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# **Broadband: the platform of the digital economy and a critical development challenge for Morocco**

*Note for the Ministry of Industry, Commerce, Investment and the Digital Economy  
(MICIEN)*



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## List of Acronyms

ADM	<i>Autoroutes du Maroc</i> (Moroccan Highways)
ADSL	Asymmetric digital subscriber line
ANRT	<i>Autorité Nationale de Régulation des Télécommunications</i> (National Telecommunications Regulation Authority)
AREGNET	Arab Regulators Network
ARPM	Average Revenue per Minute
BAM	Barid al-Maghrib
BEREC	Body of European Regulators for Electronic Communications
CDMA	Code Division Multiple Access
CGSUT	<i>Comité de gestion du service universel des télécommunications</i> (Telecommunications Universal Service Management Committee)
DSLAM	Digital Subscriber Line Access Multiplexer
EBITDA	Earnings before Interest, Taxes, Depreciation, and Amortization
FTTH	Fiber to the Home
FSUT/FSU	<i>Fonds de Service Universel des Télécommunications</i> (Telecommunications Universal Service Fund)
GDP	Gross Domestic Product
GENIE	<i>Généralisation des Technologies d'Information et de Communication dans l'Enseignement au Maroc</i> (Generalizing Information and Communication Technologies for Teaching in Morocco)
GNI	Gross National Income
GSM	Global System for Mobile Communications
GSMA	Groupe Spécial Mobile Association
HACA	<i>Haute Autorité de la Communication Audiovisuelle</i> (High Authority for Audiovisual Communication)
IAM	<i>Itissalat al-Maghrib</i>
IAP	Internet Access Provider
IRU	Indefeasible rights of use
MENA	Middle East and North Africa
MICIEN	<i>Ministère de l'Industrie, du Commerce, de l'Investissement et de l'Economie Numérique</i> (Ministry of Industry, Commerce, Investment and the Digital Economy)
MSAN	Multi-Service Access Node
NGN	Next-generation network
OCP	<i>Office Chérifien des Phosphates</i> (Cherifian Phosphates Office)
ONCF	<i>Office National des Chemins de Fer</i> (National Railways Office)
ONEE	<i>Office Nationale de l'Electricité et de l'Eau</i> (National Electricity and Water Office)
OTT	Over the Top
PACTE	<i>Programme de généralisation de l'accès aux télécommunications à toutes les régions du Maroc sans exception</i> (Programme to generalize access to telecommunications to all regions of Morocco without exception)
PNHD	<i>Plan National Haut Débit</i> (National Broadband Plan)
PPP	Public-Private Partnership
STN	Switched Telephone Network
SPV	Special Purpose Vehicle
ICT	Information and Communication Technology
ITU	International Telecommunication Union
VSAT	Very Small Aperture Terminal
WB	World Bank

## Executive summary

H.M. the King, in his speech celebrating the 61<sup>st</sup> anniversary of the Revolution of the King and the People on 20 August 2014, aspired for Morocco to join the group of emerging countries<sup>1</sup>. The Kingdom strives to reach a similar per capita income level to that of upper-middle income countries, and to reduce unemployment, which particularly affects women and youth. To meet these goals, the government recognizes the need to shift from a low-technology economy with a strong agricultural component to a more diversified economy focused on services and high value-adding industries. As the World Bank World Development Report 2016<sup>2</sup> highlights, broadband is one of the decisive factors in a nation's competitiveness. Deploying broadband is essential to improve Morocco's international competitiveness and to attract foreign investment.

Rolling out broadband is of strategic importance for Morocco, as the country aims to consolidate its promising position in the industrial and manufacturing sectors. When broadband is more widely available, labor productivity increases in services and industry. Access to broadband Internet is also a prerequisite for an innovation-driven economy. In particular, entire sectors that are strategically essential to the Moroccan economy, such as the automotive and aerospace industries, are profoundly affected by ICT use in manufacturing processes (e.g. the Industry 4.0 trend, a virtual manufacturing process). Similarly, the development of the digital economy (developing broadband, content, applications, and the skills to use ICTs) contributes to modernizing administration by introducing digital government services that are available to all. Developing the digital economy would help to reduce the complexity of administrative procedures and corruption, which are considered to be the two main obstacles to business development<sup>3</sup>. In the education and health sectors, broadband can be instrumental in improving the quality of public services. The digital economy heightens social and community involvement, as well as inclusion of isolated or marginalized populations. For instance, it helps to overcome failures of civil status record registration systems when records are incomplete or non-existent. Digital tools also foster the emergence of a participative democracy thanks to social media (Facebook, Twitter, etc.) which reduce communication costs and promote citizen involvement.

The government has developed a number of guidelines to ensure all Moroccans have access to broadband Internet by 2020. These guidelines are presented in the National Broadband Plan prepared by the *Autorité Nationale de Régulation des Télécommunications* (ANRT, national telecommunications authority) in 2012, in the Prime Minister's General Guidelines Note for the 2015-2018 period, as well as in the draft *Plan Maroc Numérique 2020* (Digital Morocco Plan, currently in the approval process) by the Ministry of Industry, Commerce, Investment and the Digital Economy (MICIEN). The Ministry's vision is that the digital economy cannot develop without efficient data transport and processing infrastructure. To achieve this, emphasis is placed on promoting "*new investments in fixed and mobile broadband and high-speed broadband infrastructure, the completion of the liberalization process in the telecommunication sector, in compliance with the agreements concluded in Morocco in this matter, and establishing an updated spectrum management framework*". The Digital Morocco Plan for 2020's major measures aim to authorize the entry of new players, to set up an investment-friendly legal and regulatory framework, and to use Public-Private Partnerships to deploy broadband infrastructure in areas that are less profitable for private investors (see Section 3, Box 6).

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<sup>1</sup> <http://www.maroc.ma/en/royal-speeches/full-text-hm-kings-speech-nation-61st-anniversary-king-and-peoples-revolution-day>

<sup>2</sup> *World Development Report (2016), Digital Dividends*

<sup>3</sup> [World Economic Forum, Global Competitiveness Report 2015-2016.](#)

In this context, this note provides an analysis of the broadband sector and formulates recommendations to initiate new reforms in the sector<sup>4</sup>. They involve completing measures to open the telecommunications sector to competition, and deploying the broadband infrastructure - in particular by using of the Telecommunications Universal Service Fund (FSU) created in 2005 - needed to reach the Digital Morocco Plan for 2020's goals for economic growth and job creation: that ICTs (i) contribute to 11% to GDP; and (ii) create 125 000 additional jobs<sup>5</sup>.

Between 1998 and 2004, the Moroccan government, with the World Bank's support, has implemented a series of reforms to liberalize and privatize the telecommunications sector, which brought significant benefits for the Moroccan economy and led to the spectacular development of mobile telephony. These reforms helped Morocco to position itself as an ICT leader in the Arab region<sup>6</sup>. The entire population benefited from the advantages of mobile, including in Morocco's remote regions (the FSU funded the PACTE project to provide network coverage in white spots), thanks to lower terminal and communication prices.

The ICT sector is one of the main drivers of Morocco's economic competitiveness, and its capacity to create jobs is considerable. However, its growth is slowing<sup>7</sup> and its potential is not fully tapped:

- The sector currently includes three general operators and niche operators (VSAT, GMPCS, 3RP). Most of the niche licenses were granted in the early 2000s. 14 years later, Maroc Télécom's presence remains strong due to efficient management, under-investment in infrastructure by other operators, and delays in implementing key regulations (see below and section 2-C), representing 62.4% of the sector's revenues. Contrary to some emerging countries in Central Europe, Morocco has no Internet access providers authorized to deploy their infrastructure, or infrastructure operators<sup>8</sup>. In 2016, the international communications market remains limited to three operators<sup>9</sup>.
- In 2015, the telecommunications sector represented 3% of GDP (Ministry of Economy and Finance, 2015), 12% of government fiscal revenues, and 1% of jobs.
- For the past 10 years, the sector has been driven by the development of the mobile market. This competitive market has now reached saturation; the mobile penetration rate (number of SIM cards relative to population) was 128% in 2015 and the market is no longer growing, which explains, along with lower retail prices<sup>10</sup>, the fall in operators' revenues. This weakens their economic model, which

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<sup>4</sup> This note focuses on broadband infrastructure, which is one of the founding elements of the digital economy, even though the development of the digital economy is not linked exclusively to that of broadband.

<sup>5</sup> These goals were calculated by the MICIEN (2014) on the basis of the European Digital Agenda, which estimates that, in an optimistic scenario, the digital economy (telecommunications and ICT in the broader sense including the audiovisual and computing sectors) can contribute 11-12% of GDP by 2020.

<sup>6</sup> The Arab region refers to a number of countries, including Arabia (Arabian Peninsula), North Africa and the Middle-East, which have in common the Arabic language and an Arab (or arabized) dominant ethnicity.

<sup>7</sup> The Ministry of Economy and Finance stated in May 2015: "*After 15 years of endogenous growth, the sector is showing signs of deceleration with lower revenues and market saturation, hence the need to explore new drivers of growth*". See: *Tableau de bord sectoriel*, Department of financial studies and forecasts, May 2015 (page 14): [http://www.finances.gov.ma/depf/SitePages/publications/en\\_chiffres/bord\\_annuel/tableau\\_bord\\_sectoriel.pdf](http://www.finances.gov.ma/depf/SitePages/publications/en_chiffres/bord_annuel/tableau_bord_sectoriel.pdf)

<sup>8</sup> In June 2016, Méditel stated that "*the priority for Morocco is not to have multiple IAPs or operators to direct international calls, but first and foremost to strengthen current operators in the face of Maroc Télécom's competition. The recommended approach quite simply favored the incumbent operator at the expense of alternative operators*". Similarly, WANA stated in June 2016: "*A proliferation of players would not contribute to a healthier competitive environment. It would only weaken alternative operators as long as this asymmetry (i.e. in terms of fixed infrastructure ownership relative to Maroc Télécom), including the existing alternative operators*".

<sup>9</sup> In June 2016, Méditel commented on the issue: "*satellite operators also provide this service, which is therefore not limited to three operators*".

<sup>10</sup> The price of incoming international calls, however, remains very high (in May 2016 the price of a SkypeOut call to a mobile terminal in Morocco was 7 times higher than in France (see <https://www.skype.com/fr/features/call-phones-and-mobiles/>)). They are a source of income for operators; this helps to explain the decision to ban Voice

is highly dependent on mobile telephony (nearly 70% of Maroc Télécom's turnover and almost all for Méditel and WANA, according to the ANRT in 2016).

- Since the introduction of 3G in 2007, followed by 4G in 2015, broadband Internet offers the most development potential in the ICT sector. But due to lack of competition, incomplete and inefficient regulation and underinvestment<sup>11</sup> in infrastructure (mainly fixed), the broadband market remains restricted to the country's main urban centers and routes. This results in a large shortfall for the State (GDP, fiscal revenue) and a persistent digital divide which leads to economic and social inequality. Other countries in the MENA<sup>12</sup> region and in emerging countries are facing a similar situation. In Morocco, access to broadband subscriptions remains too expensive for 60% of the population. Circumstances are similar in many African countries, but the main reasons for it are specific to Morocco:
  - Morocco maintains barriers to entry for players who wish to deploy their own infrastructure without radio spectrum auctions. Thus, the broadband market is consolidated around the three operators. However, some areas are not covered by any of the three main operators and competition on the 3G and 4G segments does not occur in all the covered areas: Maroc Télécom's coverage is broader than Méditel's, which in turn is broader than WANA's<sup>13</sup>. On the smaller fixed broadband market (ADSL) - 1.13 million subscriptions in 2015 - the incumbent operator holds over 99% of the market even though unbundling measures were introduced in 2008.
  - Despite receiving fixed NGN<sup>14</sup> licenses in 2006, Méditel and WANA have not yet massively invested in wire-based infrastructures<sup>15</sup>. This leads to a strong imbalance in fiber optic infrastructure between the three operators: Maroc Télécom's backbone network is estimated at 25 000 km, Méditel's at 5 000 km, and WANA's at 6 000 km (including leases from alternative infrastructure operators).
  - The FSU (Universal Service Fund) (funded by 2% of operators' total revenues for the year) is not sufficiently focused on expanding broadband (see section 2-C and 3-B). The data collected and presented in Annex 5 lead us to estimate that: (i) nearly 288 million USD are available at the FSU<sup>16</sup>; and (ii) 6 projects were initiated by the FSU since it was created, most of which focus on the education sector. Moreover, even though expanding broadband networks is a priority objective for the FSU, since 2006 none of the FSU-backed projects have massively funded the deployment of broadband infrastructure in unserved areas.

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over IP services (Skype, Viber, etc.). This decision has since been rescinded: <http://www.tic-maroc.com/2016/10/lanrt-debloque-temporairement-la-voip-au-maroc.html>

<sup>11</sup> The ANRT stated in June 2016: "*The investments undertaken by operators average over 5.5 billion Dirhams per year since 2008*". The distribution of investment per category is not available.

<sup>12</sup> MENA refers to a vast region, from Morocco in north-west Africa to Iran in South-West Asia, which generally includes all the countries of the Middle-East and North Africa.

<sup>13</sup> Voir : <https://www.nperf.com/en/map/MA/>

<sup>14</sup> NGN licenses refer to next-generation networks, whose architecture rests on packet data transfer and which can replace switched telephone network and other traditional networks.

<sup>15</sup> In June 2016, Méditel stated that it had "*invested, between 2006 and 2011, over 6 billion MAD (excluding licenses) for the development of its fixed and mobile networks and in particular in deploying optical fiber-based transfer technologies, or 20% of its total turnover for the period*". As for WANA, it stated in June 2016: "*(...) the fixed deployment plan rested on a fixed wireless technical model. WANA has fulfilled all the commitments laid out in the license requirements. For instance, WANA has invested over 10 billion dirhams over the past years and plans to invest at least as much in the coming years*". However, these statements from Méditel and WANA do not specify the breakdown of investments for the fixed network and the mobile network.

<sup>16</sup> According to the Special Purpose Account 3.1.0.0.1.04.005 – Amending Program #1, Fiscal Year 2016, a document dated 13 June 2016 - the FSU has a surplus of MAD 2 523 063 103 from the previous year, 300 million in payments by operators for the year 2016, and therefore a total of MAD 2 823 063 103 available for existing programs and programs approved in 2016.



- However, as this note was being drafted, documents were shared with the World Bank team on consultations in preparation for a call for tender aimed at financing broadband deployment in white spots with FSU funds (see section 2-C). Regardless, an FSU reform is needed to: a) publicly disclose information on the FSU's achievements and decision-making procedures (without referring to security-related issues); b) ensure that FSU funds are used to increase access to broadband infrastructure and reduce the digital divide. This would prevent the FSU from being used as a source of funding parallel to the Budget Law when it comes to funding public projects.
- Broadband infrastructure (copper and optic fiber) regulation is inefficient. Regulation decisions<sup>17</sup> do exist regarding access to the incumbent operator's local loop, but they are not sufficiently enforced, which brought the ANRT to request authority to impose stronger sanctions with regard to the encountered problems<sup>18</sup>: insufficient on-site controls, slow responses to requests related to the catalogues of ANRT-approved services, absence of civil engineering catalogues. Regulation is also incomplete as no decision exists on regulating the incumbent operator's dark fiber, which implies that negotiations between operators are not regulated and fail<sup>19</sup>. Lastly, access to the networks of alternative infrastructure operators is legally authorized, but not regulated to ensure open and non-discriminatory access to all operators.
  - In Morocco, telecommunications are considered a strategic sector for the country, as reflected in the fact that the Public Treasury, the *Caisse de Dépôt et de Gestion* (government deposit guarantee agency) and the National Investment Company are among the shareholders of the three operators, but also that the regulating authority acts under the direct supervision of a board of directors comprising the Prime Minister and several other ministers.

Under these conditions, growth prospects for broadband Internet are limited. For the reasons mentioned above, Morocco, a regional leader a decade ago, is currently behind other comparable countries. The broadband penetration rate (17.5% for fixed in % of households<sup>20</sup> and 41% for mobile in % of population in 2015 in Morocco, whereas the regional average in 2015 is 41% and 85%, respectively) is among the lowest in the MENA region (see section 2-B), and is considerably lower than some Eastern European countries (see section 2-C) where rates are close to 50% for fixed-line, and 100% for mobile (see Figure 16). These countries, where ten years ago broadband penetration rates were comparable to Morocco's, and where per capita GDP in the early 2000s was equivalent to Morocco's, have since implemented reforms which, in particular:

- Encouraged the entry of new players (see Box 1) on all segments of the market by introducing an authorization or standard license regime (less limiting than a licensing regime requiring competitive bidding and relies on the discretionary power of the State or the regulator) and by simplifying administrative procedures. Morocco has granted VSAT, GMPCS and 3RP licenses but a similar approach was not adopted to introduce Internet access providers allowed to deploy their infrastructure on the market.

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<sup>17</sup> <https://www.anrt.ma/en/reglementation/decisions>

<sup>18</sup> WANA stated in June 2016: "*Several regulations have in fact been introduced, but enforcement was lacking due to the ANRT's lack of sanctioning power; this stands to change with last week's promulgation of decree 2-16347 of 31 May 2016*".

<sup>19</sup> This aspect is the subject of a debate between the incumbent and the alternative operators. Whereas Maroc Telecom considers that "*the backbone's dark fiber is not infrastructure, as such it cannot be regulated*", Méditel believes that "*the prohibitive cost of replicating Maroc Télécom's infrastructure, and the unreasonable time it would require, mean that there are no viable alternatives for alternative operators to develop a sustainable fixed and mobile broadband offering*".

<sup>20</sup> As a percentage of the population, this penetration rate is approximately 3.5%, given that the average household in Morocco has 5 members. See: <http://www.leconomiste.com/article/893043-ces-nouveaux-profils-de-la-famille-marocaine-moins-d-enfants-plus-de-maladies-chroniq>

- Introduced regulation for open and non-discriminatory access to communications networks by telecom operators and alternative infrastructure operators, and in particular, effectively enforced existing regulation on unbundling<sup>21</sup>.
- Promoted private investment by: (i) regulating municipal property use<sup>22</sup>; (ii) facilitating the coordination of civil works among linear infrastructure projects<sup>23</sup>; (iii) passing a housing law which required new buildings to be equipped with optical fiber<sup>24</sup>; and (iv) listing and mapping existing infrastructure<sup>25</sup> that could be used to deploy new networks<sup>26</sup>.
- Promoted public/private investment through public-private partnerships (PPPs) and optimized use of the universal service fund in broadband infrastructure, in particular in areas where private interest was lacking<sup>27</sup>.

### Box 1. European experience in liberalizing the broadband sector

In Lithuania the Fiber to the Home (FTTH) penetration rate in 2015 is the highest in Europe\*, and most connections are from providers other than the incumbent. In Bulgaria, the incumbent operator's market share for fixed broadband is only 29%\*\* , and in Turkey 87 general authorizations were granted to wireless IAPs\*\*\*. In Romania and Lithuania, policies aimed at opening the market have led these countries to have higher average Internet speed than France or Italy\*\*\*\*. In Morocco, international bandwidth per Internet user is among the lowest in the MENA region and is far behind Romania, Bulgaria or Lithuania in the matter (see Figure 12).

\*[http://www.ftthcouncil.eu/documents/PressReleases/2016/PR20160217\\_FTTHpanorama\\_luxembourg\\_french\\_Award.pdf](http://www.ftthcouncil.eu/documents/PressReleases/2016/PR20160217_FTTHpanorama_luxembourg_french_Award.pdf)

\*\* Rood (2010). Very high speed broadband deployment in Europe: The Netherlands and Bulgaria compared.

\*\*\* Turkey Case Study. Strategic Options to Develop Broadband in Egypt, World Bank, 2011. Also see: [http://www.bix.bg/en/en\\_article/Bulgarian\\_Broadband\\_Market.html](http://www.bix.bg/en/en_article/Bulgarian_Broadband_Market.html)

\*\*\*\* See <http://www.speedtest.net/fr/> for Internet speed tests.

The World Bank recommends to the Moroccan government to carry out new reforms for broadband. The Moroccan telecommunications market and the operators' business model, in particular Méditel's and WANA's, remains focused on voice services, whereas the future of the telecom sector, and the digital

<sup>21</sup> The ANRT considered in 2016 that the draft law 121-12, submitted to Parliament in 2014, provided an appropriate response to this objective.

<sup>22</sup> It is to be noted that a decree, published in early 2016, set the fees for occupying State public property. Moreover, and as the ANRT stated in June 2016: "*In partnership with the Wilaya of Greater Casablanca, a procedure and a convention were signed with operators, establishing simplified procedures for accessing municipal property and coordinating civil works. The aim is to extend this model, once it has proven its worth, to all the concerned entities in the Kingdom*".

<sup>23</sup> The ANRT stated in June 2016: "*The draft decree linked to draft law n. 121-12, introduces an obligation to coordinate civil works, a public offering procedure before telecom operators begin any infrastructure works, and sets out the obligations that come with using the new infrastructure*".

<sup>24</sup> To Maroc Télécom in June 2016: "*fiber-optic cabling should not occur at the expense of copper as in some residential areas, the services requested by the customer only require the copper pair*".

<sup>25</sup> In particular, overhead and underground civil works structures (ducts, conduits, tunnels, pipes, wall-mounted structures, poles, overhead structures), technical rooms and cabinets, pylons and other high points and emission sites.

<sup>26</sup> Similarly to what is being done in Europe to facilitate the deployment of new broadband networks and track progress in infrastructure deployment. See <https://ec.europa.eu/digital-single-market/en/broadband-and-infrastructure-mapping-project>

<sup>27</sup> In June 2016, WANA stated that: "*public funding, in particular the FSU, should not be considered to be exclusively for white spots, but should also benefit dense areas if the ambition is to deploy fixed infrastructure that is as capillary as possible*".

economy's development potential, lie above all in data services. The new series of reforms recommended by the World Bank therefore rests on four main pillars, as follows:

1. Finalizing, and seeking government approval for - in cooperation with the sector's main stakeholders and following an open and participatory process - a strategy for the digital economy driven by broadband (generalizing access to broadband to the entire country). The goals of this broadband strategy must be consistent with Morocco's development and economic transformation goals, in particular those related to raising labor productivity, enhancing the competitiveness of strategic sectors for the Moroccan economy, spreading innovation (e.g. *Industry 4.0*, an ICT-based virtual industrial manufacturing process). To this end, such a strategy should draw on the objectives pursued by the European Union in terms of high speed Internet by 2020<sup>28</sup>. The Moroccan government has successfully initiated the preparation of the Maroc Numéric 2020 strategy (Digital Morocco 2020), but it has yet to be officially adopted.
2. Reviewing the scopes of action and remit of each public player in the sector. In particular, discussions with the sector's players have called attention to the fact that a new model of public governance in the sector is needed to efficiently steer the strategy to develop the digital economy. The role of the sector's ministry (MICIEN) could be strengthened to ensure the formulation of sector policy and strategic orientations, in particular by setting up a government entity devoted to the ICT sector and creating and providing the necessary tools for the new Digital Development Agency (*Agence du Développement Digital*, ADD). The role and resources of the telecommunications regulator (ANRT) could also be enhanced, by strengthening its ability to efficiently regulate (i.e. enforce decisions) a market open to competition (See Section 2-C).
3. Updating the legal and regulatory framework to: (i) introduce new players on the telecommunications market (international gateways, backbones, backhauls and access networks) according to fair rules; (ii) encourage private infrastructure investment by all players in the sector (public property use, cross-sector synergies, cabling new buildings, infrastructure mapping); and (iii) strengthen regulation for open and non-discriminatory access to communication networks (wireline infrastructure, civil engineering, etc.) for telecommunications operators and alternative infrastructure operators, and to enforce existing regulation on unbundling.
4. Considering PPPs to deploy new broadband infrastructure, including in peri-urban and rural areas where competition is relatively lower;
5. Optimizing FSU use by restructuring it into a Digital Development Fund to promote the deployment of broadband infrastructure in less profitable areas, and stimulate demand for broadband with measures such as digital literacy campaigns.

The program of specific reforms recommended by the World Bank converges with the Moroccan government's policy orientations for the coming years, and would help to meet the strategic goals set out in the Plan Maroc Numéric 2020. Such reforms would stimulate competition and expand access to broadband, including in less profitable semi-urban and rural areas. This would pave the way for large-scale development of digital services, which form the foundation of a modern, competitive, job-creating economy. Developing broadband and high-speed broadband is critical to enhance Morocco's international competitiveness, unlock the Digital Economy's job creation potential, and attract foreign investment, particularly in offshoring, in advanced services and new technologies to initiate the transition toward a new "Industry 4.0" or "smart factory" industrial model, in which digital technologies are at the heart of industrial processes.

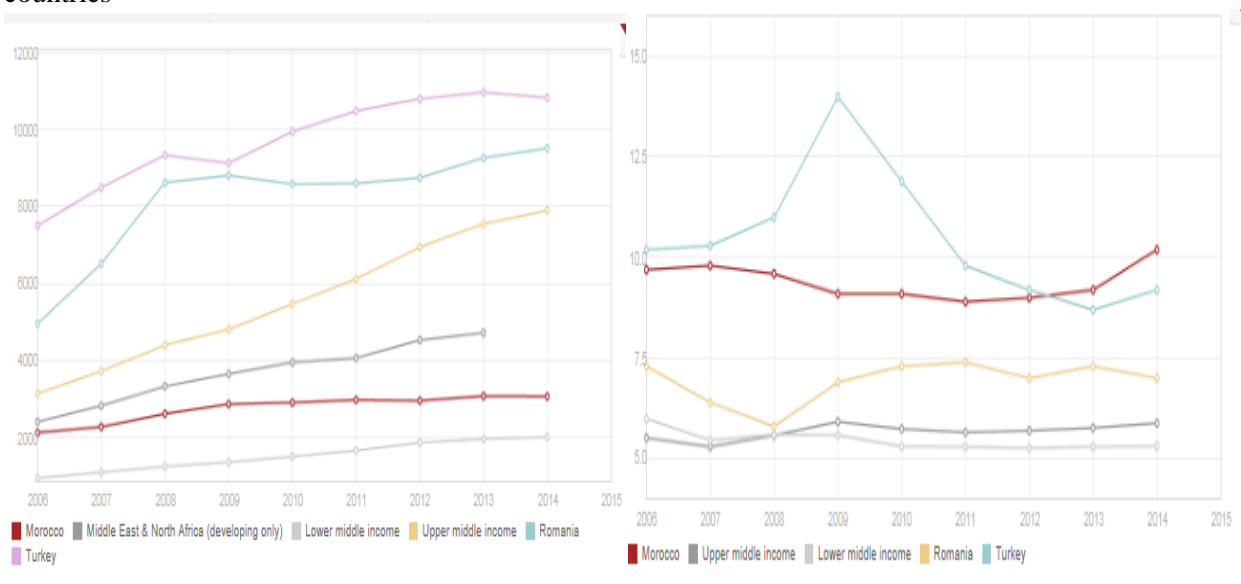
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<sup>28</sup> The European Digital Agenda (European Commission, 2013) set the following objectives for 2020: a broadband penetration rate of 100% of the population for bandwidths over 30 Mbps, and a penetration rate of 50% of the population for bandwidths over 100 Mbps.

## Introduction

In the wake of H.M. the King's speech on 20 August 2014 celebrating the 61st anniversary of the Revolution of the King and the People, Morocco's ambition is to become an emerging country by 2020. Morocco thus aspires to reach a gross national income (GNI) per capita that would place it in the category of upper-middle income countries (in which GNI is about \$8,000) such as Mexico and Romania, and to reduce the high unemployment rate (10.2% in 2014), which particularly affects women and youth (19.1% in 2014) (Figure 1). Today, Morocco is categorized as a lower-middle income country with a GNI of 3,006 USD in 2013, which places it below the average of the MENA region, of middle income countries (GNI between 4,086 and 12,615 USD), and of the group of emerging countries, such as Turkey or Romania, which Morocco aspires to join. Similarly, the unemployment rate in Morocco is about twice the middle-income country average (both upper- and lower-), and well above that of Turkey or Romania (Figure 1).

**Figure 1.** Gross national income per capita (left) and unemployment rates (right) in Morocco and other countries



Source : World Bank, 2016 (*World development indicators*)

To join the upper-middle income country category, the government recognizes the need to shift from a low-technology economy with a strong agricultural component to a more diversified economy focused on services and high value-adding industries. To make this shift, ICT and broadband development (see Box 2 for definitions), a major driver of competitiveness in modern nations, must play an essential role:

- In Morocco, 70% of the added value and 80% of exports come from low-technology manufactured goods (OCP Policy Center, 2014<sup>29</sup>); expanding broadband would allow Moroccan industry to position itself on technology-intensive global supply chains, and move up global value chains by enhancing its competitiveness, in particular by raising labor productivity. A World Bank study (2014)<sup>30</sup> showed that introducing broadband raises labor productivity by 5% in industry and by 10% in the service sector. Morocco has already successfully positioned itself on low value-adding services (such as call

<sup>29</sup><http://www.ocppc.ma/publications/politiques-publiques-transformation-industrielle-croissance-et-emploi-aumaroc#.VyoNc9IUUiQ>

<sup>30</sup> <http://www.worldbank.org/en/region/mena/publication/broadband-networks-in-mna>

centers, which in 2016 were 140 and created 25,000 jobs<sup>31</sup>) and industrial production chains in the automotive and aerospace industries. But it has to truly develop broadband, while also adapting education and training policies, to position itself on higher value-adding services (e.g. outsourcing knowledge processes and technological and information services) and to initiate a transition toward a new "Industry 4.0" or "smart factory" industrial model, in which digital technologies are at the heart of industrial processes<sup>32</sup>.

- Rolling out broadband is also one of the essential ways (with content development, applications development and the ability to use ICT) to modernize administration by introducing digital government services available to citizens and businesses. This would simplify administrative procedures and reduce corruption, which investors consider to be the two main barriers to business development (World Economic Forum, 2015-2016<sup>33</sup>). In particular, this would simplify business registration procedures, as well as customs procedures (this process is underway) and certificate computerization, which would ultimately contribute to reducing the risks of corruption. Using broadband in health and education (Internet access in schools) would improve the quality and quantity (i.e. remote services) of services provided and thereby to strengthen the social contract between the citizen and the State. The 2015-2016 World Economic Forum ranked Morocco 110<sup>th</sup> (out of 140) for Internet access in schools<sup>34</sup>.

## Box 2. Definition of ICT, broadband and high-speed broadband

The Information and Communications Technology (ICT) sector includes all the businesses that operate in the fields of computing, multimedia, Internet, telecommunications and the audiovisual sector. Telecommunications (or electronic communications) remotely transmit information by electronic and computer-based means. As for Internet, broadband generally refers to "permanent" access to telecommunications, as opposed to "modem" access through a switched telephone network (STN), allowing for an Internet connection with higher speeds than with the telephone modem. The International Telecommunication Union (ITU) defines broadband as a transmission capacity of at least 256 kbps. Nowadays, most developed (primarily European) and emerging countries have set high-speed broadband objectives, given the abundance of uses and possibilities such a connection offers in terms of developing services and economic activity. A high-speed broadband connection offers higher speeds (30 Mbit/s) than a standard binary broadband connection, for instance through a DSL network or optic fiber.

Aware that broadband has an important role to play in economic growth and job creation, which can help Morocco to become an emerging country, the government has developed - through the ANRT, the Prime Minister and the Ministry of Industry, Commerce, Investment and the Digital Economy (MICIEN) - several guidelines to ensure all Moroccans have access to broadband by 2020 (Box 3). These guidelines are presented in the National Broadband Plan, prepared by the National Telecommunications Regulation Authority (ANRT), in the Prime Minister's General Guidelines Note for the 2015-2018 period, and, more recently, in the MICIEN's draft Plan Maroc Numérique (Digital Morocco Plan) 2020 (currently in the

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<sup>31</sup> See the International Fair dedicated to call centers in Morocco (SICCAM): <http://www.bladi.net/maroc-centres-d-appels.html>

<sup>32</sup> <http://eduscol.education.fr/sti/sites/eduscol.education.fr.sti/files/ressources/techniques/1888/1888-gimelec-industrie-4.0-lusine-connectee-septembre-2013.pdf>; [https://www2.deloitte.com/content/dam/Deloitte/za/Documents/manufacturing/ZA\\_Future\\_of\\_Manufacturing\\_2015.pdf](https://www2.deloitte.com/content/dam/Deloitte/za/Documents/manufacturing/ZA_Future_of_Manufacturing_2015.pdf) ; Klaus Schwab (2016), « *The Fourth Industrial Revolution* » ; and <http://www.mckinsey.com/business-functions/operations/our-insights/manufacturings-next-act>

<sup>33</sup> <http://reports.weforum.org/global-competitiveness-report-2015-2016/>

<sup>34</sup> <http://reports.weforum.org/global-competitiveness-report-2015-2016/competitiveness-rankings/#indicatorId=GCI.B.05>

approval process). The MICIEN's vision is that the digital economy cannot thrive without efficient data transport and processing infrastructure. To achieve this, emphasis is placed on promoting "new investments in fixed and mobile broadband and high-speed broadband infrastructure, as well as completing the liberalization of the telecommunications sector, in compliance with the agreements concluded in Morocco in this matter, and implementing an updated spectrum management framework".

**Box 3. Policy orientations for developing telecommunications in the coming years in Morocco**

1. Digital Morocco Plan for 2020 (Plan Maroc Numéric 2020)	2. 2015-2018 General Guidelines	3. 2012 National Broadband Plan
<p>Through the PMN, Morocco aspires to <b>become an emerging country by 2020</b>. To achieve this goal, the PMN aims for ICT to represent <b>11% of GDP and create 125,000 additional jobs by 2020</b>.</p> <p>The PMN 2020 is broken down into six priorities: (1) Digital government services, (2) Digital excellence networks, (3) Digital cities, (4) Digital industry, (5) <b>Digital infrastructure</b> and (6) Morocco's African dimension.</p> <p>The PMN's vision is that the digital economy cannot flourish without efficient data transport and processing infrastructure. To achieve this, the PMN <b>encourages new investments in broadband and high-speed broadband infrastructure (fixed and mobile), the completion of the liberalization process in the telecommunication sector</b>, in compliance with the agreements concluded in Morocco in this matter, and establishing an updated spectrum management framework.</p>	<p>To sustain market growth and combat the digital divide, while also ensuring visibility for current and potential players, the <b>government</b> established general policy orientations for the development of the telecommunications sector. The General Guidelines Note (NOG) is a roadmap for all the players in the telecommunication sector.</p> <p>The 2015-2018 General Guidelines aim to expand access to broadband and high-speed broadband to the entire population. To this end, the following guidelines were set:</p> <ol style="list-style-type: none"> <li>1. To encourage investment and <u>strengthening the market by focusing on general operators</u>;</li> <li>2. To develop and introduce models to <u>share infrastructure</u>, particularly in less densely populated areas;</li> <li>3. To <u>accelerate</u> projects aimed at generalizing broadband and high-speed broadband, in compliance with international standards;</li> <li>4. Leverage regulation to truly <u>open some segments of the telecommunication market to competition</u>, especially business services.</li> </ol>	<p><b>In the 2013 General Guidelines, the ANRT</b> carried out a study to develop a national plan to expand access to broadband and high-speed broadband. The ANRT's goals* in the plan are the following:</p> <ul style="list-style-type: none"> <li>• <b>100%</b> of the population should have access to broadband, in all the country's municipalities, <u>within 10 years</u>.</li> <li>• <b>50%</b> of the population should have access to high-speed broadband (at least 100 Mbit/s), in the 195 most densely populated municipalities (slightly less than 2.5% of the land area), <u>within 15 years</u>.</li> <li>• <b>All public administration offices</b> in remote and/or less profitable areas should have broadband Internet access <u>within 3 to 5 years</u>.</li> </ul> <p>The results of this study were presented at the last Board meeting, on 9 May 2012, under the chairmanship of the Head of Government.</p>
<p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• The PMN 2020, which should follow the PMN 2013, <b>has not yet been approved by the government</b>.</li> <li>• The PMN 2020's cost is estimated at about 16 billion dirhams (or about <b>1.6 billion USD</b>).</li> <li>• <b><u>In spite of common objectives, the Ministry's vision differs from the Prime Minister's 2015-2018 General Guidelines when it comes to further liberalization in the sector.</u></b></li> </ul>	<p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• <b>The General Guidelines are prepared by the ANRT</b> (answer to previous question?) and are publicly available on its website: <a href="https://www.anrt.ma/publications/notes-dorientations-generales">https://www.anrt.ma/publications/notes-dorientations-generales</a>;</li> <li>• <b>General Orientation Notes are signed by the Prime Minister</b>, who is also the chairman of the ANRT board of directors: <a href="https://www.anrt.ma/lagence/organisation/instances">https://www.anrt.ma/lagence/organisation/instances</a>;</li> <li>• The MICIEN's role in preparing General Guidelines Notes is <b>not clearly defined</b>.</li> </ul>	<p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• This plan is <b>not published</b> on the ANRT website: <a href="https://www.anrt.ma/lagence/actualites/plan-national-pour-le-developpement-du-haut-et-tres-haut-debit-au-maroc">https://www.anrt.ma/lagence/actualites/plan-national-pour-le-developpement-du-haut-et-tres-haut-debit-au-maroc</a>;</li> <li>• There is <b>no progress report</b> on the implementation of this plan and the objectives to be met.</li> </ul> <p>* As a comparison, the European Digital Agenda (European Commission, 2013) sets the following objectives for 2020: a standard broadband (over 30 Mbps) penetration rate of 100% of the population; a high-speed broadband (over 100 Mbps) penetration rate of 50% of the population.</p>

Source : Authors' compilation from the Plan Maroc Numéric 2020, the 2015-2018 General Guidelines and the 2012 National Broadband Plan.

In this context, this note provides an analysis of the broadband sector and formulates recommendations to initiate new reforms in the sector. They involve the completion of measures to open the telecommunications sector to competition, and the deployment of the necessary broadband infrastructure - in particular by using the Telecommunications Universal Service Fund (FSU) more efficiently - to reach Digital Morocco 2020's goals for economic growth and job creation, namely that ICTs contribute 11% to

GDP, and create 125 000 additional jobs<sup>35</sup>. This note places special emphasis on the broadband market<sup>36</sup>, as it will be the main driver of growth in the sector for the coming years. The mobile telephony market has reached saturation with a 128% penetration rate in 2014, national retail prices have fallen and so have operators' revenues. However, broadband's potential to spur economic and social development remains untapped, in particular for the following reasons:

- Relatively low competition: even though competition is intense for the 3G market, it remains quite low for the broadband market as a whole. The incumbent operator represents 53% of overall Internet subscribers in 2015, versus 25% for Méditel and 22% for WANA (ANRT, 2015). This mainly owes to the fact that the incumbent owns more national connectivity infrastructure (as a result of operators' investment policy). But it is also due to the absence of Internet access providers or operators that are independent from the three main operators and that are allowed to deploy their own infrastructure, and to the absence of infrastructure operators. As a comparison, Turkey has 87 and 16, respectively.
- Broadband penetration is low relative to the MENA region average (17.5% of households<sup>37</sup> for fixed) and 41% of the population for mobile in 2015, versus 41% and 85% on average in the MENA region). It is even lower when compared to Morocco's competitors such as Romania (fixed broadband penetration of 46% of households and 67% of population for mobile broadband).
- Broadband subscriptions remain too expensive for the poorest 60% of the population. A representative household for this segment would have to spend respectively 26% and 23% of its disposable income for a fixed and mobile subscription (World Bank, 2014<sup>38</sup>). Many African countries face the same issue, but it must be solved if Morocco is to become an emerging country.
- A lack of fixed and mobile broadband infrastructure (see section 2-B): broadly speaking, broadband coverage is mostly concentrated in the north of Morocco, around the major cities and routes<sup>39</sup>. Fixed infrastructure is limited in size, and the incumbent owns much more fixed infrastructure than the other two operators (as a result of operators' investment policy). The lack of coverage for fixed infrastructure helps to explain the uneven 3G and 4G coverage in Morocco. Moroccan operators' network coverage maps<sup>40</sup> clearly show that 3G and 4G mobile service is concentrated along the main routes in the northwest of the country and in large urban centers. In some areas, there is no competition for the 3G and 4G segments: Maroc Télécom's coverage<sup>41</sup> is broader than Méditel's, which in turn is broader than WANA's. Since 4G was introduced in March 2015, 4G mobile coverage (LTE) has been limited to large urban centers; 1.5 million people had subscribed in June 2015, whereas government had set coverage goals at 65% of the Moroccan population (21 million people) by 2020 (Telegeography, 2016)<sup>42</sup>. A lack of transparency regarding the coverage requirements (i.e. the geographic coverage schedule)

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<sup>35</sup> These goals were calculated by the MICIEN (2014) on the basis of the European Digital Agenda which estimates that, in an optimistic scenario, the digital economy (telecommunications and ICT in the broader sense including the audiovisual and computing sectors) can contribute 11-12% of GDP by 2020.

<sup>36</sup> This note focuses on broadband infrastructure, which is one of the founding elements of the digital economy, even though the development of the digital economy is not exclusively linked to that of broadband.

<sup>37</sup> It is to be noted that as a percentage of population, the penetration rate is about 3.5%, as in Morocco the average household has 5 members. See: <http://www.leconomiste.com/article/893043-ces-nouveaux-profils-de-la-famille-marocaine-moins-d-enfants-plus-de-maladies-chroniq>

<sup>38</sup> <http://www.worldbank.org/en/region/mena/publication/broadband-networks-in-mna>

<sup>39</sup> Maroc Télécom, which has broader network coverage than other operators, stated in June 2016 that deployment of fixed and mobile infrastructure is not limited to the main urban centers.

<sup>40</sup> See: <https://www.nperf.com/en/map/MA/>

<sup>41</sup> In May 2016, Maroc Télécom stated that it owned over 6,600 3G base stations and approximately 4,000 sites which provided 4G coverage for over 50 cities.

<sup>42</sup> According to the ANRT in June 2016: "By the end of 2016 (less than a year after the introduction), operators declared a coverage of nearly 50% of the population, exceeding their commitments".

included in the terms of reference (see annexes) of operators' fixed and mobile licenses means that it is impossible to find out precisely what Morocco's broadband infrastructure coverage is. Unlike the terms of reference of the licenses, their annexes, which specify coverage requirements, are not publicly available<sup>43</sup>. And even though the ANRT has detailed databases, it does not provide public access to detailed maps of fixed and mobile infrastructure owned by operators and alternative infrastructure operators. Therefore, and contrary to many other countries, Morocco has no publicly available website providing an inventory of existing broadband infrastructure in the country. In many countries - particularly in Europe - such information is public. This is the case in Italy, for instance, where the Ministry of Economic Development (Ministero dello Sviluppo Economico<sup>44</sup>) publishes a map of white, grey and black areas on its website. This information is essential to evaluate the state of broadband, and to formulate effective policies for the sector. The fact that it is not public or available in Morocco is a major weakness.

Thus, public policies for this sector should aim to stimulate competition (through prices and quality of service) on the broadband market, and to expand access to and use of broadband Internet beyond the country's main urban centers.

This note is organized in three sections:

- Section 1 provides a summary analysis of recent economic studies that measured the impacts generated by access to and use of ICT and broadband on the economy (trade, innovation, jobs, public health and education services). It is supplemented by Annexes 1, 2, and 3.
- Then, section 2 analyzes public policies implemented by the Moroccan government since the 1990s, and their impact on the sector. It also shows that the uncompleted telecommunications reform program has led to the sector's sub-optimal development in comparison with other countries that carried out more comprehensive reforms, generating significant economic gain.
- Lastly, section 3 presents the main reforms that the World Bank would recommend that the government carry out in the broadband sector to give itself the means to fulfill its ambitions and finish opening up the broadband sector to competition. These strategic orientations are necessary for Morocco to catch up with its direct competitors - particularly in eastern Europe - in terms of ICT access, and to lay the foundations of a truly competitive, innovative, job-creating digital economy.

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<sup>43</sup> See: <https://www.anrt.ma/reglementation/cahiers-des-charges/>. Moreover, according to the ANRT in June 2016: "Coverage annexes are not published because they are considered trade secrets. The ANRT is in favor of disclosing these lists once the operators' commitment period is over. Therefore, 3G coverage commitments could be made public if the government (since licenses are awarded by decree) decides to do so. Those for 4G will in principle remain confidential until April 2016. As a reminder, draft law n. 121-12 specifically dealt with disclosure obligations for operator coverage".

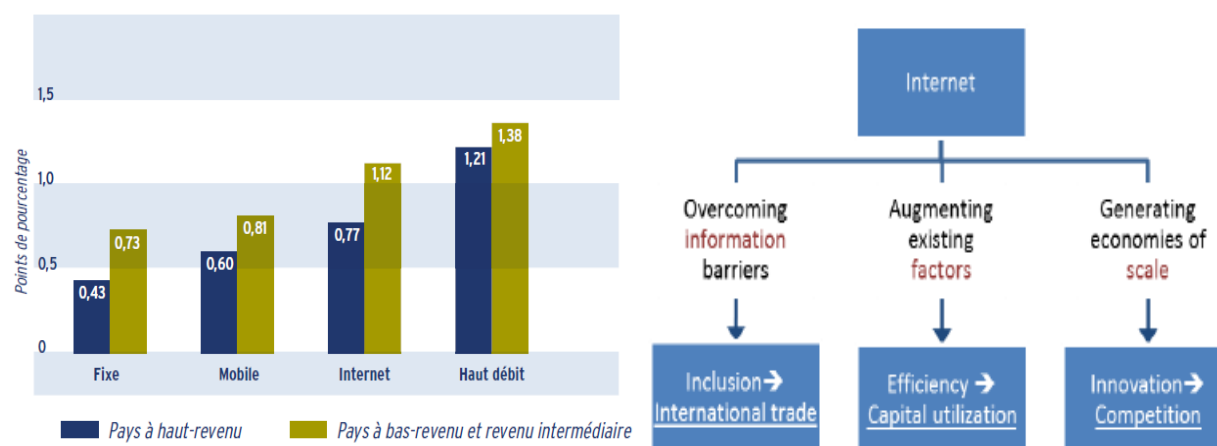
<sup>44</sup> See: <http://www.sviluppoeconomico.gov.it/index.php/en/>



## Section 1. Economic impacts of access to and use of ICT and broadband

A large number of studies - including the World Bank's World Development Report 2016<sup>45</sup> - show that when businesses, government entities, and individuals have more access to mobile services, data and broadband, this has significant positive consequences for economic activity. For instance, the World Bank's empirical study (2009)<sup>46</sup>, based on a sample of 120 countries, shows that an increase of 10 percentage points (ppts) in telecommunication services penetration generates significant gains in GDP growth (Figure 2). Broadband services (both fixed and mobile) have the strongest economic impact by virtue of their effect on market access, productivity, competitiveness, innovation, and attracting foreign direct investment.

**Figures 2 and 3.** Increases in GDP growth due to a 10 ppt rise in penetration rates of telecommunication services by type of technology and by level of development (left) and main transmission channels for the effects of broadband on economic growth (right)



Note: The findings of Qiang and Rossotto (2009) come from an econometric study based on a sample of 120 developed and mostly developing countries. Results are statistically significant.

Source: World Bank, 2009 (left), and World Bank, 2016 (right)

**The positive impact of ICT on economic growth is attributable to the fact that access to and use of these services improves (i) participation to the global economy, through better market access; (ii) the efficiency of productive systems via productivity gains; and (iii) innovation (Figure 3).** Broadly speaking, using ICTs helps to reduce transaction costs by making information easier to access and to use, which reduces the cost of searching for information and increases coordination between individuals, businesses and public administrations. Thus, firstly ICTs help economic agents to access markets by enabling, for instance, a greater number of businesses (in particular small and young businesses) to trade (by selling and buying online) new products in new markets. Secondly, ICTs improve businesses' operational efficiency by helping them to put their capital and human resources to better use and to significantly raise productivity. Thirdly, ICTs promote innovation by allowing for scale effects made possible by online platforms and services (such as mobile money, big data, e-commerce (Ebay, Amazon, etc.), e-tourism (Uber, Airbnb, etc.)) which compete with traditional business models in sectors

<sup>45</sup> World Bank (2016), World Development report 2016: Internet for Development. World Bank, Washington D.C. Available at: <http://www.worldbank.org/en/publication/wdr2016>

<sup>46</sup> World Bank, 2009. "Economic Impacts of Broadband", in Information and Communications for Development 2009: Extending Reach and Increasing Impact, Qiang, C. Z. W., Rossotto, C.M., World Bank, Washington D.C.

such as retail, transport, banking and the hotel industry. Several empirical studies managed to quantify the impact of ICT on innovation (see Annex 1) and productivity. As an example, the study by Booz & Co (2010, p.3)<sup>47</sup> shows that: i) countries with an 80% broadband penetration rate are twice as innovative as those where penetration is at 40%; and ii) each 10 percentage point increase in broadband penetration raises labor productivity by 1.5 percentage points. Another WB study (2014) shows that introducing broadband improves labor productivity by 5% in industry and by 10% in services. More recently, a study by Paunov and Rollo (2015)<sup>48</sup>, based on a sample of 49,610 businesses<sup>49</sup> from 117 developing countries between 2006 and 2011, shows that when business take up the Internet (i.e. use e-mail to communicate with clients and suppliers), this leads to significant improvements in labor productivity, regardless of the region and the level of development of the business. Interestingly, Paunov and Rollo's findings indicate that the extent of the impact varies according to the level of productivity of the business (i.e. the most productive businesses are those that benefit the most from using Internet) and the quality of the business environment (reflected by the availability of electricity, levels of corruption, financial constraints, the lack of qualified human resources, how difficult it is to regulate businesses). Nevertheless, even for the least productive businesses operating in a difficult business environment, using the Internet for business purposes leads to significant gains in labor productivity. These findings suggest that labor productivity could be much higher in Africa, in particular, as in this continent, only 45.1% of businesses use e-mail to communicate with their clients and suppliers, versus 86.7% in Latin America (Figure 4).

**Figure 4.** Percentage of businesses that communicate by e-mail with their clients and suppliers, by country income level, world region, business size and industry



Note: findings are based on surveys of 49,610 businesses over the 2006-2011 period.

Source: Paunov and Rollo, 2015

**The economic literature shows that ICTs particularly improve trade integration by (i) improving businesses' market access, (ii) enabling more businesses to access new markets and (iii) increasing the value and the volume of products traded.** Firstly, online trading platforms, for example, reduce information asymmetries and enable more businesses to access and advertise to more foreign buyers/sellers. This lowers the cost of trade by reducing the need for intermediaries to establish

<sup>47</sup> See: Booz & Co (2010), *Enabling Sustainable digital highways, Strategies for next generation broadband*.

<sup>48</sup> Paunov, C. and Rollo, V. (2015). *Overcoming obstacles: The Internet's contribution to firm development*. The World Bank Economic Review, April 2015, pp. 1-13.

<sup>49</sup> 70% of businesses had fewer than 50 employees. 53% of businesses operated in industry and 47% in the service sector.

commercial relationships, or the need to participate in costly trade shows to market their products. Several studies have demonstrated a positive correlation between the extent to which Internet is used in a country, and growth of its exports of goods and services (Freund and Weinhold, 2002, 2004; Clarke and Wallsten, 2006<sup>50</sup>). Clarke and Wallsten, for instance, use a sample of 52 developed countries and 46 developing countries, and show that a one-percentage point increase in the number of Internet users generates a total increase in exports of 0.3% of GDP. Interestingly, the link between Internet use and exports varies according to countries' level of development: in developing countries, higher Internet use leads to more exports to developed countries, but not necessarily to other developing countries. Moreover, the literature shows that Internet use helps businesses to reach new markets and to trade new products. Osnago and Tan (2015)<sup>51</sup>, for instance, show that a 10 ppt rise in rates of Internet use in an exporting country increases the number of products traded between two countries by 1.5%. Additionally, the higher the rates of Internet use in two countries, the higher the Internet's impact on the number of products traded between those countries. Lastly, the literature also highlights the existence of a correlation between the intensive margin of trade (or average value of trades by product or by business) and Internet penetration rates in a country. Thus Tan (2015)<sup>52</sup> shows that a 10 ppt increase in a country's Internet use rates increases the average trade value by product by 0.6%, and that the average value of exports per business grows by 1% when Internet use rates increase by 10 ppts in the exporting country. In other words, this study shows that the higher the Internet use in a country, the more trade values grow (due to higher trade volumes, and possibly increases in prices of products traded).

**The development of ICTs also has favorable impacts on education, health and jobs (in particular for youth<sup>53</sup>), contributing to long-term economic growth through its repercussions on competitiveness, innovation and investment.** However, in sectors such as health and education, for instance, ICTs can generate significant benefits, provided that entities do not just acquire ICT equipment, but also consider training programs for administrative staff as well as developing content (educational, health-related, etc.)

- Increased connectivity and ICT use in the education sector (Annex 2) help to: (i) improve school management; (ii) provide access to educational content to children not attending school; (iii) enhance teacher training through training programs in best teaching practices; (iv) improve student learning, and (v) evaluate students more often to better identify learning gaps.
- Similarly, in the health sector (Annex 3), increased connectivity and ICT use in health care facilities, and higher use of ICT services (voice, text, Internet) in these facilities help to: (i) deal with saturation of health centers by encouraging the exchange of health information through remote consultations and prescriptions; (ii) boost the productivity of health care staff by increasing the number of consultations; and (iii) improve access to health information for patients in rural areas who live further away from health care facilities.
- Moreover, and as contended by Rossotto et al. (2012), broadband deployment expands the boundaries of traditional occupations and contributes to create new jobs and sources of income by

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<sup>50</sup> Freund, Caroline, and Diana Weinhold. 2002. "The Internet and International Trade in Services." *American Economic Review* 92 (2): 236–40; Freund, Caroline, and Diana Weinhold. 2004. "The Effect of the Internet on International Trade." *Journal of International Economics* 62: 171–89. ; Clarke, George RG, and Scott J. Wallsten. 2006. "Has the internet increased trade? Developed and developing country evidence." *Economic Inquiry* 44, no. 3: 465-484.

<sup>51</sup> Osnago, Alberto, and Shawn W. Tan. 2015. "The Effects of the Internet on Trade Flows and Patterns." Background paper for the World Development Report 2016.

<sup>52</sup> Tan, Shawn W. 2015. "The Effects of the Internet on Firm Export Behavior." Background paper for the World Development Report 2016.

<sup>53</sup> See the World Bank's research and programs in this field: <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTEDUCATION/0,,contentMDK:20264888~menuPK:617610~pagePK:148956~piPK:216618~theSitePK:282386,00.html>

fostering micro-entrepreneurship, the outsourcing of some tasks that can be performed remotely (through smartphones, tablets or computers), and the development of mobile and other applications. Several recent empirical studies have estimated broadband's impact on job creation. The study by Crandall et al. (2007), based on a sample of 48 US states between 2003-2005, shows that for each one-percentage point increase in broadband penetration, private sector employment (excluding agriculture) increases by 0.2-0.3 percentage points per year (or 300,000 jobs)<sup>54</sup>. In Sub-Saharan Africa, the GSMA (2012) estimates that today, mobile telecommunication services (including mobile broadband) directly generate 3.3 million jobs. This figure is expected to reach 6.6 million by 2020.

**The benefits of ICTs are not limited to their economic impacts, as they also improve social and community involvement and heighten the inclusion of isolated or marginalized populations.** As indicated in the World Development Report (World Bank, 2016): the Internet "*influence[s] the participation of women in the labor force, the ease of communication for people with disabilities, and the way people spend their leisure*". Moreover, with digital identification, ICTs help to overcome failures of civil status record registration systems when records are incomplete or non-existent. Digital identification tools help to organize elections and to better manage social transfer programs; these aspects contribute to making the public sector more efficient. International experiences show that in Nigeria, for example, such tools have helped to identify nearly 62,000 "ghost" civil servants, which led to annual savings of over one billion USD. In India, digital identity cards have made it possible for 900 million people to open bank accounts and receive social transfers. In Mozambique and Kenya, mobile technologies have boosted voter turnout by offering an alternative way to vote and, with mobile applications that make it possible to file a report via SMS, have limited fraud and intimidations, which raises participation. Additionally, the Internet gives access to more information sources. This reduces dependence on the media, and complicates the enforcement of censorship measures. ICTs also encourage the emergence of a participatory democracy, in particular through digital platforms and social media (Facebook, Twitter, etc.), which considerably reduce the costs of communication and coordination, and foster collective action and citizen involvement.

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54 Robert Crandall, William Lehr, and Robert Litan (2007). The Effects of Broadband Deployment on Output and Employment: A Cross-sectional Analysis of U.S. Data. Issues in Economic Policy discussion paper no. 6. Brookings Institution. Voir : [http://www.brookings.edu/~media/Files/rc/papers/2007/06labor\\_crandall/06labor\\_crandall.pdf](http://www.brookings.edu/~media/Files/rc/papers/2007/06labor_crandall/06labor_crandall.pdf)

## Section 2. The rise of ICT and broadband in Morocco: sector assessment and development prospects

### A. The partial liberalization of the telecommunications sector and its effects

During the 1990s and in the early 2000s, the Moroccan government undertook, with the World Bank's support<sup>55</sup>, a wave of reforms that led to:

- The promulgation of law 24/96 in 1997, which creates and specifies the functions of the sector regulator (see article 29), the ANRT (National Telecommunications Regulation Agency, *Agence nationale de réglementation des télécommunications*) - reporting to the Prime Minister and operating under the authority of a board of directors made up of 14 members, including the Prime Minister and 8 other ministers<sup>56</sup> - as well as two public limited companies: the telecommunications operator, IAM (Itissalat al-Maghrib), and the postal operator, BAM (Barid al-Maghrib).
- The partial privatization in 2001 of the incumbent operator IAM, re-named Maroc Télécom, by transferring management and selling a minority share, via an international call for tenders, of 35% of equity to Vivendi.
- Opening the telecommunications market to competition starting in 1999: a GSM license was granted to operator Meditel for 10,836 billion dirhams (approximately 980 million euros)<sup>57</sup>; in 2006, 3G and fixed NGN licenses were granted to Méditel and Wana, the third operator. Today, Morocco has three operators holding GSM fixed NGN, 3G and 4G licenses:
  - Maroc Télécom, the incumbent operator, currently 53% owned by Etisalat (30% of equity remains in the hands of the State through the Public Treasury, and 17% is partly owned by staff and listed on the Casablanca and Paris stock exchanges);
  - Méditel, which was the second to join the market (in 1999 with a GSM license), is a subsidiary of Orange, which holds 49% of equity<sup>58</sup> (the remaining 51% are owned by the State through the CDG, and Finance Com, a private Moroccan company, both of which hold 25.5%). After being granted GSM licensing in 1999, Méditel obtained a 3G and a fixed license (NGN) in 2006, then a 4G license in 2015;
  - WANA, which was the third to join the market (in 2006 with 3G and NGN licensing), is a subsidiary of Kuwaiti telecom company Zain, which owns 31% of equity, and of the Moroccan Société Nationale d'Investissement (National Investment Company), which owns 69% of equity. WANA (initially Maroc Connect) obtained fixed NGN and 3G licensing in 2006, then GSM licensing in 2009 and 4G licensing in 2015.

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<sup>55</sup> The World Bank provided technical assistance on law24/96 and supported telecommunications reforms through two specific operations in the sector: (i) an adjustment program for the Post and Telecommunications sector; and (ii) an adjustment program for the sector of information infrastructure (IISDL). Additionally, the World Bank issued the following publication in December 2004 (Bjorn Wellenius, Carlo M. Rossotto, Anat Lewin, « *Kingdom of Morocco : Developing Competition in Telecommunications* », available at : [http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2005/08/03/000160016\\_20050803130745/Rendred/PDF/331870Morocco1IssuesPaperFinal1051905.pdf](http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2005/08/03/000160016_20050803130745/Rendred/PDF/331870Morocco1IssuesPaperFinal1051905.pdf), which includes precise arguments in favor of more telecom reforms and a summary of the most important ones.

<sup>56</sup> See the ANRT's organizational structure: <https://www.anrt.ma/en/lagence/organisation/instances>

<sup>57</sup> The operator license requirements are available on the ANRT website: <https://www.anrt.ma/en/lagence/organisation/instances>

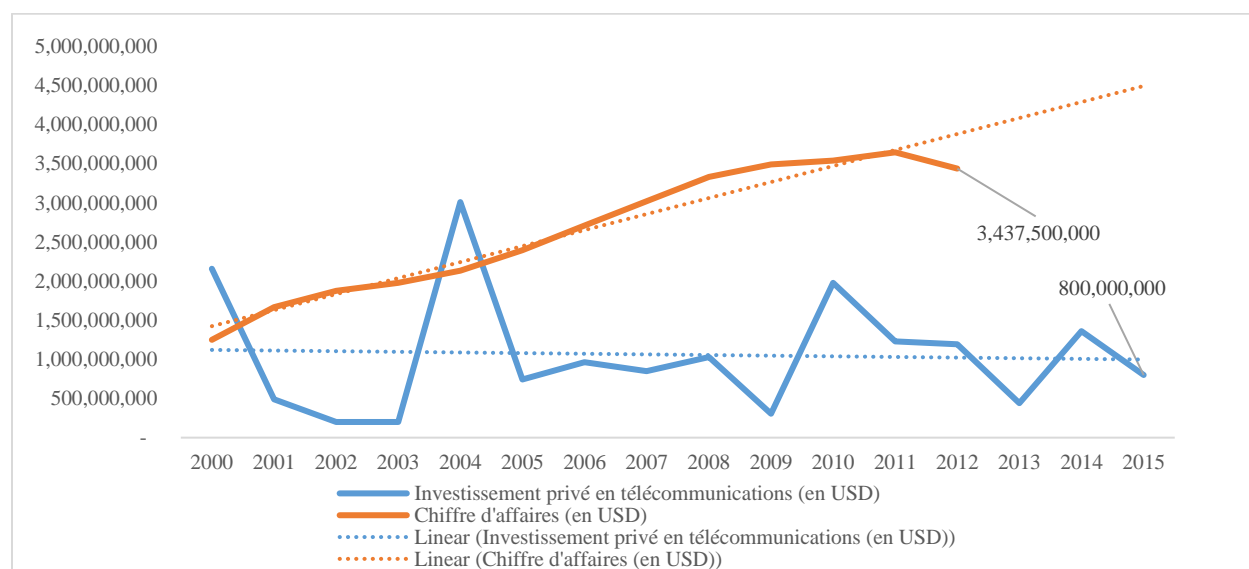
<sup>58</sup> <http://www.capital.fr/bourse/actualites/orange-fait-passer-sa-participation-dans-l-operateur-marocain-meditel-a-49--1056665>

It is clear that the Moroccan government owns stakes in two of the three operators, and that this may affect the political will to carry out reforms aimed at further opening up the telecommunications sector to competition.

**This wave of liberalization in the telecommunications sector has generated significant benefits for the Moroccan economy and led to the spectacular development of mobile services:**

- Owing to the effects of competition, mobile telecommunications penetration rates have gone from 8% in 2000 to 128% in 2015 (ANRT, 2015), meaning that the advantages of using mobile phones (primarily voice and text messaging) have reached all Moroccan society, including in remote regions.
- As a result of the mobile services boom, the three operators' aggregate turnover increased threefold over 15 years, from 1.2 billion USD in 2000 to 3.4 billion in 2012. (Ministry of the Economy and Finance, 2015 and Figure 5).
- The telecommunications sector contributes 3% of GDP in 2015 (Ministry of the Economy and Finance, 2015), 12% of the State's fiscal revenues and 1% of jobs<sup>59</sup>.
- Opening the sector to competition promoted private investment: between 1999 and 2015, the three operators invested a cumulative amount of 16.9 billion USD (Figure 5) in the telecom industry. However, since 2005 there has been a significant drop in investment rates (as a percentage of revenue), which fell from a 66% average over the 2000-2005 time period to 33% between 2006 and 2012.
- Another outcome of the partial liberalization of the telecommunications industry was to create a number of ICT- and telecom-related activities upstream (construction, installation, distribution...) and downstream of the operators (retailers, value-added service providers...). These activities also contributed to private investment in ICT, though it is not possible to precisely evaluate it.

**Figure 5.** The telecommunications industry experiences a significant drop in private investment<sup>60</sup> as a percentage of revenues since 2005



<sup>59</sup> In 2014, the MICIEN estimated that the ICT sector employed nearly 120,000 people in total, including 80,000 direct jobs and 40,000 indirect. If the audiovisual and computing sectors are added to telecommunications, the ICT industry in the broad sense contributes nearly 6% of GDP.

<sup>60</sup> For a definition: <http://data.worldbank.org/indicator/IE.PPI.TELE.CD> and <http://ppi.worldbank.org/methodology/glossary>

Note: The figures overestimate private investment because they include some public investments. The notion of telecommunications includes fixed, mobile and long-distance networks. Data for private investment cover both payments made to the State (licensing, etc.) and investment in physical assets.

Source : PPI database, World Bank, 2016.

## B. Current situation in the telecommunications and broadband markets

**The telecommunications sector, which remains highly dependent on mobile and is highly concentrated, is experiencing a slowdown:**

- The sector includes three general operators, but 14 years after competition was introduced, Maroc Télécom represents 62.4% of the industry's total turnover, in particular due to efficient financial and operational performance: in 2015, Maroc Télécom's EBITDA stands at 52% on its activities in Morocco or 1.2 billion USD, an amount equivalent to Méditel and WANA's cumulative turnover. The incumbent operator's financial health and commercial dynamism are a major asset for the country, provided that the legal and regulatory framework encourage investment and fair competition (see section 2-C). The number of Internet service providers independent from the three operators has significantly decreased (Morocco had 81 in 1998) even though it is not possible to find out the exact number in 2016. On the contrary, in developed and emerging countries that completed the liberalization of the telecommunications industry, a large market share is held by operators who are independent from those with general licenses, whose activities tend to focus on a smaller area, on the scale of a region or a community. In Chile, for instance, 30 operators had international licenses in 2004; in the UK 120 licenses of this type were granted. In Lithuania, the Fiber to the Home (FTTH) penetration rate in 2015 is the highest in Europe, and most of these connections are provided by other suppliers than the incumbent operator. In Bulgaria, the incumbent's share of the fixed broadband market is only 29%, and in Turkey, 87 general authorizations were granted to wireless Internet suppliers (see Box 1).
- The mobile telecommunications market, a very competitive one, has reached saturation: the penetration rate was 128% in 2015 (ANRT, 2015) and the market (94% of prepaid subscriptions) is no longer growing. This explains, along with the drop in national retail prices (to the benefit of consumers), the fall in operators' revenues since 2011 (Figure 6). Thus, the operators' current economic model, which is highly dependent on mobile (which represents nearly 70% of Maroc Télécom's turnover and almost all of Méditel and WANA's, according to the ANRT in 2016), in particular the voice segment, is increasingly fragile. When comparing the prices of some mobile plans in Morocco and in other Arab countries (in purchasing power parity and keeping into account promotional offers, see the AREGNET 2015 data in Figure 6), it appears that despite the drop in average revenue per minute<sup>61</sup>, the cheapest prepaid baskets (40 calls a month) are among the most expensive in the Arab region in 2015 (Figure 6)<sup>62</sup>. This is not the case of the most expensive post-paid plans, which are among the Arab region's most affordable in 2015. However it is to be noted that the AREGNET data shown in Figure 6 do not provide a definitive analysis of the price levels of

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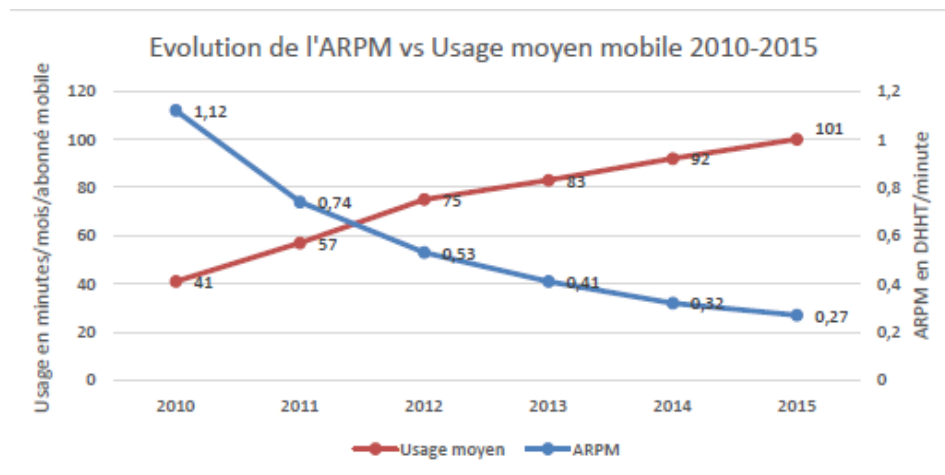
<sup>61</sup> Méditel stated in June 2016: "*The ANRT's 2015 analysis of the mobile market's annual progression shows on the contrary that at the end of 2015, ARPM in postpaid is higher than for prepaid*". The ANRT data do indicate that by late 2015, postpaid ARPM was 0.29 dirham per minute, excluding taxes, versus 0.26 dirham for prepaid ARPM. Similarly, WANA declared in June 2016: "*Prepaid ARPM is among the lowest in the region, taking into account the specificities of the Moroccan market where there are over 300 days of sales promotions per year*".

<sup>62</sup> The ANRT reached different conclusions on the basis of the Arab Advisor Group's analyses. In June 2016, the ANRT stated: "*mobile prices in Morocco are among the lowest in the Arab region (cf. the latest 2016 study of the Arab Adviser Group). Moreover, equity in pricing means that prices must be the same everywhere in the country*". Similarly, WANA stated in June 2016: "*prepaid ARPM is among the lowest in the region, taking into account the specificities of the Moroccan market where there are over 300 days of sales promotions per year*".

mobile voice services in Morocco, given, in particular, the very numerous sales promotions, which make calculations and international comparisons difficult. Regardless, Morocco has experienced a strong decline in mobile termination rates since 2010-2011, and increased competition in this segment of the market has led to a sharp drop in prices, to the benefit of Moroccan consumers.

- The challenges facing the operators' economic model has led the ANRT to take radical and unpopular measures, in particular by supporting the operators' intention to ban Skype, a decision that was made early 2016<sup>63</sup>. This decision, which was strongly criticized as it went against the interests of consumers (particularly the poorest) and the Moroccan community abroad (Skype remains accessible to businesses that use virtual private networks), protects the operators' economic model. The fragility of this economic model exposes operators to heavy losses, related to the arrival of Over the Top (OTT) operators such as Skype. However, in countries which unlike Morocco have liberalized the international communications segment, even though there is a debate about the business models of telecom operators and OTTs, it is unnecessary to restrict the use of Skype as the arrival of this type of operator does not significantly impact the revenues of existing operators, while OTT services amply satisfy the interest of consumers. It is to be noted that OTT regulation is the subject of intense debate in Europe and the Body of European Regulators of Electronic Communications (BEREC) and the European Commission are preparing guidelines and drafting revisions to regulation for 2017<sup>64</sup>.

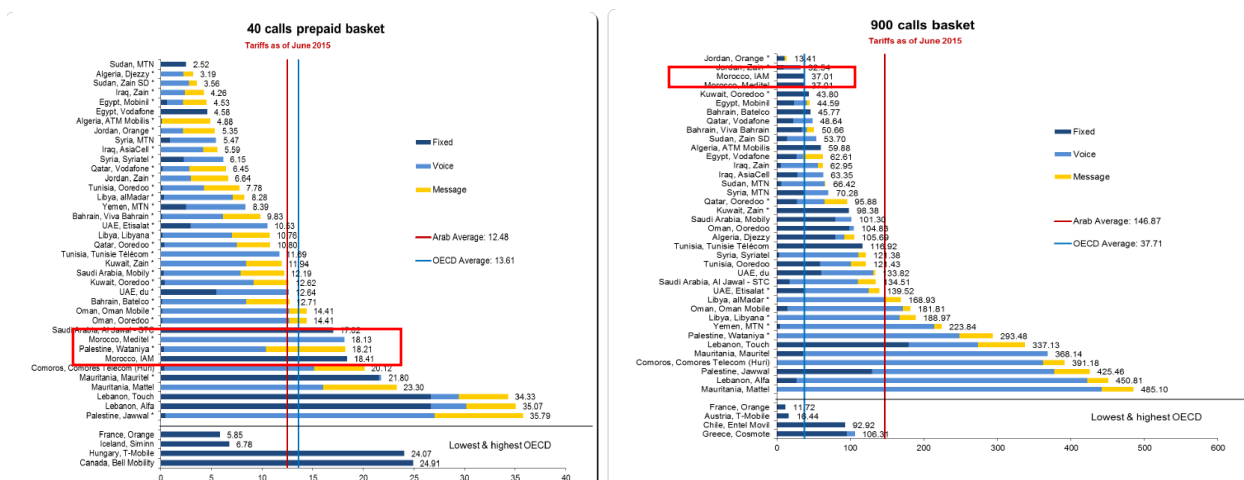
**Figure 6.** Average Revenue per Minute (ARPM), 2010-2015 (above) and monthly tariffs (USD/PPP including VAT) of prepaid (40 calls per month) and post-paid (900 calls per month) mobile baskets in Arab countries, 2015 (below)



<sup>63</sup> This decision has since been rescinded: <http://www.tic-maroc.com/2016/10/lanrt-debloque-temporairement-la-voip-au-maroc.html>

<sup>64</sup> See: *Trends in OTT Regulation*, Presentation to the World Bank, Janet Hernandez, President of Telecommunications Management Group, Inc.





Note: the monthly tariff comparisons of mobile plans cover the promotions offered in the various countries of the study.

Source: ANRT, 2015 top and AREGNET, 2015 bottom. See *Telecommunications Retail Price Benchmarking for Arab Countries 2015*, available here: <http://www.tra.org.bh/media/document/2015%20Telecommunications%20Retail%20Price%20Benchmarking%20for%20Arab%20Countries.pdf>

**After the introduction of 3G in 2007, the broadband market rapidly developed and has undergone profound changes (Figure 1). Broadband is the main source of development potential in the telecommunication and ICT industries in the coming years.**

- The broadband market is subdivided into two markets: fixed broadband (essentially made up of ADSL connections, seeing as the number of optic fiber connections is very limited) and mobile broadband (3G and 4G connections):
  - In Morocco, the size of the fixed broadband market (i.e. ADSL) is limited with 1.13 million lines in 2015. Maroc Télécom holds 99.97% (as a percentage of subscriptions) of the market (vs. WANA's 0.03%) in 2015 (ANRT, 2016). This market structure, which has not significantly evolved for several years, reflects not only the lack of interest of alternative operators, which invested little in fixed infrastructure, but also the fact that local copper loop unbundling policies introduced by the ANRT starting in 2008 have not been implemented and have not yielded results leading to higher competition<sup>65</sup> - unlike some European countries such as France (see below).
  - The mobile broadband market is more competitive. In 2015, Maroc Télécom held 49% of the market, versus 27% for Méditel and 24% for WANA (ANRT, 2016). The market is concentrated with a Herfindhal Index of 3659 in 2015.
- Since 2007, the total number of broadband subscribers (both fixed and mobile) has experienced strong growth (especially from 2008 to 2015), which shows consumers' interest in this service (Figure 7).
- The breakdown of the broadband subscriber base has considerably altered in favor of mobile broadband (Figure 7), which represents 92% versus 8% for fixed broadband. However, the number of mobile broadband subscribers (data only with Wi-fi dongles) has fallen since 2011. This is because smartphones are cheaper, and because people now use their smartphones to perform a much wider

<sup>65</sup> The implementation of unbundling is a subject of disagreement between the operators and the regulator. The regulator believes that it does not have the tools to enforce its decisions, in particular when it comes to sanctions. The incumbent operator believes that the failure to unbundle essentially depends on the alternative operators' strategy and desire to develop fixed broadband. The alternative operators believe that the technical conditions and prices offered by Maroc Télécom prevent the implementation of unbundling.

variety of Internet functions<sup>66</sup>. Moreover, as highlighted in the PNHD in 2012, it is possible that some bottlenecks remain on the backhaul (with insufficient optical fiber), which might affect the quality of service<sup>67</sup>. Consumers turn to fixed broadband which offers a steadier and better quality connection inside buildings (even though bills are on average more expensive - Figure 10).

- Unlike the fixed broadband market, and provided a sufficient fiber optic backhaul (middle mile) is available, the mobile broadband market offers ample opportunity for development and for generalizing access to broadband in Morocco, given that:
  - Though highly concentrated, the mobile broadband market is relatively competitive;
  - Prepaid plans satisfy the demand from low-income households;
  - Mobile broadband allows for the mobility of 3G/4G users;
  - Above all, for reasons related to population coverage but also commercial ones, mobile technology (i.e. last mile wireless broadband) is the most suitable. This statement should however be qualified: while for low speeds, the cost per line of the local wireless loop is usually lower than the local wire loop, this is not the case for higher speeds. Additionally, fixed broadband service quality is higher indoors than for mobile.
- The fixed broadband market remains primarily limited to the Business category<sup>68</sup> - businesses needing higher speeds and better service quality - and to wealthier households that can afford a monthly subscription (80% of ADSL subscriptions offer a speed of 4 Mbps - ANRT, 2015). But developments in the leased line market (partly reflecting the business market<sup>69</sup>) show that this segment has been narrow and sluggish for years and has even slightly declined since 2014, going from only 1173 leased line connections to 1153. This reflects the lack of competition on this market, which features the highest prices in the Arab world after Sudan and Djibouti (for the 2 Mbps/month leased line plan - see Figure 10)<sup>70</sup> and a low quality of service when compared to comparable countries (in terms of international bandwidth per user - Figure 12). On the fixed broadband market for individuals, the slight growth in subscriptions since 2011/2012 owes to a small decline in average invoice per customer, which however has increased since 2014.
  - While local loop unbundling has been authorized and regulated since 2008, local loop unbundling has not produced significant results and Maroc Télécom continues to hold almost all the market. Though Méditel and WANA have the licenses (NGN licenses granted in 2006 with coverage requirements that are not made public) needed to operate in the fixed broadband market, they have not yet tried to activate them by massively investing in wireline

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<sup>66</sup> In Morocco in May 2016, the price of a lower-mid-range smartphone was estimated to vary between 30 USD (black market) to 80 USD (new). Smartphones can be used to activate hotspots, which are an effective substitute for Wi-fi dongles.

<sup>67</sup> In June 2016, the ANRT stated that it disagreed with this analysis. Méditel stated in June 2016: "*the ANRT reports on 3G quality show that indicators related to Méditel's 3G network are at least equivalent to Maroc Télécom's, and even better when it comes to PC connections (source: <https://www.anrt.ma/sites/default/files/rapportannuel/2015-Qos-Data-3G.pdf>)*".

<sup>68</sup> This segment also covers the needs of bank branches, regional offices of government agencies and ministries, and commercial agencies.

<sup>69</sup> The ANRT Observatory (Internet Market Dashboard), available online, has limited information regarding the leased line market and provides no information on frame relay or VPN IP connections. However, according to WANA in June 2016: "*There are approximately 23,000 "DATA" (i.e. "Business") connections in the entire market, of which 18,000 are provided by Maroc Télécom and about 5,000 by alternative operators. This market has steadily grown for the past 10 years, at an annual pace of 5 to 10% in value*".

<sup>70</sup> *Telecommunications Retail Price Benchmarking for Arab Countries 2015*, available at: <http://www.tra.org.bh/media/document/2015%20Telecommunications%20Retail%20Price%20Benchmarking%20for%20Arab%20Countries.pdf>. The ANRT and Maroc Télécom pointed to other comparative studies in May 2016, available with paid access (<http://www.arabadvisors.com/reports/item/15337>), saying that they show that ADSL prices are among the cheapest in the Arab world. Additionally, in 2016 Méditel stated: "*leased line comparisons are unreliable, as they are based on catalogue prices and billed prices. The catalogue prices do not include the invoice discounts offered to SMEs and large accounts which are the main customers for these offerings*".

infrastructure<sup>71</sup>. While Méditel long favored investing in mobile, WANA took the risk of investing in CDMA (fixed-line restricted mobility), as well as seeking 3G licensing, which was unsuccessful. In May 2016, Maroc Télécom indicated that since unbundling was introduced in 2008, WANA had submitted 1300 unbundling requests to the incumbent operator (of which 1100 were met), and that Méditel had only submitted 200 bitstream requests<sup>72</sup>. Méditel, on the other hand, stated in June 2016 that the number of bitstream requests was well above 200 and states that: "*Méditel also submitted unbundling requests to Maroc Télécom and faced many hurdles related to customer service, access to quality information about Maroc Télécom's lines eligible for unbundling, refusals to unbundle suspended and inactive lines, access to shared cabinets for physical unbundling, conditions in which virtual unbundling tests could be carried out*". The small size of the copper network (the ANRT counted 1.1 million ADSL lines in 2015) and the prices charged by Maroc Télécom<sup>73</sup> (though they are regulated by the ANRT<sup>74</sup>) explain the lack of interest shown by WANA and Méditel in the ADSL network, despite renewed interest in the past years. Rather than investing in wireline infrastructure in the access network (which is highly capital-intensive and difficult to get a return on in the short term), alternative operators prefer to request shared access to older (copper) and newer (e.g. DSLAM/MSAN and FTTH) infrastructure deployed by Maroc Télécom on the local loop, which Maroc Télécom disagrees with. The incumbent operator does not challenge the unbundling of the copper loop, which is a longstanding infrastructure, but points out that the FTTH market is emerging and requires investment from the various operators to develop. At the same time, the ANRT imposes symmetric regulation<sup>75</sup> (i.e. the duty of all operators) on new FTTH infrastructure<sup>76</sup>. According to Maroc Télécom, this regulation currently deters investment while also encouraging the competing operators to wait, preferring a shared access to Maroc Télécom's infrastructure rather than deploying wireline infrastructure<sup>77</sup>. But, according to the ANRT in June 2016: "*Méditel, which was not declared to "exert significant influence", and WANA respect the principles of this decision in the areas of Casa Green Town, Atlantic Free zone,*

<sup>71</sup> In June 2016 Méditel stated that it had "*invested, over the 2006-2011 period, over 6 billion MAD (excluding licenses) to develop its fixed and mobile networks, and in particular to deploy fiber optic transmission infrastructure, or 20% of its total turnover for the period*". However, this statement does not specify the breakdown of investments for the fixed network and the mobile network.

<sup>72</sup> According to Maroc Télécom, bitstream is an option that requires the least possible investment and Méditel has shown no interest in physical or virtual unbundling.

<sup>73</sup> According to Maroc Télécom in June 2016, access tariffs are cost-oriented. The fact that unbundling has not occurred is rather due to the strategy of alternative operators which is not oriented toward this segment.

<sup>74</sup> See decisions ANRT/DG/N°06/15 of 27 Safar 1437 (9 December 2015) listing the public network and telecommunications operators exerting significant influence on specific telecommunications markets; and decision n. 03/15 of 30 September 2015, which lays out the technical and pricing conditions for the wholesale bitstream offering for the unbundling of Maroc Télécom's local loop and sub-loop.

<https://www.anrt.ma/reglementation/decisions>

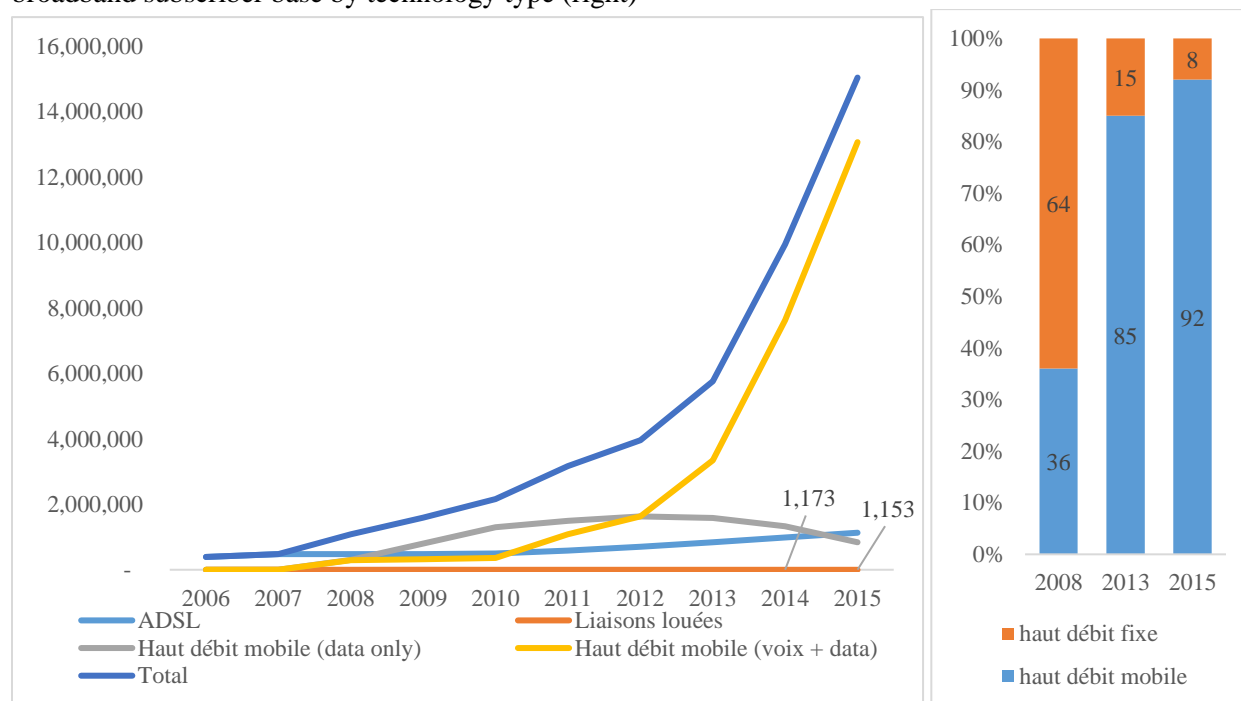
<sup>75</sup> [https://www.anrt.ma/sites/default/files/2014-06-14-FTTH-fibre-optique\\_1.pdf](https://www.anrt.ma/sites/default/files/2014-06-14-FTTH-fibre-optique_1.pdf)

<sup>76</sup> According to Méditel in June 2016: "*The local loop and sub-loop infrastructure (copper or fiber) is in fact longstanding infrastructure, its "terminal" part was funded by taxpayers, which Maroc Télécom largely benefited from through laws on community planning (n. 12-90, article 44) and allotments (n. 25-96, article 19). In any case, this is an "essential" infrastructure, as defined in competition law, and to which all alternative operators need access to be able to offer broadband on retail markets. Alternative operators also need access to the ducts, most of which are owned by the incumbent operator. Access to this infrastructure is essential for alternative operators wishing to offer broadband on the retail market, as was very often seen in Europe*".

<sup>77</sup> In June 2016, Méditel stated: "*when compared to revenues, Méditel's investments have actually been much higher than Maroc Télécom's. For instance, in 2015, this ratio was nearly 28% for Méditel, compared to Maroc Télécom's 18%*". However Méditel does not compare the amounts the amounts invested by the two operators, or provide information on the share of Méditel's investment in the fixed network.

*Casanearshore et Technopolis, and share their infrastructure (passive and active, as the case may be) with Maroc Télécom. Moreover, since 2014 the incumbent operator has developed an FTTH offer, which was launched". This situation on the fixed broadband market reveals inefficient regulation for the copper and fiber optic local loop (See section 2-C).*

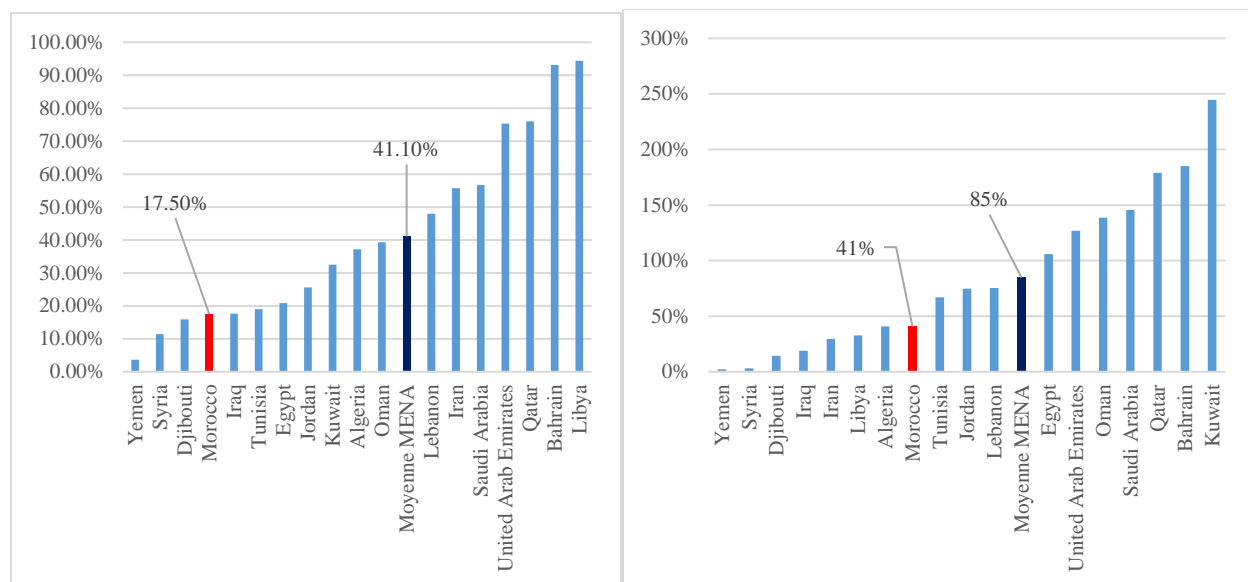
**Figure 7.** Broadband access (number of subscribers) by technology type (left) and breakdown of broadband subscriber base by technology type (right)



Source: ANRT, 2015

**Despite growing numbers of subscribers, broadband penetration is low; it is among the lowest in the MENA region (Figure 8), and well below that of comparable emerging countries (Turkey, Bulgaria, Lithuania, Romania, etc.) where rates are nearing 50% for fixed-line and 100% for mobile.** Broadband penetration rates remain relatively low in Morocco, in particular in rural areas where 42% of the population lives (i.e. 14 million people). The findings of the ANRT's survey point to a deep and persistent digital divide. In 2015, while 76% of urban households owned Internet access equipment, only 47% of rural households did (Figure 9). However, household ownership of Internet equipment has considerably increased in both urban and rural areas between 2014 and 2015, and the introduction of 4G has contributed to this.

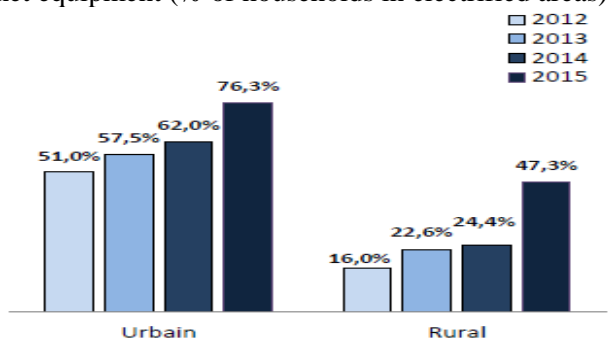
**Figure 8.** Fixed broadband penetration as a percentage of households (left) and mobile broadband penetration as a percentage of population in MENA countries (right) in 2015



Note: Fixed broadband includes mainly ADSL, and optic fiber to a lesser extent. Mobile broadband includes mobile Internet plans (3G and 4G) for data only and voice + data.

Source: TeleGeography’s GlobalComms Database, 2015.

**Figure 9.** Household Internet equipment (% of households in electrified areas)



Source: ANRT survey, 2015

**In Morocco, the fact that broadband penetration is generally low and even more so in rural areas is related to two factors:**

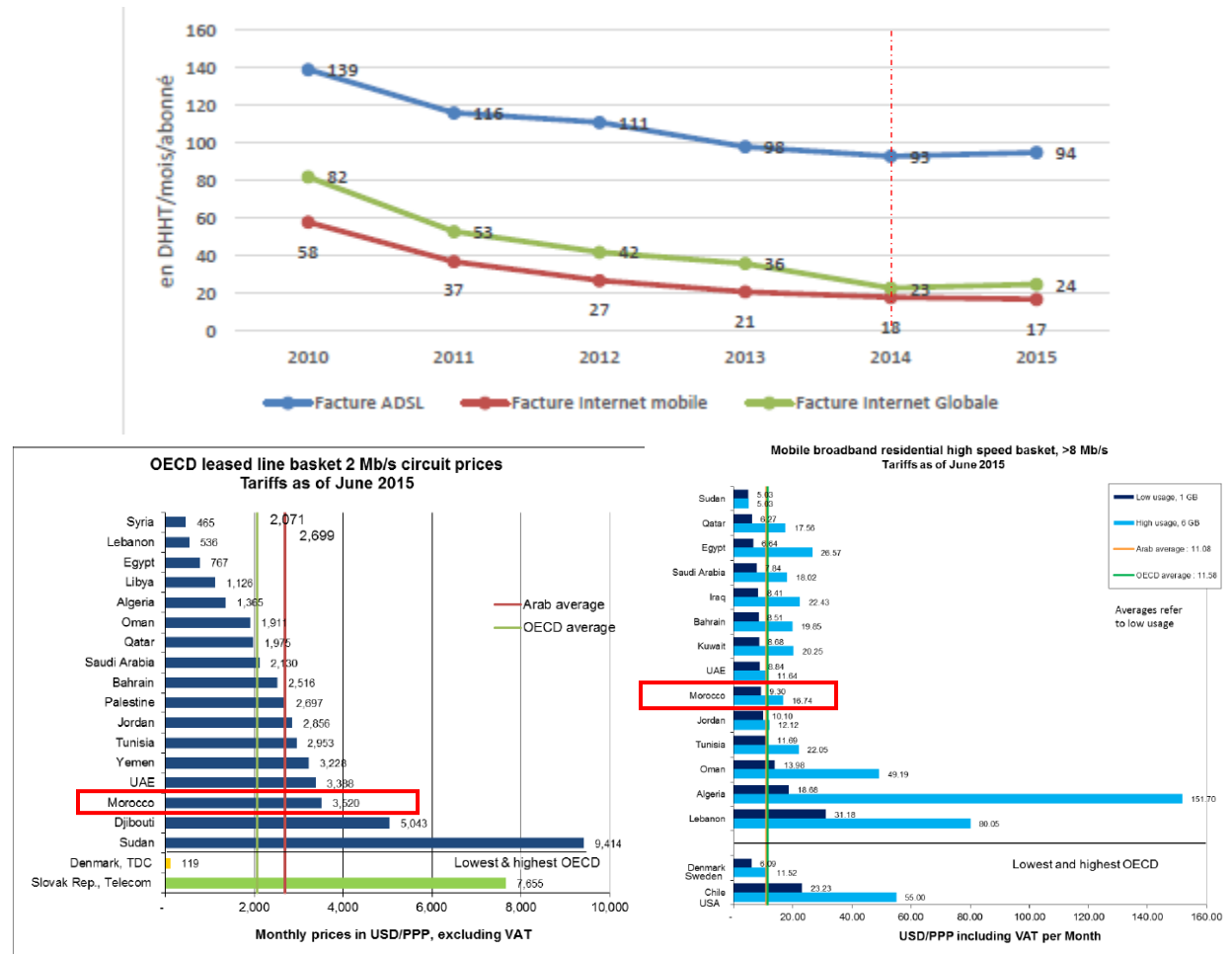
**A. On the demand side, there are issues related to the prices of subscriptions and equipment (as compared with average income), in particular in semi-urban and rural areas.**

- The ANRT survey (2015) shows that the costs of an Internet subscription and of the equipment required to access it remain too steep for a large share of the population, despite steadily declining prices. The survey finds that for some 30% and 34% of households that do not own equipment to access the Internet in 2015, the costs of service and equipment remain major obstacles. While the average Internet (fixed and mobile) invoice per customer has been on a downward trend since 2010 (Figure 10), it has risen since 2014, driven in particular by higher average invoices for fixed broadband (ADSL), a market which in 2015 was 99.97% held by the incumbent operator.
- Compared with other MENA countries, fixed and mobile subscriptions are expensive and price levels are not yet low enough to fuel a broadband boom. According to the ITU,

broadband penetration rates rise quickly when retail prices fall below 3-5% of national average monthly income per capita (Figure 11). They are just above 5% in Morocco.

- When comparing the prices of some Internet plans in Morocco and in other Arab countries, it appears that despite the decline in average Internet invoices, the cheapest plans - "businesses / leased lines 2 Mbps/month" for fixed and "residential 8 Mbps/month" for mobile - are among the most expensive in the Arab world (Figure 10)<sup>78</sup>.
- Low broadband penetration in Morocco is partly due to the fact that access to this service - via a subscription - remains too expensive for the poorest 60% of the population (WB, 2014)<sup>79</sup>. It was estimated that a household representative of this segment of the population must spend respectively 26% and 23% of its disposable income to access a mobile and fixed broadband plan (WB, 2014).

**Figure 10.** Average monthly Internet invoice between 2010 and 2015 in Morocco (above), and monthly tariffs (USD/PPP including VAT) of some fixed and mobile plans in Arab countries in 2015 (below)

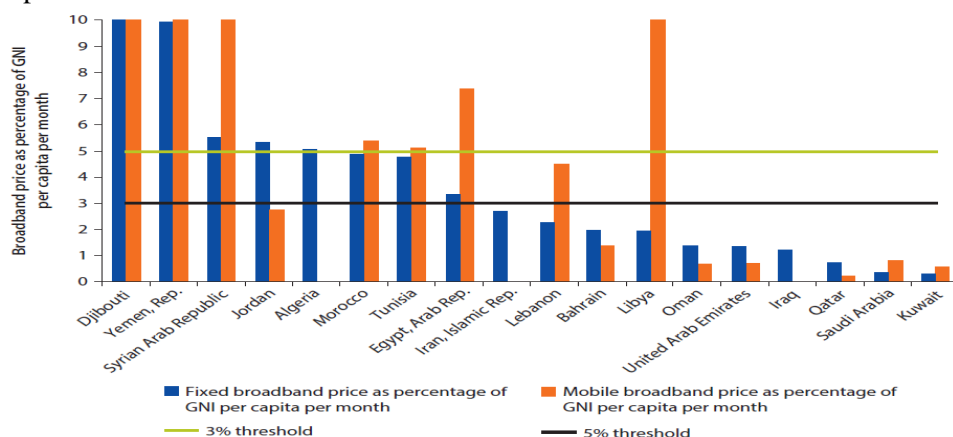


<sup>78</sup> The ANRT does not share this analysis. The ANRT and Maroc Télécom pointed to other comparative studies in May 2016, available with paid access (<http://www.arabadvisors.com/reports/item/15337>), saying that they show that prices in Morocco are among the cheapest in the Arab world.

<sup>79</sup> <http://www.worldbank.org/en/region/mena/publication/broadband-networks-in-mna>

Source: ANRT, 2015 above; AREGNET, 2015 below. See: *Telecommunications Retail Price Benchmarking for Arab Countries 2015*, available here: <http://www.tra.org.bh/media/document/2015%20Telecommunications%20Retail%20Price%20Benchmarking%20for%20Arab%20Countries.pdf>

**Figure 11.** Prices of fixed and mobile subscriptions as a percentage of average monthly Gross National Income per capita



Source : WB, 2014

**B. On the supply side, there are issues with the quality and coverage of mobile broadband infrastructure<sup>80</sup>:**

- The *quality* of the mobile broadband infrastructure network - which lacks optic fiber away from the largest urban centers (see PNHD assessment, 2012) - is generally insufficient to cope with the increasing use of mobile Internet (see Moroccan operators' network coverage maps<sup>81</sup>). Moreover, as mentioned in the PNHD in 2012, bottlenecks may remain in the backhaul (lacking optical fiber), affecting service quality and resulting from the upsurge in 3G/4G subscriptions since 2007 and 2015. This situation calls for new investments in optic fiber fixed infrastructure on the backbone and the backhaul, not just in some areas that are already covered by 3G/4G but also and especially in areas where 3G/4G is not available from any of the operators (see Moroccan operators' network coverage maps<sup>82</sup>). Service quality issues for mobile broadband are particularly exacerbated in urban areas, as users share frequencies; additional frequencies should be granted, or a new spectrum should be freed (i.e. digital dividend)<sup>83</sup>. The quality of broadband infrastructure explains the low average Internet service quality (in terms of international bandwidth per Internet user) in Morocco, when compared to other MENA countries (including Tunisia), and even more so when compared to central European countries (Figure 12). And as pointed out by the ANRT (2015), international bandwidth in Morocco no longer grows since 2013 and 2014 (Figure 12). Cheaper smartphones (see above) and low service quality, on average, help to explain the fall in data only broadband mobile subscriptions since 2012 (see above), and since 2011, the revived growth of ADSL subscriptions which offer higher-quality, steady connections (unlike the theoretical connections provided by 3G/4G) (see above).

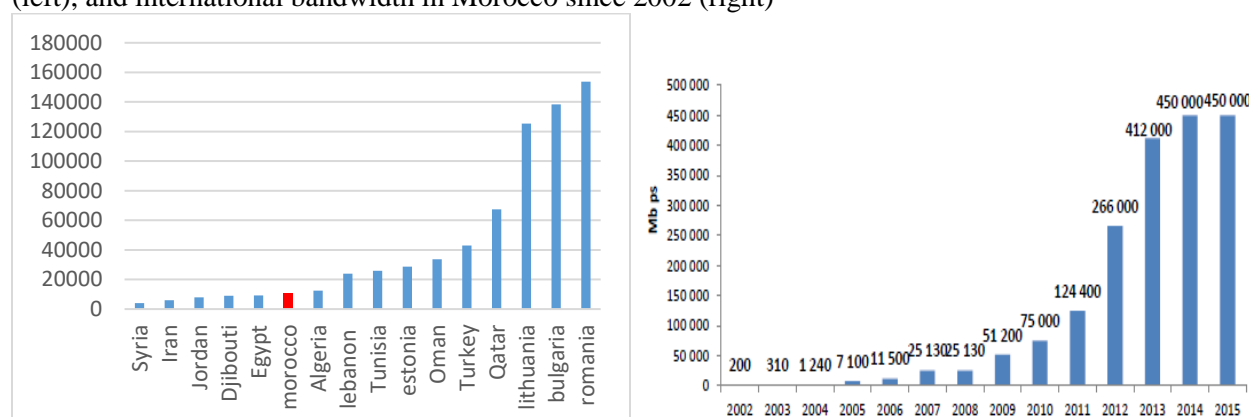
<sup>80</sup> It is to be noted that 3G data coverage is much lower than 3G voice coverage.

<sup>81</sup> See <https://www.nperf.com/en/map/MA/>

<sup>82</sup> See <https://www.nperf.com/en/map/MA/>

<sup>83</sup> In June 2016, the ANRT stated: "The 3 general operators have the necessary spectrum, in the bands 800, 900, 1800 and 2600 MHz to efficiently and harmoniously develop 3G and 4G".

**Figure 12.** International bandwidth (bit/s) per Internet user in 2014 in Morocco and in other countries (left), and international bandwidth in Morocco since 2002 (right)



Source : ITU, 2016 and ANRT, 2015

- The coverage of the Moroccan broadband infrastructure network, for fixed-line (with optic fiber) but especially for mobile, is poor and as things currently stand, growth prospects seem limited:

Limited coverage and large white spots, in particular in the country's north-east, south and east of the center:

In terms of fixed fiber optic (essential to ensure service quality for fixed and mobile broadband during traffic surges) infrastructure (backbone, backhaul and access), there are strong imbalances between the three operators:

- Maroc Télécom owns and operates the largest fiber optic network, estimated at nearly 25,000 km and covering much of Morocco. Despite Méditel and WANA's interest in accessing this infrastructure<sup>84</sup>, infrastructure sharing has not been subject to a specific regulation (unlike Maroc Télécom's local loop and civil engineering<sup>85</sup>) and remains very complex to implement (also see section 2-C).
- Méditel, which was the second to arrive on the market in 1999, has historically concentrated on the mobile market and has invested little in fixed infrastructure after acquiring its NGN license in 2006 (for 7 million euros), which came with no deployment or coverage requirements for the operator. In this context, and though it obtained a 3G license in 2006, the operator did not massively invest in fixed infrastructure<sup>86</sup>, not even in the most profitable urban centers. Méditel claims that it owns over 5000 km of inter-urban optic fiber (including fiber that is co-owned or leased to alternative

<sup>84</sup> In March 2015, Maroc Télécom stated: "because the backbone is not an essential infrastructure, there is no obligation to share it, which is consistent with the major regulation models in the world". On the other hand, Méditel stated in June 2016: "However, the prohibitive cost of reproducing Maroc Télécom's infrastructure, and the unreasonable time it would require, mean that there are no viable alternatives for alternative operators to develop a sustainable fixed and mobile broadband offering. As a result, they will be excluded from these markets". As for the ANRT, it stated in June 2016: "Some of this infrastructure is longstanding or has been set up a number of years ago. Not adopting draft law 121-12 means that the sector will not be able to make this infrastructure shareable".

<sup>85</sup> It is important to note that in decision ANRT/DG/N°06/15 of 27 Safar 1437 (9 December 2015) listing, in 2016, the operators which exert significant influence on specific telecommunication markets, article 6 (p. 6) states: "In cases where Maroc Télécom's civil engineering infrastructures are inexistent or do not meet the telecommunications operators' needs for the passage of their transmission or distribution infrastructure, Maroc Télécom is required to submit an offer for substitute solutions, in particular solutions that enable dark optic fiber to be used throughout the country".

<sup>86</sup> Méditel stated in June 2016: "Méditel's investment rates are far higher than Maroc Télécom's. Over the past three years, Méditel invested an average of 23% of its revenues - 6 percentage points higher than Maroc Télécom, and twice as much if EBITDA is taken into account". However Méditel does not compare the amounts invested by the two operators and does not specify the share of Méditel's investments allotted to the fixed network.



infrastructure operators: primarily ONCF (the railroads operator), but also to a lesser extent Autoroutes du Maroc (ADM, the Moroccan highway authority) - see below).

- WANA, which was the third to arrive on the market in 2006, acquired its NGN license (for 28 million euros and allowing for restricted mobility) as well as its 3G license in 2006. Similarly to Méditel, and in the absence of fixed-line coverage obligations, WANA's priority was not to massively invest in optic fiber; it limited itself to deploying peri-urban loops (nearly 600 km) in the most profitable urban areas. Starting in 2013, larger investments in optic fiber (nearly 1500 km) were deployed for the backhaul, to ensure quality 3G and 4G service. In total, WANA claims 6000 km of inter-urban optic fiber (including fiber that is co-owned or, to a lesser extent, leased from alternative infrastructure operators: mainly ONEE (utility), as well as Finetis Maroc, ADM, and ONCF).

Aware of this imbalance, in 2004, prior to the 3G launch, the ANRT and the Moroccan government amended law 24/96 (see in particular articles 7 bis and 22 bis), allowing alternative infrastructure operators (i.e. ONCF, the railways operator, and ONEE, the utility) to lease or sell excess capacity in their optic fiber networks (as well as their civil engineering amenities) to licensed operators. This facilitated the deployment of optic fiber networks for Méditel and WANA, through co-deployment agreements and/or by leasing dark fiber. ONCF's optic fiber networks are 1,600 km long (with wires ranging from 12 to 72 pairs depending on the section), and ONEE's are 7000 km long (primarily installed on 400kV, 225kV and 60 kV power lines; ONEE does not have a document mapping its optic fiber network on a geographical map of Morocco). Extension projects are ongoing, in particular with the construction of new railway lines by ONCF. Besides ONEE and ONCF, ADM and Finetis Maroc own optic fiber and civil engineering networks that can be operated by the telecommunications operators for their broadband networks. No public information is available on the characteristics of the ADM network, but Finetis Maroc claims to have deployed<sup>87</sup> nearly 2,050 km of optic fiber in 2005 (in particular through co-construction with ADM).

Despite their strategic importance, optic fiber (and civil engineering) networks owned by ONEE and ONCF are of limited use for the development of broadband, for two reasons:

- The ONCF network only covers the northeastern portion of the country; while the ONEE's is broader and reaches Laayoune, located in the southern, Saharan part of the Kingdom, it does not penetrate the large urban areas (unlike the ONCF, through its network of train stations) and is partly made of optic fiber and transmission equipment that is sub-optimal for broadband services<sup>88</sup>.
- Moreover, concerning access to the ONCF and ONEE networks, there is no regulation<sup>89</sup> on the catalogues of services offered to telecommunications operators, or on the terms of access, and these services are not offered based on an open call for expressions of interest. As a result, negotiations with telecommunications operators occur on the basis of a private agreement. This does not encourage a harmonization of technical and price conditions between operators, or optimized use of the public fiber optic networks of ONCF and ONEE, at the expense of government budget. For

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<sup>87</sup> For 22 million euros (excluding operating costs), which amount to a deployment cost per kilometer of nearly 10,000 euros, an amount equivalent to the US average: <https://www.fcc.gov/general/national-broadband-plan>.

<sup>88</sup> ONEE's active transmission network is made up of two types of transmission equipment: (i) SDH (Synchronous Digital Hierarchy) equipment that transmit data between the network's various nodes; and (ii) PCM (Pulse Code Modulation) which perform the necessary data extraction in each of the sites served by the fiber optic transmission network. SDH fiber optic transmission equipment set up on the local loops have a STM-16 capacity, enabling speeds of 622 Mbit/s.

<sup>89</sup> In June 2016, it was stated that "*the current regulatory framework includes clear provisions (see article 22 bis) regulating the conditions (including prices) under which the infrastructure of ONCF, ADM and ONEE, as public service companies, may be used. To date, the ANRT was never asked to settle a dispute on the matter. (...) Some alternative infrastructures may be regulated in the event that the ANRT is requested to settle a dispute, in compliance with current regulation*".

historical reasons, Méditel is the main user<sup>90</sup> of ONCF's network. WANA's use of the ONCF network is limited to the Casablanca-Marrakech line, and Maroc Télécom does not use this network. As for the ONEE network, WANA is its sole user<sup>91</sup>.

- Lastly, while ONCF and ONEE infrastructure is available, demand is limited as only the three licensed operators are allowed to lease it. Due to the lack of local, independent operators, and because it is prohibited to lease directly to IAPs and private networks, the range of potential clients is narrow.

Under-investment in fixed infrastructure, along with insufficient regulation of this infrastructure (see section 2-C), directly affect 3G and 4G mobile coverage. In Morocco, to be able to function under satisfactory quality conditions, these services must rely on a network of radio antennas linked to a fiber optic network able to handle high traffic. The lack of fixed infrastructure coverage helps to explain the unequal 3G and 4G coverage in Morocco. It is to be noted that 3G and 4G licensing requirements are not made public, which may also be a factor behind the uneven 3G and 4G coverage. Lastly, the imbalance between operators in terms of optic fiber infrastructure explains the differences in 3G and 4G coverage between operators. Moroccan operators' network coverage maps<sup>92</sup> highlight two important points:

- 3G and 4G mobile services are concentrated along the main routes in the northwest of the country and in the main cities.
- There is no competition in some areas with 3G and 4G coverage, as Maroc Télécom's coverage is broader than Méditel, which in turn is broader than WANA's.

#### Limited expansion prospects for broadband infrastructure:

Moroccan operators' investment capacity is difficult to estimate. However, the gap between turnover and private investment could suggest good profitability favorable to investment. As an example, in 2016, Maroc Télécom indicated that its EBITDA was 52% (nearly 1.2 billion USD) on the Moroccan market, which amounts to Méditel and WANA's combined revenues. But since 2011 the industry's total revenues have declined: the three operators' combined investment fell from 1.2 billion USD to 800 million USD between 2010 and 2015 (see Figure 5). Box 4 provides an overview of the current situation for each of the three Moroccan telecommunications operators.

Regardless the three operators' investment capacity, the current regulation on rights of way to occupy property of the State (managed by the Ministry of Equipment, Transport and Logistics) and property owned by municipalities (managed by the Ministry of the Interior) does not encourage operators to invest in fixed and mobile infrastructure. Regulations on the occupation of State-owned land (i.e. intercity routes) recently (see article 10 of the budget law 70-15 for the fiscal year 2016) established the royalty fees for occupying State-owned property for all public telecommunication network operators (Figure 13); until then, these were not clearly regulated and harmonized. Despite this recent improvement, the occupation of municipal property (urban routes) is not specifically regulated, and is therefore left at the discretion of the municipality, which may charge different fees depending on the municipality and the operator. As an example, Maroc Télécom and WANA indicated in 2016 that they were charged an annual 30 dirhams per linear meter for occupying Casablanca city property, five times the amount charged for State property (Figure 13). For operators, this is a significant cost that may slow down broadband

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<sup>90</sup> WANA's use of the ONCF network is limited to the Casablanca-Marrakech line, and Maroc Télécom does not use this network.

<sup>91</sup> ONEE stated in May 2016 that WANA's use of the fiber optic network was limited to seven lines: **Line 1**: Rabat – Kenitra – Tangier – Spain; **Line 2**: Meknes – Fes – Berkane - Oujda; **Line 3**: Casablanca - Settat – Beni Mellal – Khenifra; **Line 4**: Casablanca – El Jadida – Marrakech – Ouarzazate; **Line 5**: Marrakesh – Chichaoua – Agadir; **Line 6**: Ouarzazate – Tinghir- Errachidia; **Line 7**: Agadir – Tan Tan – Laayoune – Tarfaya

<sup>92</sup> <https://www.nperf.com/en/map/MA/>. Regarding these maps, the ANRT stated in June 2016: "These coverage maps do not reflect the reality of the 2G mobile network coverage.

juin 2016, l'ANRT indiquait à propos de ces cartes : « Ces cartes de couverture ne reflètent pas la réalité de la couverture par les réseaux mobiles 2G ». Pour autant, il n'existe pas de cartes de couverture alternatives.

deployment in Casablanca. More broadly, the absence of harmonized regulation by the Ministry of the Interior on occupying municipal property affects the cost of investing in urban areas to deploy broadband infrastructure.

**Figure 13.** Annual fees charged for occupying State property in Morocco

Using the ground or underground for the passage of telecommunication lines and related elements	6 dirhams per linear meter (0.6 USD)
Connection boxes for telecommunication lines	100 dirhams per square meter of floor area (10.3 USD)
Cabinets housing technical systems to deliver to subscribers, connection relays and telephone boxes	400 dirhams per square meter of floor area (41,2 USD)
Radio station equipment (pylons, mobile antennas) and associated equipment	20 000 dirhams per site (2061 USD)

Note: the USD-dirham exchange rate used is 9.7 dirhams for 1 USD in May 2016.

Source: Article 10 of budget law 70-15 for fiscal year 2016

Moreover, prospects to expand broadband connectivity infrastructure are limited by the absence, in the telecommunications industry, of players other than the three operators allowed to deploy and operate their own infrastructure networks. To date, Morocco has not attempted to encourage the entry of infrastructure operators or Internet access providers authorized to deploy infrastructure. Unlike many emerging countries in Europe (Bulgaria, Romania, Lithuania), in Morocco there is no specific legal status or regime relevant to this type of operator (see section 2-C). Infrastructure operators' role is to build wireline networks; their business is not to serve final customers, but to provide wholesale services (active or passive via IRU) to telecommunications operators and/or large accounts (i.e. institutions and public and private companies organized in a network). Finetis Maroc's unsuccessful experience in 2005 showed that foreign private investors were interested in operating in this field. Unlike telecommunications operators, who do not usually have the expertise to set up networks and often externalize this activity, infrastructure operators can roll out networks at a lesser cost.

Moreover, while the real estate construction sector has been expanding for several years and is likely to continue on that path as a result of demographic pressure, the legal and regulatory framework<sup>93</sup> and their application do not provide for the systematic fiber optic cabling of new buildings. And, when new buildings are cabled, it is with copper wire. Therefore, the cables deployed in new buildings are not systematically the subject of an open call for expressions of interest<sup>94</sup> of all telecommunications operators, at the expense of competition and the interest of consumers.

The lack of digital records and maps<sup>95</sup> of national (at the regional and municipal level) public and private infrastructure that can be used by telecommunications operators to deploy their own infrastructure networks is also a significant obstacle for investment. Such information should help telecommunications operators to better plan their investment and to reduce the cost of deployment. Digital records and maps of national public and private infrastructure were very often made available to investors (and the wider public for the development of digital services such as applications) in developed and emerging countries.

<sup>93</sup> In June 2016, the ANRT stated: "A joint decree by the Ministry of Urban Planning and the Ministry of the Digital Economy is being drafted and is expected to lay out the telecom installations to be deployed in the various allotment and housing categories".

<sup>94</sup> In June 2016, the ANRT stated: "Regarding expressions of interest, note that draft law 121-12 clearly addressed this aspect and laid out the procedure to be followed".

<sup>95</sup> In June 2016, the ANRT stated: "Draft law 121-12 addressed this point and introduced a database of infrastructure developed by operators".

Lastly, through its 2012 National Plan for Broadband Development (PNHD<sup>96</sup>, which is not made public), the Moroccan government aims to provide broadband coverage for 100% of the population by 2022 (minimum of 2 Mbps, a modest target in comparison with those set by Morocco's competitors such as Romania, which aims to generalize speeds of 100 Mbps and 30 Mbps by 2020), at identical prices for urban and rural areas<sup>97</sup>. However:

- The sector's public financing mechanism (i.e. the FSU, the Telecommunications Universal Service Fund, created in 2005) is under-used, and seldom supports private network infrastructure development projects (international connectivity, backbone, backhaul, access network). The need for public financing is due to the fact that private operators concentrate their investment in densely populated urban areas where purchasing power is high and demand for telecommunication services is strong. The 2012 PNHD estimates that it is possible to provide mobile broadband coverage for 60% of the population by 2022 through the efforts of the three private operators and in identified areas. Coverage for the remaining 40% of the population (who live in more remote, sparsely populated semi-urban and rural areas with poor and/or no profitability) cannot be provided without the use of public funds (Figure 14).
- The use of the Universal Service Fund (FSU, funded by 2% of the operators' total yearly turnover) is not sufficiently directed towards developing broadband (see section 2-C and 3-B). The data collected and presented in Annex 5 helps us to estimate that: (i) nearly 288 million USD are available at the FSU and could be used to develop broadband; and that (ii) 6 projects were initiated by the FSU since its creation in 2005, most of which in the education sector. And, while expanding broadband networks is one of the FSU's priority objectives, since 2006 none of the FSU-backed projects have massively financed broadband infrastructure deployment in the Kingdom's underserved areas. However, as this note was being drafted, documents were shared with the World Bank team on consultations in preparation for a call for tender aimed at financing broadband deployment in white spots with FSU funds (see section 2-C).
- Moreover, the ANRT should consider funding through Public-Private Partnerships (PPP) - on a large scale and in a spirit of decentralization and higher independence for the regions - (see the best European experiences that include the arrival of new players) for the deployment of fiber optic broadband infrastructures. Until now, the ANRT has not attempted to promote infrastructure-based competition (rather than service-based<sup>98</sup> - see section 3-B). It is instead considered preferable (see the ANRT's General Guidelines 2010-2013 and 2015-2018<sup>99</sup>) to encourage joint investment projects between operators, which have not yet materialized (see section 2-C).

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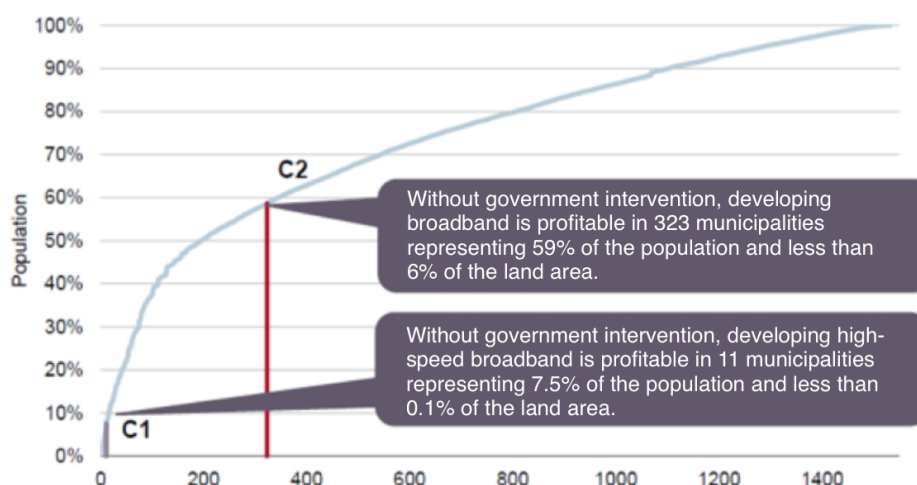
<sup>96</sup> <https://www.anrt.ma/lagence/actualites/plan-national-pour-le-developpement-du-haut-et-tres-haut-debit-au-maroc>.

<sup>97</sup> Broadband access (min. 2 Mbps) for 100% of population by 20203 and high-speed broadband (100 Mbps) for 50% of population by 2028.

<sup>98</sup> See the ANRT's General Guidelines 2015-2018 (p.4).

<sup>99</sup> <https://www.anrt.ma/publications/notes-dorientations-generales>.

**Figure 14.** Development of broadband and high-speed broadband without government intervention



Source : 2012 National Broadband Plan, ANRT, 2014

**Box 4.** Current situation for the three telecommunications operators<sup>100</sup>

Méditel (18% of total turnover in 2015) is the operator whose financial position is the most difficult, as it is still bearing the costs of its GSM license, paid nearly 980 million euros (even though there have been support measures such as the extension of the mobile license and the acquisition of the NGN license for a modest amount and under conditions of market protection) and it is affected by the low prices of mobile subscriptions and 3G data which constitute its core business. With little financial latitude, Méditel's declared strategy is mainly to increase its mobile market share (through low-cost prepaid plans) and to develop infrastructure sharing (radio sites and fixed infrastructure) as much as possible.

WANA (19.6% of total turnover in 2015) is Maroc Télécom's main competitor. Its business has been improving since 2010. WANA's investment capacity is higher than Méditel's: WANA's managers mentioned, among the company's investments, the acquisition of a submarine cable with landings in Casablanca and in Spain.

15 years after partial liberalization in the sector, Maroc Télécom's presence remains very strong with 62.4% of the industry's total turnover (2015). Its investment capacity is higher than other operators (despite a slight decline in revenues for the past few years, partially offset by Maroc Télécom's growing revenues abroad). Since 2013, Maroc Télécom has made significant investments to deploy FTTH and to improve ADSL quality by deploying MSANs as close to subscribers as possible.

Source: World Bank, 2015

**Considering the current situation of broadband in Morocco, and the country's ambition to become a regional leader and to rise to the level of economic development of upper-middle income countries, the Moroccan government now faces the need to introduce a second wave of reforms in the broadband sector.** Following the example of international best practices, Morocco should primarily strive to:

- Encourage the arrival of new players (without limits on their numbers and without prohibiting infrastructure deployment) on all market segments (international gateways, backbones, backhauls,

<sup>100</sup> Méditel stated in June 2016: "Méditel is in a comfortable financial situation for the following reasons: (i) in 2014/2013, Méditel was the only operator whose turnover grew to the tune of 6% in a declining market, whereas Maroc Télécom declined by -3% on its mobile segment over the same period; (ii) 5% lower debt; (iii) Méditel enjoys great room to manoeuvre: it sought a 3 billion MAD loan from banks and was offered 7 billion MAD, with a 10-year fixed rate. This demonstrates banks' confidence in Méditel".

access) by introducing an authorization regime (less restrictive than a licensing regime which requires competitive bidding) and by simplifying administrative procedures. Like its direct competitors - in particular Eastern European countries - Morocco should shift towards total openness to competition of the various segments of the telecommunication market (without limiting the number of players). Nonetheless, a progressive and measured approach could be adopted by gradually introducing growing numbers of players on the various market segments.

- Introduce regulation for open and non-discriminatory access to communications networks (wireline infrastructure, civil engineering and easements) to telecommunications operators and alternative infrastructure operators, and in particular to effectively enforce existing regulation on unbundling.
- Promote private investment in telecommunications by: (i) regulating occupation of State and municipality-owned property; (ii) facilitating the coordination of civil engineering works between linear infrastructure projects; (iii) creating a housing law requiring that new buildings be equipped with optic fiber; and (iv) listing and mapping any infrastructure that can be used to deploy new networks. All these points have been the subject of a draft regulation reform, which was adopted by the Council of Ministers and the Government Council in January 2014, and has been under examination by Parliament since March 2014.
- Promote public/private investment, possibly by entering Public/Private Partnerships (PPPs), and by optimizing the use of the Universal Service Fund by ensuring it backs broadband infrastructure development, in particular in areas where private interest is lacking.

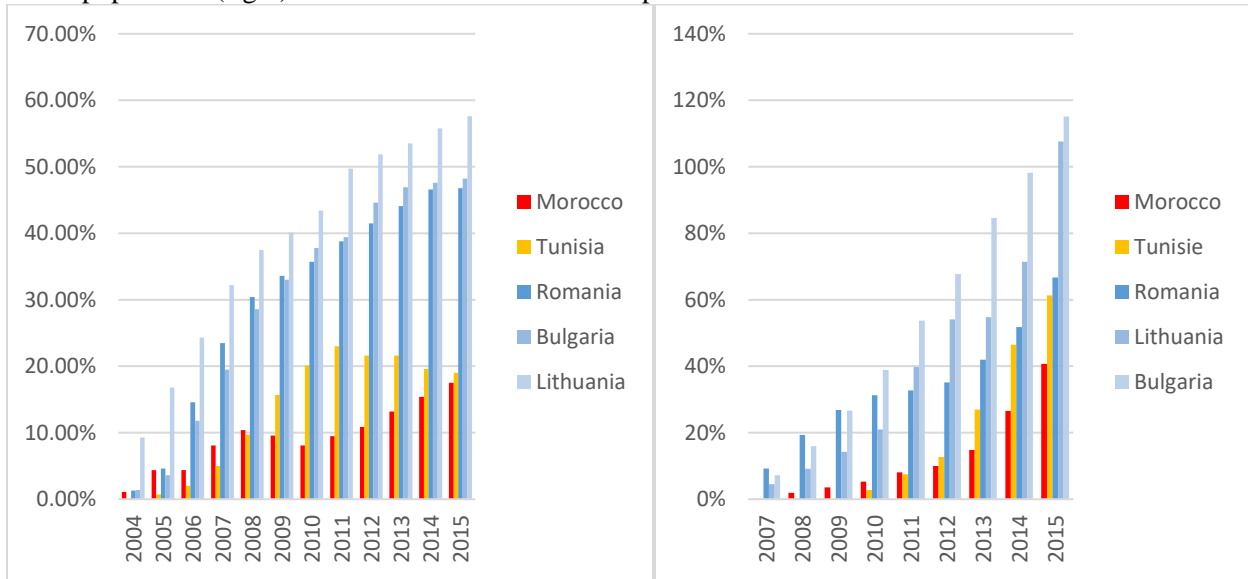
### **C. The need for a new wave of sector reforms to develop broadband accessible to most**

**As a consequence of a program of reforms left unfinished in the broadband sector, Morocco increasingly lags behind other comparable countries.** Broadband penetration (and service quality) in Morocco (17.5% for fixed as a % of households<sup>101</sup> and 41% for mobile as a % of the population) is significantly below (Figure 15) some Eastern European countries (Lithuania, Romania, Bulgaria) and Turkey, which led more comprehensive reforms. These differences result from different public policy choices. Influenced by Western European standards, countries such as Romania, Bulgaria and Lithuania, for instance, highly liberalized the broadband markets and provided public funding to promote access to (and use of) broadband. This was achieved through infrastructure deployment programs (international connectivity, backbone, backhaul, access networks) - with the support of the European Commission structural funds and of national public funds - in areas with little or no coverage, in partnership with private operators. Today, these countries are considered emerging economies, a group which Morocco aims to join; comparing them to Morocco is warranted as when the sector reforms were launched, their level of development (in terms of GDP per capita) was equal to that of Morocco today (Figure 16).

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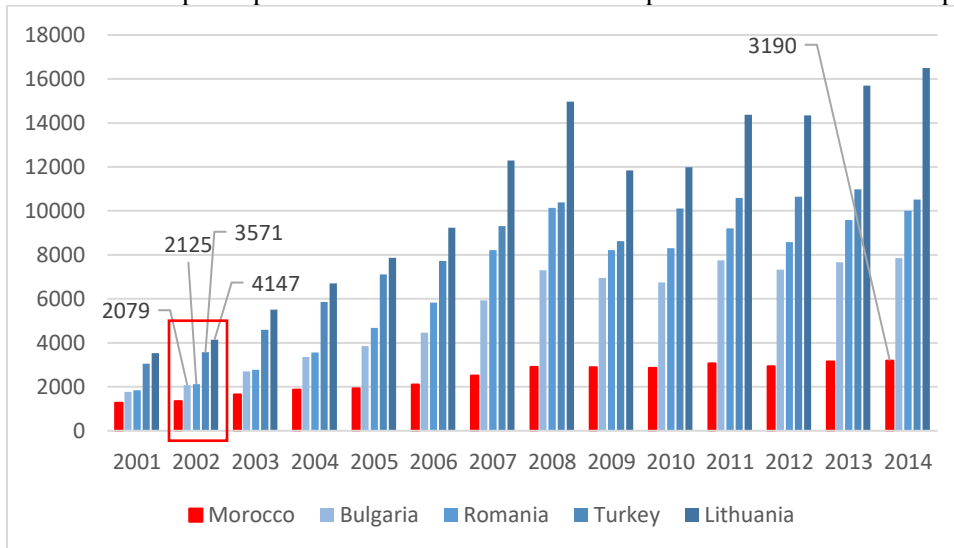
<sup>101</sup> It is to be noted that as a percentage of population, the penetration rate is about 3.5%, as in Morocco the average household has 5 members. See: <http://www.leconomiste.com/article/893043-ces-nouveaux-profils-de-la-famille-marocaine-moins-d-enfants-plus-de-maladies-chroniq>

**Figure 15.** Penetration rates for fixed broadband as a % of households (left) and mobile broadband as a % of the population (right) in Morocco and Eastern Europe



Source: TeleGeography’s GlobalComms 2015, <http://www.telegeography.com>

**Figure 16.** Trends in GDP per capita in Morocco and in other comparable countries in Europe and Asia



Source : World Bank, 2016 ; *World Development Indicators* database: <http://databank.worldbank.org/data/home.aspx>

**In comparison to Eastern European countries, with which performance gaps in terms of broadband and international economic competitiveness are likely to widen, the main obstacles to expanding broadband penetration in Morocco are the following:**

*A lack of competition on the market and the absence of a regulated wholesale market*

Unlike European emerging countries<sup>102</sup>, in particular, in Morocco barriers to entry continue to exist (the law does not forbid new licenses, but in practice no licenses other than those of the general operators and the niche operators have been granted) for players who wish to deploy their own infrastructure without radio spectrum auctions. It is to be noted that while the existing law has its limitations, it does not prevent the entry of new players. Nevertheless, in Morocco there are no infrastructure operators, or operators independent from the three telecommunications operators, who are able to deploy their own infrastructure networks. This is due to the fact that telecommunications law does not make a clear distinction between telecommunications operators (Maroc Télécom, Méditel and WANA) who market the radio spectrum, and Internet access providers and infrastructure operators who do not use or market the radio spectrum. Therefore, Internet access providers and infrastructure operators wishing to deploy their own infrastructure are subject to the same licensing regime (and therefore to competitive bidding) as telecommunications operators; for financial reasons, this prevents them from legally operating on the telecommunications market<sup>103</sup>. Moreover, the ANRT does not have a manifest intention to authorize the entry of such players (see ANRT's General Guidelines 2015-2018, p.7).

Moreover, the international communications market is theoretically open to competition, but in practice it is oligopolistic. The three operators<sup>104</sup> are allowed to set up their own international connectivity infrastructure (i.e. international gateway and submarine cable landing stations), but in the absence of regulation on the terms of access to this strategic infrastructure, the three operators are under no obligation to grant open and non-discriminatory access to any (existing or future) operator to the infrastructure through regulated offers. In fact, each of the three vertically integrated operators developed its own international connectivity infrastructure, and uses it to acquire international capacity. There is no truly competitive dynamic on the international communications market. By contrast, Chile had for instance granted nearly 30 international licenses in 2004, and the United Kingdom 120. In Morocco, this situation has negative consequences on the telecommunications market. Firstly, it does not encourage lower termination rates for international calls, or the allocation of significant international capacity on the international communications market; operators sell low capacity through prepaid plans (by setting low data consumption thresholds), which means that they can minimize investments in data transmission infrastructure, which is very costly yet critical for service quality. Secondly, this situation constitutes an obstacle to the entry of potential new players (infrastructure operators, Internet access providers allowed to deploy their infrastructure) wishing to acquire international capacity from licensed operators, as they would be forced to negotiate directly with operators (for very high prices).

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<sup>102</sup> A country such as Turkey authorized the entry of 87 Internet access providers allowed to deploy their own infrastructure, and 16 infrastructure operators.

<sup>103</sup> The case of Finetis Maroc aptly illustrates this. Finetis Maroc was interested in investing in Morocco, intending to become a wholesale infrastructure provider. Unlike many European countries, Morocco did not make the necessary decisions to grant specific licenses appropriate to this type of operator, whose business is not to serve final customers but to lease dark and/or active fiber (through IRU) from telecommunications operators and/or institutions and public and private companies. This sub-optimal situation considerably harms Finetis Maroc, which took the risk of deploying - without an infrastructure operator license but operating within a land use agreement - a 2050 km-long open access optic fiber backbone network for 22 million euros.

<sup>104</sup> As a reminder, Méditel stated in June 2016: "*satellite operators also provide this service, which is therefore not limited to 3 operators*".



Moreover, on the national data communication market, there is no real regulated wholesale market. This partly owes to the absence of infrastructure operators and operators allowed to deploy their own infrastructure who are independent from the three operators. But it also results from the incomplete telecommunication legislation and regulation, and their lack of enforcement. Indeed, while law 24/96 legislates on sharing civil engineering and easements among operators (article 22 bis), it does not cover national fiber optic networks. Regarding enforcement of the regulations, regulation decisions on access to the incumbent operator's local loop, urban ducts and civil engineering amenities do exist<sup>105</sup>, but are not sufficiently enforced: alternative operators point to a lack of on-site controls, slow responses to requests related to the catalogues of ANRT-approved services, and the absence of civil engineering catalogues<sup>106</sup>. Regulation is also incomplete as there is no regulation decision on the incumbent operator's dark fiber, meaning that negotiations between operators are not regulated and do not succeed<sup>107</sup>. Lastly, access to the networks of alternative infrastructure operators is legally authorized, but is not regulated to ensure open and non-discriminatory access to all operators<sup>108</sup>. Alternative infrastructure operators are not subject to a specific regime under law 24/96. Law 24/96 stipulates that leasing or sales contracts concluded between alternative infrastructure operators and licensed operators must be communicated to the ANRT "*for information*". Because they are not regulated, contracts between alternative infrastructure operators and telecommunications operators are negotiated on the basis of a private agreement; access conditions for operators are not harmonized (see above). Thus there is a significant lack of regulation regarding alternative infrastructure in Morocco; the use of such infrastructure is far from optimal, at the expense of broadband development as well as government spending.

In the absence of a regulated wholesale market, possible future newcomers (i.e. Internet access providers, "operator's operators", etc.) would face a very complicated situation, which constitutes a barrier to entry. Similarly to what has been done in European countries, one option would be that the State require entities who own fiber optic infrastructure and in which it holds stakes to create technical and commercial departments dedicated to the wholesale telecommunications market.

*A model of rules and regulation that does not encourage further liberalization in the broadband sector*

Until now, and for historical reasons the ANRT is a regulator that operates under direct government supervision through its board of directors made up of the Prime Minister and several ministers<sup>109</sup>. Additionally, in compliance with article 29 of law 24/96, the ANRT not only plays the role of regulator (*ex ante* and *ex post*, see below), but also steers sector policy by managing the Universal Service Fund (see section 3-B), by preparing strategic documents for the sector (PNHD, General Guidelines, etc) and by suggesting amendments to the legal framework of telecommunications (e.g. in 2015), as well as by

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<sup>105</sup> In particular, see Decision ANRT/DG/N°06/15 of 27 Safar 1437 (9 December 2015) which lists, for the year 2016, the public telecommunication network operators who exert significant influence on specific telecommunication markets; and Decision n° 03/15 of 30 September 2015, which lays out the technical and pricing conditions for wholesale bitstream offerings for the unbundling of Maroc Télécom's local loop and sub-loop. <https://www.anrt.ma/reglementation/decisions>

<sup>106</sup> In June 2016, Maroc Télécom stated that it had: "*fulfilled all its regulatory obligations regarding the publication of unbundling and civil engineering catalogues*".

<sup>107</sup> This aspect is the subject of a debate between the incumbent and the alternative operators. Whereas Maroc Telecom considers that "*the backbone's dark fiber is not infrastructure, as such it cannot be regulated*", Méditel considers that "*the prohibitive cost of replicating Maroc Télécom's infrastructure, and the unreasonable time it would require, mean that there are no viable alternatives for alternative operators to develop a sustainable fixed and mobile broadband offering*".

<sup>108</sup> In June 2016, the ANRT stated that "*some alternative infrastructures may be regulated in the event the ANRT is requested to settle a dispute, in compliance with current regulation*".

<sup>109</sup> <https://www.anrt.ma/en/lagence/organisation/instances>

investigating applicants for licensing (including frequency allocation). This governance mode, which gives significant power to the General Director - while there is no regulatory board - is not consistent with international best practices or with the model of the Moroccan High Authority for Audiovisual Communication (HACA, *Haute Autorité de la Communication Audiovisuelle*), which is administratively independent and collegial. Thus, the ANRT's governance model should be aligned with international best practices and the HACA model, in particular by strengthening the ANRT's political independence by creating a regulatory board within the ANRT. The government should also clarify the roles of the ANRT and the Competition Council. Article 109 of law 104-12 concerning pricing freedom and competition in 2014<sup>110</sup> assigned the ANRT the responsibility to enforce the 2014 competition law until further notice; more recently, decree n. 12-16-347 (which modified and completed decree n. 2-05-772 of 13 July 2005) gave the ANRT the decision-making power to sanction anti-competitive practices in the telecommunications sector (Article 20), but also to regulate "*cases of abuse of a dominant position or a state of economic dependence*" (Article 24). However, in compliance with Article 166 of the Constitution<sup>111</sup>, this power is also held by the Competition Council, which has authority over many sectors. The Competition Council deplors the lack of consultation in adopting this decree<sup>112</sup> and the overlapping prerogatives between the industry regulator and the Competition Council; it is not clear who - between the ANRT and the Competition Council - ultimately wields decision-making power. As a result, it is possible that these two entities issue different rulings on one case, while terms of cooperation between the two are not clearly defined. Moreover, unlike the ANRT which enjoys substantial financial resources (spectrum fees, etc.), resources of industry's ministry (MICIEN) allocated to ICT are more limited, and are meant to help steer the sector's policy: strategic orientations (ICT strategy and the digital economy, universal service, general guidelines, broadband plan, opening the sector to competition) and revising the legal and regulatory framework.

The government and the ANRT protect the three telecommunications operators while not encouraging or facilitating the entry of new players on the market. In contrast, Morocco's competitors (Romania, Lithuania, etc.) do not directly subject the entry of new players to the discretion of the regulator (in those countries, there is an automatic relationship between license/authorization requests and their being granted). The ANRT has no precise agenda (see 2015-2018 General Guidelines, p. 7) to authorize the entry of new operators (such as IAPs owning their own infrastructure, or infrastructure operators) and its vision is to "*consolidate the market around general operators*". Law 24/96 does not allow Internet access providers to deploy their own infrastructure, as they would have to obtain an operator license (which is subject to competitive bidding). Besides, the ANRT has not licensed operators to deploy infrastructure locally. Yet this could contribute to the deployment of new infrastructure and strengthening competition on the broadband market. The government and the ANRT also protect the three telecommunications operators by prohibiting voice over IP services, which have "*lasting impacts on operators' income, thus reducing their investment capacity*" (2015-2018 General Guidelines, p. 3), creating a "*loss of revenues for the national telecommunications market*" (ANRT, 2016)<sup>113</sup>. The ANRT's decision - which was not technically subject to a regulation "decision", publicly available on the ANRT website, but a press release on 7 January 2016 - may reveal some level of understanding with the three telecommunications operators. It is to be noted that the economic impact (in terms of GDP loss) of blocking these voice over IP services

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<sup>110</sup> [http://conseil-concurrence.ma/wp-content/uploads/2014/08/BO\\_6280\\_Fr.pdf](http://conseil-concurrence.ma/wp-content/uploads/2014/08/BO_6280_Fr.pdf)

<sup>111</sup> Article 166 states: "*The Competition Council is an independent administrative authority which, to ensure free and fair competition, is tasked with ensuring transparency and equity in economic relations, in particular by analysing and regulating competition on markets, controlling anti-competitive practices, unfair trade practices and operations aimed at heightening economic concentration and monopolies*". See <http://www.bladi.net/IMG/pdf/Constitution-maroc-2011.pdf>

<sup>112</sup> <http://lematin.ma/journal/2016/les-nouvelles-prerogatives-de-l-anrt-mecontentent--le-president-du-conseil-de-la-concurrence/248150.html>

<sup>113</sup> <https://www.anrt.ma/sites/default/files/CP-Telephonie-IP-fr.pdf>

was recently estimated at 320 million dollars (between 1 July 2015 and 30 June 2016) by the Brookings Institute<sup>114</sup>. In November 2016, several press articles announced that the ANRT had rescinded its decision regarding the prohibition of voice over IP<sup>115</sup>.

Moreover, there is no regulation (by the Ministry of the Interior and in the Local Government Code) on occupying municipality-owned property providing for harmonized fees for occupying public property among the various operators and in all municipal property in the country. This is a major obstacle to the deployment of new infrastructure (high fees, lack of predictability on the amount, differences in fees, etc.). The ANRT's 2015-2018 General Guidelines (p.5) aim to harmonize rules and procedures for the occupation of public property without providing further detail.

Lastly, while cross-sector coordination (see Box 5) is considered critical (by France, the USA and the European Commission, which all introduced an appropriate regulatory framework) for the deployment of broadband networks, in particular in universal service areas (grey and white spots), the Moroccan legal framework does not actively promote this type of practice<sup>116</sup>. While local initiatives do exist (e.g. in Casablanca as part of the smart city project), they have not yet succeeded and an appropriate regulatory framework for this type of practice does not yet exist in Morocco. In particular, there is no public information on existing fixed and mobile telecommunication infrastructure mapping, which facilitates cross-sector synergy planning and provides information on the infrastructure coverage of Morocco's various communities; yet such information is critical to plan universal service missions. The lack of transparency on coverage obligations (i.e. the geographic coverage schedule) from the requirements (in the annexes) included in the operators' fixed and mobile licenses also contributes to this.

**Box 5.** Why promote coordination for civil engineering works between public linear infrastructure projects (transport, telecommunications, water, power, gas, etc.)?

As was the case in European, American and African experiences, promoting cross-sector synergies is a strategic challenge for the national economy. To ensure that broadband infrastructure does not remain limited to the main urban areas, and considering the significant investments related to this type of infrastructure, government should define policies and procedures that reduce the costs of deploying broadband connectivity networks. One solution is to promote the coordination of civil engineering works for new infrastructure construction projects between the sectors of public service networks (utilities, transport) and telecommunications. Indeed, coordinating civil engineering works between infrastructure projects can generate substantial savings, as building infrastructure (railways, roads, terrestrial fiber optic projects, etc) requires much civil engineering work (digging trenches, etc.) which account for the bulk (70-90%) of the cost of deploying a fiber optic network. Moreover, deploying ducts for fiber optic cables (either for immediate or future use) along transport infrastructure (roads, highways, bridges, etc.) as the infrastructure is being built or improved only entails marginal costs: it is estimated that to set up ducts for fiber optic cables only represents a fraction (possibly less than 0.02%) of the cost of deploying the host infrastructure. Similarly, installing earth wires containing excess optic fiber as new power lines are being built only represents a marginal cost compared to an earth wire that only contains the number of pairs required for power operation. Yet, initiatives to coordinate civil engineering works across sectors are rare in the absence of a legal and regulatory framework aimed at facilitating (through incentives or through requirements and legal specifications) synergies between public service network projects (transport, utilities) and broadband deployment projects. In the absence of such a legal and regulatory framework, cross-sector synergies remain limited, because they rest solely on the private initiative of telecommunications operators and public service network operators who seek - usually non-systemically - to share investment costs.

Source: World Bank, 2015

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<sup>114</sup> <https://www.brookings.edu/wp-content/uploads/2016/10/internet-shutdowns-v-3.pdf>

<sup>115</sup> <http://www.tic-maroc.com/2016/10/lanrt-debloque-temporairement-la-voip-au-maroc.html>

<sup>116</sup> In June 2016, the ANRT stated: "Draft Law n. 121-12 includes clear provisions on this matter with regard to telecommunications operators".

### *Lacking investment in broadband infrastructure*

The rise of broadband also led to a lack of quality and coverage of existing network infrastructure (see above). Both the government and the ANRT (2015-2018 General Guidelines, p. 2) recognize that further development in the telecommunications sector will require investment to "*deploy new fiber optic infrastructure, mainly fixed, which is the only technology that can absorb growing volumes of data exchange*".

In a context where private investment from operators is declining, one solution would be to authorize the entry of new players to deploy new infrastructure and provide wholesale services. Even though this measure was mentioned in the ANRT's 2015-2018 General Guidelines (p.7) and may be considered in 2017, it does not seem to be a matter of priority. Rather, the ANRT states that it aims to maintain competition among the three general operators by encouraging joint investments between operators, possibly through Special Purpose Vehicles (SPVs) involving general operators, without providing further details on this approach. It is to be noted that in June 2016, the ANRT mentioned that it was favorable to an SPV model, "*the scope of which would be restricted to building and operating passive infrastructure exclusively meant for licensed operators whose joint stakes preserve them from conflicts of interest*".

To date, and unlike Eastern European countries which, driven by experiences in Western Europe (where broadband markets are highly competitive), mobilized public funding (with the help of the European Commission, in particular) to deploy broadband infrastructure in areas that attracted little private interest through Public-Private Partnerships, Morocco has not opted for this type of measure. Annex 4 provides an overview of international experiences in forming PPPs to fund new infrastructure.

Yet, the Universal Service Fund (FSU, *Fonds de service Universel*), funded by telecom operators since 2005, enjoys abundant resources (nearly 288 million USD were available in 2016) accumulated since the Fund was created in 2005. However, its governance could be improved and its use should be steered towards mass deployment of broadband infrastructure in the Kingdom's underserved areas:

- **FSU governance:** The FSU is managed by the Telecommunications Universal Service Management Committee (CGSUT, *Comité de gestion du service universel des télécommunications*), the composition and prerogatives of which are defined in decree n. 2-05-771 of 13 July 2005<sup>117</sup>. The CGSUT is an inter-ministerial committee established under the authority of the Prime Minister and consists of 7 members, including 5 representatives of government authorities charged with telecommunications, the Interior, Finances, land use planning and national defense, as well as the president of the ANRT management committee<sup>118</sup> and the director of the ANRT. The ANRT director is not only a CGSUT member, but he is also tasked with enforcing its decisions. As stated in decree n. 2-05-771 (pp.8-9): "*as such, the ANRT director performs any action or operation in compliance with the Committee's decisions. The ANRT director is also tasked with preparing the meetings of the Telecommunication Universal Service Management Committee*". The CGSUT's functions are: (i) to plan programs to deliver universal service in the country, in accordance with its priorities; (ii) to disclose, for each call for tenders, the content of universal service in accordance with the provisions of the aforementioned law n. 24-96; (iii) to examine the programs put forward by existing public telecommunication network operators; (iv) to approve the draft list of requirements regarding calls for tenders for programs that weren't carried out by existing public telecommunication network operators as submitted by the ANRT. The FSU's governance could be improved in several ways:
  - The CGSUT's rules of procedure, required by decree n. 2-05-771, are not publicly available;

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<sup>117</sup> [https://www.anrt.ma/sites/default/files/documentation/1998-2-97-1026-con-expl-res-telecom\\_ver\\_consolidee\\_fr.pdf](https://www.anrt.ma/sites/default/files/documentation/1998-2-97-1026-con-expl-res-telecom_ver_consolidee_fr.pdf)

<sup>118</sup> Mr Driss DAHHAK; see <https://www.anrt.ma/en/lagence/organisation/instances>

- Decree n. 2-05-771 states that the CGSUT must issue a summary of its activities as well as a progress report on the implementation of universal service programs, but none of these documents are publicly available. In reality, CGSUT decisions are archived in the detailed minutes of CGSUT sessions and the FSU's achievements are also described in detail in files which are confidential as they are not publicly available;
- In reality, the FSU serves as a parallel mechanism to the Budget law to support government programs that should undergo the budgetary approval process for funding. Thus, the FSU funds objectives other than reducing the digital divide;
- No strategy for Universal Service exists, except the General Guideline regarding the implementation of the Telecommunication Universal Service which only covers the 2006-2008 period<sup>119</sup>.

Thus, even though the ANRT considers in its 2015-2018 General Guidelines (p.7) that the FSU has had significant "achievements", the FSU's effectiveness is difficult to evaluate. Moreover, the Court of Auditors has provided a critical analysis of FSU usage (in particular for the GENIE program<sup>120</sup>) since 2013<sup>121</sup>.

FSU programs: the 2006-2008 General Guidelines regarding the implementation of the FSU sets 4 priority universal service development programs in Morocco: (i) the National Human Development Initiative (INDH, *Initiative Nationale de Développement Humain*); (ii) public rural telephony; (iii) the creation of community ICT centers and (iv) broadband expansion. Expanding broadband network therefore is one of the priority objectives and requires "*expanding the capacity and connectivity of broadband networks so as to make community ICT centers available and to cover white spots*". However, the fact is that none of the FSU-backed projects since 2006 have massively funded the deployment of broadband infrastructure in the Kingdom's underserved areas. Yet law 24/96 (article 13 ter) provides for specific licensing, after calls for tender, to carry out universal service missions - including for unlicensed operators. Available information only mention the existence of 6 projects including 4 (GENIE, INJAZ, NAFID@ and E-SUP) focusing on improving ICT equipment and generalizing ICT use, in particular in the education sector (see Annex 5). Thus just one program, called PACTE, aims to expand mobile and Internet connectivity by deploying 2G and 3G BTSs to cover nearly 2 million people in 9,263 communities defined as "white spots". This program was launched in 2006 and was supposed to end in 2011, but still hasn't been completed and therefore was extended to 2016 without there being any information on the location of the concerned communities, the population already covered and remaining to be covered or the type of coverage deployed (2G and/or 3G). This being so, the ANRT stated in June 2016: "*nearly 40% of communities covered for universal service were covered with 3G*". Generally, while the ANRT's annual reports provide little information on FSU-backed programs, the data collected and presented in Annex 5 indicate that nearly 379.8 million USD were spend by the FSU since its creation in 2005 and that nearly 288 million USD are available.

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[https://www.anrt.ma/sites/default/files/editor/file/nog\\_relative\\_mise\\_oeuvre\\_service\\_universel\\_telecommunications.pdf](https://www.anrt.ma/sites/default/files/editor/file/nog_relative_mise_oeuvre_service_universel_telecommunications.pdf)

<sup>120</sup> The Court of Auditors' report lists and details a large number of weaknesses: (i) limited strategy and planning; (ii) low synchronization between actions; (iii) no priorities are set on which schools to equip; (iv) limited visibility concerning the purchase of digital resources; (v) the absence of a unifying network for information systems in teaching; (vi) limited introduction of open source; (vii) Wi-fi-related health risks in schools; (viii) limited management of the GENIE project; (ix) inadequate administration of the information technology; and lastly (x) low usage rates.

<sup>121</sup> See in particular: [http://www.courdescomptes.ma/upload/Module\\_20/File\\_20\\_136.pdf](http://www.courdescomptes.ma/upload/Module_20/File_20_136.pdf); it is to be noted that another report by the Court of Auditors may be under way and would more generally address the FSU's management, following an audit performed in 2014/2015.

In the ANRT's 2015-2018 General Guidelines (p. 7), the government states its intention to use FSU funds more over the 2016-2022 period so as to meet the National Broadband Plan objectives by 2020 and to promote the development of ICT use through calls for tender. As this note was being drafted, the ANRT shared some documents with the World Bank about a consultation in preparation for a call for tender aimed at making use of FSU funds to increase broadband access in Morocco's disadvantaged regions. Responses to this consultation were expected in September 2016. Following a preliminary analysis of these consultation documents shared with the World Bank, it can be observed that:

- Only operators with a general license can participate; the option of introducing new broadband players in low-income areas is not considered;
- The minimum speed (to be guaranteed by operators) is 2 Mbps whereas broadband programs in Europe target speeds of 30 Mbps and 100 Mbps;
- The consultation is not public, and the ANRT has only consulted the three general operators; the areas to be covered are not listed or appear in confidential annexes that were not shared with the World Bank; the exact award process remains to be clarified, which will probably occur after the closure of the first phase of consultations (September 2016). Unlike Morocco, consultations for universal broadband service in Europe are public, and the areas to be covered are known and published on websites that are publicly available (one example, among others, is the Italian broadband plan, which shows a map of the country, divided in white, grey and black spots - see <http://bandaultralarga.italia.it/piano-bul/strategia/>);
- The consultation introduces an innovative concept, the Host Operator (the operator receiving the funds, in exchange for open network access requirements) and the Operator-Buyer (who relies on the host operator's infrastructure). The intention is to introduce some level of competition in disadvantaged and to discipline the operator receiving the funds (funding is provided only if open access requirements are met). This proposal is promising, but the inefficiency of regulation and in previous experience with shared infrastructure brings the efficiency of this approach into question.
- Even if this consultation has the potential to stimulate broadband in underprivileged areas, a more open and participative consultation would certainly lead to better results.

## Section 3. Proposed sector reform program to increase broadband access and use

### A. Proposed sector reform program

**Considering the obstacles to broadband development in Morocco, and to help Morocco catch up with comparable emerging countries and to position itself as an economic leader in the region, it is recommended to the Moroccan government to carry out a new wave of reforms resting on the following pillars:**

6. Finalize, and seek government approval for - in cooperation with the sector's main stakeholders and following an open and participatory process - a strategy for the digital economy driven by broadband (generalizing access to broadband to the entire country). The goals of this broadband strategy must be consistent with Morocco's development and economic transformation objectives, in particular those related to raising labor productivity, enhancing the competitiveness of strategic sectors for the Moroccan economy, spreading innovation (e.g. *Industry 4.0*, an ICT-based virtual industrial manufacturing process). To this end, such a strategy should draw on the objectives pursued by the European Union in terms of high speed Internet by 2020<sup>122</sup>. The Moroccan government has successfully initiated the preparation of the Maroc Numéric 2020 strategy (Digital Morocco 2020), but it has yet to be officially adopted.
7. Review the scopes of action and remit of each public player in the sector. In particular, discussions with the sector's players have called attention to the fact that a new model of public governance in the sector is needed to efficiently steer the strategy to develop the digital economy. The role of the sector's ministry (MICIEN) could be strengthened to ensure the formulation of sector policy and strategic orientations, in particular by setting up a government entity devoted to the ICT sector and creating and providing the necessary tools for the new Digital Development Agency (Agence du Développement Digital, ADD). The role and resources of the telecommunications regulator (ANRT) could also be enhanced, by strengthening its ability to efficiently regulate (i.e. enforce decisions) a market open to competition (See Section 2-C).
8. Update the legal and regulatory framework to: (i) introduce new players on the telecommunications market (international gateways, backbones, backhauls and access networks) according to fair rules; (ii) encourage private infrastructure investment by all players in the sector (public property use, cross-sector synergies, cabling new buildings, infrastructure mapping); and (iii) strengthen regulation for open and non-discriminatory access to communication networks (wireline infrastructure, civil engineering, etc.) for telecommunications operators and alternative infrastructure operators, and to enforce existing regulation on unbundling.
9. Consider forming PPPs to deploy new broadband infrastructure, including in peri-urban and rural areas where competition is relatively lower;
10. Optimize FSU use by restructuring it into a Digital Development Fund to promote the deployment of broadband infrastructure in less profitable areas, and stimulate demand for broadband with measures such as digital literacy campaigns.

**This proposed new wave of reforms aimed at further opening the telecommunications sector to competition, with a special focus on broadband, is consistent with the Moroccan government's policy orientations for 2020.** These policy orientations, which are presented in the 2012 National Broadband Plan, the Prime Minister's 2015-2018 General Guidelines Note and, more recently, in the draft

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<sup>122</sup> The European Digital Agenda (European Commission, 2013) set the following objectives for 2020: a broadband penetration rate of 100% of the population for bandwidths over 30 Mbps, and a penetration rate of 50% of the population for bandwidths over 100 Mbps.

Digital Morocco Plan for 2020 (*Plan Maroc Numéric 2020*, approval pending) by the sector ministry (MICIEN), converge toward the objective of generalizing broadband access to the entire Moroccan population by 2020 (see Box 3 above). With this in mind, through the Digital Morocco Plan for 2020, the Moroccan government commits to "(...) *new investments in fixed and mobile broadband and high-speed broadband infrastructure, as well as completing the liberalization of the telecommunications sector (...)*". To this end, the key measures of the Digital Morocco Plan for 2020 aim in particular to authorize the entry of new players, to introduce an investment-friendly legal and regulatory framework and to form PPPs to deploy broadband infrastructure in areas with low profitability (Box 6). Thus, the specific reform program recommended by the World Bank converges with the Moroccan government's policy orientations for the telecommunications sector in the coming years.

**Box 6.** The Digital Morocco Plan for 2020's main actions to develop digital infrastructure

*Plan Maroc Numéric 2020 - Digital Morocco Plan for 2020*  
Pillar 4: developing digital infrastructure

Aware that broadband development is lagging behind and of the impacts this has on economic growth, the PMN 2020 places particular emphasis on **developing digital broadband and high-speed broadband infrastructure for all households, businesses and public institutions and covering the entire country.**

Providing broadband everywhere in the country (just like generalizing access to electricity, which covers over 98% of the Moroccan population - see the Rural Electrification Program) is **not a luxury** but stems from the constitutional right of **all citizens to have equal access to the public services that information technology helps to materialize.**

To develop high-speed digital infrastructure and ensure that all Moroccans have access to broadband, the PMN 2020 has set the following targets:

1. To **encourage investment** in new infrastructure and **elicit the emergence of new operators**, including alternative infrastructure operators (ONEE, ONCF, ADM, etc.), local governments and public service concessions-holders, including through an Economic Interest Group or an SPV to create an operator dealing purely with infrastructure, which would be available to all ICT service providers;
2. To **promote, through regulatory provisions, synergies between civil engineering works (water, electricity and road transport)** and those related to the extension of the optic fiber backbone network and the copper network;
3. Encourage **joint investments among operators** to reduce costs;
4. Develop a **regional satellite broadband telecommunication system**;
5. **Encourage the deployment of fiber optic infrastructure by authorizing the entry of new players on the market by creating new legal statuses and by granting licenses.** This relates to:
  - Internet access providers who have their own infrastructure, who should be allowed to serve the final customer with their own infrastructure network;
  - Specific legal statuses for "infrastructure operators", who should be granted licenses appropriate to their type of activity.
6. **Leverage public-private funding mechanisms (PPP)** to build and operate new fiber optic network infrastructure in rural / unprofitable areas.

Source: authors' compilation from the Digital Morocco Plan for 2020

**To initiate the implementation of this wave of sector reforms, policy action should be focused on three priority reforms (related to the aforementioned Pillars 2, 3, 4, and 5) which can be introduced quickly and make significant impact. The priority measures are the following:**

- Reform #1: Introduce a new ICT governance model;
- Reform #2: Encourage infrastructure-based competition;
- Reform #3: Effectively implement the Universal Service Fund (FSU).



Priority is given to these reforms for the following reasons:

- Reforms related to pillar 1 have already been initiated by the sector ministry (MICIEN) by preparing the forthcoming Digital Morocco Plan for 2020. This being so, Moroccan authorities are slow to finalize an ambitious strategy and a reform program to develop broadband Internet. The World Bank highly recommends finalizing - in consultation with the sector's main public and private stakeholders - the Digital Morocco Plan for 2020 and its national approval process.
- Pillar 2 is not the subject of ongoing efforts, but there is political will to address this matter, in particular at the MICIEN and the Court of Auditors. As mentioned in the draft Digital Morocco Plan for 2020 (p. 46), the Court of Auditors noted, in its evaluation of the Digital Morocco Plan for 2013 (p. 11<sup>123</sup>): *"the governance of this strategy is weak and inconsistent, and [the Court of Auditors] draws attention to the fact that the ANRT plays a role in policymaking, development and regulation of the ICT sector"*. With this in mind, the draft Digital Morocco Plan for 2020 (p. 46) points out that *"for the Plan to be a success, it is essential to rebuild the Digital Economy's institutional framework on three fundamental missions: Policymaking, Development, and Regulation, and to distribute them among the MICIEN, a digital council (to be created), the ANRT and the Competition Council"*. The importance of pillar 2 is justified by the fact that the institutional framework is no longer appropriate for the development of a digital economy based on a fully liberalized telecommunications sector rather than on the consolidation of the three operators. In particular, the infrastructure sharing regulation's lack of results in terms of broadband infrastructure deployment throughout the country, as well as unpopular decisions going against the interests of the Moroccan consumer contribute to this. The lack of cooperation, consultation, and clarity about the distribution of prerogatives of the ANRT, the MICIEN and the Competition Council contribute to it as well.
- Pillars 3 and 5 also are not the subject of ongoing efforts, but they appear in the draft Digital Morocco Plan for 2020's priority actions. Regarding pillar 3, the draft Digital Morocco Plan for 2020 (p. 34) aims to *"encourage the development of fiber optic infrastructure by authorizing the entry of new players on the market by creating new legal statuses and by granting licenses"*. Regarding pillar 5, the draft Digital Morocco Plan for 2020 (pp. 44-45) aims to enhance the FSUT's effectiveness by strengthening the provisions of law n. 24-96 on Universal Service and to prioritize the reduction of the digital divide when allocating FSUT resources. Thus, political will exists regarding pillars 3 and 5. Moreover, these pillars can be quickly implemented and would have direct, short-term impacts, by improving access to cheaper broadband through increased private investment and competition. These are the objectives of the World Bank telecommunication programs.
- Pillar 4 (i.e. PPPs) is also consistent with the priorities of the draft Digital Morocco Plan for 2020 (p. 34), which aims to *"leverage Public-Private funding mechanisms (PPPs) to build and operate new fiber optic network infrastructure in rural / unprofitable areas. This option is particularly relevant for the eastern and central regions of the country, whose characteristics make infrastructure development very costly and therefore deter operators"*. The draft Digital Morocco Plan for 2020 recognizes (p. 34) that *"in low-profitability and unprofitable areas, using public funds (government and lenders) should be possible. This means that public-private funding mechanisms (PPPs) could be formed"*. Therefore, implementing pillar 4 involves public funding and thus is highly dependent on the implementation of Pillar 5, the FSU, which is the sector's most appropriate public financing vehicle to put in place PPP mechanisms aimed at deploying new telecommunication infrastructure.

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<sup>123</sup> [http://www.courdescomptes.ma/upload/MoDUle\\_20/File\\_20\\_136.pdf](http://www.courdescomptes.ma/upload/MoDUle_20/File_20_136.pdf)

## B. Priority reform #1 – Introducing a new ICT governance model

Morocco needs a modern institutional framework to grow the digital economy, and in particular for the broadband sector. As was previously demonstrated, the model put in place by law 24/96 has a number of limitations:

- Limited competition in terms of number of players in the telecommunication sector;
- Under-developed fixed fiber optic infrastructure;
- Under-investment in the broadband sector;
- Incomplete and ineffective regulatory framework;
- Lack of transparency and efficiency in the use of the Universal Service Fund (FSU).

In this context, several changes in the telecommunications governance model are recommended:

1. Revise the prerogatives of the sector's institutions. The role of the sector's ministry (MICIEN) could be extended to define the sector's policies and strategic orientations, in particular by creating a governmental entity devoted to ICT and creating and providing the necessary tools to the new Digital Development Agency (ADD, *Agence de Développement du Digital*).
2. The role and resources of the telecommunications regulator (the ANRT) could be enhanced, by improving the ANRT's ability to effectively regulate a competitive market. This can be done by giving the ANRT the necessary powers, including to impose financial penalties if necessary, to exercise its functions so as to ensure that decisions are effectively enforced.
3. The role of public institutions in charge of national information security should also be reconsidered. International experience shows that in most cases, Critical Information Infrastructure Protection (CIIP) has a specific strategy, with dedicated institutions. While there are different models around the world (see Annex 6), the role of the telecommunications regulator is limited to providing support to the specialized institutions. In **Italy**, for instance, since the 1990s a specialized police force (i.e. the *Polizia Postale*) is in charge of protecting critical infrastructure and systems from cyber-attacks. The Italian regulator facilitates the work of this police force during its exchanges with operators. In **Lithuania**, the telecom regulator, the Communications Regulatory Authority (RTT) is tasked with "*ensuring that operators and electronic communication service providers fulfill their obligations which may be imposed on them in the interest of national defense, national security and maintenance of law and order, as well as in extraordinary circumstances*". The RTT also ensures that operators maintain the equipment needed by security agencies (State Security Department of the Republic of Lithuania), in compliance with article 77 of the law. Moreover, the RRT is Lithuania's Computer Emergency Response Team (CERT-LT) (<https://www.cert.lt/en/>). In **Tunisia**, the government decided to create a National Information Security Agency (ANSI) responsible for cyber-security, and the institutional framework of information security is being reassessed with the introduction of a new Digital Code. Lastly, in **France**, the law on the modernization of the economy sets out the obligations of telecom operators who are required to (i) allow access to their network, (ii) keep an archive of their data (for a duration spanning several months to a year, depending on the nature of the data), (iii) to block access to some sites (in particular sites that promote terrorism). Additionally, intercepting voice and data services is a recourse only allowed to relevant authorities within the police and customs. In this field, the telecom regulator (ARCEP) plays no role but for checking that telecom operators meet their network access obligations. In France, the ARCEP's opinion is not required when preparing regulations on the interception of digital services.
4. The ANRT's governance should be reconsidered to introduce a regulatory council working with the ANRT's General Director in a collegial and politically independent manner. Moreover, the

makeup of the ANRT's board of directors should be reconsidered in a way to ensure its independence.

5. The government should clarify the respective roles of the ANRT and the Competition Council concerning competition law enforcement and the regulation of anti-competitive practices in the telecommunications sector (see section 2-C, p. 41). The current framework poses a risk of overlap between the prerogatives of the sector regulator and those of the Competition Council, and it is not clear who, between the ANRT and the Competition Council, ultimately wields decision-making power.
6. The ANRT should adopt an open and consultative approach to introduce new regulation in the sector (following the example of ARCEP in France and OFCOM in the United Kingdom). For instance, OFCOM regularly publishes consultation documents which are publicly available on the OFCOM's website. Consultation documents and comments are published on the website. Any decision taken by OFCOM must be justified and made public (see: <http://stakeholder.ofcom.org.uk/>). In Morocco, consultation by the ANRT is limited to operators.
7. The ANRT should publish coverage obligations included in the licensing requirements of all operators, if necessary modifying information in such a way as to protect operators by not disclosing commercially sensitive information.
8. The ANRT should collect and publish in digital format information on any infrastructure deployed by the three operators, including fixed, mobile, backhaul, backbone, international and access network infrastructure. A national digital mapping project, which would include telecommunications infrastructure and any other infrastructure asset (road, water, gas, electricity, sanitation) should be set up to inform public decision-making in (i) the development of a policy for accessing existing infrastructure and (ii) stimulating investment in broadband based on access to existing infrastructure. To this end, as stated by the ANRT in June 2016, "*a specific law would be needed to obligate any player (other than the operators) to provide the ANRT with the necessary data (as is the case in Portugal). It is to be noted that this obligation is not systematic in several European regulations*".
9. The Universal Service Fund for telecommunications needs major restructuring to help fund Internet infrastructure in areas of the country that attract little private interest. The Fund's management rules should ensure that it is used as a complement to other public and/or private resources. Optimal use of Fund resources could help Morocco meet broadband development objectives similar to those set by European countries for 2010 (speeds of 30 and 100 Mbps). Transparency in using the Fund should be improved, including by introducing public audits of the Fund and by formulating an annual strategy approved by the government and made public. The World Bank highly recommends publishing a summarized version of files and minutes, so as to give Parliament and the Moroccan people the opportunity to be informed about the FSU's achievements. Currently, only the ANRT's annual reports are public, but they merely provide summary information on the FSU. Similarly, the telecommunications operators' network coverage maps are not public, just as black, grey and white spots maps, operators' broadband investment programs, public infrastructure maps, and calls for tender (which are only for existing operators) to cover the Kingdom's underserved areas.

## C. Priority reform #2 – Encourage infrastructure-based competition<sup>124</sup>

### **Rationale for the reform:**

Promoting competition in broadband should be encouraged in all infrastructure sectors (international connectivity or first mile, backbone/backhaul or middle mile, and access network or last mile) and in particular in the access network to increase the population's access to broadband in underserved areas. To this end, infrastructure-based competition should be encouraged - as opposed to service-based competition - assuming that each operator relies on their own network. This type of competition is at the heart of policies to open the telecommunications sector to competition in Europe and in particular in France. This model helps to pursue several objectives, such as introducing lasting competition between network operators, promoting innovation and differentiating products. It is also the model that most stimulates jobs and investment.

In Morocco, licenses/authorizations should be granted by the ANRT to allow the effective entry of Internet Access Providers (IAPs) on the market so as to give them the right to serve the final customer with their own infrastructure such as local wireless loops. The entry of IAPs on the Moroccan market is a strategic measure to accelerate broadband infrastructure deployment throughout Morocco and to increase the population's access to broadband. Indeed, IAPs play a strategic role in that they can offer complementary services to those of operators, by providing services through their own infrastructure in market segments where services by the licensed operators lack quality or competition. Similarly, Morocco should facilitate the entry of wholesale infrastructure providers, whose business is not to serve final customers but to lease dark fiber (through IRUs) and/or leasing capacity to telecom operators as well as large accounts. Just like with IAPs, the entry of infrastructure operators on the Moroccan market is a strategic measure, considering that Morocco has a real need for open access fiber optic networks, in particular in the central, eastern and southern regions of Morocco.

Even with infrastructure-based competition, ways of pooling essential operator-owned infrastructure should be introduced, as this helps to reduce costs (by avoiding the duplication of existing infrastructure) and to improve coverage (by redeploying investments in areas that are not yet covered). Pooling strategic operator-owned infrastructure involves the introduction of fair and equitable regulation regarding operators' access conditions to existing strategic infrastructure. Developing broadband in Morocco, as elsewhere in the world, requires i) building a national fiber optic network that includes the existing fiber optic networks of telecommunications operators (i.e. the networks of Maroc Télécom, Méditel, WANA, ONCF, ONEE, ADM and FINETS, but also future infrastructure operators/IAPs, etc.) and ii) ensure open and non-discriminatory access to this shareable infrastructure, under fair and reasonable conditions that do not discourage investment. This aspect is particularly critical to promote competition in the telecommunications market and to facilitate the entry of new players such as IAPs and wholesale infrastructure providers.

### **Reform content:**

The aim of the proposed reform is to heighten competition in the broadband market so as to improve service offerings (service availability and value for money) in already covered and non-covered areas, which will support economic and social development in Morocco.

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<sup>124</sup> In June 2016, the ANRT stated: "*the ANRT does not agree with this model. It considers that, due to investment optimization imperatives, all regulatory tools must first be operationalized to allow service-based competition. Not operationalizing regulatory tools, which is a requirement for any new player, will deter such new players and will not lead to the market being opened to new players. After regulatory tools are operationalized, infrastructure-based competition will naturally fall back into place (see new provisions on the subject in draft law n. 121-12)*".

The proposed reform program includes the following: (i) the sector ministry updating the legal framework of telecommunications, in particular to heighten competition in the market in terms of number of players by facilitating the entry of IAPs and wholesale infrastructure providers; (ii) the ANRT granting several licenses/authorizations for IAPs and wholesale infrastructure providers; (iii) the ANRT introducing, and enforcing, true regulation on essential infrastructure access and pooling; (iv) drawing up a digital list of all the public and private infrastructure that could be used to deploy telecommunication networks; (v) examining PPP models that are most appropriate to the Moroccan context to deploy broadband access in secondary cities.

The main beneficiaries of this reform will be ICT service users (personal and business customers) and in particular new users for whom ICT services will have become affordable. The expected outcomes of this reform for the sector are higher use of ICT and broadband in particular, higher quality services and increased innovation.

### **D. Priority reform #3 - Make effective use of the Universal Service Fund**

#### **Rationale for the reform:**

Universal access policies aim to narrow the "digital divide", in other words to provide access to ICT services to populations which would otherwise be deprived of it for geographic (e.g. sparsely populated or remote areas), economic (low purchasing power) or social (e.g. people with disabilities, the elderly, etc.) reasons. In the case of Morocco, there is a strong correlation between geographic and economic barriers and ICT uptake. Connectivity is primarily lacking in the country's poor and remote areas: telecommunications operators tend not to extend their coverage to areas where investing in infrastructure would have negative economic yields (which would generally be the case today in Morocco's poor and sparsely populated regions).

An effective universal access policy enables the poor to have access to ICT services, by financially supporting supply (for instance, subsidies from the universal access fund - financed by operators' contributions - granted to operators to provide services, through "minimum grant" or net cost of universal service schemes), and/or by supporting demand (for instance, social transfers to poor customers), in a transparent and effective manner. For this reason, universal access policies also appear in policy tools to meet the needs of poor populations, besides other tools such as licensing obligations.

ICT services can bring a significant number of direct and indirect economic and social benefits, as highlighted in the *World Development Report - Digital Dividends, 2016*. These benefits are particularly relevant for poorer households, to the extent that mobile telecommunications can make essential services available (emergency calls, mobile banking, etc.) and strengthen the resilience of these households. They also stimulate economic growth in regions where low-productivity workers and businesses predominate (e.g. small farms), thanks to ICT-based services: improved access to markets, information, etc.

The government has already created a trust fund called Telecommunications Universal Service Fund (FSUT) with the 2005 budget law<sup>125</sup>. The scope of Universal Service includes land management missions and value adding services, in particular those that provide Internet access. An inter-ministerial committee called "Telecommunication Universal Service Management Committee" (CGSUT) is tasked with

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<sup>125</sup> In Morocco, the Telecommunication Universal Service Fund is governed by law n.44-96 of 7 August 1997, as amended and supplemented by law n.55-01 of 8 November 2004. This mechanism was supplemented with the adoption of decree n.2-97-1026 of 25 February 1998, as amended and supplemented by decree n. 2-05-771 of 13 July 2005, and the requirements for public telecommunication network operators. See: <https://www.anrt.ma/en/missions/service-universel/presentation>

defining and approving the Universal Service programs to be implemented. The FSUT is supposed to fund all CGSUT-approved Universal Service programs. The FSUT may also receive any other contributions through donations and bequests made to it to develop telecommunication Universal Access programs. In practice, the government has not adopted a general strategy for universal access (the ANRT apparently prepared several documents and action plans but they were not discussed and approved); to date, only a very small part of FSUT funds have been disbursed.

Two factors prevent the FSUT from being optimized to fund projects aimed at developing ICT access and use: (i) a lack of visibility on available resources and their mobilization process; and (ii) the absence of a strategic framework that defines, through a public-private consultative process, the main strategies and the list of projects to be funded as well as allocation modalities for the FSUT's resources.

The ministry responsible for telecommunications is considering, in the context of the Digital Morocco 2020 strategy, and with the support of the sector's public and private players, to optimize FSUT use. Following a report by the Court of Auditors, the government positioned itself in favor of restructuring the FSUT. Thus, it is proposed that FSUT missions be redefined, in particular in favor of broadband development, and to revise its governance through possible restructuring, with the aim of strengthening the fund by adding other possible sources of funding, such as the government deposit guarantee agency (*Caisse de Dépôt et de Gestion*) and other financial institutions (by replacing the FSUT with a Digital Development Fund (FDN)). The government's and ANRT's 2015-2018 General Guidelines indicate an intention to "adapt the [FSU] tool" in such a way as to meet the PNHD 2012 targets.

#### **Content of the reform:**

The objective of the proposed reform is to increase ICT service availability among underserved or un-served populations, which will support economic and social development in Morocco, in particular in poorer areas. The proposed reform program aims to gradually implement the universal access policy. The detailed program includes: (i) carrying out an audit of FSUT's past actions; (ii) effective establishment of the fund's managing bodies (in the event the FSUT were to be replaced by the FDN); (iii) adopting a universal access strategy (updated on the basis of documents already prepared by the ANRT, in particular); (iv) carrying out several national connectivity improvement projects in areas where private interest is lacking (providing telecommunication network coverage in poor areas); and (v) occasional measures to stimulate demand for broadband.

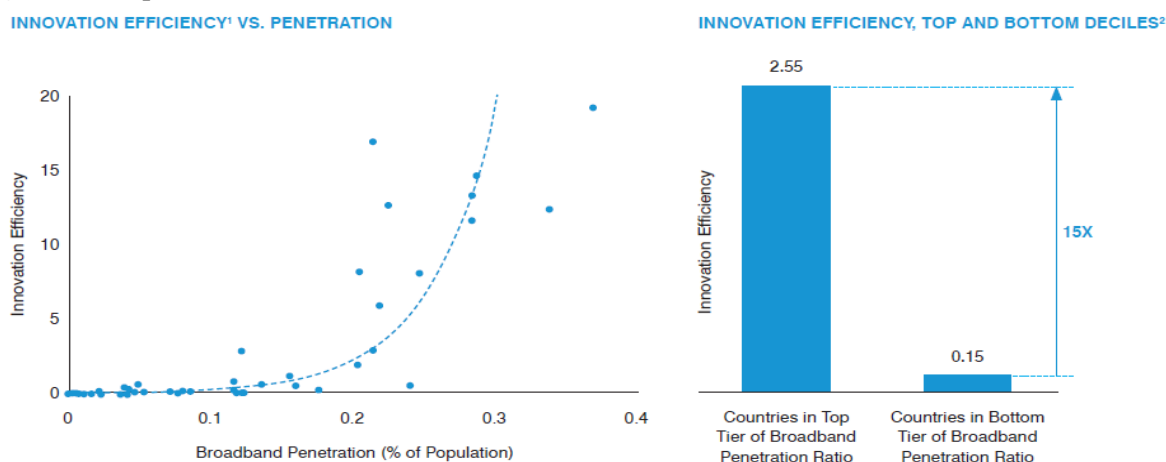
The main beneficiaries of this reform will be ICT service users (personal and business customers), and in particular users who live in Morocco's underserved or un-served areas. Expected outcomes for the sector are increased use of ICT (mobile telephony, mobile Internet, mobile banking) and quality of service (mainly network coverage) in areas that are not currently covered.

## Section 4. Annexes

### Annex 1. How and why can ICT promote commercial innovation in Morocco?

Several empirical studies measured the impact of ICT on innovation. As an example, a study by Booz & Co (2010)<sup>126</sup> based on a sample of 50 countries shows that countries with an 80% broadband penetration rate are twice as innovative as countries where that rate stands at 40% (Figure 17).

**Figure 17.** Impact of broadband on innovation



<sup>1</sup> Innovation efficiency is defined as the number of patents per million divided by the EIU Innovation input/enabler score for the country

<sup>2</sup> Countries are grouped into deciles of broadband/Internet penetration levels, and averages per decile are used.

Source: Economist Intelligence Unit, "A New Ranking of the World's Most Innovative Countries," April 2009; International Telecommunications Union, World Telecommunications/ICT Indicator Database 2009; Booz & Company analysis

ICT promotes innovation by allowing businesses to benefit from scale effects by using online platforms and services (such as mobile money, big data, e-commerce (Ebay, Amazon, etc.), e-tourism (Uber, Airbnb, etc.) which compete with traditional business models in sectors such as retail, transport, tourism and finance (World Bank, 2016)<sup>127</sup>. Using online platforms (i.e. websites) and services eliminates the costs of communication and information search (businesses can access and advertise to a large number of buyers/sellers), which reduces the fixed costs of starting a business and therefore encourages the growth of start-ups which use the economies of scale made possible by the use of online platforms. Economies of scale made possible by ICTs inspire new internet-based business models aiming to provide various services (e.g. retail, transport, logistics, tourism, finance).

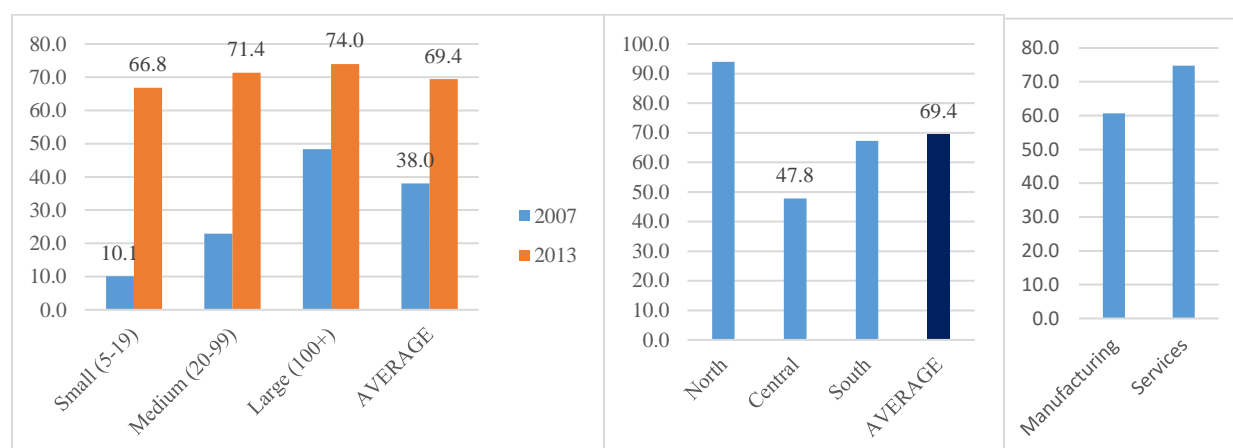
While a country's capacity for innovation is partly determined by levels of businesses' Internet access and use, broadband penetration in Morocco remains low. Internet access (number of users) remains limited, yet over half of the Moroccan population uses Internet, which suggests that there is sufficient critical mass to encourage businesses to commercially innovate through the Internet by using online platforms and services.

126 See: "Enabling Sustainable Digital Highways Strategies for Next-Generation Broadband", available at: [http://www.strategyand.pwc.com/media/file/Enabling\\_Sustainable\\_Digital\\_Highways.pdf](http://www.strategyand.pwc.com/media/file/Enabling_Sustainable_Digital_Highways.pdf)

127 See: World Development Report, 2016: Internet for development, World Bank, Washington D.C. Available at: <http://intranet.worldbank.org/servlet/main?noSURL=Y&theSitePK=8258057&piPK=8258060&pagePK=8258272&contentMDK=23669193>

For businesses, having a website partly reflects an ability to innovate via the Internet; available data<sup>128</sup> show that while the share of Moroccan businesses who have a website has soared since 2007, 30% of Moroccan businesses still have no website. Additionally, there are significant differences depending on business size, their geographical location and their line of business (Figure 18). Firstly, in 2013, much fewer small Moroccan businesses had a website compared to medium-sized or large firms. Secondly, businesses with an online presence remain very geographically concentrated: while 94% of firms in northern Morocco have a website, this percentage is only 67% in the south and 48% in the central region. Lastly, while the industrial sector is pressured to innovate (OCP, 2014)<sup>129</sup>, Moroccan industrial firms have fewer websites (40% of them don't own one) than those that operate in the service sector. These data show that Moroccan companies are behind in terms of innovation and business development. Surveys carried out in Mauritania in 2015 based on a diverse sample of businesses showed that using a website greatly improved promotion of the firm's activities, its national and international visibility and its capacity to innovate by providing services online<sup>130</sup>.

**Figure 18.** Share of Moroccan firms owning a website in 2013 by firm size in number of employees (left), geographical location (middle) and their line of business (right).



Beyond the lack of company websites, Morocco could further prioritize investments in training ICT engineers and technicians, and in start-ups and SMEs in the ICT sector. Around the world, youth drive ICT development and innovation; African leaders have often become aware of the need to finance, with the support of operators in the field, ICT incubators<sup>131</sup> that provide a variety of services to young entrepreneurs who have ambitious and realistic ICT projects. As an example, Senegal has seen the emergence of 6 ICT incubators, including Dakar's CTIC<sup>132</sup> which was created in 2011 and is West Africa's first incubator and accelerator for ICT and mobile technology entrepreneurs. Since it was created, 14 ICT firms were incubated at the CTIC, including 4 that have emerged from the incubator and 6 that are hiring. There is no similar facility entirely dedicated to ICTs in Morocco. Incubators do exist, but they are not specifically tailored to the needs of ICT start-ups (the Technopark's performance is not easy to evaluate) and Al Akhawan University in Ifrane cannot be equated to an ICT incubator as it only offers specialized

128 See World Bank data.

129 *Politiques publiques, transformation industrielle, croissance et emploi au Maroc: une analyse quantitative*, by Richard Agénor and Karim El Aynaoui, OCP Policy Center. Available at: <http://www.ocppc.ma/publications/politiques-publiques-transformation-industrielle-croissance-et-emploi-au-maroc>

130 See World Bank (2016), chapter on ICT in the Diagnostic Trade Integration Study (DTIS) report.

131 An incubator can be defined as a facility specialized in creating and supporting ICT startups.

132 <http://www.cticdakar.com>



trainings<sup>133</sup>. The absence of an ICT start-up incubator does not encourage innovative services to flourish, in particular in the fields of electronic payments and money services, which have considerable consequences on productivity, financial inclusion, trade and economic growth<sup>134</sup>. This absence cannot be offset by application competitions ("hackathons"<sup>135</sup>), which to be sure contribute to innovation, but do not have a lasting impact without facilities that can host the winners of such competitions for 2 or 3-year cycles to ensure that the start-ups succeed and last. No facilities similar to the one created in Chile (start-up Chile<sup>136</sup>), for instance, were created which the OCP Policy Center recommended in 2014<sup>137</sup>. Lastly, unlike countries such as Senegal which has five, Morocco only has two mobile money service providers.

Considering these observations, it appears that Morocco, as it defines its ICT development strategy for 2020, should implement structured measures to promote ICT start-ups by creating an incubator (public-private - see Dakar CTIC) and encourage businesses to access (e.g. through subsidies) and use (e.g. through trainings) broadband, in particular in SMEs in the central and southern regions of the country.

## **A. Annex 2. How and why can ICT help to improve education services in Morocco?**

From a general standpoint, using ICT, and particularly mobile phones (voice, text messaging, mobile financial services, Internet) carries the benefit of improving access and use of information, which reduces the costs of information search and increases coordination among individuals, businesses and administrations.

Today, the benefits of using mobile ICTs (primarily voice and text messaging, Internet to a lesser extent) have reached Moroccan society as a whole due to cheaper terminals and mobile communication services. Thus, many individuals can acquire a mobile phone and send, receive and obtain information more quickly and at a lower cost than ever before. The fact that almost all Moroccan citizens own a mobile phone, and that households increasingly have a computer or a tablet, offers government an opportunity to address some weaknesses of the public education system. Morocco is facing three major challenges:

- ❖ a low level of knowledge in students (reading, language and math) and mass illiteracy;
- ❖ a lack of equipment and infrastructure and growing numbers of students per class;
- ❖ inadequately trained teachers and high teacher absenteeism.

As an example, government public data (Figure 19) show that the number of students per teacher increased from 27.2 in 2011 to 27.5 in 2013 in primary schools, and from 24.3 in 2011 to 26.8 in 2013 in secondary schools<sup>138</sup>. This may be partly related to the fact that 191 primary and secondary schools were closed between 2008 and 2013<sup>139</sup>. Government budget for education is declining (in value and as a % of total budget) since 2010, which is mainly due to a drastic decline in investments (equipment, infrastructure, etc.) (Figure 20). The share of schools that have access to Internet or to a video projector

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133 <http://www.aui.ma/en/sse.html>

134 See in particular: Beck et al. (2015). Mobile Money, Trade Credit and Economic Development: Theory and Evidence. Available at: [https://pure.uvt.nl/portal/files/5677317/2015\\_023.pdf](https://pure.uvt.nl/portal/files/5677317/2015_023.pdf)

135 For example: <https://theodi.org/blog/moroccos-first-open-data-hackathon>

136 <http://startupchile.org/about/>

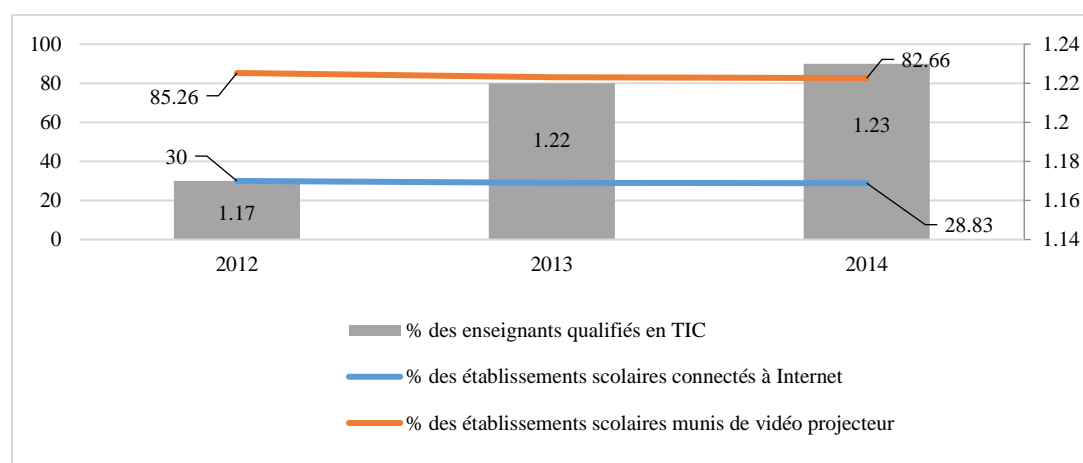
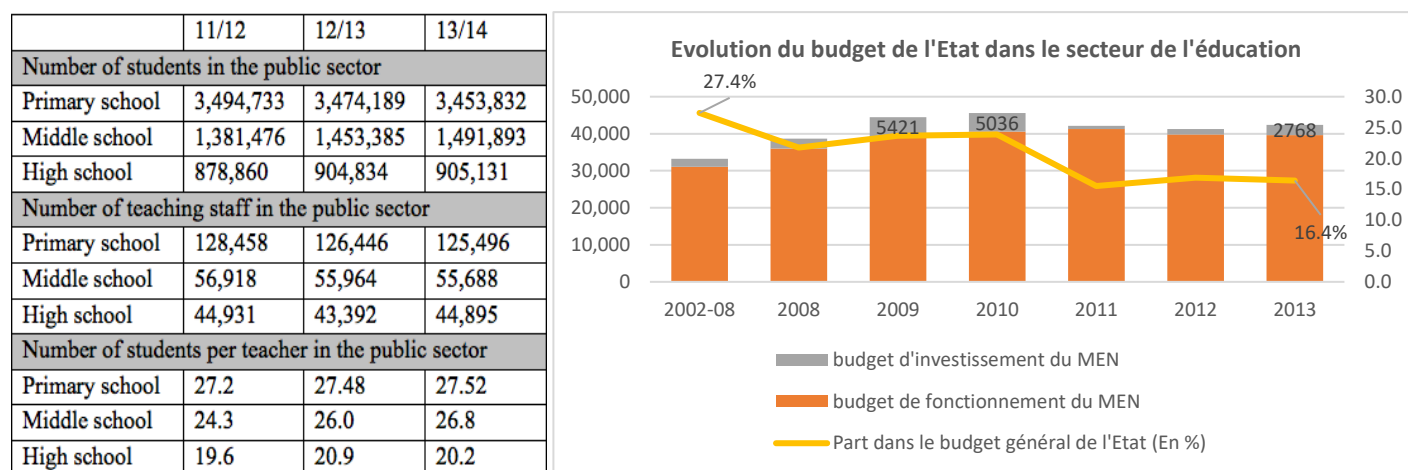
137 <http://www.ocppc.ma/publications/politiques-publiques-transformation-industrielle-croissance-et-emploi-au-maroc#.VyoNc9IUUiQ>

138 Source: <http://www.data.gov.ma/data/fr/group/education>

139 [http://www.lemonde.fr/afrique/article/2015/04/16/maroc-l-ecole-privee-est-une-source-de-segregation\\_4617413\\_3212.html](http://www.lemonde.fr/afrique/article/2015/04/16/maroc-l-ecole-privee-est-une-source-de-segregation_4617413_3212.html)

has fallen, significantly so since 2012<sup>140</sup>. Lastly, while the proportion of ICT-qualified teachers is growing, it remains very low - just above 1% (Figure 21). These data highlight a wide gap (already pointed out in the implementation of the GENIE program) between schools' ICT equipment and teacher's ability to make educational use of this equipment. While nearly 30% of schools have an Internet connection, they may not be able to make educational use of it as only 1% of teachers are ICT-qualified.

**Figure 19, 20 and 21.** Headcounts in public education (upper left), government budget for public education (upper right), and ICT use by teachers and in schools (below).



Experience shows that using ICT in education could further several objectives: (i) improve school management; (ii) provide access to educational content to children not attending school; (iii) enhance teacher training through training programs in best teaching practices; (iv) improve student learning, and (v) evaluate students more often to better identify learning gaps<sup>141</sup>. In particular, it was pointed out that using multimedia tools (radio, DVDs, CDs and other media) improves student motivation and introduces and encourages new teaching and learning practices, as well as a restructuring of the education system. Broadly speaking, increased connectivity and ICT use in education lead to a better qualified labor supply and help to better meet the needs of businesses which, on the medium term, promotes employment and economic growth through the consequences this has on competitiveness, innovation and investment.

140 Source: <http://www.omtic.gov.ma/Pages/home.aspx>

141 GSMA and McKinsey, 2012. Transforming learning through mEducation.

The Indonesian experience, for example, adequately illustrates how ICT use can improve education management at the local level. Following the 1999 law which transferred responsibility for managing education to local authorities, and considering the education budget cuts and the significant lack of capacity of schools and local authorities, the Indonesian government decided to introduce a program (Decentralized Basic Education, DBE<sup>142</sup>) aimed at improving the management and governance of primary and secondary schools and services of local authorities in charge of education:

- With regard to schools, 50% of which had computers available for teachers and administration, the DBE program provided trainings to school leaders and teachers focusing on improving ICT use, preparing a school development strategy, and improving the working relationship (openness, transparency, consultation) between teachers and civil society. Also, IT tools (software, databases) were developed to improve schools' accounting management.
- With regard to local governments, various IT systems were put in place to improve school performance monitoring and follow-up and to develop an education strategy at the regional level. An IT system helped to produce accounting and financial analysis tools that could monitor spending and income by school, which made it possible to compare school performance, evaluate budget allocation and identify strategic priorities. Other IT systems were developed to calculate (based on a number of indicators) school budget needs and to list all assets and staff for each school.

In total, the DBE program (phase 1) affected over 16,000 schools in 148 districts and over 40,000 civil servants (school leaders, teachers and administrative staff) in the education sector.

Many examples of using ICTs to improve teacher and student learning can be found<sup>143</sup>. One of the initial observations of such programs is that teachers often lack technical knowledge and class management experience (supervision, etc.) to satisfactorily impart knowledge. Thus, the PHARE Program (*Programme Harmonisé d'Appui au Renforcement de l'Éducation*)<sup>144</sup> in Mali aims to improve the quality of education in primary schools by focusing on learning how to read and write in English. The approach is to use smartphones and computers for teachers and students to engage in interactive learning programs (divided in 6 difficulty levels to adapt to the user's level). Individual results obtained through these learning programs can then be aggregated for each school, and monitored across time by the public administration in charge of the sector. The PHARE program lasts 5 years and covers 40,000 classrooms in Mali, for a total of 500,000 students.

In Indonesia, it was observed that students from rural areas (in particular) often lack schoolbooks and other educational material, which slows down learning. To address this, in 2004 the Ministry of Education and Culture created a television program (TV Edukasi<sup>145</sup>) which broadcast educational programs in reading, writing and mathematics. There are two television channels, one meant for teachers and the other for students.

Many countries have started to use tablets and computers for individual use at school<sup>146</sup>, so as to enhance the effectiveness of teaching and learning practices. One of the key takeaways from these experiences is that it is just as important to provide schools with educational equipment as to train teaching staff to use

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142 USAID, 2012. Indonesia: Decentralized Basic Education Project Final Evaluation, Volume I, Main Report.

143 For many examples, see: USAID, 2011. Designing Effective Education Programs Using Information and Communication Technology (ICT), Compendium.

144 See:

[http://www.edc.org/projects/mali\\_usaidphare\\_program\\_programme\\_harmonis%C3%A9\\_dappui\\_au\\_renforcement\\_de\\_leducation](http://www.edc.org/projects/mali_usaidphare_program_programme_harmonis%C3%A9_dappui_au_renforcement_de_leducation)

145 <http://tve.kemdiknas.go.id/>

146 For an overview, see: <http://blogs.worldbank.org/edutech/big-educational-laptop-and-tablet-projects-ten-countries>

these tools. Thus, the Jamaican e-learning program<sup>147</sup> not only provides equipment (tablets, laptops) and Internet connections to 162 secondary schools, but also technical training to over 11,000 teachers on using IT tools. Additionally, online learning material (documentation, etc.) is supplied to teachers to help them develop a learning program and to prepare tests for their students. There is some proof that using ICT at school improves student learning:

- In Ghana, the reading skills of 350 children considerably improved after using the reading tablets that had been given to them<sup>148</sup>.
- In Ethiopia, it was found that even without teachers, children learn how to use the reading tablets that were provided to them to learn to read.
- In New Mexico, after three years of using tablets (in Kindergarten), teachers found that the share of children who knew how to read went from 29% to 93%<sup>149</sup>.
- In India, using smartphone games designed to improve English learning boosted student performance in evaluations by 60%.

Using ICT can also help to combat staff absenteeism in schools. According to Aker and Ksoll (2015), teacher absenteeism rates in West Africa ranges from 27% to 40%<sup>150</sup>. To address this, the government of Niger introduced an effective surveillance system through which administrative staff carry out weekly monitoring via mobile phone with users, technical staff and village chiefs to check attendance and reasons for absence.

Considering the above observations on Morocco's education sector, and given the benefits of using ICT, it seems critical to re-initiate an investment program to supply schools with IT equipment and an Internet connection, and to better train teachers and administrative staff to use ICT. Recent efforts have<sup>151</sup> headed in that direction, but generalizing them by making them part of a national strategy to promote ICT use in education seems essential.

## **B. Annex 3. How and why can ICT use help to improve provision of health services in Morocco?**

From a general standpoint, using ICT, and in particular mobile phones (voice, text messaging, mobile financial services, Internet) has the advantage of improving access and use of information, which reduces the costs of searching for information and to increase coordination between individuals, businesses and administrations.

Today, the benefits of using mobile ICTs (mainly voice and text messaging) have reached Moroccan society as a whole due to cheaper terminals and mobile communication services. Thus, many individuals can acquire a mobile phone and send, receive and obtain information more quickly and at a lower cost than ever before. The fact that almost all Moroccan citizens own a mobile phone is a great opportunity for government to address some of the weaknesses of the public health system by improving the quality of services provided. Like other public health systems, Morocco's faces three major challenges:

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147 <http://www.e-ljam.net/>

148 See: <http://www.economist.com/news/business/21567972-schools-africa-are-going-digitalwith-encouraging-results-tablet-teachers>

149 GSMA and McKinsey, 2012. Transforming learning through Education.

150 See: Jenny C. Aker and Christopher Ksoll (2015). Call me educated: Evidence from a mobile monitoring experiment in Niger. Working paper.

151 <http://www.h24info.ma/maroc/education-nortis-va-connecter-4000-ecoles-internet-satellite/34644>

- First, a lack of infrastructure: in 2014, Morocco only had 2767 health centers for a population of 33 million people (or nearly 12,000 people per center) and 150 hospitals<sup>152</sup>, which translates to overstretched medical services, queues and appointments that are difficult to obtain.
- Second, a lack of staff: this is a major problem as in 2012, there was only one doctor per 1,900 people, and one nurse per 1,300 people<sup>153</sup>.
- Lastly, health staff absenteeism is high. These issues are exacerbated in rural areas where infrastructure and human resources are becoming rarer and where distance makes access to healthcare more difficult.

In this context, using mobile services (voice, text, Internet) can help reduce overcrowding in health facilities by encouraging the exchange of health information through remote consultations and prescriptions. Thus, health staff can make a simple diagnosis (possibly by receiving pictures) when no medical examination is needed, and follow up patients remotely (e.g. drug prescriptions, dose recommendations, diet recommendations, etc.). This helps to reduce overcrowding in health centers by reducing the number of patients who have to physically go to the facility; it also encourages higher staff productivity by enabling a higher numbers of consultations. Moreover, it facilitates access to health information for patients from rural areas who live the farthest from health centers.

As an example<sup>154</sup>, and to combat maternal and infant/child mortality - one of Morocco's serious challenges - the health ministries of Tanzania<sup>155</sup> and Pakistan developed and launched a free SMS-messaging<sup>156</sup> system<sup>157</sup> which provided registered women with precise information on necessary care and practices to follow during pregnancy, childbirth and the post-natal period. Health experts determine message content, and texts are sent on a case-by-case basis depending on the stage of pregnancy and the age of the children. Women who receive messages are registered by health staff who collect the patient's personal data at registration. SMS messages also serve as reminders for critical medical examinations and required doses for some drugs. In Tanzania, with the system launched in 2012, 100,000 women were registered within 5 months and were sent over 4 million text messages. In Pakistan, a rigorous study (based on control groups who had not benefited from the free SMS system) evaluated the system's impacts where it was introduced; it showed that 98% of registered women regularly received text messages, that the rate of women giving birth in health centers / hospitals went from 35% to 55%, that the number of exchanges between women and health staff was significantly higher and that the rate of antenatal visits went from 43% to 66%.

Beyond the opportunities afforded by ICT to improve provision of medical and health information, using mobile phones can also help to combat staff absenteeism in health facilities and hospitals. In Niger, where absenteeism of health and teaching staff<sup>158</sup> is a critical challenge, the government has introduced an

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152 <http://www.data.gov.ma/data/fr/group/sante>

153 See: <http://www.data.gov.ma/data/fr/group/sante> ; These statistics take into account staff in public and private centers.

154 For more examples, see: USAID (20102), mHEALTH Compendium, Vol. (2), Technical report.

155 In Tanzania, the rate of maternal mortality is 454 per 100,000 live births and the infant mortality rate is 51 per 1000 live births.

156 In Pakistan, the software used to set up SMS messaging is <http://www.frontlinesms.com/>

157 For the Tanzanian experience, see: <http://www.thehealthcompass.org/sbcc-spotlights/wazazi-nipendeni-love-me-parents>

158 In West Africa, the estimated rate of teacher absenteeism ranges from 27% to 40%. See: Jenny C. Aker and Christopher Ksoll (2015). Call me educated: Evidence from a mobile monitoring experiment in Niger. Working paper. Available at:

[https://www.tcd.ie/Economics/assets/pdf/Seminars/20142015/Acker%20Call%20Me%20Educated\\_13feb2015.pdf](https://www.tcd.ie/Economics/assets/pdf/Seminars/20142015/Acker%20Call%20Me%20Educated_13feb2015.pdf)

effective surveillance system in which administrative staff carry out weekly monitoring via mobile phone with users, technical staff and village chiefs to check attendance and reasons for absence.

Lastly, by computerizing health services and improving Internet connectivity in healthcare facilities, as well as their interconnectedness (i.e. intranet), ICTs are essential to enhance operations management systems (paying wages, invoicing, equipment supply, staff tracking, stock management, etc.) and data transfer (e.g. electronic health records<sup>159</sup>, telemedicine, etc.) between the various points of the medical network (health centers, hospitals, central administration). Yet, in Morocco, information collected in 2015 from health experts show that none of the country's 2767 health centers use ICTs, and in the 150 hospitals, only patient admission and invoicing services are ICT-based. This considerably restrains prospects of improving health staff productivity and operational efficiency of the administrative management system.

### **C. Annex 4. European and international experiences in using Public-Private Partnerships to deploy broadband infrastructure by type of infrastructure network segment.**

Using Public-private funding mechanisms (PPPs) to build and operate new fiber optic network infrastructure in rural / low-profitability areas is a particularly relevant option for the regions of eastern, southern and central Morocco which have characteristics that make infrastructure development very costly and therefore discourage commercial operators:

- they are far from the main metropolitan regions;
- long distances between cities;
- population is much sparser than in metropolitan regions;
- much of Morocco's rural population is concentrated in those areas, a population for whom there is - in principle<sup>160</sup> - little to no demand for broadband service.

In this context and following the example of European and International experiences, Morocco should use public-private partnerships (PPPs) to develop fiber optic network infrastructure. European and international experiences in using PPPs to develop fiber optic networks (i.e. new generation networks) show that these partnerships:

- come in various forms (contract form and length, how contracts are awarded, financing structure (public-private), private operators' obligations);
- cover various segments - separately or simultaneously) of the infrastructure network (international connectivity, backbone, backhaul and access network)
- involve various types of private players (commercial operators, infrastructure operators, operator consortium);
- involve various types of public players (government, municipalities, public development funds: rural, digital, universal service, etc.)
- But usually satisfy the same two conditions<sup>161</sup> (European Commission, 2013, p. 21):

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159 A thorough electronic health records system makes it possible to store, obtain and modify electronic information about patients, helping the health organization's departments to collaborate as care is being provided.

<sup>160</sup> Actually, experiences in India have shown that investments by operators who had deployed fiber optic networks turned out to be much more profitable than what traditional calculations can forecast (Singh et al., 2008). This is because the presence of bandwidth in rural areas fuels much higher demand than currently anticipated, similarly to what occurred with telephones. See:

[http://www.apc.org/en/system/files/APCProPoorKit\\_PolicyAndRegulation\\_CaseStudyRural\\_FR\\_1.pdf](http://www.apc.org/en/system/files/APCProPoorKit_PolicyAndRegulation_CaseStudyRural_FR_1.pdf)

<sup>161</sup> These two conditions are indispensable to obtain European Commission funding.

- open access to the PPP-built networks through wholesale offers. This entails access to active as well as passive infrastructure (i.e. conduits, poles, dark fiber, street cabinets and boxes)
- fair and non-discriminatory treatment of operators. This encourages competition between operators and therefore affordable services for final users.

### **European and international experiences in using PPPs to deploy backbone networks**

In one scenario, with a concession contract, the government licenses a private sector entity to build (with subsidies) and operate (financial responsibility of the private entity) an open-access backbone network. The State determines the terms of the service to be provided, in terms of quality (bandwidth) and price and subsidizes the operator. The subsidy amount is determined by an auction: the bidder offering the lowest subsidy amount is awarded the contract (through a call for tender).

- Chile (source: WB, 2014): this type of PPP was used in particular in Chile to cover rural areas where there was no broadband service (WB, 2014). A license was granted to an existing operator (Entel Movi) who, after the network was built in 2010, saw growing numbers of subscribers.
- Germany (source: WB, 2014): the German government also used this type of PPP in 2008. Several contracts (for different geographic areas) were awarded to existing commercial operators. The maximum duration of a concession contract is 5 years and, depending on the investment cost, the winning tenderers may have to provide wholesale access (on a non-discriminatory and transparent basis) to the subsidized infrastructure.
- France (source: European Commission, 2005): France made a different use of this type of PPP in the rural and mountainous region of Limousin (787 municipalities where 1.1% of the population of Metropolitan France lives). It awarded a 20-year concession to a private infrastructure operator to build (total cost of 68 million euros, 55% government subsidies) and operate (private funds, i.e. 17 million euros) a backbone/backhaul and access network (FTTO, copper and WiMAX). The operator is only allowed to provide connectivity (bandwidth, dark fiber, active services) to all market players (telecom operators, IAPs, ASPs, content providers) who wish to serve final users (individuals, businesses, public entities) and collect all revenue over the period of the contract. This experience launched in 2005 led to the entry of 20 service providers who operate in the Limousin DORSAL network today compared to only 4 in 2004. Service prices for final users (households, public institutions and businesses) have considerably declined and service quality has improved. This has significantly stimulated private sector development in Limousin as businesses developed and remained in the region.

In a second scenario, the government contributes to covering the cost of investment to create a backbone network with a consortium of several existing private operators who operate the network. In exchange for its financial contribution, the government establishes free access to the network, on a non-discriminatory basis.

- Africa (source: WB, 2010): this type of partnership was used to finance a submarine cable, EASSy, which connects several East African countries but may double as a land-based backbone network. In the EASSy case, a consortium of 20 operators funded the project with financial support from lenders (IFC, AFD etc.). One of the members of this consortium is a Special Purpose Vehicle (SPV) made up of the region's smaller operators. Lender support was provided through loans to this SPV. In the Consortium agreement, the SPV is allowed to sell capacity to any licensed operator in the region, on an open, non-discriminatory basis.

In a third scenario, the government sets up "pay or play" mechanisms, which provide existing operators with financial incentives to develop a backbone network in areas that are not covered by broadband. These incentives come in the form of reduced universal service requirements, such as a reduced contribution to the universal service fund, or waiving requirements to cover non-profitable areas. This type of partnership is usually more effective than creating a Universal service fund, which imposes a tax

on operators which constitutes an implicit barrier to entry on the market (WB, 2014). Just as with the amount of subsidies, the amount of financial incentives can be awarded through invitation to tender to just one operator, which encourages competition. Otherwise, these benefits can be made accessible to all operators.

- Sweden (source: WB, 2014): Sweden used this type of partnership on numerous occasions since 1999 through (i) tax incentives for operators and (ii) grants to municipalities to develop backbone networks in rural areas, but also in Stockholm (through the operator Stokab<sup>162</sup>).
- Brazil (source: WB, 2014): In Brazil, the government and the regulator have waived the universal service requirements of five fixed-line operators in return for building a backbone network connecting 3439 unserved municipalities.

### **European and international experiences in using PPPs to deploy backhaul networks**

In some cases, PPPs are formed to build backhaul networks in remote and underserved areas where the State aims to reduce the digital divide.

- Estonia (source: European Commission, 2010): for the "Westin" project in Estonia, a partnership was formed between several ministries (Agriculture, Interior, Economy and Communications) and several commercial operators, brought together into a foundation (ELA). The purpose was to build and maintain (total cost 65 million euros) a backhaul network in underserved areas. Operators built the network and a private company performs the maintenance.
- Lithuania (source: European Commission, 2012): a backbone and backhaul network was developed in Lithuania. The Rain project (Rain 1 concerned the backbone and cost 21 million euros; Rain 2 concerned the backhaul and cost 51 million euros) connected 51 municipalities home to 300 000 people. What made it possible was a PPP between the government (several ministerial entities), which built and owns the network (open and non-discriminatory access), and private operators, selected by invitations to tender, who operate and maintain the network. The Ministry of Telecommunications defines the private operators' requirements and the network access price. The network is supervised by a public non-profit organization (appointed by the Ministries of Telecommunications and Transportation). Maintenance is performed by private companies selected by invitations to tender.

### **European and international experiences in using PPPs to develop the access network**

- Germany (source: European Commission, 2008): Germany also offers an example of PPP, formed in 2008 to develop an access network in underserved or unserved areas with low population density. The PPP took the form of government subsidies (i.e. federal government and municipalities, with the European Commission's support) for several projects by private operators aiming to develop and access network. Government subsidies did not exceed 200,000 euros per project and only aimed to fill the profitability gap between urban and rural investments. The subsidy amount was defined by auctioning: the bidder offering the lowest subsidy level was awarded the contract (through invitations to tender). Through these contracts, which do not exceed 5 years, the access network is built, operated and owned by the winning tenderer who must provide open access to all operators and retail prices must be similar to those in urban areas.

### **European and international experiences in using PPPs to develop the backhaul and access network**

- Greece (source: European Commission, 2011): This experience involved rolling out a backhaul and access network covering 7.56% of the total population of Greece. The population to be covered (i) was unconnected; (ii) lived in remote, rural, mountainous areas with low population density; and (iii) was made up of 50% of people over 55. The inhabited areas to be covered amounted to 45% of Greek territory in terms of number of villages. There were two reasons behind the government's support: (i) these areas were neglected by commercial operators; (ii)

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<sup>162</sup> <https://www.stokab.se/In-english/>



these areas were to be covered to pursue the national Digital Agenda for Europe. The total cost of building the network was 250 million euros, fully born by public entities (Greek Rural Development Fund (EARFD), Greek Digital Convergence Fund (ERDF), various other national funds, European Commission). The publicly funded network entirely belongs to the State. The project was awarded by the government through an invitation to tender (coverage and cost guarantee). The private operator's obligations are to provide two types of services: (i) bandwidth of 30 Mbit/s for at least 45% of the population (primarily areas of over 400 inhabitants); and (ii) bandwidth of 8 Mbit/s in other rural areas (intermediate step as eventually 30 Mbit/s bandwidth should be available in all areas). The private operator is responsible for building the network (with public funds), but also to manage and to operate the network (with private funds). The private operator is only allowed to provide wholesale offers to commercial operators. Access to the network is open and non-discriminatory and the access price paid by commercial operators is determined and supervised by the regulator.

## D. Annex 5. The 6 major projects funded by the Universal Service Fund

### Comments:

- According to the Special Purpose Account 3.1.0.0.1.04.005 – Amending Program #1, Fiscal Year 2016, a document dated 13 June 2016 – the FSU has a surplus from the previous year of 2,523,063,103 MAD, 300 million in payments by operators for the year 2016, and therefore a total of 2,823,063,103 MAD is available (nearly 288 million USD). The document authorizes the use of 2,528,406,486 MAD for existing programs and programs approved in 2016.
- The total budget for the FSU's various programs (see table) is 379.8 million USD.

Programs	Description	Date launched	Budget	Completed actions	Comments
PACTE (major program)	The goal of the PACTE program is to provide mobile and Internet access in 9,263 rural localities (approximately 2 million people) defined as white spots (areas not covered by telecommunication networks).	Late 2006	1950 million MAD (201 million USD)	Implementation of this program was assigned by the CGSUT to operators Maroc Télécom, Méditel, CIMECOM and SpACeCOM. In 2015, the ANRT indicated that 98.2% of the 9,263 localities were covered (versus 90% in 2013). In the areas remaining to be covered, issues have arisen about acquiring the land for masts and base stations, but also regarding electrification. Méditel was the operator tasked with covering the remaining 565 rural localities by rolling out a 2G and 3G cellular mobile network within two (2) years, starting from the year 2014. According to the ANRT, 33 localities cannot be connected due to geographic and technical constraints.	This program, which was supposed to end in 2011, was extended to 2013 then to 2016.
GENIE (major program and operational component of the strategy to generalize ICT in public teaching (TICE))	<p>The GENIE program covers nearly 10,000 schools throughout the Kingdom (in urban or sub-urban areas) that were or will be provided multimedia equipment and connected to the Internet. 1300 satellite schools, in rural areas, will be equipped with a Multimedia Pack and connected to the Internet. The aim is to reduce the geographic digital divide.</p> <p>The program is subdivided into four pillars:</p> <p>1/ Infrastructure: Setting up multimedia environments connected to the Internet;</p> <p>2/ Teacher training: several training modules are planned for inspectors, school leaders and teachers;</p> <p>3/ Digital resources: buying digital resources and creating a national digital resources laboratory and a national TICE portal;</p> <p>4/ Increasing usage: provide adequate support to users.</p>	Launched early 2006 and revised in 2009 to be extended until 2013.	1038 million MAD (107 million USD), including 647 million MAD (66.7 million USD) which have already been used	The main actions carried out by this program in 2014 are: 1/ Infrastructure: 87% of "urban and rural" schools have a basic multimedia environment. 2/ Teacher training: 70% (151,558) of teachers were trained. 3/ Digital resources: 90% of digital resources, consistent with school curricula, were acquired and distributed. 4/ Increasing usage: 200 local workshops were organized to raise teacher awareness of the importance of ICT in education.	The GENIE project is extended.
NAFID@ (part of the GENIE program)	This program provides a subsidy for any Internet service subscription to members of the Mohamed VI Foundation for the Promotion of Social Work in Education and Training (FM6) during three years. This subsidy is provided to a maximum of	Launched in 2010 for a duration of three years.  The program	192 million MAD (19.7 million USD)	By 31 December 2013, 150,000 members had benefited from NAFID@.	Completed program, 100% implemented.

	150.000 members for a 36-month period, for an amount of 40 DH/month/member.	has ended.			
INJAZ	This program offers a subsidy to graduate students enrolled in eligible programs for an annual mobile Internet subscription and a laptop or a tablet. The total amount of this grant (Internet + workstation) is capped at 3600 DH per beneficiary.	Launched in 2009, with 4 editions (2009/10 ; 2010/11 ; 2012/13 ; 2013)	378 million MAD (38,9 million USD) in subsidies	By late 2014, the program had reached nearly 106.000 beneficiaries including nearly 18.000 for the 2013/2014 academic year, with a satisfaction rate of almost 84% among eligible students.	INJAZ was extended
E-SUP	This program aims to generalize ICT in higher education, just like GENIE does for national education.	n.d.	120 million MAD (12,3 million USD) in transfers to the Ministry of Education	No action has yet been taken: though FSU funds were transferred to the Ministry of Education, the Ministry has not yet used them.	The program is being finalized and implementation should be launched in 2016.
Community Access Centers (CAC)	This program aims to create 400 community access centers (CACs) from which to access ICT. The first phase of this program aimed to create CACs in youth centers and girls' residences for Internet and mobile access.	n.d.	Budget of 8.8 million MAD (0.9 million d'USD)	By late 2014, 50 CACs were already deployed and mostly operational; 25 more were being set up. Responsibility for implementing the 1st phase of the program was assigned to operators CIMECOM and SpACeCOM, using VSAT satellite technology.	Considering the operational problems which arose for operators during implementation and the population's lack of interest in these CACs, in 2013 the CGSUT decided to stop the program and to carry out an impact assessment for the CAC program, so as to redefine the terms and conditions of its implementation and relaunch in a precise, consistent and practical manner and within the budget allocated to this project.

Note : as of 14 June 2016, the ANRT had not published its 2015 annual report due to the delay in publishing the Official Gazette. The USD-Dirham exchange rate used is 9.7 dirhams for 1 USD in May 2016.

Source: ANRT website (<https://www.anrt.ma/missions/service-universel/>), ANRT 2013 and 2014 annual reports, and other information not publicly available (in particular regarding the budget of FSU programs) provided by the ANRT to the World Bank in July 2016.

## E. Annex 6. Overview of cyber-security and electronic surveillance in France, Italy and Lithuania

**Warning:** This annex offers a very succinct overview of how regulators in France (ARCEP), Italy (AGCOM) and Lithuania (RRT) address cyber-security and electronic surveillance management issues. It does not attempt to provide an in-depth analysis of the topic. The reader may refer to the following documents for further information on the legislative framework:

- European Court of Human Rights, [Factsheet - Personal Data Protection](#), June 2016;
- France, National Assembly, [Draft law on intelligence – Impact assessment](#), 18 March 2015;
- UNESCO, [Global Survey on Internet Privacy and Freedom of Expression](#), 2013;
- European Parliament, [Report EP 305.391/ A5-0264/2001 on the existence of a global system for the interception of private and commercial communications \(ECHELON interception system\) \(2001/2098\(INI\)\)](#), 11 July 2011.

	France	Italy	Lithuania
Does the country have a Digital Strategy?	Yes  France created a Digital Agency tasked with developing and implementing the Digital Strategy <a href="http://www.agencedunumerique.gouv.fr/en/">http://www.agencedunumerique.gouv.fr/en/</a>	Yes. See  <a href="http://www.agid.gov.it/agenda-digitale/agenda-digitale-italiana">http://www.agid.gov.it/agenda-digitale/agenda-digitale-italiana</a>  and  <a href="http://www.sviluppoeconomico.gov.it/index.php/it/incentivi/impresa/grandi-progetti-di-ricerca-e-sviluppo">http://www.sviluppoeconomico.gov.it/index.php/it/incentivi/impresa/grandi-progetti-di-ricerca-e-sviluppo</a>	Yes  The Digital Agenda of Lithuania can be found here: <a href="https://www.e-tar.lt/portal/lt/legalAct/dbd546f0b04011e39a619f61bf81ad0a/GIVRcGMwtl">https://www.e-tar.lt/portal/lt/legalAct/dbd546f0b04011e39a619f61bf81ad0a/GIVRcGMwtl</a> (in Lithuanian)
Does this Strategy cover broadband and e-government?	No, there are other specific strategies  <a href="http://www.economie.gouv.fr/republique-numerique/projet-de-loi-republique-numerique-adopte-par-cmp">http://www.economie.gouv.fr/republique-numerique/projet-de-loi-republique-numerique-adopte-par-cmp</a>  The High-Speed Broadband Plan <a href="http://www.francethd.fr/">http://www.francethd.fr/</a>	Yes	Yes.  Broadband is also covered by the New Generation Internet Access Development Plan.
Institutions responsible for the Digital Strategy	Digital Agency and High-Speed Broadband France  ARCEP, the regulator, also contributes to the implementation of the strategy and publishes an annual report for policy-makers.  <a href="http://www.arcep.fr/index.php?id=8571&amp;tx_gsactualite_pi1%5Buid%5D=1827&amp;L=1">http://www.arcep.fr/index.php?id=8571&amp;tx_gsactualite_pi1%5Buid%5D=1827&amp;L=1</a>	Ministry of Economic Development (other ministries and the regulator are also consulted)	Ministry of Transport and Communications, with assistance from the Information Society Development Committee
Legal status of electronic communications interceptions	Governed by the Law on the Modernization of the Economy (LME).	Governed by Article 266 and <i>et seq.</i> of the Italian Code of Criminal Procedure and Legislative Decree 259/2003.	Governed by the Law on Electronic Communications of the Republic of Lithuania and the Code of Criminal

	<p>In principle, an operator must accede to requests to intercept electronic communications, must store digital data for a period ranging between several months to several years depending on the nature of the data, and must block access to some sites in case of a judicial request to do so (in the case of sites advocating terrorism).</p> <p>ARCEP, the regulator, has no role to play in interceptions, but can ensure that operators comply with the law and are compensated by the government as required by the law. The regulator is also formally consulted on draft laws regarding these issues.</p>	<p>Depending on the nature of the violation, different police services carry out interceptions (<i>Guardia di Finanza, Polizia, Carabinieri</i>).</p> <p>The interception is authorized by a judge for preliminary investigations, at the request of the prosecutor. In urgent situations and when a delay may gravely impede the investigation, the prosecutor may make a request for surveillance to the judge responsible for preliminary investigations, who must reach a decision within 48 hours.</p> <p>Terrorism and organized crime have a different legal status (Anti-terrorism decree 21/4/2015), which provides for specific measures on electronic communication:</p> <ul style="list-style-type: none"> <li>• In a terrorism investigation, no judge's authorization is needed to intercept communications;</li> <li>• Internet service providers and telecommunications operators must eliminate any digital content encouraging terrorism and radicalization; the order requires an executive decree which comes from the Polizia Postale Agency, which may confiscate all of the supplier's equipment if the order is not complied with within 48 hours.</li> <li>• Using digital tools to encourage terrorist proselytism is harshly punished.</li> </ul>	<p>Procedure.</p> <p>Intelligence services, players involved in a preliminary investigation, prosecutors, courts and judges may access telecommunication networks. Operators are required to maintain the equipment and the services needed for interceptions, and are compensated by public funds.</p> <p>RRT, the regulator, ensures that operators and electronic communication service suppliers comply with the obligations that may be imposed on them in the interest of national defense, national security and maintenance of law and order, and in extraordinary circumstances. Furthermore, RRT collaborates on these matters with homeland security services.</p>
<p>Institutions responsible for cybercrime</p>	<p>The National Agency for Information Security (ANSSI) is responsible for cybersecurity, and has a CERT-FR (national Computer Emergency Response Team)</p>	<p>Polizia Postale, a specialized body of the Italian police, is in charge of cyber-security.</p> <p>The telecommunications regulator may support the Polizia Postale in its activities, but has no specific role.</p>	<p>RRT plays an important role as a national Computer Emergency Response Team (CERT-LT).</p> <p>The role of the CERT-LT is to ensure cybersecurity and to circulate relevant information (see <a href="https://www.cert.it/en/">https://www.cert.it/en/</a>)</p>

Source: Responses of national regulators.