20 ($2.53)
7	MAD 50 ($6.33)	MAD 50 ($6.33)	MAD 70 ($8.87)
30	MAD 200 ($25.33)	MAD 200 ($25.33)	MAD 180 ($22.80)
Monthly subscription (voice and data)			
Bandwidth	Maroc Telecom	Méditel	INWI
1.8	N/A	MAD 139 ($17.61)	N/A
3.6	MAD 99 (US$12.53)	MAD 245 ($31.03)	N/A
7.2	MAD 199 (US$25.21)	MAD 419 (53.01)	N/A

Table 3-5: Morocco 3G tariffs, September 2011 (*Source*: Adapted from operator websites)

if it is exceeded then the user's speed is reduced. Méditel offers unlimited data explaining its higher tariffs. INWI offers data-only postpaid packages with speeds up to 1 Mbit/s so its offering is not comparable to the other operators.

Comparing mobile broadband prices to peer countries is difficult due to different pricing structures, speeds and options. Furthermore, there is a difficulty with 3G speeds in that *actual* bandwidth can differ dramatically from *theoretical* speeds based on the user's device, coverage and network capacity. In terms of prepaid mobile broadband, Maroc Telecom offers an unlimited option with a validity of one month. However the speed is 0.512 kbit/s, lower than what peer operators in other countries advertise. On the other hand the peer operators have data caps after which speeds are reduced or users have to pay for additional downloads. Although the Maroc Telecom prepaid price is the most expensive compared to peers, on a data download basis it could be considered the cheapest since it offers unlimited usage with no penalty (Table 3-6). For monthly mobile broadband using USB connections to link a laptop, Maroc Telecom

	Tunisia (Orange)	**Maroc Telecom**	**Egypt (Mobinil)**	**Jordan (Orange)**
Prepaid (one month validity)				
Price	$22.01	$25.53	$10.12	$9.90
GB included	5	unlimited	0.5	1
Theoretical speed (Mbit/s)	7.2	0.5	7.2	10.5
Price per GB	$4.40	N/A	$20.24	$9.90
Price per Mbit/s	$3.06	$51.06	$1.41	$0.94
US$				
Price	$22.01	$12.64	$8.43	$14.03
GB included	7.5	5	1.5	2.5
Theoretical speed (Mbit/s)	7.2	3.6	7.2	21.1
Price/GB	$2.93	$2.53	$5.62	$5.61
Price/Mbit/s	$3.06	$3.51	$1.17	$0.66

Table 3-6: Mobile broadband prices, September 2011, US$ (Source: Adapted from Maroc Telecom, Orange Jordan and Tunisia, Mobinil)

offers the second cheapest tariff compared to peers and the cheapest on a price per GB basis. However like the prepaid option, Maroc Telecom's prices are the highest on a price per theoretical speed basis.

In respect to prices for bundling of broadband services, both Maroc Telecom and Méditel offer triple play packages. Maroc Telecom provides a package of television (IPTV), broadband (ADSL) and telephony (PSTN and VoIP) (Table 3-7). By December 31, 2010, Maroc Telecom recorded 40,000 households with IPTV, which is a fixed line TV service launched in 2006.[xxix] Given that Méditel does not offer fixed line broadband, its package uses 3G voice and data coupled with satellite television.

	Maroc Telecom			Méditel
	BOX	**SILVER BOX**	**GOLD BOX**	**HD-BOX**
Monthly Price (with VAT)	MAD 299 (US$37.21)	MAD 349 (US$43.42)	MAD 389 (US$48.41)	MAD 249 (US$ 31.54)
ADSL Speed	2 Mbit/s	4 Mbit/s	8 Mbit/s	3.6 Mbit/s

Table 3-7: Bundled offers, September 2011. Note: Maroc Telecom packages include IPTV with two channels and the option to purchase additional ones, a wired telephone line and VoIP service with unlimited free calls to Maroc Telecom fixed lines. Meditel's package includes free calls between other HD-BOX subscribers. (*Source*: Adapted from Maroc Telecom and Meditel)

The option of holding a *beauty contest* rather than an *auction* to award licenses is attractive for governments interested in assessing each applicant's vision and long-term business plan before making final selections. In a beauty contest the request for proposals focuses on technical criteria rather than price, and includes questions that request prospective operators to address equity in coverage especially in rural areas, job creation, service provision, and to also provide strong indication of financial viability. Further, the option of the beauty contest provides space for new entrants or aspiring operators who are not as well financed to compete against incumbents that may be better positioned financially and with a stronger customer base. Although a beauty contest may be perceived as less transparent than an auction, a significant benefit is that winners typically do not pay the large amounts that an auction entails, which theoretically should result in lower prices for consumers.

In the case of Morocco, ANRT ran a beauty contest in 2006 to award three 3G licenses and the results were astounding – mobile broadband subscriptions increased 530 percent between 2007 and 2008. Today, mobile broadband accounts for three quarters of the country's broadband market share. As it wished to expand competition in the marketplace and push for universal access, ANRT designed a proposal that would ensure that the license would be awarded to the best technical and quality oriented bid. In addition to the technical requirements, a fixed license fee was set at MAD 360 million plus an additional MAD 36 million for the re-organization of the radio frequencies. In the end, bidders included Maroc Telecom, Méditel, WANA (Maroc Connect at the time) and Maroc Nejma (a Kuwait-based company). The evaluation was based on four criteria: 1) deployment of infrastructure, 2) service quality engagement, 3) diversity, innovation, and incentive packages to customers, and 4) financial viability of bidder and shareholder relations.

The aspiring operator WANA made a great impression and was ranked first, followed by Maroc Telecom and Méditel. The introduction of a third operator in the market reaped benefits for both ANRT and the newly licensed company. WANA's launch of its restricted mobility service (branded as Bayn) in 2007 and full mobility service (branded Wana Mobility) in 2008 expanded mobile broadband as well as its own public reach and penetration. So large was this achievement, however, that WANA became a victim of its own success. When the company launched WANA mobility using CDMA technology as opposed to the GSM standard Méditel and Maroc Telecom use, they also followed the policy of giving away free phones (two for the price of one). The promotion was so popular that WANA sales exceeded expectations and the company faced two major challenges: 1) a still under-developed infrastructure that could not handle the burden of so many users at once, and 2) technology incompatibility resulting in unexpected roaming issues (most neighboring countries were using GSM). Eventually, many of the customers switched back to Maroc Telecom and Méditel and the surge of customers leveled.

A lesson learned and improved upon – since 2010 WANA was recapitalized through new investments by the Zain Group, changed management, and adopted a new brand name "INWI" phasing out WANA mobility and upping its sale figures. INWI currently claims the greatest 3G coverage, providing CDMA2000/EVDO for all new customers and 1X (an IMT-2000 technology but slower) where coverage areas have not yet been enhanced with EVDO technology.

Source: INWI Interview, July 2011; ANRT. 20 July 2006. *Rapport d'instruction - Attribution de licences de 3ème génération en vue de l'établissement et l'exploitation de réseaux publics de télécommunications au Royaume du Maroc.*

Box 3-1: Awarding 3G in Morocco: The story behind INWI's success

4 Creating an enabling environment

4.1 Overview

The World Bank views broadband as an ecosystem consisting of various components that needs to be in harmony for the broadband market to be healthy and sustainable. [xxx] An enabling environment is necessary to promote supply-side growth as well as to facilitate demand. The Moroccan government has implemented regulations to open up the local loop in an effort to create greater supply of broadband connections and has also developed a number of programs to increase access. It has also promoted e-Government through several strategic plans with the aim of developing e-services to encourage citizens and businesses to interact with it online.

4.2 Regulation

4.2.1 Tariff guidelines

At the time of writing this report, a set of tariff guidelines produced by ANRT in August 2010 is still ongoing with the aim of establishing a regulatory framework around retail pricing, paying special attention to the newest operator which may not benefit from the same reach and longevity as the incumbents. With these guidelines, ANRT will be monitoring four major practices that it will consider unlawful:[xxxi]

- The *squeeze* effect resulting in tariffs that cannot be replicated by competitors in a manner that will be economically viable. It is strategy by which a vertically integrated operator sets its tariffs below the cost level of a reference operator.
- *Predatory pricing* practiced by an operator that exposes the competition to a reduction of their margin and as such is apt to exclude them from the market.
- *Abusive bundling* is taking advantage of the ability to provide the sale of two or more different services that cannot be replicated by competition, affects the interest of the client, comprises the commercialization of competitor offers, and reduces demand for competitor products.
- *Unfair cross-subsidization* where an operator uses profits from one service to subsidize losses in another service.

The document purposes to protect against the potential domination of one operator over the other, especially the one with greatest cliental network and financial leverage. The above prohibitions of practices would cover voice, data, messaging and other data transmission services over telephone, mobile and data networks.

4.2.2 Local Loop Unbundling

In an effort to promote competition, ANRT prioritized the issue of local loop unbundling as early as 2004 through a decision resulting in negotiations with the incumbent Maroc Telecom which needed to provide technical specifications about its legacy copper infrastructure and pricing options for operator access. However it was not until an order from the Prime Minister that dates were set for implementation of local loop unbundling – with partial unbundling expected by January 2007 and full unbundling by July 2008.[xxxii] A final agreement on full unbundling was reached on December 27, 2007 after a series of correspondence between ANRT and Maroc Telecom. This also included new modifications to pricing of partial unbundling.[xxxiii]

Under ANRT oversight, the monthly costs that were decided upon for 2008 were competitive and favored affordable operator access. The tariff structure is multi-layered, including costs relating to:

- Maroc Telecom intervention in case there is a problem,
- technical issues specific to shared access,
- the creation of specific applications in order to access the local loop,
- infrastructure (or entities) within Maroc Telecom to implement the local loop, and
- billing access to the local loop.

With the final agreement, Méditel and INWI's expected monthly cost to access high frequencies of the unbundled lines (partial) was estimated at MAD 35, 30 percent less than what was initially agreed upon for the year 2007. For full

Program	Objective	Budget	Time frame
GENIE	Equipping 9,260 educational institutions with multi-media rooms and Internet ***Target***: 6 million students	MAD 2 billion of which MAD 1 billion from is from the USF	2009-2013
NAFID@	Providing computers with mobile broadband to teachers ***Target***: 150,000 teachers	MAD 216 million (including support from the Mohammed VI Foundation)	2009-2012
GENIE –SUP	Provision of digital equipment to universities and training institutions.	MAD 120 million	2011-2012
INJAZ	Provision of computers with mobile broadband to senior secondary school students ***Target***: 80,000 students	MAD 246 million	2009-2013
CAC	Creation of community access centers that provide access to ICT ***Target***: 400 centers	MAD 80 million	2009-2013

Table 4-1: Universal Service Fund programs (*Source*: Adapted from ANRT)

unbundling, the estimated cost was MAD 100, lower than what Maroc Telecom charges its direct customers and what many incumbents in Europe were charging their competitors.

Additionally, Maroc Telecom was required to provide information about its subscribers as well as specifications that pertain to its equipment sites enabling competitors to have the option to either rent lines or share the physical infrastructure.[xxxiv] This would give flexibility to the competitors in terms of lowering costs by running their own lines through shared infrastructure. While these measures are deemed encouraging for competitors, the impact of local loop unbundling on broadband has so far been limited. As of June 2011, Maroc Telecom had a 99.8 percent share of the ADSL market.

In addition, while local loop unbundling can be useful policy for promoting broadband competition, in the case of Morocco its relevance is also restricted. There are only 1.2 million copper-based fixed lines of which 40% are already used for ADSL.

4.2.3 Universal access

A key objective of ANRT and the Ministry of Industry, Commerce and New Technologies has been the promotion of universal access. It is also a fundamental strategy of *Digital Morocco* where extending citizen access to broadband is viewed as an essential ingredient for social transformation.

As mentioned earlier, a Universal Service Fund (USF) was created in Law 55-01 requiring all operators to allocate two percent of revenue. This meant that a fund would be available for incentivizing infrastructure development in remote and hard to reach areas. If operators invest in those areas on their own, the amount they spent is reduced from their USF contribution ("Pay or play").

In 2007, the "PACTE" program (2008-2011) was approved by a special commission in charge of universal service. The program, which is the largest financed by the USF intends to address coverage of 9,263 locations classified as "white areas," of which 50 percent are listed under the National Initiative for Human Development (*Initiative Nationale pour le Développement Humain*, INDH).[xxxv] These areas belong to 55 regions and 841 communes of the territory, including 2.3 million habitants or approximately 17% of the rural population in Morocco. The budget for this is activity is estimated at MAD 1.44 billion. By the end of the PACTE program it is envisaged that essentially all populated areas will have mobile coverage, up from 97.5% of the population in 2010.[xxxvi]

For the period of 2008-2013, the remaining allocation of the USF (around 60 percent) is disbursed across five targeted programs most of which relate to provisioning schools and students with ICTs. In addition there is a program to create 400 access centers as called for in *Digital Morocco* (Table 4-1). According to ANRT orientation note, it is anticipated that a study will be launched by the end of 2011 to establish guidelines for the next stage of the program development including plans for Universal Service Fund during 2012-2016

4.2 Applications

The majority of those using the Internet in Morocco are doing so for entertainment purposes or for communication via email (Figure 4-1). Exchanging videos and music, social networking and Internet telephony are main uses driving people to broadband, averaging a combined increase of 29 percentage points in 2010.

There is no denying that social media is driving Internet usage in the Middle East, particularly given the recent political events. According to a 2011 study, in UAE and Qatar, almost 30 percent of the population is on Facebook. [xxxvii] Egypt added two million Facebook users in four months. In Morocco, 67 percent of the population that goes online does so for social networking. This is up almost 20 percentage points from 2009 and today the country has the third highest number of Facebook users in the Arab world (Figure 4-2). With 79% of Moroccan Facebook users between the ages of 15-29, there are three considerations when thinking about the Internet market:

- The first is that given that most Internet users in Morocco are on some kind of social networking platform with rich multimedia features, demand for better quality in service will increase.
- Second, the majority of users driving broadband are between the ages of 15 and 29, an attractive audience for broadband market opportunities but also in terms of finding ways of increasing usage of applications that impact their livelihoods.
- Finally, social media has pushed Morocco's ahead many of its neighbors in broadband usage and as such reveals a niche population ready to be networked and capitalized.

In contrast to entertainment activities, e-commerce usage by consumers in Morocco is low. Only six percent of Internet users take advantage of online banking or ordering goods over the Internet. In respect to purchasing goods over the Internet, only 4% of surfers do this. The main reason given is that there is no need. This is tied to 57% who say they do not purchase online because they cannot "touch" the product. Security is also a concern with almost seven out of ten users.

There are several domestically developed online payment services for Moroccan Internet users. *Maroc Telecommerce*, an initiative of Moroccan banks, provides an e-commerce platform where users can make online purchases and merchants can sell products and services. Businesses use the service to open online stores after passing security clearance and demonstrating financial capability in order to provide users with confidence when making purchases. *Mobicash* introduced in 2008 by Maroc Telecom is a mobile payment system. Users can transfer and receive money from others, pay their Maroc Telecom bills or recharge their phones and use their handsets to make purchases from authorized merchants.

4.3 e-Government

The Moroccan government has promoted the vision of ICTs for transforming public administration for a number of years. The government can be a leader by computerizing its own operations as well as providing online services to stimulate broadband demand. A number of initiatives have been launched but progress has been slow. One challenge has been incentivizing the bureaucracy to adopt a greater public service perspective. Successful projects include those that have been able to overcome ingrained resistance through a proactive public administration such as in the city of Fez (Box 4-1)

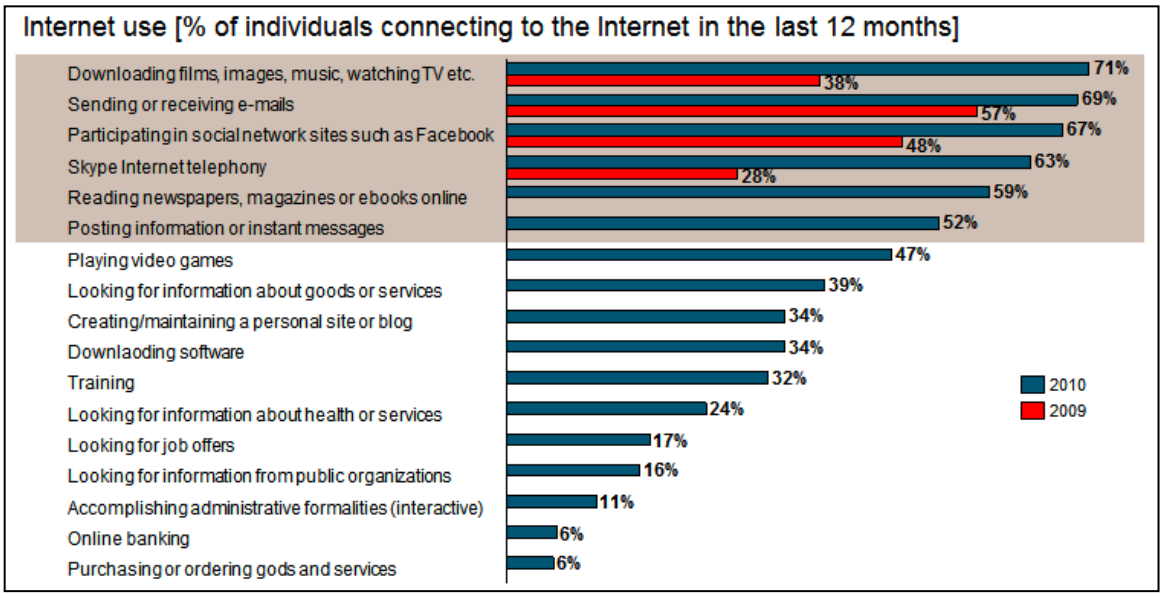


Figure 4-1: Internet uses, Morocco, 2010 (*Source*: ANRT)

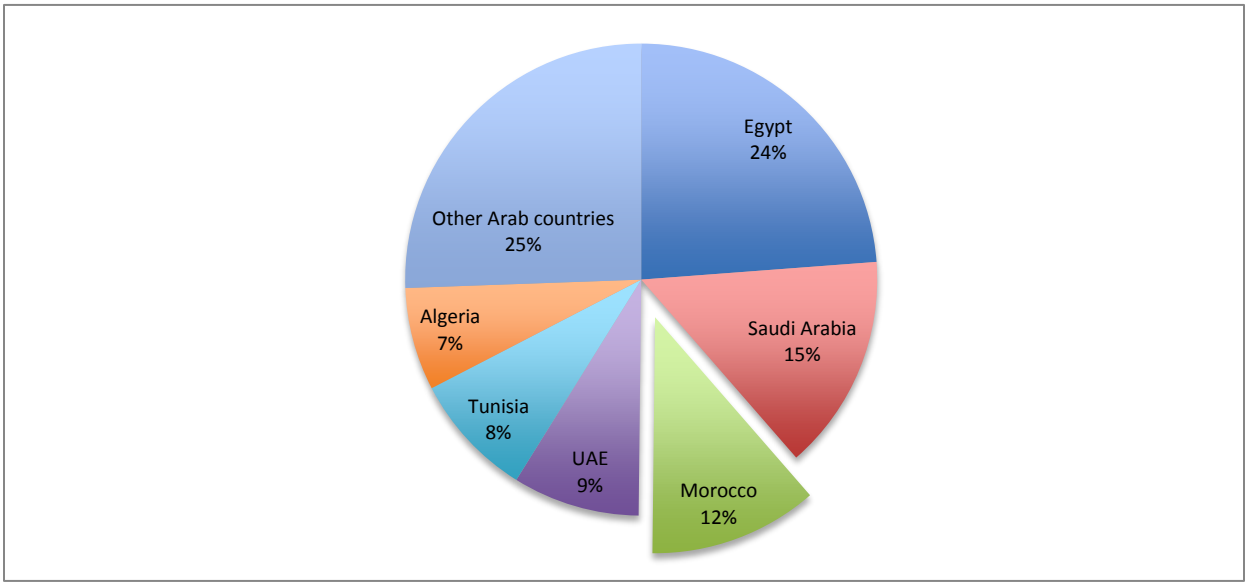


Figure 4-2: Share of Facebook users, Arab region, April 2011 (*Source*: Dubai School of Government)

Morocco developed a four-year e-government plan called IDARATI (***I****nformatisation des* ***D****épartements* ***A****dministratifs et leur mise en* ***R****éseau* ***A****déquate via les* ***T****echnologies de l'****I****nformation*) covering the period 2005-2008.[xxxviii] It was intended to leverage on government progress to date for example in establishing a national portal and passing supporting legislation. By 2010, there were 370,000 visits to the citizen public administration portal and some 200 forms online.[xxxix]

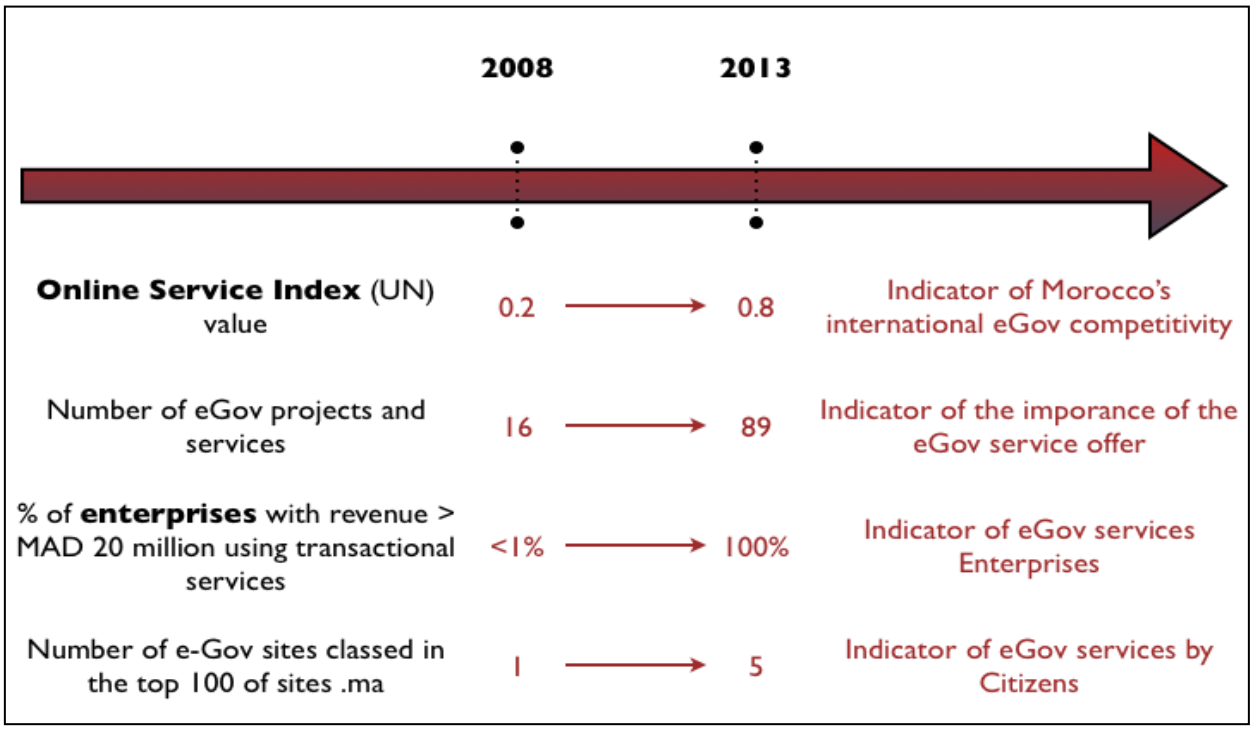


Figure 4-3: Moroccan e-Government targets (*Source*: Digital Morocco 2013)

E-government is a key pillar of the *Digital Morocco* strategy. Concrete targets include increasing the number of e-government services from 16 in 2008 to 89 by 2013 (Figure 4-3). Additionally, the government is anticipating that by 2013 all enterprises generating revenue of more than MAD 20 million annually will be using transactional services. Other targets include raising the country's e-Government score in UN rankings and increasing the number of public administration sites in the top Moroccan 100.

In order for the program to meet its objectives, a governing structure was established with 15 flagship services to be implemented by 2011 and a timeline for the completion of all targeted 89 e-Government services by 2013. The 89 e-government services include 42 transactional, 30 informational, and 17 infrastructure related applications. The focus is on delivery of transactional processes given that e-services require direct interaction with citizens and enterprises to achieve their full utility.

It will be important to ensure that services available online are also accessible in some alternative form so that all segments of population benefit. There is a risk of exclusion when digitizing public services, especially if other mediums of delivery are phased out before online access is universal.

4.4 Moroccans online

Morocco has experienced major growth of the Internet over the last decade, reaching an estimated 14 million users by the end of 2010 or almost half the population (Figure 4-4, top). When it reached one million in 2003, the majority were accessing via cybercafés. The significance of these public spaces continues with 76 percent of users who access the Internet outside of the home doing so via a cybercafé (approximately 8 million users).[xl] As the country continued to push reforms with Law 55-01 in 2004 and the liberalizing of fixed and cellular markets, the usage of Internet expanded. In particular, the country experienced its highest Internet growth rates between the years2007-2009 which coincided with the deployment of 3G technologies by the three operators. As a result, when compared to the rest of the region, the percentage of the online population in Morocco exceeds most countries in the MENAregion including neighbors Egypt and Tunisia (Figure 4-4, bottom).

Employees of the *Bureau d'État* Civil (BEC) in the Moroccan city of Fez previously had to search for birth certificates through hundreds of handwritten records and transcribe by hand information from the original birth certificate to provide citizens with copies needed for applying for a job. It could take hours, if not days, to fill this request along with the many others received that day. Applying for these certificates could take days. Although under-the-table bribes were common, the process could still be unbearably long. Those who finally received their documents were often so elated that they fail to double-check the handwritten copies, resulting in a return visit to the BEC to fix poorly transcribed entries that had not been accepted at their final destination.

In an effort to remedy this problem the local Al-Akhawayn University developed the e-Fez Action Research Project, funded by Canada's International Development Research Centre (IDRC) to design, develop, and implement an e-government system to automate delivery of citizen-oriented services. With a two-year grant from IDRC, the university had to prioritize. It opted for automating one of the most widely used services in BEC offices: providing birth certificates. A pilot project, undertaken in partnership with the Université Laval in Québec and in collaboration with the Fez municipal government, was planned for the Agdal district. Its BEC office was set up in 1986, and had registered approximately 15,000 citizens.

The research team soon discovered that automation required more than they had bargained for. Every birth certificate in the Agdal office would have to be digitized. This meant installing the necessary infrastructure in the office, which previously had no computers or Internet connections. Even the electrical service was prone to interruptions. The municipality of Fez played a major role by installing new electrical lines, Internet connections, and computers; the project provided cables and servers. The municipality was so highly motivated that it began automating two other offices at the same time.

The team then needed to find a way to digitize the existing records. They tried scanning, but the error rate was 60%. The only viable alternative was to enter the information on each birth certificate into a database. The result was unprecedented. For the first time ever, Moroccan citizens' records were digitized. Data entry began in February and ended in November 2005.

Citizens now have three choices for obtaining a birth certificate. Rather than wait days to receive a handwritten copy, they can provide office staff with their serial number and the computer system generates and prints a copy of the certificate.

The impact of the e-Fez Action Research Project has been far-reaching. At the local level, some 15,000 registered citizens now have access to government services instantly. Services are transparent and take less time and effort. The project generated collaboration between various sectors of society in Fez. An academic institution, citizens, elected officials, government employees, and an international organization worked together to make better local governance a reality. The project has won widespread recognition, winning Morocco's National Prize for Electronic Administration: e-Mtiaz 2006. And in 2007 the project earned a Technology in Africa Award (TIGA) and a United Nations Public Service Award (UNPSA).

Building on e-Fez, Al Akhawayn University launched another project with IDRC and IT+46 of Sweden and with support from the city and the ANRT to deploy a WiMAX network interconnecting government offices and providing public access through hotspots. The Wireless Metropolitan Area Network @ Fez (Wman@Fez) project is the first WiMAX community network in the country. It has been extended to several other towns in the Middle Atlas region.

Adapted from IDRC, "Fez: The e-capital of Morocco." http://web.idrc.ca/uploads/user-S/12089602911E-Fez.pdf and "Al Akhawayn Workshop Focuses on Innovative Project to Enhance Local Government with Wireless Networks." *News*, November 24, 2010. http://www.aui.ma/PresidentsCabinet/News/news10/news10-index.htm

Box 4-1: e-Fez

Thirty-four percent of households have personal computers and 25 percent of households have broadband access at home, significantly higher than the two percent in 2004. Of the households with Internet access, 78 percent use 3G with a USB modem. Just over a fourth of households with electricity but without Internet access envision having 3G in the next 12 months.

There are barriers to increasing Internet use that are likely to constrain future growth such as the lack of electricity in some rural areas. Another barrier is cost with just over half of households without Internet saying they cannot afford it. This is mainly attributed to the price of purchasing a computer. A key obstacle is digital literacy with almost half of households without Internet saying they do not see the utility and one quarter replying they lack skills to use it. This is mainly a problem with the older generation given that most of the country's Internet users are young. While the *Digital Morocco* plan calls for providing Internet access to all schools, it does not explicitly deal with digital literacy training for those no longer in school. Thus digital illiteracy is likely to remain a bottleneck for increasing broadband access.

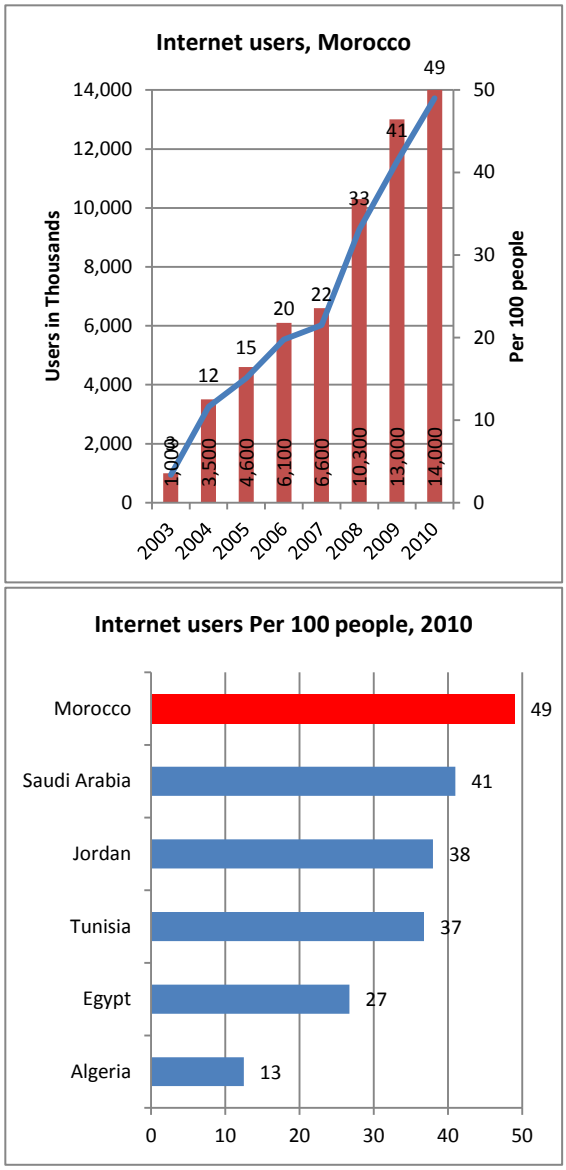


Figure 4-4: Internet users in Morocco and selected countries (*Source*: Adapted from ANRT and regional communications authorities)

5 Success and challenges

Morocco was one of the first countries in the Middle East and North Africa region that institutionalized an independent regulator to govern and incentivize the market and introduce 3G technologies, in an effort to expand broadband access to the people. The framework of *Digital Morocco* reinforces essential policies around access and content, a multi-stakeholder governance body to oversee the process and a budget to finance activities. There is a monitoring system via the regulator's Observatory where an online platform is available for the public to access results and analysis of the market on a quarterly basis.

Government policies such as the introduction of an additional operator and early awarding of 3G licenses through a beauty contest have impacted Morocco's broadband market. Dial-up Internet access has practically disappeared and speeds of up to 20 Mbit/s are available with ADSL. Fixed broadband pricing is relatively low compared to peer countries. Mobile broadband has taken-off following allocation of the three licenses in 2006 and accounted for over three quarters of the broadband market by mid-2011. Operators offer a variety of mobile broadband payment plans ranging from one-day use to monthly subscriptions. Though difficult to measure precisely because of different speeds and data consumption practices, mobile broadband pricing in Morocco is relatively inexpensive compare to its peers. Usage of mobile broadband is high compared to peer countries for which data is available.

At the same time, the impact of the programs implemented over the years has not always been certain and there is limited evaluation regarding the quality and outcomes of increasing access. Facilitating dialogue on deeper reform of the sector, intensifying the competitive environment, and demonstrating improvements in livelihoods through ICTs are some of the key issues facing ANRT, which is in the process of strengthening its capacity to deliver on its mandate. The regulatory and political environment are only parts of an ecosystem; the business environment, the production of content, exporting of broadband enabled services, and the consumption of information are parts that are at times disconnected from each other. At the same time, while there are high expectations for ICT in the country, Morocco's level of social and economic development including more than two out of five people residing in rural locations, constrains broadband diffusion and will be difficult to change in the short-term.

There are three overarching gaps that Morocco faces when one considers the current state of broadband in country: **the need for well-balanced infrastructure**, **improved quality and affordability**, and **greater push for demand driven services**. These gaps are interrelated as shown by the table below which illustrates the penetration of Internet access in Moroccan households according to income and geographic zone and the corresponding literacy rate.

	Monthly household income (MAD)				
	> 18,000	8,000-18,000	3000-8000	<3,000	
High Density Zones	80%	35%	15%	2%	0%
Medium Density		35%	15%	2%	0%
Grey/White Zones (sparsely populated)			0%	0%	0%
Literacy rate (%)	100%	95%	90%	55%	35%

Table 5-1: Household Internet penetration rate by geographic zone and monthly income, 2008

(*Source:* Adapted from Digital Morocco 2013)

Penetration is reduced with the geographic location indicating the need for well-balanced infrastructure. Penetration drops as income falls, indicating the need for greater affordability. Finally penetration is less where illiteracy is high indicting the need for skills development in order to use broadband services.

5.1 Well-balanced infrastructure

Growth in the broadband sector in Morocco is driven by the mobile industry, in particular 3G. Today, over three quarters of broadband penetration is due to 3G and it has the promise to reach populations otherwise neglected. Yet the overall country access rate remains low especially in low-density areas. And while all operators use 3G technologies, Maroc Telecom delivers 99 percent of ADSL, through its historic control over the wired telephone network. Local loop unbundling has been in effect since 2007 but results are negligible. Operators must be encouraged to share infrastructure to lower costs in an environment where fixed networks are limited and wireless networks costs can be leveraged to help cover larger areas. In order for broadband diffusion to be successful significant efforts to improve backhaul is critical. This includes deploying fiber deeper into rural areas. At the same time, the level of electrification in rural areas needs to be boosted. These steps will require fresh and innovative thinking since purely competitive solutions can only go so far in addressing these problems.

5.2 Improved quality and affordability

3G has proven quite popular in Morocco and is the main channel for broadband access. Nevertheless, there are looming quality concerns. One issue is inconsistent coverage with users often switched to slower 2G speeds outside urban areas. Additionally, the popularity of social networking is resulting in growing mobile data usage that is starting to place a strain on mobile networks. Quality issues also affect fixed broadband particularly for subscribers who are not close to the exchange.

Affordability is a significant barrier. It is cited as the main reason people do not have computers or Internet access at home in ANRT surveys. Additional efforts are needed to make broadband service and end user devices cost effective for ordinary citizens.

5.3 Greater push for demand driven services

Morocco has made tremendous strides in getting its population online. The number of Internet users has increased from 3.5 million in 2004 to 14 in 2010. According to surveys many people are using entertainment type applications. There is a need to channel that demand into other applications that can help improve livelihoods. This includes developing applications in education, government and health that incorporate social network features to make them attractive and encourage user content creation. It also calls for private-public partnerships to explore innovative ways of getting young people online to search for jobs and economic opportunities otherwise only accessible by a select few via personal connections.

At the same time there is a need to remedy the digital divide in Moroccan Internet use. Most Internet users are young indicating a need to get more people over thirty online. While government is focusing efforts on increasing school connectivity there is a pressing need to provide digital literacy training to those out of school.

5.4 Lessons learned and remaining challenges

- Just under half the population uses the Internet in Morocco, higher than other countries, and an impressive achievement considering the relatively low literacy level. The widespread availability of Internet cafes and more recently a trend towards home access with 3G has been a factor contributing to Internet growth as has a youthful population. Most usage is currently towards entertainment. A shift is needed to make users become producers and access information that can help them in their daily lives.
- The government's early decision to license of 3G through a beauty contest has boosted Internet penetration, with household penetration tripling. The challenge will be to expand access beyond the one quarter of households that already have it. Stimulating and filling demand will be challenging due to lack of adequate coverage and electricity in rural areas, affordability constraints, and unawareness

about the benefits. There needs to be focus on reducing prices and raising digital literacy, especially among the older population.

- Enhancement of infrastructure is fundamental. Mobile broadband coverage is not consistent across the country with bandwidth often falling back to 2G speeds outside urban areas. At the same time, the exponential growth in mobile broadband use is affecting quality. Greater efforts are needed to expand high-speed backbone infrastructure throughout the country. Microwave technology is limited in its ability to support the exponential growth in mobile broadband. In that respect, operators need to upgrade their backhaul with fiber.
- Innovative approaches are needed to expand local high-speed access to increase diversity of options beyond ADSL and 3G. Morocco faces a situation where fixed broadband options are essentially limited to ADSL because cable modem is not a viable alternative (due to the popularity of satellite television) and where the cost of fiber installation for local access is often prohibitive. A fresh approach is needed including incentives for encouraging fiber deployment and reviewing experiences of other countries with open access and flexible ISP laws. Inclusive and bottom up approaches could also stimulate local broadband development. One example is municipal Wi-Fi (Box 5-1), where efforts in Morocco have been constrained by various laws and regulations. These might be loosened to encourage alternative low-cost solutions for broadband access.

Global efforts to build community-based Wi-Fi networks have emerged as a solution for people to access free broadband. One such example is FON established circa 2007 in Madrid, Spain.[1] Today, the network has over four million hotspots in 24 countries. Morocco is the only country in the Middle East and North Africa region with members formally registered with the network.

In 2007, Abdesselam El Omari, an IT entrepreneur based in Rabat heard of the newly established FON network. When Abdesselam contacted the company to join, he received four routers free of charge and was requested to keep one for himself while giving the remaining three to others with broadband connections and interested in becoming part of the movement.[1] As a member, he received an identifier that would allow him to connect to any FON wireless network around the world and could potentially make enough money to subsidize his monthly broadband connection costs if traffic was sufficient. This was made possible because the company also sold prepaid cards that would allow anyone to connect to the community network. Money generated by these cards would be split between the company and the owner of the router to which the prepaid card holder connects to at any given time.

Abdesselam installed one router in his apartment and one in his parent's house as they live next to the Hilton Hotel with promising potential for traffic. He gave the two other routers to friends in Casablanca. After speaking to a lawyer about this opportunity and his desire to expand it in country, he was dissuaded from continuing as it posed two types of legal problems:

- The first challenge was in regards to his ISP and rules against reselling Internet access. Sharing was permissible but selling was not.
- The second was related to fiscal issues and declaration of unauthorized income. Making money without declaring it and receiving VAT from users was problematic.

As a result, Abdesselam stopped the service. While in principal, the network provided an alternative solution to accessing broadband the incentive model does not take into consideration local telecom regulations in regards to sharing versus reselling bandwidth. Also, the emergence of mobile devices to connect to broadband reduced the market base. Nonetheless, community-based Wi-Fi networks remains relevant where creative solutions are needed to provide broadband access in poorly served areas.

Interview with Abdesselam El Omari, Rabat, July 2011.

Box 5-1: Experimenting with Community-Driven Wi-Fi in Morocco

About *info*Dev

*info*Dev is a global development financing program among international development agencies, coordinated and served by an expert Secretariat housed at the World Bank Group, one of its key donors and founders. It acts as a neutral convener of dialogue—and as a coordinator of joint action among bilateral and multilateral donors—supporting global sharing of information on ICT for development (ICT4D), and helping to reduce duplication of efforts and investments. *info*Dev also forms partnerships with public and private sector organizations who are innovators in the field of ICT4D. *info*Dev is housed in the Financial and Private Sector Development (FPD) Vice Presidency of the World Bank Group.

For additional information about this study or more general information on *info*Dev, please visit **www.infodev.org/publications**.

Endnotes

[i] This section draws on Haut Commission au Plan. *Le Maroc en chiffres 2009*. http://www.hcp.ma/downloads/Maroc-en-
[ii] For the purpose of this study and unless otherwise noted, the Middle East and North Africa region constitutes the following countries: Algeria, Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Qatar, Tunisia, Saudi Arabia, Syria, West Bank & Gaza, and United Arab Emirates.
[iii] *Loi 24-96 relative à la poste et aux télécommunications*. 7 August 1997. http://www.anrt.net.ma/fr/admin/download/upload/file_fr1818.pdf. The basic telecom law has had several amendments over the years. A consolidated version, *Loi n°24-96 consolidée relative à la poste et aux télécommunications, telle qu'elle a été modifiée et complétée,* is available here: http://www.anrt.ma/fr/admin/download/upload/file_fr1825.pdf
[iv] SEPTI, 2000. *Rapport de la Sous-Commission des Technologies de l'Information: Plan quinquennal 1999-2003*.
[v] The figure refers to the electrified areas only; the figure over entire population is 43 percent.
[vi] ITU. 2011. *Measuring the Information Society*. The IDI is a composite index consisting of 11 indicators including access, use, and skills. http://www.itu.int/ITU-D/ict/publications/idi/2011/
[vii] World Economic Forum. 2011. *Global Information Technology Report 2010-2011*. http://www.weforum.org/reports/global-information-technology-report-2010-2011-0
[viii] ANRT. 2010. *Annual Report 2009*.
[ix] ANRT. 2010. *Note d'orientations générales pour le développement du secteur des télécommunications à horizon 2013*.
[x] World Bank. 2004. *Morocco: Developing Competition in Telecommunications*. http://go.worldbank.org/T4B5VCU0D0
[xi] *Loi 55-01 modifiant et complétant la Loi 24-96 relative à la poste et aux télécommunications.* 4 November 2004. http://www.anrt.ma/fr/admin/download/upload/file_fr1820.pdf
[xii] A 2001 ITU report notes there was a "Lack of a clear separation between the functions and roles of the SEPTI and ANRT in the area of regulation; overlapping of functions, as noted by representatives of the State." ITU. 2001. *Effective regulation case study: Morocco*. http://www.itu.int/itudoc/gs/promo/bdt/cast_reg/79125.pdf
[xiii] Piot, Stéphane. 2011. National broadband plan in Morocco Approach and key findings to date presented at the Broadband Development in Morocco: Challenges, Policies and Regulation, using lessons learnt from South Korea, July 7, Rabat. http://www.anrt.ma/fr/content/main.php?id_page=116&id_sous_page=0&niveau3=0#.
[xiv] Roland Berger. 2011. Acceleration in deployment of High Speed in new planning zones in Morocco presented at the Broadband Development in Morocco: Challenges, Policies and Regulation, using lessons learnt from South Korea, July 7, Rabat. http://www.anrt.ma/fr/content/main.php?id_page=116&id_sous_page=0&niveau3=0#.
[xv] Ministry of Industry, Trade and New Technologies. 2007. *E-Morocco 2010 Strategy: Accomplishments, Perspectives & Action Plans*.
[xvi] *Maroc Numeric: Stratégie nationale pour la société de l'information et l'économie numérique 2009 – 2013*. http://www.egov.ma/Documents/Maroc%20Numeric%202013.pdf
[xvii] WiMAX is considered fixed in the case of Morocco however it can also be classified as mobile depending on the specific technology.
[xviii] Maroc Telecom's formal name is Itissalat Al-Maghrib (IAM). For more information about the company see its web site at: http://www.iam.ma/Groupe/Pages/accueil.aspx
[xix] Initially, ONPT rented out its bandwidth to ISPs through leased lines and the ISPs then sold dial-up services to customers. With dial up, customers were paying a connection fee in addition to minutes since their phone service was billed on a pay per use basis and this continued until the introduction of broadband. When Maroc Telecom was formed in 1998, it modified its policy and began selling services directly to customers making it difficult for smaller ISPs to compete. In 1999, Casanet was bought by Maroc Telecom which then became its Internet subsidiary Manara; Maghrebnet canceled its internet provision and only providing network services, Wanadoo Morocco a subsidiary of France Telecom eventually became Wana which was later absorbed into WANA Corporate, now INWI, and other internet service providers shut down, such as ELAN and Fusion. MTDS, one of the oldest ISPs in Morocco, was established in 1993 and continues to date. As a wholesaler, it buys bandwidth from the incumbent selling mostly to a select group of commercial customers, as well as providing network security, technical know-how, and ICT applications for social and economic development purposes.
[xx] France Telecom. September 21, 2010. *Méditel enters into a strategic partnership with France Telecom to become the value and innovation champion in Moroccan telecoms*. http://www.orange.com/en_EN/press/press_releases/att00017093/20100920-Meditel and FTEUK(vdef).pdf.
[xxi] Méditel's full name is Médi Télécom. For more on the company see its web site at: http://corporate.Méditel.ma/servletAccueil?tache=PageIndex#
[xxii] For more on INWI see: http://www.inwi.ma/corporate
[xxiii] TeleGeography. "Maroc Telecom's first phase of regional fibre backbone 60% complete." February 20, 2010. http://www.telegeography.com/products/commsupdate/articles/2010/02/26/maroc-telecoms-first-phase-of-regional-fibre-backbone-60-complete/
[xxiv] Maroc Telecom. 2011. *Document de Reference 2010*. http://www.amf-france.org/DocDoif/txtint/RAPOSTPdf/2011/2011-028400.pdf
[xxv] Williams, Mark. 2010. *Broadband for Africa: Developing Backbone Communications Networks*. Washington D.C.: World Bank. http://publications.worldbank.org/index.php?main_page=product_info&cPath=&products_id=23786.

[xxvi] "Marais Groupe porte le capital de sa filiale Finetis Maroc à 20 MDH." *La Vie éco*, November 5, 2009. http://www.lavieeco.com/news/economie/marais-groupe-porte-le-capital-de-sa-filiale-finetis-maroc-a-20-mdh-13688.html.
[xxvii] GSM Association. 2010. *Mobile Broadband Success Story, Challenges and Opportunities*.http://www.gsmamobilebroadband.com/upload/resources/files/GSMA%20-%20SMC%20Tunisia%208Nov2010%20MBB.pdf
[xxviii] Teligen. September 2011. *2011 Telecommunications Retail Prices Benchmarking Report for Arab Countries*. http://www.tra.org.bh/en/PriceBenchmarking.asp
[xxix] Maroc Telecom. 2011. Document de Reference 2010. http://www.amf-france.org/DocDoif/txtint/RAPOSTPdf/2011/2011-028400.pdf
[xxx] Kim, Yongsoo, Tim Kelly, and Siddhartha Raja. 2010. *Building Broadband: Strategies and Policies for the Developing World*. Washington D.C.: World Bank. http://www.infodev.org/en/Publication.756.html.
[xxxi] *Décision ANRT/DG/n°05/10 du 11 Aout 2010 portant adoption des lignes directrices encadrant l'examen par l'ANRT des offres tarifaires des exploitants de réseaux publics de télécommunications.* http://www.anrt.ma/fr/admin/download/upload/file_fr2127.pdf
[xxxii] Partial unbundling includes access to only high frequencies in the copper line (ADSL) and full unbundling includes both voice and ADSL.
[xxxiii] *Décision ANRT/DG/N°03/08 du 04 janvier 2008 portant approbation de l'offre technique et tarifaire relative au dégroupage partiel et total de la boucle locale d'IAM pour l'année 2008.* http://www.anrt.ma/fr/admin/download/upload/file_fr1433.pdf
[xxxiv] The local loop unbundling policy applied to operators. MTDS which has a customer base of around 1000 ADSL subscribers has a separate agreement with Maroc Telecom dating back from the days of ONPT. Specific details are confidential.
[xxxv] INDH was announced in a speech by King Mohammed VI to highlight social challenges and launch a program that can mobilize resources and raise living standards and social development indicators: http://www.indh.gov.ma/
[xxxvi] ANRT. 2011. "The ICT Sector In Morocco: Key Figures" presented at the Broadband Development in Morocco: Challenges, Policies and Regulation, using lessons learnt from South Korea, July 7, Rabat. http://www.anrt.ma/fr/admin/download/upload/file_fr2230.pdf.
[xxxvii] Salem, Fadi and Racha Mourtada. 2011. "Civil Movements: The impact of Facebook and Twitter." *Arab Social Media Report*, May. http://www.dsg.ae/portals/0/ASMR2.pdf
[xxxviii] Comité National eGov. 2006. *IDARATI-Programme national e-Government 2005-2008*. http://unpan1.un.org/intradoc/groups/public/documents/un-kmb/unpan040433.pdf
[xxxix] Ministère de l'Industrie, du Commerce et des Nouvelles Technologies. 2011. *Programme eGouvernement*. http://www.egov.ma/Espace%20Services/Documents/Programme%20eGov%20Morocco%20(2).pdf
[xl] ANRT. 2011. *Enquête de collecte des indicateurs TIC 2010*.