

Standard Disclaimer:

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Introduction

Many of the countries in the Middle East and North Africa region (MENA) have identified that broadband Internet will be a critical input to the broader objective of nation building and the transition to a knowledge-based economy.

. This study assesses the status of broadband development in MENA, highlights key bottlenecks to growth, explores policy options, and offers suggestions on how to accelerate investment and diffusion of broadband connectivity. The focus of the study is on infrastructure-related actions; measures to stimulate demand for broadband are therefore only marginally addressed.

Box 1: Definition of Broadband

Broadband generally refers to a telecommunications connection that is “always on”, as opposed to a “dial-up” connection via the public switched telephone network (PSTN) to activate an Internet connection, and with speed rates higher than the rates obtained with a dial-up modem. The commonly accepted definition of bandwidth rates for broadband, according to the International Telecommunications Union (ITU), is at least 256 kbps. This definition of broadband (“always on”, download speed rates higher than 256 kbps) will be used throughout this study (International Telecommunications Union 2010; International Telecommunications Union 2011). There are indications that this definition may change over time. For instance, countries around the world have started to include in their national broadband plans an objective in terms of so called Fast and/or Ultra-Fast Broadband (FB, UFB). Again, the definitions of FB and UFB vary according to the specific plan and country context. So far, no common definition has been established internationally. However, FB and UFB have to do with new and evolving high-speed technologies, such as fiber optic cables, 4G, WiMAX, and so on, and refer respectively to bandwidth rates typically of about 30 Mbps and 100 Mbps and above.

Today eleven countries out of nineteen in MENA have adopted showing dedicated efforts to stimulate broadband market development in a systematic and holistic way with all key stakeholders. Indeed, all the countries in MENA with high penetration rates have adopted dedicated policy documents. At the core of such national broadband strategies are . These targets may differ across the region owing to available broadband infrastructure and to the disposable income of the population as well as to the state of government finances, especially when public funding is explored (see example of Egypt’s National Broadband Plan in Box 2).

The MENA region would benefit from the adoption of a common approach to broadband development. According to Bilbao-Osorio, Dutta, and Lanvin (2013), MENA “boasts one of the most diverse performances in the world” when it comes to the Information and Communications

Note: Yes—country has adopted broadband policy document; Planned—country is planning to start or has started preparation of broadband policy document, status for 2013; No—country does not have a broadband policy document; n.a.—information is not available.

MENA is at risk to fall behind in terms of Broadband development

Development of broadband, like any innovation, tends to follow an s-shaped curve. The s-curve reflects the three phases in the evolution of a market as measured by the extent of broadband penetration: Introduction (or Emerging), Developing, and Mature. The emerging phase is prior to the first inflection; the development stage is between the first and second inflections; and the maturity phase is after the second inflection. Adoption is slow initially but accelerates rapidly before stabilizing as it reaches maturity. The particular shape of the curve (namely its slope and the points of inflection) will differ between countries as a result of differences in policy and regulatory framework, income per capita, the availability and penetration of substitute and complementary products, etc.

The price of broadband plays a critical role in terms of broadband penetration. According to the ITU, broadband penetration grows rapidly after the level of retail price falls below 3-5% of average monthly income, which makes it **affordable**. In MENA, fixed broadband price constitutes ~3.6% of the average monthly income per capita, while mobile broadband price stands at ~7.7

Figure 1: Fixed and Mobile Broadband Prices



Sources: GNI per capita: World Bank, latest available; Prices: World Bank based on operators' data.

Note: For West Bank and Gaza data are not available; Values for Djibouti: fixed BB: 22.09%; mobile BB: 77.15%; Values for the Republic of Yemen: fixed BB: 9.97%; mobile BB: 12.86%; Values for Syria: mobile BB: 13.77%; Values for Libya: mobile BB: 32.38%.

Box 2: How affordable is Broadband in MENA?

An affordability analysis looks at the percentage of disposable income that the poorer segment of the population would need to spend to afford broadband. For example, a representative household in the lowest 40 percent income bracket of Morocco would need to pay about 33 percent of its disposable income to afford mobile broadband. That same family would need to spend about 30 percent of its disposable income to afford fixed broadband services. The situation is only slightly better for the bottom 60 percent of the Moroccan population measured by income. Mobile broadband would require about 26 percent of their disposable income, and fixed broadband would require 23 percent of disposable income. In spite of important reforms undertaken by Morocco, a leader in many respects, broadband services are still unaffordable for the majority of the population. Even so, Morocco is the best performer in this group.

The situation is worse for other MENA countries in the “emerging” broadband development phase. In Tunisia, the poorest 40 percent of the population would need to spend over 40 percent of their disposable income to afford mobile or fixed broadband. In the Republic of Yemen, the poorest 40 percent of the population would need to spend over 50 percent of their income for mobile broadband and 46 percent for fixed broadband. In Djibouti, a mobile broadband package is a multiple of the disposable income of the poorest 40 percent and 60 percent of the population, and fixed broadband would absorb roughly the whole income of the poorest 60 percent of the population. In countries classified in the “emerging” broadband development phase (Algeria, Djibouti, Morocco, Syria, Tunisia, and the Republic of Yemen), both fixed and mobile broadband services are far from being affordable for at least 60 percent of the population.

Table 2: Affordability of Broadband in Emerging Markets

Algeria	-	-	63.31%	50.61%
Djibouti	407.39%	318.34%	116.66%	91.16%
Morocco	32.11%	25.94%	29.03%	23.45%
Syrian Arab Rep.	90.14%	74.59%	36.06%	29.84%

Figure 2: Fixed Broadband Penetration and Affordability, December 2012

Source: World Bank analysis; Penetration: TeleGeography's GlobalComms Database (<http://www.telegeography.com>, data

for December 2012, only four countries in MENA have launched commercial 4G services. Before fourth quarter of 2013 three more countries have launched commercial 4G networks.

Figure 3: Mobile Broadband Penetration and Affordability, December 2012

Table 3: Competition for International Submarine Cable Connectivity

	Number of relevant countries: 19	#	Countries
North Africa	Partially competitive	1	Morocco
	No competition	4	<u>Monopoly</u> : Algeria, Egypt, Libya, Tunisia
			<u>Monopoly</u> :
Mashreq	Competition	1	Jordan
	No competition	4	<u>Monopsony</u> : West Bank and Gaza
			<u>Monopoly</u> : Iraq, Iran, Lebanon, Syria
Gulf	Competition	3	Bahrain, Saudi Arabia, Oman

Table 4: Options for Expansion of National Backbone Infrastructure

1.	Active infrastructure sharing	Leasing of the capacity from backbone infrastructure provider Among potential providers are incumbent operator and utility companies
2.	Passive infrastructure sharing	Leasing of ducts (where operator could deploy its own fiber cables) or leasing of dark fiber (which could be lit by own active equipment of the operator) Among potential providers are incumbent operator and utility companies
3.	Deployment of own infrastructure	Performance of civil works and laying down own fiber infrastructure

company, Haya Water, and telecom operators. Under its ongoing water reuse project, Haya Water simultaneously covers tens of thousands of homes and offices across the Muscat Governorate of Oman and installs fiber optic cables alongside its new pipelines. From the perspective of telecom operators, such synergy provides a highly cost-effective solution for telecommunication infrastructure deployment. From the perspective of the state, this synergy reduces the impact on the environment by not having to undertake a second round of construction work in the future.

Box 3: Joint Infrastructure Deployment Framework in Bahrain

In December 2008 the Telecommunications Regulatory Authority (TRA) of Bahrain adopted a Guideline on Telecommunications Infrastructure Deployment (Guideline). The Guideline aims to facilitate the deployment of telecommunications network infrastructure through defining technical specifications and simplifying construction procedures. A joint infrastructure deployment framework was part of the facilitation process.

According to the Guideline, “Telecommunications Infrastructure Providers are required to adopt joint infrastructure installation methods when more than one provider wishes to lay telecommunications infrastructure at the same location and within a timeframe not exceeding one year from the date of notifying other providers of the intention of the first Telecommunications Infrastructure Provider’s intention to carry out infrastructure works.”

TRA is of the opinion that this method of joint work shall reduce the cost for constructing networks and shall help in effectively utilizing the available telecommunications corridor space.

Source: Telecommunications Regulatory Authority 2008.

Local access connectivity

complementary architectures are emerging, with mobile technologies off-loading onto fixed technologies via Wi-Fi the significant traffic generated by tablets and smartphones. In the ideal situation, infrastructure deployment should go hand in hand with utilization. However, this is not always the case in MENA, and the gap can sometimes depend on the sub-region and/or the broadband technology. Three actions will accelerate access network infrastructure development: (i) , (ii) and (iii) .

The competition dynamic in the broadband market is significantly impacted by the existence of such inter-platform competition, either on the basis of WiMax technologies (e.g., Bahrain, Jordan) or via FTTx technologies (the United Arab Emirates) providing alternative broadband access to the traditional copper line of the telephone network equipped with xDSL technology. The market share of incumbent fixed operators tends to be much lower in countries with vibrant infrastructure based competition.

s. Key reforms to stimulate xDSL are: (i) to award new licenses for fixed broadband; and (ii) to ensure an appropriate set of regulated wholesale offers (including unbundling and bitstream) are effective.

, which will foster more broadband usage on the networks in place, as the price of handsets and other mobile broadband devices will fall. Key reforms to be considered are: (i) to award new licenses for 3G/4G operators, including making the necessary spectrum available; and (ii) to introduce mobile number portability. Only Oman, Saudi Arabia, and the United Arab Emirates have introduced 4G licenses. One important element in the move from 3G to 4G will be the availability of mobile broadband enabled devices. An opportunity for countries in MENA could be to award technology neutral wireless broadband licenses, and let the operators decide the transition from 3G to 4G, as operators are best placed to decide when to undertake the necessary investment.

Even if FTTx is most developed in the Gulf countries, efforts to develop this technology are taking place throughout the whole MENA region. Nevertheless, the level of penetration (number of customers on homes passed) is low. This significant gap between the supply and utilization of FTTx access technology creates the risk that investments made to deploy fiber optic in the access network may not be profitable and therefore sustainable in the long term. This could have an adverse effect on the development of fiber lines in new housing areas, with a high potential for residential broadband. **This calls for a clearer strategy for setting appropriate FTTx targets (which areas to cover, and in which sequencing) and governance models (e.g., co-investments, public-private partnerships) for further FTTx deployments.** Such a strategy could possibly strongly encourage fiber development in new dwellings, as several broadband providers would be interested in serving these new neighborhoods. There has been no systematic pre-planning for new residential areas in MENA, as incumbent operators tend to limit

discriminatory, transparent open access to existing networks) accompanied by an independent

The key factors limiting the development of broadband in most countries of MENA being lack of

. For example, in terms of market structure, most advanced telecommunications markets have eliminated entry barriers for all market segments, allowing a large number of operators, as many as the market can sustain. In MENA, only Bahrain and Jordan have implemented a policy of full liberalization in telecommunications. All other countries have a limit on the number of licensed operators. For example, in Tunisia, the government is obliged by law to go through an open and competitive tender process whenever it decides to award a new telecommunications license. In a fully liberalized market, it should be the market, and not the government, that decides the number of operators. New licensing tools, such as class licenses and simple authorizations, should be considered. This first set of measures needs to be complemented by other measures for competition to be sustained. In particular, other traditional reform efforts include the establishment and strengthening of independent national regulatory authorities (NRA), and the promotion of a harmonized regulatory framework that would allow investors to look at the market in MENA as an integrated regional market.

An effective regulatory framework also needs to be established to promote competition. For instance *ex-ante* regulatory provisions allow for the effective utilization of existing infrastructure. The application of *ex-ante* obligations is normally limited to one undertaking holding significant market power. In this respect, regulations that facilitate and discipline the access to already constructed infrastructure are essential. These include: Regulated access to submarine cable landing stations; Non-discriminatory and transparent access to utilities'

The build on the opportunity to break and isolate functional separation across the network layers (see Figure 5). For instance, the Qatar National Broadband Network (Q.NBN) aimed to accelerate the deployment of FTTH, and deliver coverage in excess of 95 per cent by 2015 (100 Mbps). Q.NBN is 100 percent owned by the Qatari government and provides equal, non-discriminatory access to the FTTH network, enabling any operator to use the infrastructure to deliver services. The appeal of “active/passive” infrastructure models is related to the possibility of sharing deployment of critical infrastructure, avoiding duplication, and structuring the capital of the passive infrastructure operator to include investors with a typical passive return on the investment profile. As a result, cost of access to critical infrastructure can be reduced allowing, at the same time, full competition at active network and services levels. However, these models also carry risk, related to the complexity of the model and related regulatory requirements to avoid private investment displacement.

Finally, there is a potential incentive to examine infrastructure deployment models where the

Box 4: Cutting the Roll-out Costs of Broadband Infrastructure in the EU

In June 2012, the European Commission launched a public consultation on an EU initiative to reduce the cost of rolling out broadband communication infrastructure in Europe, inviting member states, private

the social divide in MENA. In 2012, the gender gap in Internet usage in MENA was 34%, which is the second largest regional gender gap after Sub-Saharan Africa (45%).

To address the residual issues of geographic reach of services, differences in Internet speed, and affordability in such underserved areas, a combination of supply and demand policies (outside of the scope of this study) may be considered. Supply side policies include: Including coverage obligations in the licenses of telecommunications operators; Using public subsidies for rural broadband network deployment; and Exploring technological options, including broadband via satellite, and compromise on the broadband speed.

Box 5: Designing Public Subsidies for Rural Broadband: the Example of Chile

Chile decided to extend telecommunications infrastructure to those living in underserved areas by providing public funding through its Fondo de Desarrollo de las Telecomunicaciones, (FDT). In order to improve efficiency and speed in delivering subsidies, the country successfully used reverse or minimum subsidy auctions to develop the

Box 6: Satellite Rural Broadband in Canada

In Canada, policy responses to the problem of rural broadband have come not only from the federal government, but

addressing local resistance to change, often coming from those economic and political agents that are profiting from existing rents. This is a tall order indeed.

However, certain specific conditions in MENA can facilitate the implementation of this complex reform. First, the presence of energy and transport utilities with extensive but presently under-utilized fiber optic networks can be leveraged to strengthen domestic and international connectivity in a competitive environment. Second, there is the emergence of an urbanized, young population that will exert tremendous pressures on demand for broadband on the one hand and on demand for housing on the other. Better coordination of civil works and innovative modes of infrastructure supply can be introduced in MENA to meet this growing demand in rapidly changing urban areas. Third, the ample availability of capital in the region led the telecommunications sector to be the driving force of foreign direct investment in most countries in the past decade. If the appropriate regulatory framework at the national and regional levels is introduced, regional capital can appropriately fund a quick expansion of broadband networks in the region, laying the foundations for broadband- and mobile-led innovation and growth. It is, indeed, crucial that these favorable conditions are strategically exploited by policy makers in the region to strengthen broadband connectivity in a competitive and transparent sector context and that they are not used to exacerbate existing dominant positions in the market. If the right conditions are set, countries in MENA have an opportunity to leapfrog existing infrastructure and create the foundations for a digital economy.