

Telecommunications Sector in DJIBOUTI : Finding the Path to Growth

2015 Report

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Executive Summary

The objective of this note is to outline the potential benefits to furthering the development Djibouti's ICT sector and building upon Djibouti's submarine cable infrastructure. The note provides a review of the current status of the Djibouti ICT market and proposes a methodology for enhancing the Djibouti ICT policy framework and for deciding between alternative paths for ICT development.

Strengthening the ICT sector is consistent with the Djibouti Vision 2035, Djibouti's National Trade and Development Strategy, Strategy for Accelerated Growth and Employment Creation and National Initiative for Social Development (Trade Policy Review Report). In addition, Djibouti highlights the importance of its ICT sector in its recent World Trade Policy Statement provided to the World Trade Organization in September 2014.

The Djibouti Vision 2035 and associated strategies describe Djibouti's strengths and advantages including location, natural resources, tourism potential, submarine cable infrastructure and young and increasingly educated population. The plans also recognize that Djibouti's recent reliance upon capital intensive and public sector approaches to development are not sufficient and sustainable and highlight short term immediate national needs, medium term sector development objectives and longer term national aspirations.

The Djibouti 2035 Vision focuses on five pillars: National Peace and Unity, Good Governance, Diversified Economy, Consolidation of Human Capital and Regional Integration. Achieving objectives in each of these pillars is predicated on a strong ICT sector and the availability of quality telecommunication services at affordable prices.

For example:

- National Peace and Unity – ICT can assist in building social cohesion and national unity. With Djibouti City comprising a very large percentage of the Djibouti's population and many rural areas being fairly remote, ICT can facilitate connecting rural and urban areas and also engaging the urban poor.
- Good Governance – The ITU World Summit on Information Society (WSIS) held in Tunisia in 2005 highlighted the benefits of ICTs for society and good governance. "The Tunis Summit represents a unique opportunity to raise awareness of the benefits that Information and Communication Technologies (ICTs) can bring to humanity and the manner in which they can transform people's activities, interaction and lives, and thus increase confidence in the future".¹ ICT can provide the means to facilitate effective public administration, access to government services for citizens and to streamline processes enabling economic development. An example of a Djibouti initiative that will benefit from a more robust ICT infrastructure is the Single Window established by the National Agency for Investment Promotion to provide a one stop shop for business creation.
- Diversified Economy – With the Djibouti Container Terminal and underway and planned construction of the Doraleh Multipurpose Port, Damerjog Livestock Port, Djibouti City to Addis Ababa and Tadjurah to Mekele rail lines, Tadjurah to Balho highway, and new Djibouti airport,

¹ "Tunis Commitment", World Summit on the Information Society, International Telecommunications Union, November 18th, 2005, <http://www.itu.int/wsis/docs2/tunis/off/7.html>.

Djibouti infrastructure is beginning to meet the aspirations and goals of Djibouti Vision 2035. The Vision 2035 notes how one factor that will enable achieving the proposed rate of economic growth is the expansion of “New Information and Communication Technologies”. Some highlighted sectors of the economy have been slower to develop than port infrastructure including tourism, energy and financial services. These sectors as well as agriculture will all benefit from a robust ICT sector and quality, affordable telecom services.

- Consolidation of Human Capital – Djibouti has a young population and has made great strides in education in the last decade but with an undiversified economy many graduates are unable to obtain employment. The challenge has increased due to rapid urbanization with many rural citizens moving to Djibouti City. ICT can provide a platform for training and skills development and job creation. In addition, ICT can further health care, social security and status and engagement of women and youth.
- Regional Integration – With partnerships and initiatives in the Common Market for Eastern and Southern Africa (COMESA), Intergovernmental Authority on Development (IGAD), African Economic Union and WTO, in combination with its geographic location, port infrastructure and submarine cables, Djibouti has made taking advantage of trade liberalization a cornerstone of its Djibouti Vision 2035 strategy. Telecommunications is integral to this objective from communicating with trading partners to establishing B2B and B2C marketplaces.

Underlying the Djibouti Vision 2035 aspirations are goals of increasing economic growth, creating an environment for economic opportunity, and building a shared prosperity and strengthening the business environment.

From ACE to EASSy, there have been great inroads in submarine cable infrastructure for Africa in the last ten years. To take advantage of these new cables, countries have been developing national ICT plans and national backbones. The national ICT plans align with plans and objectives for national economic development. Most all of the countries have similar goals to Djibouti for ICT to serve as an economic catalyst, provide a platform for diversifying the economy and contribute to the development of other sectors. Kenya and Tanzania are two examples that will be discussed in this note as well as the landlocked Rwanda and Burundi as their national planning was inspired by the new submarine cables.

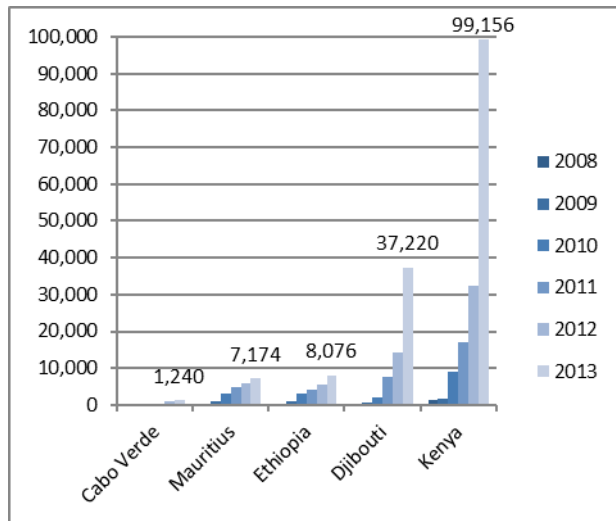
Each of these countries have different models for developing their ICT sector and views of the role of public private partnerships, but methodology for deciding upon an approach is applicable to all. Undertaking the development and implementation of a formalized national ICT plan, will assist Djibouti in achieving its vision of ICTs of fostering an information society with corresponding sector expertise, facilitating increased competitiveness in all sectors, and furthering Djibouti citizens well being as part of its Vision 2035 plan.

Potential of the ICT Sector to Serve as an Engine of Growth and Development of Djibouti’s Economy

A. Opportunity Arising from Horn of Africa and East Africa Submarine Cables and National Backbone Connections

With seven different international cable systems, SeaMeWe3, Aden-Djibouti, EASSy/WIOC, SEACOM, EIG, Djibouti – Ethiopia, and Djibouti- Somalia as a result of and in combination with its strategic port and trade location, Djibouti is well placed to achieve ICTs role in the Djibouti 2035 Vision. The cable landings provide opportunity for furthering the ICT industry in Djibouti, contributing to the growth of other sectors, strengthening Djibouti’s business environment, enhancing government services and public administration and contributing to shared prosperity. Figure 1 shows Djibouti’s submarine cable capacity compared to other nations in the region.

Figure 1. Total international bandwidth in Djibouti and comparison with other countries



Source: Telegeography (2014)

While the new Djibouti Data Center in Djibouti City is an immediate example of the potential for new services but Djibouti faces the question of what is the best path to strengthening the ICT sector and to take advantage of the submarine cable systems.

With EASSy and ACE and the development of other Africa based submarine cable systems in the last ten years, other Africa nations have seen similar opportunities and potential benefits and assessed alternative paths. These include Kenya, Tanzania, Rwanda and Burundi:

- Rwanda – Prior to the development of the SEACOM, TEAMS and EASSy submarine cables landing in Kenya and providing access to Rwanda, telecom services were satellite based with corresponding high prices and low market penetration rates. The Rwandan government developed a national ICT plan to take advantage of the new access which included the implementation of a national backbone with five cross border links, ICT environment with consistent set of high quality ICT services at affordable prices across Rwanda, connectivity between government facilities and application of ICT to further Rwanda economic and social development. (Rwanda ICT Policy Mission : Vision 2020)
- Kenya – With the arrival of SEACOM, TEAMS and EASSy, Kenya has developed a national ICT master plan in conjunction and support of the national development program outlined in Kenya Vision 2030. The National ICT Master Plan has an overall objective of facilitating Kenya’s transition to a knowledge society, establishing Kenya as a regional ICT hub and contributing to achieving Vision 2030 socio-economic targets. Specific foundations and pillars include : ICT human capital and workforce development, integrated ICT infrastructure, integrated information infrastructure, E-

government services, ICT as a driver of industry, and developing ICT businesses. (Kenya National ICT Master Plan)

- Tanzania – While Tanzania developed its first national ICT plan in 2003, the arrival of the EASSY and SEACOM cables has greatly changed the context and possibilities. High level governmental support for ICT has led to the development of the National ICT Broadband Backbone (NICTBB) which has the objective of providing access to high quality affordable ICT services across Tanzania, providing ICT connections to neighboring countries and contributing to addressing the digital divide.
- Burundi – With an objective similar to Rwanda of taking advantage of EASSy and newly arrived East Africa submarine cable systems, Burundi has also undertaken development of a national backbone network. The goals of the Burundi Backbone System are to provide for access to ICT services across Burundi's seventeen provinces, develop connections and cross border links to neighboring countries and provide access to EASSy.

For Djibouti, the seven cable systems provide an opportunity to further the national advantages of its geostrategic location and increasing competitive advantages in port and transportation industries while contributing to tourism, financial services and other industries and enhancing social welfare.

B. Potential Paths to Strengthen the ICT Sector and Build Upon the New Submarine Cables and Landings

As noted in Djibouti's World Trade Policy Statement 2014, a key step towards taking advantage of the new submarine cables and landings is the development of a national ICT strategy and national ICT master plan. These plans would tie to and contribute to Djibouti's development vision as described in Djibouti Vision 2035, sector development initiatives and poverty reduction efforts in described in the National Initiative for Social Development.

Subsequent to the World Summit on Information Society call to action, 161 economies (84% of world total) had national ICT strategies in place and 7% had national ICT strategies in development in 2010.² (ITU 2010) "Taking into consideration the leading role of governments in partnership with other stakeholders in implementing the WSIS outcomes, including the Geneva Plan of Action, at the national level, we encourage those governments that have not yet done so to elaborate, as appropriate, comprehensive, forward-looking and sustainable national e-strategies, including ICT strategies and sector e-strategies as appropriate, as an integral part of national development plans and poverty reduction strategies, as soon as possible and before 2010."

The plans vary in scope and covered elements but many incorporate many of the WSIS action lines of:

- WSIS Action Line C2 - Information and Communications Infrastructure
- WSIS Action Line C3 – Access to Information and Knowledge
- WSIS Action Line C4 – Capacity Building
- WSIS Action Line C5 – Building Confidence and Security in the Use of ICTs

² "National e-Strategies for Development: Global Status and Perspectives 2010", International Telecommunications Union (ITU), Geneva, Switzerland, March, 2011.

- WSIS Action Line C6 – Enabling Environment
- WSIS Action Line C7 – ICT Applications – Benefits in All Aspects of Life
- WSIS Action Line C8 – Cultural Diversity and Identity, Linguistic Diversity and Local Content.³

With planning underway for the WSIS +10 goals, the WSIS + 10 Vision for 2015 and beyond again highlights the importance of national ICT strategies, “*Maximising* opportunities to leverage the ICTs , and transformative technology more generally, as enablers for social and economic development by creating appropriate national strategies and policies for the advancement of WSIS /ICT for development goals and by encouraging cooperation among all stakeholders ...”⁴

The Rwanda experience provides a good model for the development and governance of a national ICT plan in support of national development and poverty reduction strategies. In a manner similar to Djibouti, Rwanda started with a strategy for national and economic development, the Rwanda Vision 2020.⁵ This vision included short, medium and long term objectives of promoting economic stability and wealth creation, transforming Rwanda from an agrarian to knowledge based economy, and creating a productive middle class and fostering entrepreneurship. And then the vision had six associated pillars of good governance, human resource development, private sector led development, infrastructure development, productive high value and market oriented agriculture and regional and international integration.

In support of Rwanda Vision 2020, Rwanda has developed a series of National Information and Communication Infrastructure (NICI) plans:

- NICI 2005 for the years 2001 to 2005⁶ - with goals of developing the regulatory, institutional and legal framework for ICT development and associated liberalization of the telecom marketplace.
- NICI 2010 for the years 2006 to 2010⁷ - with goals of development of ICT infrastructure including a national fiber optic backbone network and national data operations center
- NICI 2015 for the years 2011 to 2015⁸ - with goals of ICT development in five focus areas of cybersecurity, ICT skills, private sector, eGovernment and community

and the planned

- NICI 2020 for the years 2015 to 2020 – with the goal of consolidating the accomplishments of the first three plans and achieving the ICT role in the Rwanda Vision 2020.

Figure 2 below shows an idealized view of development of a national ICT plan starting with the national vision and building consensus around a national ICT vision and how ICT supports the national strategy. Developing the legal and regulatory framework, infrastructure plans, human

³ National e-Strategies for Development: Global Strategies and Perspectives 2010”, International Telecommunications Union (ITU), Geneva, Switzerland, March, 2011.

⁴ “WSIS Vision for WSIS 2015 and Beyond”. International Telecommunications Union (ITU), Geneva, 2014.

⁵ “Rwanda Vision 2020”. Republic of Rwanda, Kigali, Rwanda, July, 2000.

⁶ “An Integrated ICT-led Socio-Economic Policy and Plan for Rwanda”, Government of Rwanda, Kigali, Rwanda, March 2001.

⁷ “An Integrated ICT-led Socio-Economic Policy and Plan for Rwanda: the NICI Plan 2010” Government of Rwanda, Kigali, Rwanda, 2005.

⁸ “National ICT Strategy and Plan: NICI 2015”, Government of Rwanda, Kigali, Rwanda, 2010.

capacity development plans and then e-government and sector specific plans are also key elements of the National ICT plan. Key aspects throughout the process are national leadership on ICT and its role in the national strategy, stakeholder engagement and metrics.

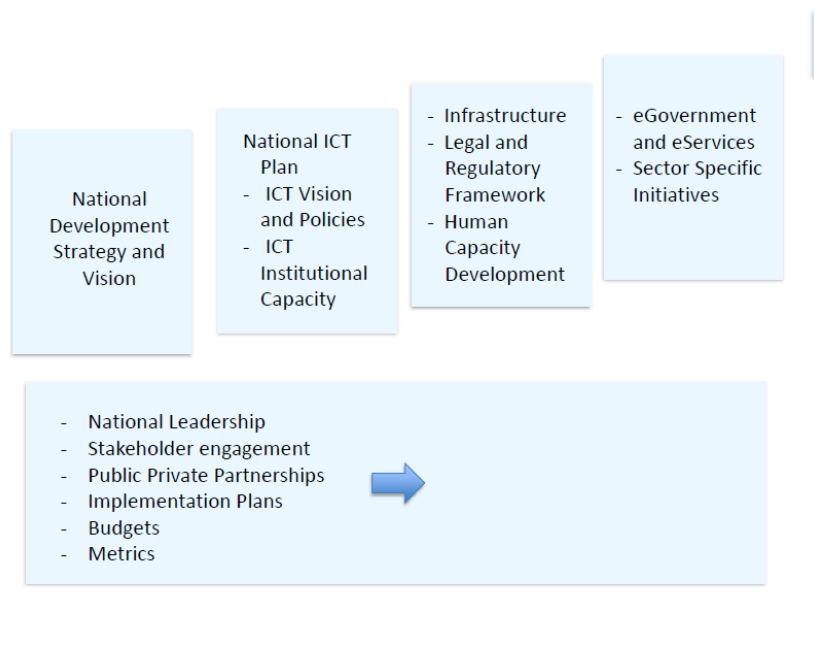
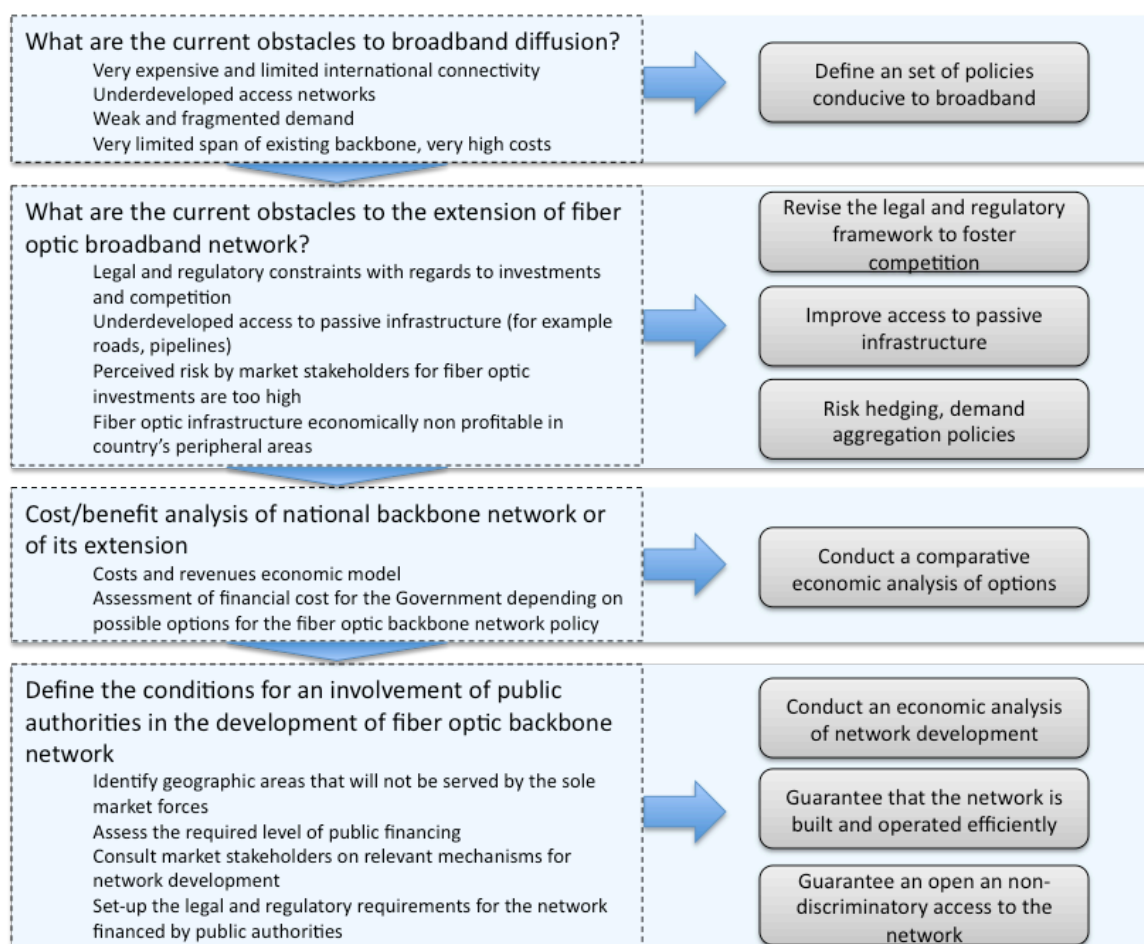


Figure 2: Development of National ICT Plan

As part of national ICT plans and motivated by the landing of submarine cables, countries are evaluating alternatives for the development of national broadband networks as part of their infrastructure. Figure 3 below highlights some of the major questions and steps in the process starting with an industry assessment, defining the government’s role and the extent of use of public – private partnerships and then financial comparison of alternatives.

Figure 3: Methodology for designing a national backbone network



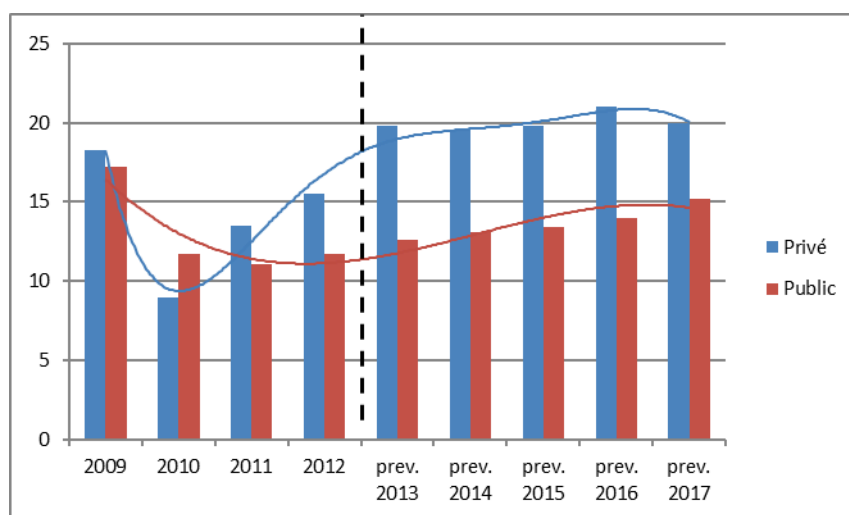
C. Strengthening the ICT Sector Contributes to Diversifying the Economy

While growing and having much promise, the Djibouti economy is beginning a transition from being foreign direct investment led to one that is increasingly diversified. Since the mid-2000s, economic growth has been led by FDI, most of which has been channeled toward the transport sector following the opening up of the port sector to private investment. In addition, the transport sector (port services and related logistics) is dependent on trade with Ethiopia, where economic growth has been declining steadily since 2007 increasing the risk to Djibouti's economy during the transition. The contribution of the transport sector to GDP has remained at close to 21 percent of GDP since 2006 (see Figure 3 below), and the boom in this sector has not yet produced the expected impact on employment. To date, the establishment of the Djibouti free zone, in parallel with major port projects, has also not led to significant private sector development.

As noted in the Djibouti Vision 2035 One major challenges facing Djibouti is economic diversification, with the aim of reducing unemployment and poverty. IMF estimates (2013) put Djibouti's unemployment rate at 60 percent—well above the rates in other MENA region countries. Furthermore, the youngest members of the population are more affected by unemployment—80 percent of persons between the ages of 20 and 24 are unemployed.

Diversification of the Djiboutian economy calls for significant investments that cannot be made by the State alone. The transformation of Djibouti’s economy into a true regional platform for commercial, logistical, and financial services and the development of the tourism and fisheries sectors—the pillars of “Djibouti Vision 2035”—call for an ambitious investment program. However, Djibouti has limited leeway in terms of public investment. Having entered an IMF program, Djibouti must maintain fiscal discipline through effective tax collection, strict control of expenditure, and the repayment of arrears,⁹ particularly domestic arrears to be paid to public enterprises.¹⁰

Figure 3. Trend in public and private investment (% of GDP)



Source: IMF, 2013

Building on the port experience, diversification of the Djiboutian economy requires the stimulation of private investment through sector policies that facilitate openness to domestic and foreign private sector participation. The public-private sector partnerships established in the context of the port sector – PAID, DCT, DHT, ZF – have functioned well and have generated US\$561 million in private investment between 2000 and 2009 (close to 50 percent of 2009 GDP). This can be replicated in other sectors in order to improve the management of existing infrastructure and attract private investment for new infrastructure.

D. ICT has Significant Potential to Contribute to Economic and Social Development

Unlike the water and electricity sectors, which face uncertainty in terms of private investment in the short term,¹¹ the telecommunications sector is ideally suited to attracting investment: demand for telecommunications services is rapidly growing and providing telecommunications services has a strong business case. Since telecommunications services are not considered basic services, the political dimension—numerous subsidies, social tariffs—of telecommunications activities is not as highly charged an issue as it is in the water and electricity sectors. And importantly, ICT is an important element of Vision 2035 and will contribute to paving the way for Djibouti to become a regional ICT leader through the development of both the domestic and international markets. This

⁹ In 2013, public debt stood at 55 percent of GDP, a figure that poses a high risk of over indebtedness.

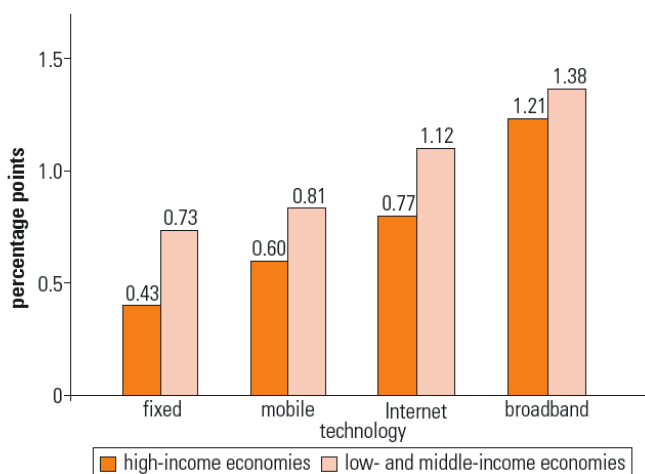
¹⁰ Payment arrears to Djibouti Telecom, ONEAD, EDD stand at 4 percent of GDP (IMF, 2013).

¹¹ Owing to their weak financial position and the political dimension of their activities, these public enterprises have more difficulty attracting donor financing.

would create significant knock-on effects for the rest of the economy and would allow Djibouti to become a true platform, open to the entire subregion, for commercial, logistical, and financial exchanges.

By liberalizing and developing the telecommunications sector, Djibouti could foster greater access by enterprises and individuals to telephone and broadband Internet services, which would produce a significant knock-on effect on economic activity. A recent empirical study based on a sample of 120 developing countries shows that every ten percentage point increase in the penetration rate of telecommunications services leads to significant GDP growth (Figure 2). Broadband services (fixed and mobile) have the greatest impact through their ripple effects on productivity, competitiveness, and attraction of foreign direct investment. Another World Bank study (2014) shows that the introduction of broadband services boosts worker productivity by 5 percent in the industry sector and 10 percent in the services sector, thus increasing the competitiveness of the economy and promoting exports. Clarke and Wallsten (2006) have noted that a 1 percentage point increase in the number of Internet users leads to a 4.3 percentage point increase in exports. Furthermore, broadband permits the deployment of “smart” infrastructure such as smart electricity grids that enhance the performance of the electricity grid through more effective use of energy resources (Nocentini et al., 2013). In addition to its short-term economic impacts, the development of broadband services generates employment. Crandall et al. (2007) demonstrate that for every 1 percentage point increase in broadband penetration, private sector employment (excluding agriculture) increases by 0.2-0.3 of a percentage point per year. In Sub-Saharan Africa, the GSMA (2012) estimates that mobile telecommunications services (including mobile broadband) currently generate 3.3 million direct jobs, with this figure being projected to climb to 6.6 million in 2020.

Figure 4. Higher GDP growth resulting from a 10 percentage point increase in the penetration rate of telecommunications services



Source: World Bank, 2009

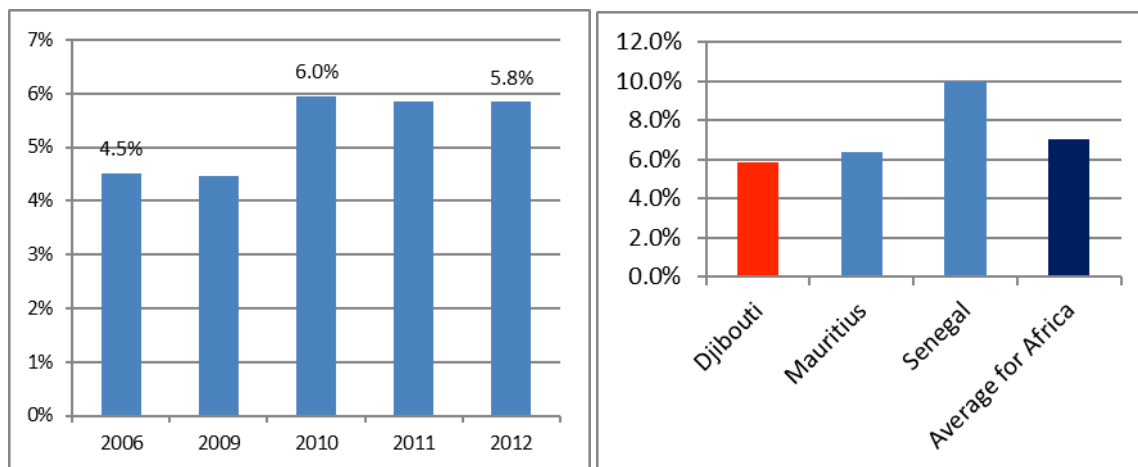
Currently, the potential of the telecommunications sector to be an engine of economic growth and employment in Djibouti and contribute to Vision 2035 is in the beginning stages. This observation is supported by the following analysis:

a) First, the contribution by telecommunications sector revenue to GDP has not increased since 2010 (Figure 5, left) and is lower than the average in the Africa region (Figure 5, right). Furthermore, relative to Mauritius for example, the contribution of the telecommunications sector has not begun to include ICT value-added activities led by telecommunications activities to a large degree. In 2013, 42 percent of the value added of the ICT sector in Mauritius was derived from telecommunications-related activities such as industrial activities, call centers, software and website development.¹²

b) Second, the telecommunications sector has not yet contributed to a diversification of the economy, as shown in the trend in the sector composition of GDP between 2006 and 2011. In other words, the major investments made in submarine cables since the mid-2000s have not had a significant impact on the rest of the economy through the emergence of new, value-added activities. By way of illustration, the finance and transport sectors, which constitute the pillars on which the Government’s development strategy is being built (see “*Djibouti 2035*”) and ought to have benefitted from the installation of submarine cables, have not undergone any major change. Their contribution to GDP remained virtually unchanged between 2006 and 2011.

c) Third, the telecommunications sector makes only a limited contribution to job creation (0.4 percent of the working population), as it provides jobs to 1,300 salaried employees at Djibouti Telecom.

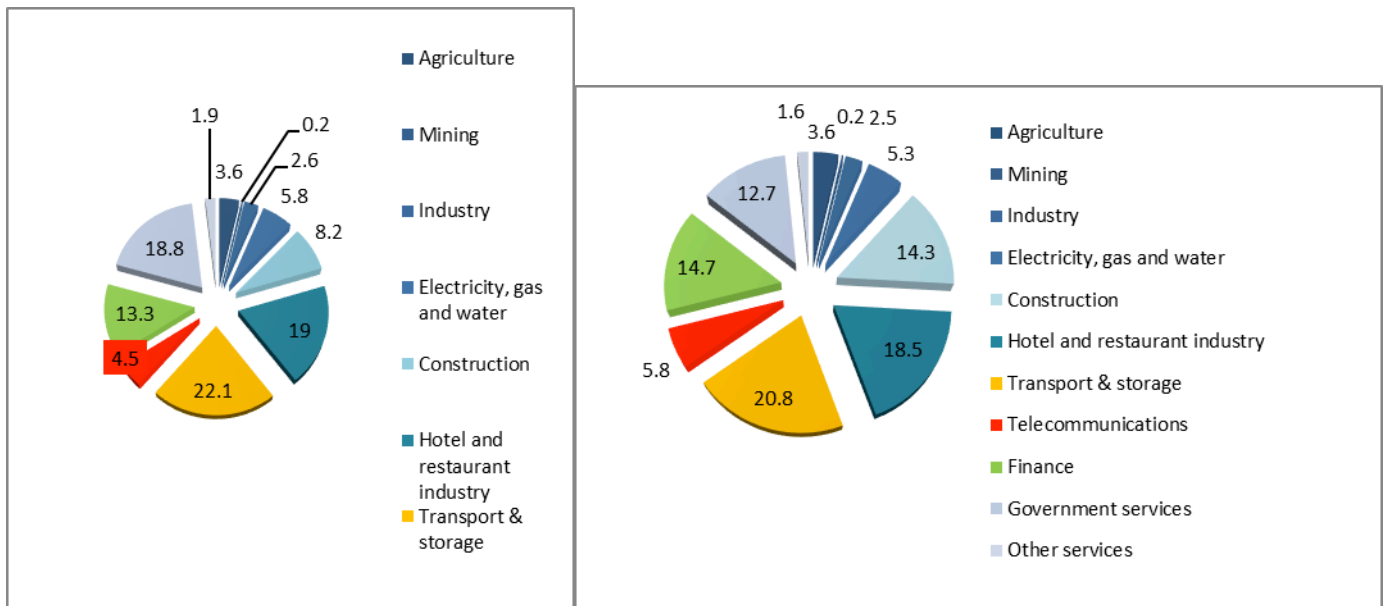
Figure 5. Telecommunications contribution to GDP in Djibouti (left) and in other African countries in 2012 (right)



Source: Calculations made using Djibouti Telecom 2012, World Bank 2014, and GSMA 2014 data

Figure 6. Trend in the composition of GDP by activity sector between 2006 (left) and 2011 (right)

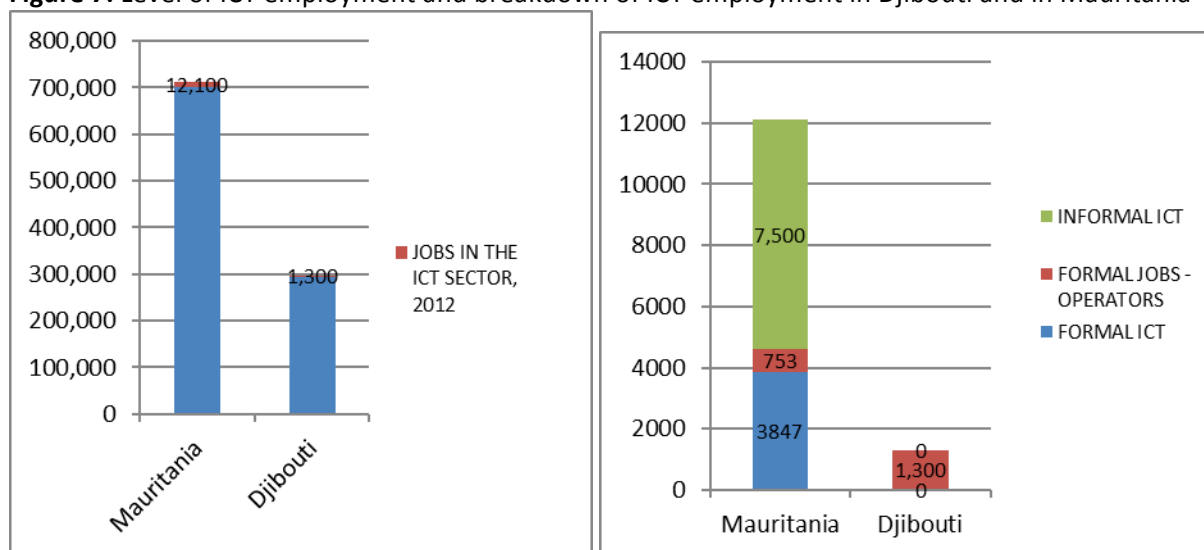
¹² <http://statsmauritius.gov.mu/English/StatsbySubj/Documents/ei1119/ict.pdf>



Source: Calculations made using OECD (2012), Djibouti Telecom (2012), and GSMA (2014) data

In proportional terms, the comparison with Mauritania reveals a gap from an employment standpoint that suggests that Djibouti’s telecommunications sector has not yet begun to reach its promise. In Mauritania, while the size of the working population is only 2.4 times greater than in Djibouti, employment in the telecommunications sectors is 9.3 times higher (12,100 compared to 1,300 – Figure 7, left). This is explained by the presence of three market operators, which has paved the way for the emergence of a number of related activities, with these operators outsourcing some of their activities to subcontractors. Consequently, employment in the telecommunications sector in Mauritania is much greater and more diversified—12,100 individuals are employed in this sector, with 7,500 working in the informal sector,¹³ 753 with the three operators, and 3,847 in related subcontracted activities (Figure 7, right).

Figure 7. Level of ICT employment and breakdown of ICT employment in Djibouti and in Mauritania



Source: World Bank, 2014

¹³ Persons who resell SIM and reloadable cards and bonuses; persons who repair cellular telephones, etc.

The comparison with Mauritania suggests that if Djibouti undertakes reform of the telecommunications sector, ICT employment would exceed 5,000 jobs in Djibouti compared to the mere 1,300 currently. This would lead to the net creation of 3,788 jobs as a result of the increase in the number of services and actors operating in the market.

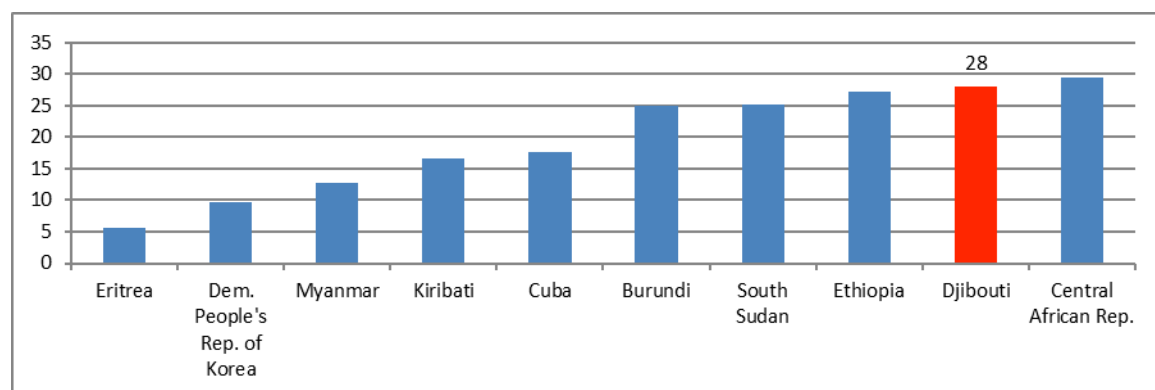
Assessment and Opportunity of the ICT Sector

While the new Horn of Africa and East Africa transoceanic cables provide much opportunity, recent data show that Djibouti has not yet taken advantage of the possibilities in a similar manner to other East Africa countries.

The analytical data suggest that the limited contribution made by the telecommunications sector to economic growth in comparison to other Africa countries with recently connected transoceanic cables is linked to the fact that telephone (fixed and mobile) and broadband markets are among the least developed in the world. As is the case with Eritrea and Ethiopia, this situation stems from the structure of the Djiboutian market, which has one of the last monopolies in the world, with the presence of a single operator. Figures 8 and 9 point to the existence of a clear dichotomy between market penetration rates—especially mobile—where monopolies exist in countries such as Djibouti and more competitive markets in the other MENA countries and Africa comparable in size to Djibouti (Mauritius—(1.2 million inhabitants) and Cape Verde—(0.5 million inhabitants)).

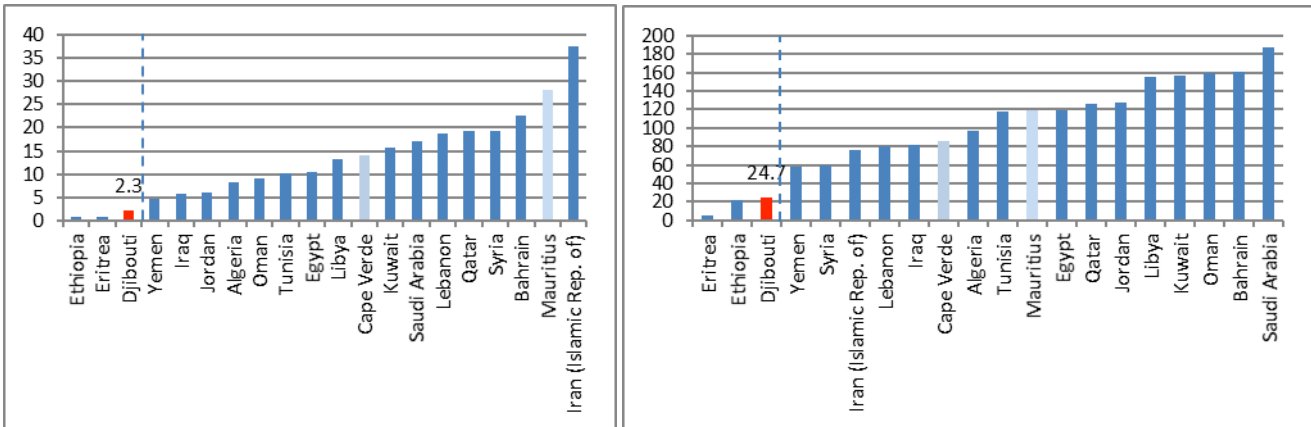
The telephone and mobile Internet markets, which are developing rapidly at a global level, remain in an undeveloped state in Djibouti. Mobile telephone penetration rates (28 percent) were among the ten lowest in the world in 2013 (Figure 8), while the average is 70 percent in Africa and 68 percent in MENA. Internet adoption and access also lags with the mobile broadband penetration rate amongst the lowest in the world at 1.6 percent. In contrast, this rate is 43 percent in Cape Verde which has a population and international connectivity much lower than Djibouti's. The result is that Internet use in Djibouti is in an early phase—only 8.26 percent of the population uses the Internet – not reflecting Djibouti's submarine cable connectivity

Figure 8. The ten countries with the lowest penetration rates (as a %) of mobile telephones in the world in 2013



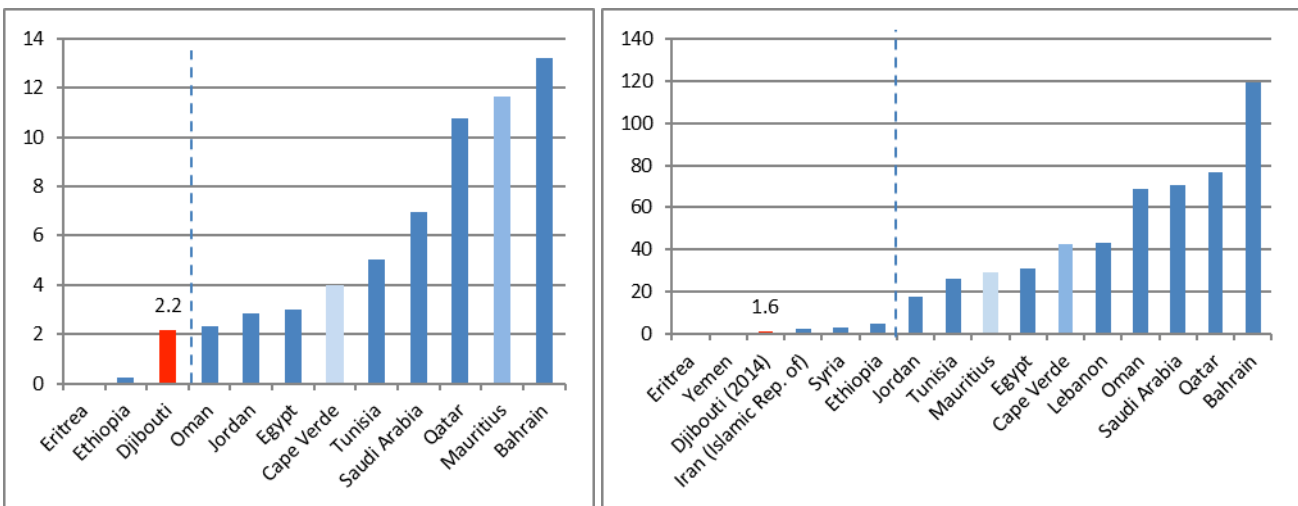
Source: ITU (2014)

Figure 9. Penetration of fixed-line telephones (left) and mobile telephones (right) in the MENA region and a number of African countries in 2012



Source: ITU (2014) and GSMA (2014)

Figure 10. Penetration of broadband fixed service (left) and mobile services (right) in the MENA region and a number of African countries in 2013



Source: ITU (2014) and GSMA (2014)

A. The Fixed-line Telephone Market

The fixed-line telephone market operated by the national operator has seen a gradual decline in the number of fixed lines since 2010. There have been two distinct phases noted in this market since 2008. During the first phase, the reduction in subscriber rates and line installation fees led to a growth phase of the market despite the competition from mobile telephones. During the second phase, the number of fixed lines fell, beginning in 2010 when rates (subscriber and installation) returned to their 2008 levels, despite a program to promote access to fixed-line telephones via lower rates in rural areas only.

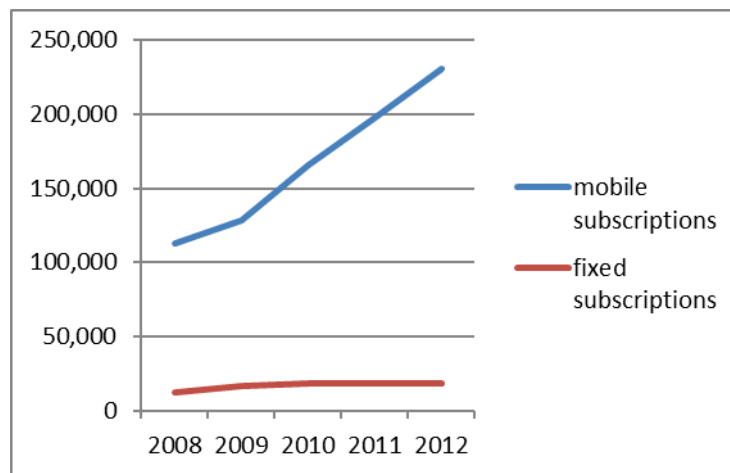
High rates have contributed to an underutilization of the copper network. Of the 50,000 lines reported by Djibouti Telecom in 2013, only 36 percent are activated. Subscriber and line connection fees are very high, taking into account the population poverty rate. While 70 percent of the population lives on US\$2 per day, the subscription rate for individual customers is US\$6 per month and installation fees amount to 40 percent of monthly per capita income. Because the monthly business subscription fee is almost six times higher than the individual subscription rate, small and

medium enterprises often do not have fixed-line telephones. Similarly, only the wealthiest households (12,000) can afford fixed-line telephones.

B. The Mobile Telephone Market

The subscriber base of the mobile telephone market, in which Djibouti Telecom has a monopoly (marketed under the brand name Evatis), has been growing since 2008 (Figure 11). Prepaid subscriptions account for 97 percent of this market. The increase in the subscriber base has been spurred by the deployment of a 2.5G EDGE network in 2007 followed by a 3.5G network in 2012, which eased the pressure on the 2G network that had reached a saturation point and made it possible to offer new services (SMS, MMS, emails and Internet services, roaming).

Figure 11. Trend in the fixed and mobile telephone subscriber base (2G)



Source: GSMA (2014) and Telegeography (2014)

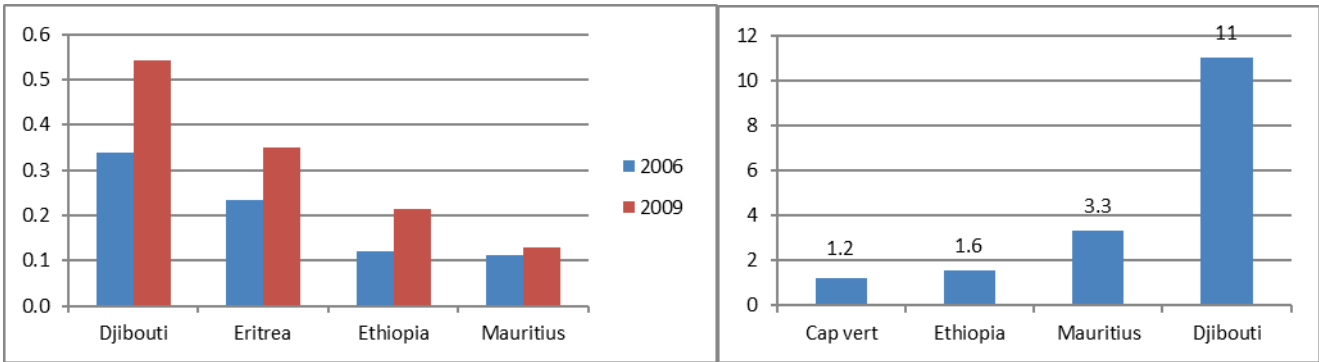
Despite the growth in the market, the penetration rate of the mobile telephone network in Djibouti is one of the lowest in the world. Djibouti is ninth place among the countries in the world where mobile telephone services are the least developed.

Currently, the Djibouti telecom market has: (a) high communications and connectivity costs; (b) limited availability of diverse service plans; and (c) poor quality of the network.

Of the other countries in the region where a monopoly exists (Ethiopia and Eritrea), rates are highest in Djibouti for local calls (3 minutes) made using a prepaid mobile subscription plan (Figure 12). Relative to a competitive market such as Mauritius, the rates for a local call is almost five times higher. The rate charged by Djibouti Telecom for a 2G SIM card is ten times higher than in Ethiopia or Cape Verde and makes access to mobile telephones too expensive for the 70 percent of Djibouti's population living on US\$2 per day. Access to roaming service requires payment of a security deposit of US\$1,104.¹⁴

Figure 12. Price in US\$ of a 3-minute mobile call using a prepaid subscription (left) and the price in US\$ of a 2G SIM card using a prepaid mobile subscription (right)

¹⁴ <http://www.djiboutitelecom.dj/particulier-mobile-roaming.html>



Source: ITU (2014) and operator websites visited in 2014

The range of mobile telephone service plans offered by Djibouti Telecom is very limited. The sole Evatis package is comprised of telephone, SIM card, and calling credit. Unlike the prepaid packages offered by *Orange Maurice*¹⁵ for example, Djibouti Telecom’s package does not include unlimited service, SMS, or Internet service. The Evatis package was introduced almost a year ago and has not been updated.

Figure 13. Comparison of the prepaid mobile packages offered by Djibouti Telecom (left) and *Orange Maurice* (right)

OFFRE SPECIAL AID-EL-FITR
DÉS LE 1^{ER} AOUT 2013

NOUVEAU

Smartphone Huawei Ascend Y190
Smartphone Huawei Honor U8660
Huawei Tablet Mediapad S7

de SMS, d'Internet, en illimité

Our NEW Prepay packages not only include mobile internet but also SMS and UNLIMITED Facebook (for packages at Rs99 and Rs349).

Package	Price	Data	SMS	Facebook
Daily	Rs 19	30MB data	30 SMS	
Weekly	Rs 99	250MB data	150 SMS	illimité*
Monthly	Rs 349	1GB data	500 SMS	illimité*

Source: Operator websites visited in 2014

Djibouti Telecom has experienced coverage and network quality problems despite the small size of the country and its small population. The 2G network reached a saturation point in 2007 (Telegeography, 2014; World Bank 2009) and although coverage is provided to almost the entire population currently, geographic coverage is limited to the main urban centers and thoroughfares. The 2.5G and 3G networks deployed in 2007 and 2012 cover only the city of Djibouti.

Djibouti Telecom’s monopoly stifles incentives to develop mobile telephone services through expansion of the customer base. There are two reasons for this:

- First, revenue expectations linked to an expanded customer base are relatively low, particularly since the wealthiest customers are already subscribing to the service. The monthly revenue per subscriber is US\$97 for fixed-line telephones compared to US\$7 for mobile telephones;

¹⁵ <http://www.orange.mu/mobile/prepay-packages.php>

the reason being that revenue for mobile telephone service and fixed-line service is the same (US\$21 million), despite the fact that the number of fixed-line subscribers is 14 times lower.

- Second, attracting additional customers with modest or low incomes would not only require lower prices for communication and network connection services, but also investments aimed at improving the quality of the network in very densely populated neighborhoods such as Balbala.

C. The Broadband Market

While Djibouti Telecom is the sole provider of Internet access, the broadband market has undergone significant change since the introduction of 3G in 2011:

- First, the total number of broadband subscribers (fixed and mobile) has increased sharply, a development that reflects customer expectations.
- Second, the composition of the broadband subscriber base has shifted significantly between 2012 and 2013 to a preference for 3G data. The positioning of the 3G market is attributable to the fact that:
 - 3G subscriptions are prepaid, unlike ADSL, which is postpaid,¹⁶
 - Users have greater mobility with 3G data (3G Wi-Fi dongle);
 - The number of ADSL fixed lines is limited.

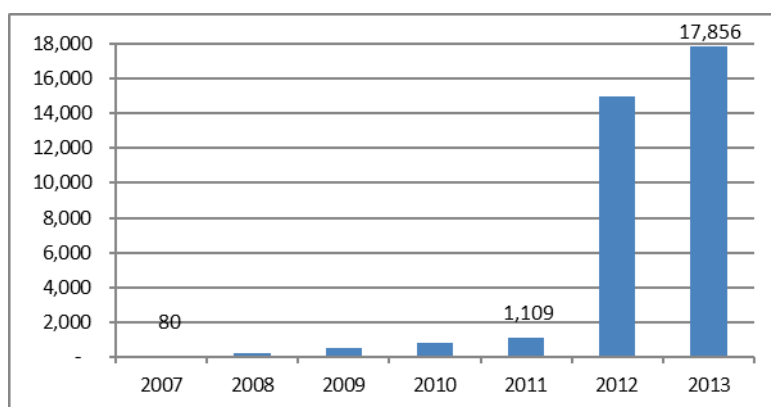
The fixed broadband market (ADSL) has had limited development since it was introduced in 2012, with fewer than 18,000 subscribers (Djibouti city only¹⁷) and does not offer any significant potential for growth in the context of current market conditions. The initial 2011-2012 market surge reflects a pent up demand for broadband services (Figure 13). However, owing to the small size of the network and the price of subscriptions, the service has not had significant growth since that time:

- The installation fee for an ADSL line (US\$55) and monthly subscription rates for basic speed (1 Mbps) are prohibitive for the majority of the population. Monthly subscription fees range from US\$70 to US\$83 by type of subscription (Table 4). This represents between 50 and 60 percent of the average monthly income of Djiboutians in 2012 (US\$131).
- Djibouti should consider establishing a legal framework that encourages the routine wiring of new buildings. For example, engineers responsible for the construction of Tadjourah Port indicated (June 2014 mission to Djibouti) that provisions were not made for a port Internet connection in civil engineering plans. This curbs broadband use since major customers are not connected and providing this connection entails redoing civil engineering work, which could have been avoided had this work been coordinated with other construction work.

Figure 13. Trend in the ADSL subscriber base

¹⁶ Postpaid subscriptions involve a payment commitment that is not sustainable for Djiboutians, owing largely to their income levels.

¹⁷ <http://www.adjib.dj/offres/adsl.php>



Source: ITU (2014)

The mobile broadband market exploded between 2011 and 2013 but prices remain high and out of reach for many Djiboutians. Between 2011 and 2013, the number of subscribers increased from 1,000 to close to 18,000. As is the case with ADSL, this increase reflects the strong pent up demand for Internet services. Despite the forecast for continued significant growth, actual growth is well below growth in other markets. The initial increase notwithstanding, the mobile broadband penetration rate in Djibouti is currently one of the lowest in the world given that only 1.6 percent of the population had access to this service in 2013 (compared to 43 percent in Cape Verde, for example).

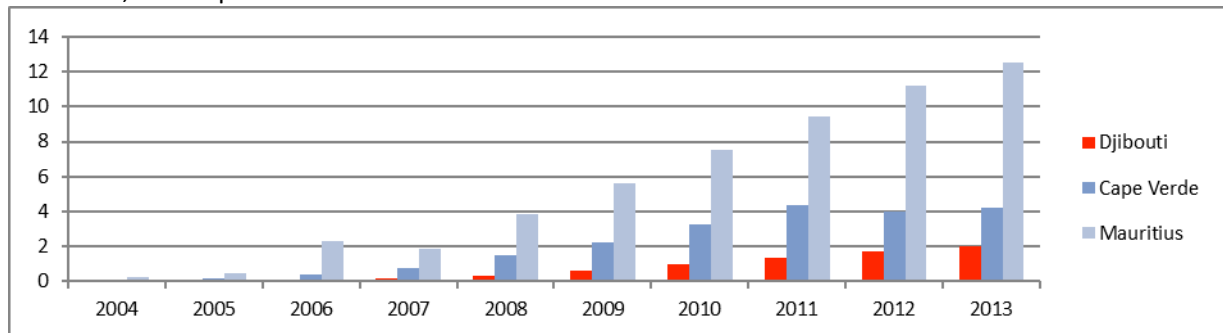
Rates for 3G DATA services are unaffordable for the majority of Djiboutians. While a 3G data dongle costs US\$83, the charge for a monthly subscription is almost US\$110, that is, 65 percent of the monthly income of Djiboutians in 2012. Monthly mobile broadband subscriptions are even more expensive than ADSL subscriptions. Despite the high cost of the service, the 3G Data market is expected to expand in the years ahead. This is attributable to the prepaid feature of these plans, which allows for flexible usage (8-hour or 20-hour cards), making them more accessible. However, Djibouti's penetration rate is projected to be a mere 30 percent by 2020, a rate that matches the 2013 rate in Mauritius, where the penetration rate is expected to reach 110 percent in 2020.

The comparison between Djibouti on one hand and Cape Verde and Mauritius on the other reveals significant differences in the growth of broadband penetration (fixed and mobile, Figures 14 and 15 respectively) highlighting different sector policies and the opportunity remaining for Djibouti. Cape Verde and Mauritius have promoted private sector participation in the telecommunications and ICT sector in order to increase service availability and network quality while decreasing prices of services.

- First, Cape Verde (1996) and Mauritius (2000) opted to restructure their national operators to establish a partnership with an internationally renowned private operators (Portugal Telecom for Cape Verde and France Telecom for Mauritius). These arrangements resulted in enhancements in services as evidenced, for example, by the differences in the level of growth in the fixed broadband markets, which are all still monopolistic. ADSL markets developed earlier in Mauritius and Cape Verde, as semi-private national operators invested heavily in network and service quality improvements, and regulatory institutions established in tandem with privatization reforms advocated for lower rates.
- Mauritius (2003) and Cape Verde (2007) then opened up the mobile telephone market (and consequently the mobile Internet market) to competition by awarding new licenses. Mauritius introduced 3G in 2004 and currently has three 3G and two 4G operators, while Cape Verde's

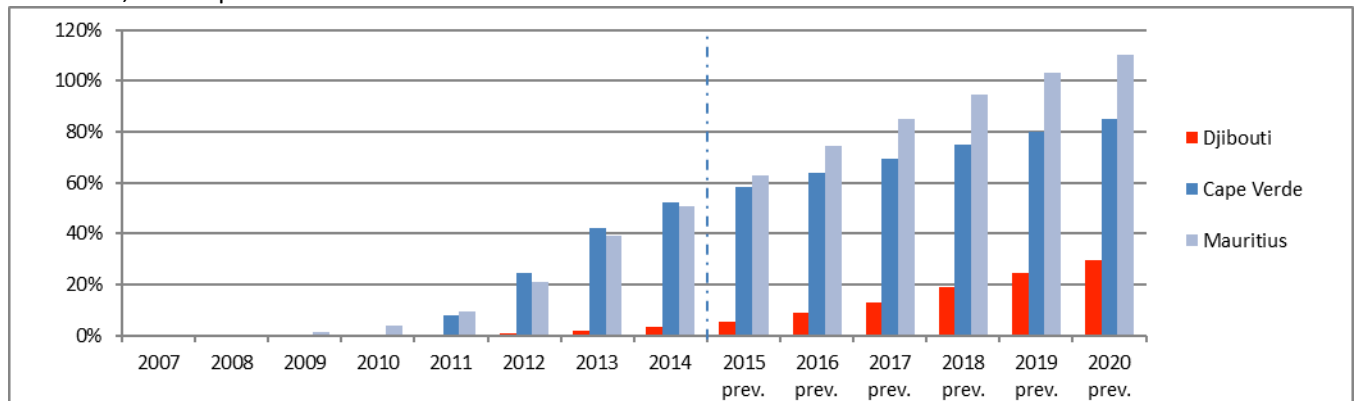
smaller market is slightly less competitive, with two 3G operators. Opening up the markets to competition has promoted innovation and lower rates.

Figure 14. Comparison (as a % of the population) of fixed broadband penetration rates in Djibouti, Mauritius, and Cape Verde



Source: ITU, 2014

Figure 15. Comparison (as a % of the population) of mobile broadband penetration rates in Djibouti, Mauritius, and Cape Verde



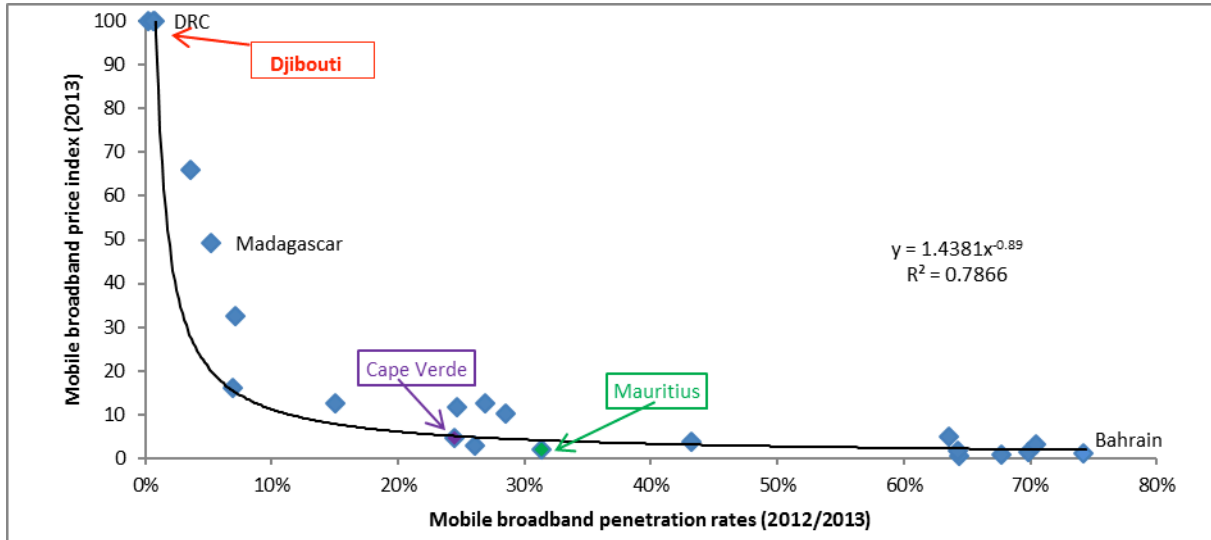
Source: GSMA, 2014

The current differences in the broadband penetration rates between Djibouti, Cape Verde, and Mauritius are attributable primarily to the service price level. Based on a sample of 22 African and MENA countries that are fairly comparable in size to Djibouti, Figure 16 reveals a strong correlation between the mobile broadband penetration rate and the mobile broadband price index (calculated by ITU¹⁸). This empirical observation shows that Djibouti will not be able to develop its mobile broadband market without significantly lowering service prices. However, international experience shows that significant and regular reductions in service_prices can only be achieved with the introduction of additional operators. Based on a sample of nine countries of relatively the same size as Djibouti, another analysis (Figure 17) indicates a strong positive correlation between the number of 3G and 4G operators and the mobile broadband penetration rate.

Figure 16. Correlation between penetration and mobile broadband prices in a number of MENA and African countries¹⁹

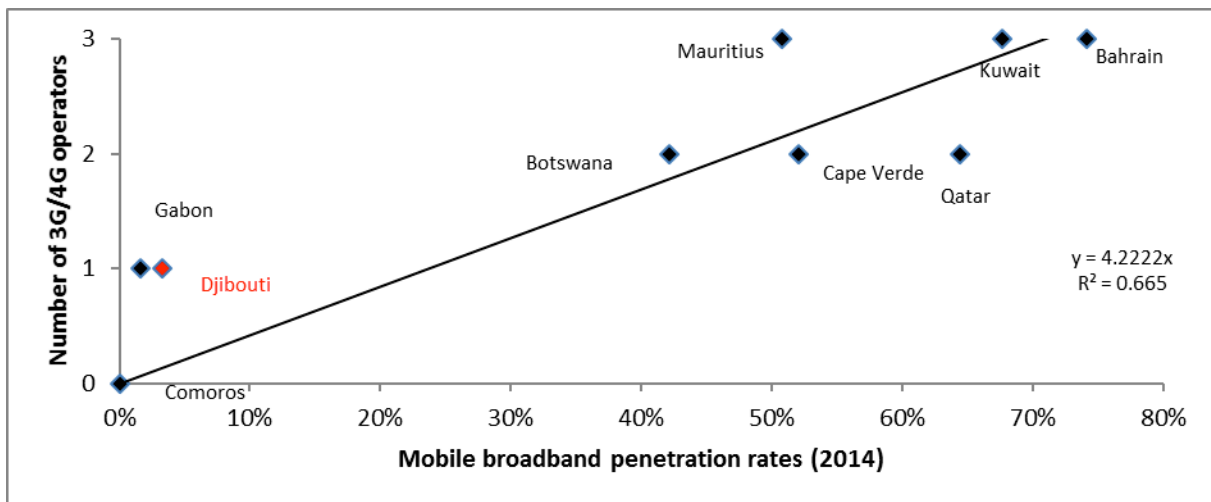
¹⁸ This index (i.e., mobile broadband sub-basket) takes the cost of prepaid and postpaid subscriptions into account and links them to the GNI/capita.

¹⁹ Djibouti, São Tomé and Príncipe, Cape Verde, Bahrain, Qatar, Kuwait, the Democratic Republic of the Congo, Mozambique, Madagascar, Nigeria, Lesotho, Morocco, Botswana, Libya, Kenya, Ghana, Mauritius, Lebanon, South Africa, Turkey, Saudi Arabia, and Egypt



Source: ITU, 2013 and GSMA, 2013

Figure 17. Correlation between mobile broadband penetration and the number of 3G and 4G operators in some MENA and African countries



Source: ITU, 2013 and GSMA, 2013

Considerations for Achieving ICTs Role as Part of Vision 2035.

Achieving ICTs role as part of Vision 2035, is predicated on further development of the corresponding ICT vision and plans for ICT and in turn planning how ICT is going to provide a platform for success in each of the five pillars of National Peace and Unity, Good Governance, Diversified Economy, Consolidation of Human Capital and Regional Integration

A. Developing and Implementing a National ICT Plan

Developing a formal sector strategy that defines the major objectives and initiatives to be implemented by the Government in the coming years will provide a roadmap for ICTs role as part of Vision 2015. . A formal strategy for ICT's role would contribute to Good Governance and public administration (e-Government) on one hand, and provide incentives for private sector participation (development of an IT service industry that can maintain and develop information systems for public entities and ensure widespread use of ICTs in private sector businesses) including for attract private investors to finance broadband infrastructure and services on the other. Experiences in other developing countries shows that the transition to a knowledge economy requires an increase in the demand for, and exchange of, digital data. Computerization of the public sector and the development of online services for citizens and businesses are driving up demand and helping to more quickly cover the investments needed to facilitate broadband communications.

Given that the public sector in Djibouti is still in the early stages of the computerization process, much remains to be done to equip and connect government entities and strengthen human resource capacity. While reducing poverty and unemployment is now the top priority of the Government, which wants the poorest and most vulnerable in the society to benefit from economic growth in Djibouti, an effective social transfers system is not yet in place. Implementing this type of system is facilitated by an electronic central national identity register using biometric identity card. The absence of this type of system presents targeting problems with respect to social transfers made each year, resulting in a shortfall in public finances. Although estimates from Djibouti's Ministry of Budget show that an annual budget of DF 3 billion (US\$16.5 million) is sufficient to cover the distribution of benefits, the Government is spending close to DF 10 billion each year (US\$55.2 million). The creation of an electronic central national identity register and the development of a money transfer system using mobile banking technology (transfer of money and coupons via SMS) would help Djibouti improve the targeting and effectiveness of its social transfers.

The Government must also be mindful of the major obstacle that underdevelopment of the telecommunications sector poses to the rapid development of the private sector and expansion of economic activities in the COMESA region. Without any significant improvements in the prices and quality (voice and data) of communication services, the objectives set forth in "Djibouti Vision 2035" cannot be attained. Mirroring the examples of Cape Verde and Mauritius, diversification, strengthening of the economy, and the development of the financial, logistics, and tourism sectors rely heavily on a dynamic telecommunications market that is accessible to as many people as possible.²⁰ In Mauritius, the rapid development of the financial and port sectors was attributable to improved Internet connectivity and liberalization reforms in the telecommunications sector, which attracted a substantial number of international businesses eager to take advantage of the high quality voice and data services in Mauritius, with a view to outsourcing a number of their activities in this country (customer service, back office, accounting, human resources, data storage, etc.), based on the *business process outsourcing* (BPO) model. Similarly, in Cape Verde, the rapid development of the tourism industry is largely the result of the program to open up the telecommunications sector to competition (introduction of a second operator in 2007), which helped drive down prices and improve service quality, thus enhancing Cape Verde's visibility, inter-island communications, and the country's attractiveness. Cape Verde currently has one of the best Internet connectivity in Africa. Building on the experiences in Mauritius and Cape Verde, Djibouti is tackling the challenge of successfully implementing an industry and service ecosystem to maintain and develop the systems deployed in the public sector and local businesses.

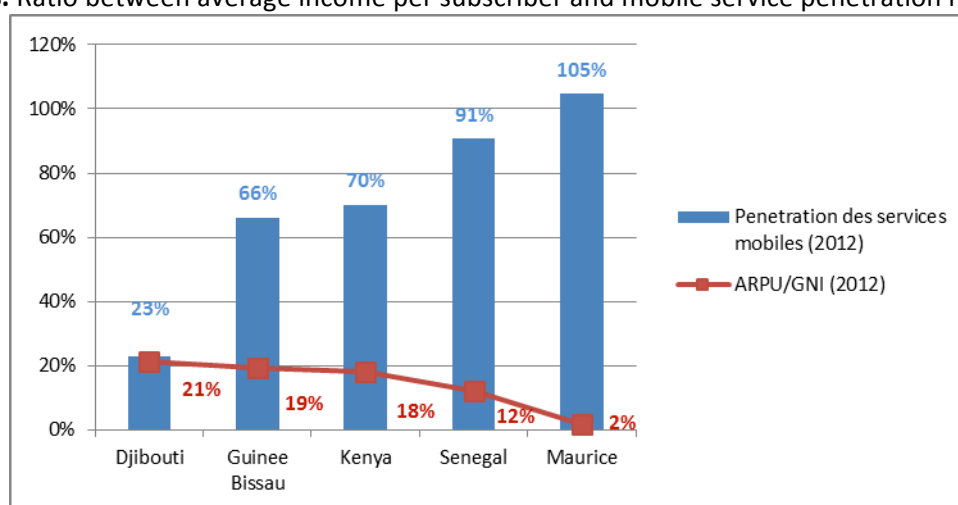
²⁰ See the main findings and recommendations in the note on the report on the *High Development Exchange program* held from June 20 to 23, 2014 to launch Djibouti Vision 2035.

B. Achieving Lower Cost of Telecommunications Services

A key goal of the national CIT plan is achieving lower cost telecommunication services.

The price of subscriptions for telecommunications services is beyond the reach of most Djiboutians. For example, in 2012, the per capita GNI was US\$1,574 (US\$131/month). However, given that the total average monthly payment per subscriber was US\$28 in 2013, a subscriber is therefore spending more than 21 percent of his or her monthly income on telecommunications services. This is a very high proportion relative to other African countries (Figure 18), and is even higher when compared to emerging (between 3 percent and 5 percent) and developed (less than 1 percent in Europe and the United States) countries.

Figure 18. Ratio between average income per subscriber and mobile service penetration rates



Source: GSMA (2012; 2014) and Djibouti Telecom 2012

The problem of high service costs is more acute for broadband Internet, because access to the service via subscription²¹ is prohibitive for 60 percent of the poorest residents of Djibouti. It is estimated that a representative household from this segment of the population must spend 318 percent and 91 percent, respectively (compared to 26 percent and 23 percent in Morocco), of disposable income on mobile and fixed broadband subscriptions (Figure 19). Subscriptions to broadband services therefore remain inaccessible to most Djiboutians. These observations suggest an urgent need for measures that will allow the poorest segments of the population to have minimum access to broadband services and receive training in the use of these services.

Figure 19. Price of fixed and mobile broadband subscriptions as a percentage of the average monthly per capita GNI of the poorest segments of the population in several MENA countries

²¹ The use of Internet services in cyber cafés is therefore not taken into account.

Country	Mobile BB against average income of lowest 40%	Mobile BB against average income of lowest 60%	Fixed BB against average income of lowest 40%	Fixed BB against average income of lowest 60%
Algeria	–	–	63.31	50.61
Djibouti	407.39	318.34	116.66	91.16
Morocco	32.11	25.94	29.03	23.45
Syrian Arab Republic	90.14	74.59	36.06	29.84
Tunisia	44.18	34.56	41.09	32.14
Yemen, Rep.	59.86	49.18	46.44	38.16

Sources: Prices: World Bank analysis based on operators' data, January 2013; total income: purchasing power parity (PPP) 2005; population: World Bank, 2011, Development Data Platform (DDP); Income distribution by quintile: PovcalNet, the online tool for poverty measurement, World Bank, DDP; earliest available information was used.
Note: BB = broadband.

Source: World Bank, 2014

C. Enhancing Infrastructure Quality and Coverage

In addition to addressing the high cost of telecommunications service, fostering an industry with high quality services and good network coverage is a key component of the national ICT plan and achieving Vision 2015.

The Djibouti 2G network covers only 75 percent of the country. By way of comparison, this coverage is significantly lower than the coverage in Guinea Bissau, a post-conflict country with a land area that is 40 percent greater than that of Djibouti and lower urban population density in the capital (80 percent compared to 85 percent in Djibouti). This coverage differential between Djibouti and Guinea Bissau is attributable to the competitive nature of the telecommunications market. In Guinea Bissau, the three operators (total population of 1.6 million inhabitants) are investing heavily in the expansion of the 2G and 2.5G networks, including in the most remote areas (e.g., Bijagos Islands), and in quality improvements, with a view to increasing market share. However, Djibouti Telecom has no such incentives owing to the lack of competition in the Djiboutian market. In 2012, the operator invested a mere US\$1 million in the national network, which is equivalent to less than 6 percent of total investments. This happened despite the fact that in its 2012 business report, Djibouti Telecom had already indicated that *“the transmission network is beginning to show signs of wear and tear and must be rehabilitated and secured by a radio ring.”* The coverage problems plaguing the mobile network (EVATIS) are criticized frequently on the Internet by civil society users: *“The EVATIS network has been in place for 11 years and for 11 years it has remained inaccessible to many places in the capital and inland regions.”*²²

Table 1. Coverage of 2G (and 2.5G) networks provided by telecommunications operators

	Guinea Bissau	Djibouti
Urban population	869,000	732
Population (capital)	700,000	623,89
Area (km ²)	36,000	23,000
2G coverage (% pop.)	75	85-90

Source: Telegeography, 2014, Djibouti Telecom 2012 and WDI, 2014

²² https://www.facebook.com/permalink.php?id=177451628933005&story_fbid=526887883989376

While having developed rapidly, 3G network coverage is available to only 80 percent of the population (less than the population in the capital) and provided almost exclusively to the wealthiest areas in Djibouti city.

For both 2G and 3G, there are maintenance challenges for the tower sites (especially those that are spaced far apart from each other) that affect network and service quality. Djibouti Telecom is covering the high electricity costs for the sites. In 2012, energy use (electricity and oil) was one of the highest operating costs, accounting for more than 30 percent of purchases consumed (US\$3.3 million). Electricity was partly supplied by generators that used fuel (purchase and transportation of fuel) and had to be repaired frequently (maintenance and importation of spare parts). In 2012, owing to the inadequate electricity supply, Djibouti Telecom had to invest close to US\$1 million to purchase new generators.

Broadband services are facing the same difficulties as mobile telephone services: terrestrial networks connected to submarine cables are fragile and costly and frequently experience technical problems (disruptions and maintenance problems) that degrade service quality or disrupt access to these services.

The World Bank missions conducted in Djibouti in 2013 and 2014 drew attention to the fact that businesses and individuals regularly note telecommunications limitation, either because they cannot gain access to these services or because the services are of poor quality and too costly. The *High Development Exchange program* held in June 2014 to launch “Djibouti Vision 2035” highlighted the expectations of the private sector and civil society with regard to accessible and high quality telecommunications services. This event was well attended by 300 local and foreign participants representing the public sector, donors, the private sector, civil society, and academia (university students and professors). While the large enterprises (banks, logistics operators) focused on the cost, poor quality, and reliability of the telecommunications services, small and medium enterprises—which comprise the lion’s share of the 3,435 enterprises registered in 2012 by the Djibouti’s Chamber of Commerce—underscored the fact that they quite often lacked the financial and/or technical (remoteness) capacity to gain access to the service. This feedback on experiences highlighted the existence of a genuine unmet demand for telecommunications services (voice and data communication, site and content creation, e-business, etc.). Specifically mentioned was the need to improve the quality and lower the cost of telecommunications through reform of the regulatory framework and the partial and phased introduction of new entrants in the sector (including mobile telephone operators, Internet access providers and phone centers).

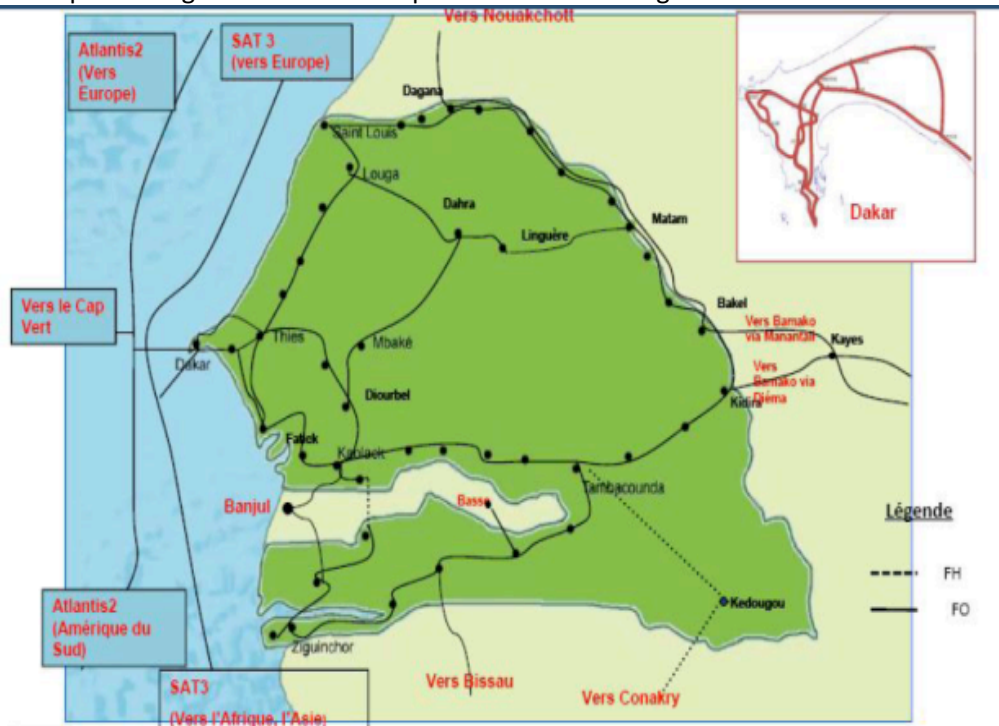
Coverage by existing backbone infrastructure

Although local fiber optic loops are in place in Djibouti city and Balbala,²³ the terrestrial fiber optic network was deployed especially for international markets and comprises two transmission corridors to Ethiopia. A comparison with a country like Senegal, which has a lower per capita income and where distances between cities are much greater than in Djibouti, highlights the benefit of competition on the investment efforts of operators to deploy fiber optic networks with a view to increasing service accessibility for a large percentage of the population. In Senegal, Orange-Sonatel deployed a veritable fiber optic capillary network (and the microwave network) connecting the country’s main urban centers while also serving all neighboring countries: Guinea Bissau, Guinea Conakry, the Gambia, and Mauritania (Figure 19). In Djibouti, only two cities other than the capital

²³ <http://www.winne.com/ssa/djibouti/reports/2007/cp/telecom/index.php>

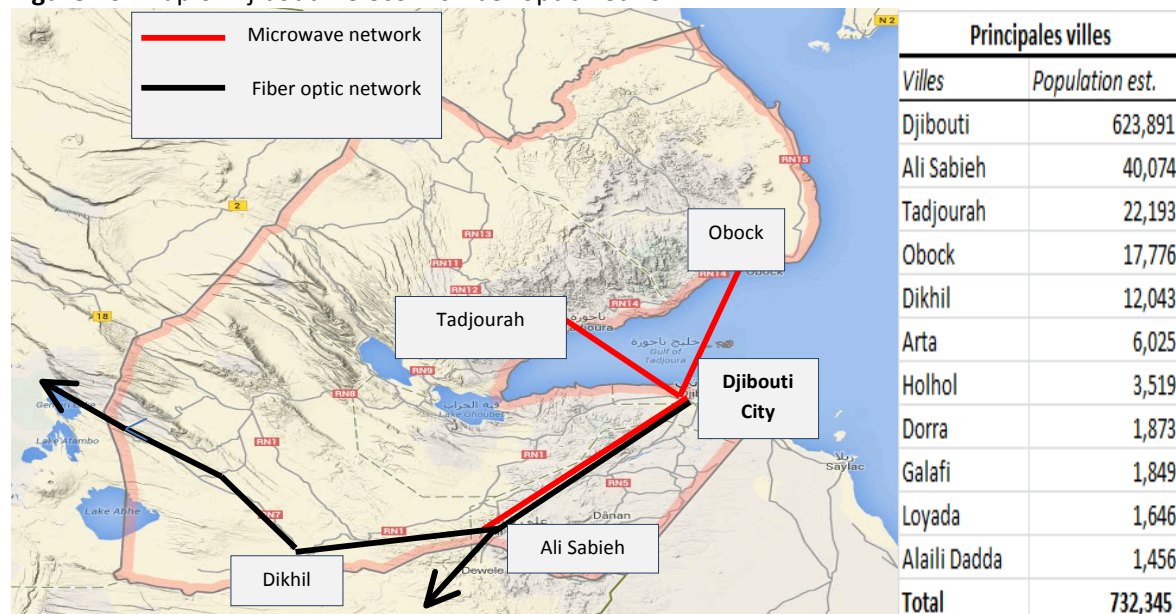
have fiber optic connections and Ethiopia is the only neighboring country with terrestrial corridors (Figure 20).

Figure 19. Map of Orange-Sonatel’s fiber optic network in Senegal



Source: Orange Sonatel, 2014

Figure 20. Map of Djibouti Telecom’s fiber optic network



Source: Hamilton, 2014

D. Promoting ICT and Human Capacity Development

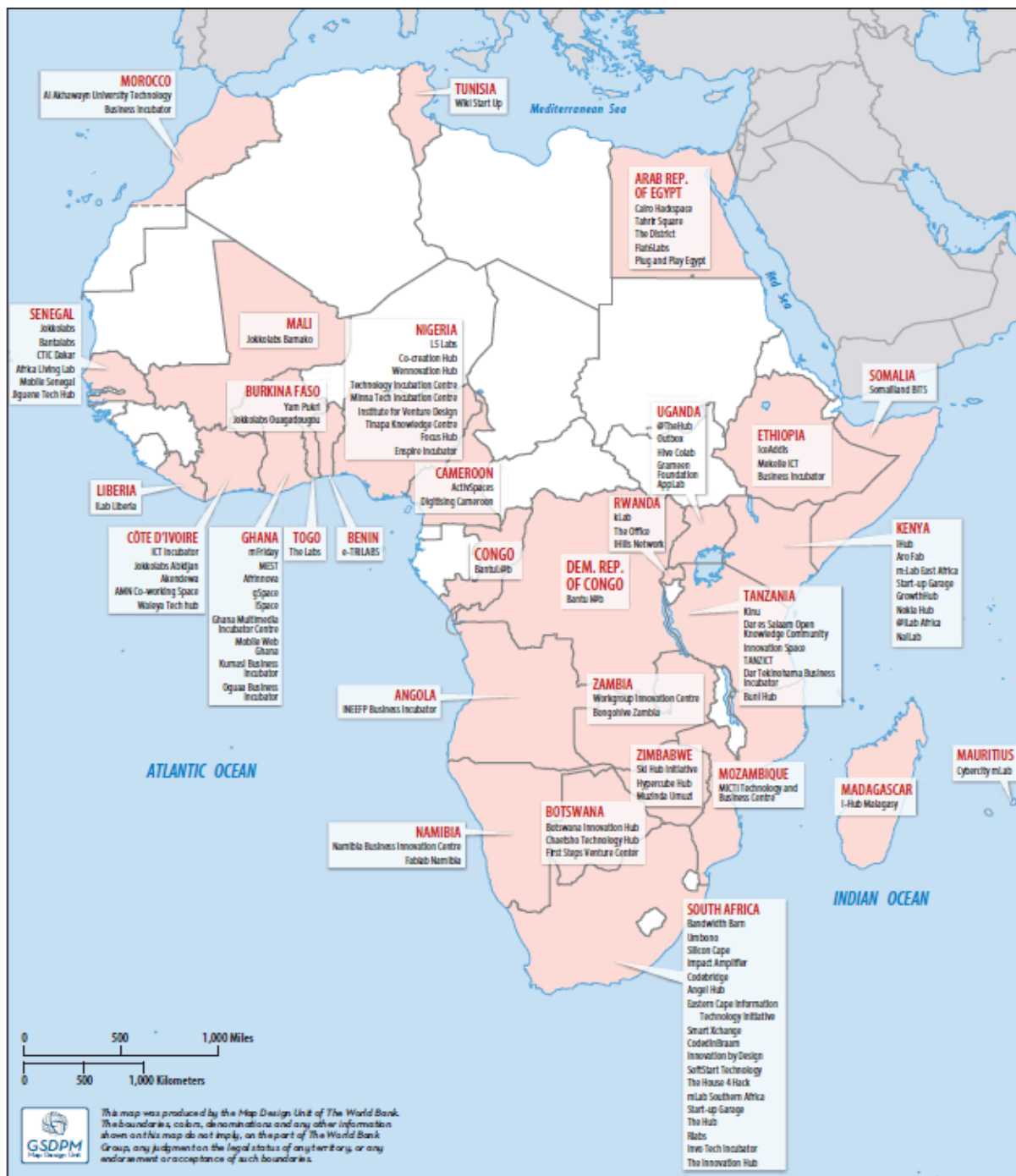
A key goal of ICT as part of Vision 2035 is facilitating human capacity development and economic diversification and development.

In this regard developing programs to increase connectivity in schools, universities and hospitals, and also increase training programs for the population in the use of ICTs will be a key element of the national ICT plan. While increased digital literacy will benefit all levels of society, there are no structured programs in place in the national education and social protection sector to connect sites and promote usage. Most of the schools and hospitals located outside the capital are not connected because ADSL and 3G Data services are available in Djibouti city only. There is no universal service fund available to finance projects (connection, supply of equipment, training) in unprofitable areas. The “Millennium Village program,” which entailed the establishment in 2013 in Arta (40 km from Djibouti city) of a small WiMAX network, was financed by ITU.²⁴

Djibouti and its economy diversification efforts will also benefit from efforts to support the development of the ICT sector. In contrast with many Africa countries (Figure 21), Djibouti does not have a Tech-hub and it has no programs in place to provide support to young developers and promote the development of applications. While young people all across the globe drive ICT development, young people in Djibouti are especially inhibited by the high cost of services and have great difficulty gaining access to the Internet to develop their projects. While this situation is commonplace in many other African countries, the governments have very often recognized the need to finance, with assistance from local operators, infrastructure (centers, incubators, Tech-hub) and make this infrastructure available to young developers of ambitious, realistic projects. And yet, they would help promote broadband use and thus meet the objectives of the national operator while facilitating access to information by all.

Figure 21. Tech Hubs in Africa (Updated in February 2014)

²⁴ <https://itunews.itu.int/Fr/5006-Une-occasion-dameliorer-laces-aux-services-de-base-dans-les-domaines-de-la-sante-et-de-leducation.note.aspx>



Source: iHub Research/World Bank/Bongohive

Recent Experience with Models for National ICT Plans and National Backbone Networks

Although the experiences of national backbone on the African continent are still relatively few and recent to identify one single best management practice for fiber optic infrastructure, this paper presents a set of experiences that could be used as a background for thought in the development of a Djibouti national ICT plan. For the purposes of this study, four African countries (Burundi, Kenya,

Rwanda, Tanzania) are particularly representative because the projects were directly inspired by the arrival of new submarine cables.

All these countries have different geographic circumstances, are at different stages in the development of national backbones and have adopted different approaches to the development of their national backbones:

- Coastal countries (Kenya, Tanzania) or locked (Rwanda, Burundi);
- Countries where the model is based either exclusively or almost exclusively on public authorities (Kenya, Tanzania, Rwanda), or on a public private partnership (Burundi).

The more advanced countries corresponding to a stage of development of national backbone (Kenya, Tanzania), and less advanced in terms of deployment (Rwanda, Burundi);

The four cases studies in selected countries - Tanzania, Kenya, Rwanda and Burundi - have chosen somewhat different paths related to the two families of development models referenced above. Tanzania's government has taken on the most risk and responsibility of the four, while Burundi has engaged the most in a PPP. In order to provide further refinement to the development families and map them to the country approaches, they have been subdivided into four generic groups:

1. New national backbone wholesale operator
2. New national backbone wholesale and retail operator
3. PPP such as consortium / infrastructure sharing
4. Incumbent operator.

The sections below provide more information on these four approaches, drawn from country examples.

A. New National Backbone Wholesale Operator: Example of the National Backbone of Rwanda

In these models, the new public operator is active on the wholesale markets ("wholesale"), proposing to other operators and access to capacity / bandwidth.

Table 2: Main characteristics of new national backbone wholesale operator - case of Rwanda

New National Backbone Wholesale Operator		
Example:		
⇒ RWANDA (national backbone network)		
⇒ Length: 23000 km; Construction cost: U.S. \$ 13,043 / km		
⇒ Throughout the national territory		
	Passive infrastructure	Active equipment
WHO OWNS?	Government	Government
WHO BUILDS?	Government	Government
WHO OPERATES AND MARKETS?	<ul style="list-style-type: none"> • Government through a licensed wholesale operator (named "Broadband Services Company") licensed • This operator may outsource the provisioning, operations and marketing to a technical partner 	

a) Objectives pursued by the government with the national backbone:

Until 2008, international connectivity to and from Rwanda was enabled through satellite links. Prices for international calls and Internet access were high resulting in the low market penetration of these services. With the imminent arrival of new submarine cables to Kenya (Seacom, TEAMS, EASSy), the Rwandan Government decided to invest in a national backbone connecting the capital Kigali to the rest of the territory. The plan also included five cross-border links.

The national backbone is one of the key components of Rwanda’s national comprehensive ICT policy²⁵, which has the following objectives:

- Connect Rwanda with the world through cross-border links²⁶ ;
- Ensure that the entire country has access to the same set of ICT services including broadband Internet at affordable prices;
- Provide for the connectivity between the majority of Government facilities on the territory;
- Promote the use of ICT to accelerate the social and economic development of Rwanda.

With an additional objective of both economically profitable areas and economically unprofitable areas’ coverage, the Rwandan Government initially sought to prevent fiber optic deployment by other fiber optic operators (MTN, LAPGreen, KDN / Altech).

A more incentive based approach to encourage private sector investment was then adopted and the project design took into account the backbone needs of private operators to expand their infrastructure.

b) Advantages and disadvantages of new national backbone wholesale operator model:

The main advantages and disadvantages of these new national backbone wholesale operator models are summarized below:

Table 3: Advantages and disadvantages of new national backbone wholesale operator – case of Rwanda

New national backbone wholesale operators	
BENEFITS	DISADVANTAGES
Clear separation between the backbone network and other operators and ISPs: this significantly reduces the risk of cross-subsidization and discrimination between network clients.	Potentially less attractive to an investor if the Government decides to find a strategic partner because the scope of activities is reduced to wholesale markets.
Extends the backbone network to	Does not guarantee that other operators and ISPs are active in retail markets throughout the country ⇒ Possible but difficult to implement remedies include an access strategy and operational

²⁵ Rwanda ICT Policy Mission: “Vision 2020 aims to transform Rwanda into a middle income country and transition her agrarian economy to an information rich, knowledge based one by 2020. The Government of Rwanda strongly believes that Information and Communication Technology (ICT) can enable Rwanda to leap-frog the key stages of industrialization.”, Rwanda ICT National Strategy - 2015

²⁶ The cross border connection is two fold: i) reach across Kenya and Tanzania to the submarine cables; and position Rwanda as a transit hub for other countries.

	universal service portfolio, and having a full service wholesale operators offering a range of services including ducts and dark fiber transmission capacity.
Positive impact on the competitive dynamics of the territory, especially for competition in telecom and Internet services	Does not address the issue of access networks which must be supported by other operators and Internet service providers
	The new national backbone wholesale operator is the only provider which may limit incentives to operate the system effectively ⇒ Possible but difficult to implement remedies include obligations in the license or agreement and regulatory incentives regulation to ensure efficient operation in terms of cost and quality of service

The model that is currently being considered in the Democratic Republic of Congo (DRC), where the government is considering deploying and managing a 7,500 km backbone infrastructure, is illustrating the challenges and opportunities described above. With World Bank funding, the project (called CAB5) will finance around 2,800 km of fiber optic backbone, out of the 7,500 km planned. The entire network aims at providing DRC with access to international connectivity through the submarine cables running down the coasts of Africa (i.e. WACS, ACE, Seacom, Eassy, LIONS, etc). The government is willing to mobilize the investment needed to build the network, so that to asset ownership over the infrastructure.

From the onset, the government of DRC intends to set up a *Société de Patrimoine Nationale* (SPN – public asset holding company). This SPN will own the infrastructure and will subsequently select, through a tender process, a specialized private sector operator who will manage the backbone. It is proposed to separate the tender process for (i) the passive infrastructure (i.e. fiber cables and ducts) and partial active infrastructure (buildings, transmission technology neutral equipment that can be shared among operators) from (ii) the rest of the active infrastructure and network intelligence that usually needs to be operator-specific.

In the first step, the SPN will select a construction company through an open competition to build the infrastructure, conduct civil work, and lay down dark fiber on the ground. Once built, the infrastructure will be incorporated as equity into the capital of the SPN. In the second step the SPN will contract an aggregation of operators or several operators separately (the “Concessionaire(s)”) to “light” the dark fiber (i.e. to invest in access network and active equipment) and a concession contract would be prepared and concluded between the SPN and these operators for the maintenance, management and commercialization of the infrastructure.²⁷

²⁷ PPP structure in DRC – Central African Backbone SOP5 – Project Appraisal Document, 2014

B. New National Backbone wholesale and Retail Operator: Example of National Backbone in Kenya

In these models, the new public operator who operates the national backbone sells services on a retail basis (individuals, businesses, governments) as well as to wholesale markets (other operators and ISPs).

Table 4: Main characteristics of new national backbone wholesale and retail operator model - case of Kenya

New National Backbone Wholesale and Retail Operator		
Example:		
⇒ KENYA (national backbone network NOFBI)		
⇒ Length: 5000 km; Construction cost (amortized over 25 years): U.S. \$ 10,000 / km		
⇒ Throughout the national territory, with focus on economically inefficient areas		
	Passive infrastructure	Active equipment
WHO OWNS?	Government	Government
WHO BUILDS?	Government	Government
WHO OPERATES AND MARKETS?	<ul style="list-style-type: none"> • Government through the National Society of broadband licensee • This company can outsource the provision of operations and marketing to a technical partner 	

a) Objectives pursued by the government with the national backbone:

The development of backbone networks in Kenya experienced rapid growth after the arrival of new submarine cables (Seacom, TEAMS and EASSy). There is no monopoly on the construction and operation of backbone networks, with the public sector (government, incumbent operator, public electricity company) acting separately from the private sector. The objective of the Government of Kenya for the national backbone NOFBI ("National Optic Fibre Backbone Infrastructure") was to extend fiber optic infrastructure in areas considered uneconomic, as quickly as possible.

b) Advantages and disadvantages of new national backbone wholesale and retail operator model

The main advantages and disadvantages of the new national backbone operator model are summarized below:

Table 5: Advantages and disadvantages of new national backbone wholesale and retail operator model – case of Kenya

New National Backbone Wholesale and Retail Operator Model	
BENEFITS	DISADVANTAGES
Extends the backbone network to unserved areas considered uneconomic.	Bases the entire project management in government with the corresponding challenges of project management, acquisition and procurement. ⇒ A possible but difficult to implement remedy is to use a technical service provider for the

	operation and marketing
Provides the possibility of taking advantage of the skills and expertise of the private sector by outsourcing the operational delivery and marketing to a different technical service provider than the incumbent operator under a management contract.	<ul style="list-style-type: none"> • Difficulties in justifying to the incumbent operator • Need for strong supervision of the provider to ensure compliance with its license and its agreement
The technical service provider has a commercial interest in exploiting the network efficiently because it is free to market the capacity of the backbone network (in compliance with its license and its convention).	<p>The technical service provider is unlikely to focus on retail operations because they are economically inefficient</p> <p>⇒ Possible remedies include requirements for retail operations in the agreement and the use of universal access funds / Service</p> <p>The technical service provider may seek to limit competition in the retail market (by operators active in the rest of the country)</p> <p>⇒ Possible but difficult to implement remedies include the efficient regulation of wholesale markets and fostering of competition through multiple full service wholesale operators offering a range of services such as ducts and dark fiber transmission capacity.</p>
	<p>Fully funded by the Government investment</p> <p>⇒ Remedies include the use of the access funds / universal service resources but doing so involves a resource allocation tradeoff between access networks and backbone networks</p>

The Government of Kenya established a national broadband company to house the national backbone and then hired an operator for the operation and marketing to wholesale and retail markets. The contract of three years in length was awarded to Telecom Kenya. In July 2013, the government renewed its agreement with Telkom Kenya. In April 2014, French telecom operator Orange, announced its intention to invest U.S. \$28.8 million in its 3G network across Kenya, thus contributing to the Multi Service Access Node (MSAN) that will help further expanding the NOFBI infrastructure.

C. Models Where the Risk is Shared Between the Government and Private Sector: Example of National Backbone of Burundi

In this context, the PPP is materialized as a joint venture, based on a partnership agreement, whereby capabilities and resources of a public entity and a private entity are combined to ensure greater efficiency and provide easier access to capital and sharing of risk in order to implement the infrastructure.

For the construction and management of a national backbone network, the Government may use:

- either a new wholesale only operator. This new operator can be: constituted by existing operators associated in a consortium and sharing the infrastructure; or constituted by a new operator usually in a Special Purpose Entity (SPE) created for this purpose by one or more existing operators with the new operator chosen through a competitive tender.
- or existing operators under a system based on incentives given to the private sector ("incentive-based private sector models") like what has already been experienced in the case of access networks with the model strategies of universal service / access. In this case, traders are generally active both in the wholesale markets ("wholesale") on retail markets ("retail").

In these, private sector operators form a consortium for the construction and operation of the backbone network. By providing financial resources to the consortium, the Government can ensure that the national backbone is constructed and operated in accordance with public policy objectives, such as effective coverage areas considered uneconomic, or ensuring that the wholesale rates charged by the consortium are cost oriented and that services are marketed in a non-discriminatory manner.

Table 6: Main characteristics of PPP consortium / infrastructure sharing model - case of Burundi

PPP consortium / infrastructure sharing model																
Example:																
<ul style="list-style-type: none"> ⇒ BURUNDI (national backbone network - Burundi Backbone) ⇒ Length: 12300 km; Construction cost: U.S. \$ 12,500 / km 																
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;"></th> <th style="width: 25%;">Passive infrastructure</th> <th style="width: 25%;">Active equipment</th> </tr> </thead> <tbody> <tr> <td>WHO OWNS?</td> <td colspan="2">Consortium of private sector operators (non-equity of the Government)</td> </tr> <tr> <td>WHO BUILDS?</td> <td colspan="2"> <ul style="list-style-type: none"> • Consortium of private sector operators, in accordance with its partnership agreement and its agreement with the Government • Financial allocation as grant from the Government related to a set of conditions (coverage, pre-sales capacity, open access) </td> </tr> <tr> <td>WHO OPERATES AND MARKETS?</td> <td colspan="2">Consortium of private sector operators consortium, in accordance with its partnership agreement and its agreement with the Government</td> </tr> <tr> <td>NATURE OF PUBLIC FUNDING</td> <td colspan="2">Financial allocation in the form of a grant to the consortium</td> </tr> </tbody> </table>		Passive infrastructure	Active equipment	WHO OWNS?	Consortium of private sector operators (non-equity of the Government)		WHO BUILDS?	<ul style="list-style-type: none"> • Consortium of private sector operators, in accordance with its partnership agreement and its agreement with the Government • Financial allocation as grant from the Government related to a set of conditions (coverage, pre-sales capacity, open access) 		WHO OPERATES AND MARKETS?	Consortium of private sector operators consortium, in accordance with its partnership agreement and its agreement with the Government		NATURE OF PUBLIC FUNDING	Financial allocation in the form of a grant to the consortium	
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NATURE OF PUBLIC FUNDING	Financial allocation in the form of a grant to the consortium															

a) **Objectives pursued by the government with the national backbone:**

Building upon the "Connect Africa" Summit, which took place in Kigali (Rwanda) in 2007, the Government of Burundi committed to accelerate the deployment of a good quality, affordable national high-capacity communications network. The Government's objective was to have the private sector to invest in the development of infrastructure, through the establishment of public-private partnerships. These efforts were undertaken without limiting the rights of operators to deploy their own fiber optic infrastructure.

The main elements of this strategy are to:

- i. improve the availability and diversity of services across the country;
- ii. provide incentives for the development of an Internet backbone;
- iii. participate in the establishment of regional backbone infrastructure (such as the backbone of the East African Community [7], the network underwater Africa (EASSy) cable and other terrestrial and submarine infrastructure initiatives); and
- iv. establish access points for regional projects and extend the network to low-income areas of the country.

b) Advantages and disadvantages of the PPP model:

The main advantages and disadvantages of the PPP model are summarized below:

Table 7: Advantages and disadvantages of the PPP consortium / infrastructure sharing model

PPP models such consortium / infrastructure sharing	
BENEFITS	DISADVANTAGES
Extends the backbone network in unserved areas as uneconomic.	
The backbone network is built and operated by private operators already active/represented in the country, with their experience increasing the probability of project success.	Risk of collusion between private sector operators in the consortium, leading to higher prices for consumers and higher profits for operators. ⇒ A possible remedy is the Government imposing specific provisions in the consortium agreement.
With private sector operators partly financing the project, the amount of public funding is reduced and operators are financially interested in the success of the backbone network. This is particularly effective in a small country having a significant number of operators.	The consortium will not bring together all private sector operators, especially if the market is still in a growth phase and with the entry of new players. Operators in the consortium therefore have an incentive to raise prices and treat new players in a discriminatory manner. ⇒ Possible remedies include specific provisions imposed by the Government in the consortium agreement to allow new operators to enter the consortium; and effective regulation of wholesale markets.
	Instability of shareholders financing by the private sector may slow the project ⇒ Possible remedies include the release of funds by the private sector in the beginning of the project (before the tender for the construction of the infrastructure process).
As the private sector operators participating in the consortium will also be the main customers of the backbone	As there is no competitive bidding for the establishment of a consortium, it is difficult to assess the appropriate level of public funding that

network, they have an incentive to construct and operate the network effectively.	complements private funding for the backbone network. ⇒ Possible remedy is for the Government to undertake a techno-economic study of the backbone network as a basis for discussion with private sector operators.
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In February 2014, authorities announced the completion of the first phase of the national fiber optic infrastructure project launched in 2012. The Burundi Backbone System (BBS) Company, which is behind the construction of the network, is made up of five top telecommunication companies in Burundi, including state-owned Onatel. Currently, 8 out of Burundi's 17 provinces are reportedly connected to the fiber optic network, which taps into a grid of six border points, linking it with several countries in the region, as well as to EASSy.

D. Incumbent Operator Models: Example of the National Backbone of Tanzania

In these models, it is incumbent operator who develops and manages the national backbone and sells to the retail (individuals, businesses, governments), as well as the wholesale markets (other operators and ISPs).

Table 8: Incumbent operator models – case of Tanzania

Incumbent Operator Model		
Example:		
⇒ TANZANIA (national backbone network NICTBB)		
⇒ Length: 10674 km; estimated construction cost: U.S. \$ 17.575 / km		
⇒ Throughout the national territory		
	Passive infrastructure	Active equipment
WHO OWNS?	Government	Incumbent operator
WHO BUILDS?	Government	Incumbent operator
WHO OPERATES AND MARKETS?	<ul style="list-style-type: none"> The Government has fully funded the construction of the passive infrastructure (trenches, fibers). The incumbent operator pays a fixed fee. The incumbent operator installed active equipment to light the fiber and provide capacity services or routing traffic. 	

a) Objectives pursued by the government with the national backbone:

The Tanzanian government's vision is: "NICTBB helps to fulfill the increasing demands of information services, strengthen competitive abilities of domestic data and voice operators as well as bridging the digital divide. It is necessary in developing high speed broadband and helps to efficiently exploit the benefits from undersea submarine cables landing in Dar es Salaam by providing high quality capacity fiber optic connectivity from Tanzania to within Africa and the rest of the world. NICTBB is

redefining everything that we know in e-government, e-learning, e-health, e-commerce, etc. “ (NICTBB 2014)

b) Advantages and disadvantages of the incumbent operator model:

The main advantages and disadvantages of these models focused on incumbent operators are summarized below:

Table 9: Advantages and disadvantages of the incumbent operator model (case of Tanzania)

Incumbent Operator Model	
BENEFITS	DISADVANTAGES
Reduce the cost of national backbone through economies of scale and free investment capacity of private operators for provisioning and developing services.	The private sector is not strongly associated with the project and corresponding risk of low utilization of the national backbone network. This can then lead to government intervention that is detrimental to the dynamics of investment in the private sector (limiting investment in alternative fiber optic infrastructure by other operators) to ensure economies of scale on the national backbone.
Extends the backbone network in unserved areas that are considered uneconomic.	The choice of a single constructor and in the absence of private sector involvement is likely to generate a higher cost per km compared to best practices on the continent
Increases the value of the incumbent operator for privatization and / or repositions the incumbent operator in a competitive market	As the incumbent is vertically integrated with a downstream branch active in the retail market, there is a risk of discriminatory behavior vis-à-vis other operators and service providers. ⇒ A possible but difficult to implement remedy is the efficient regulation of wholesale markets.
Relatively simple due to a limited number of governance stakeholders (government, incumbent)	Difficult to guarantee the performance of the incumbent ⇒ A possible but difficult to implement remedy is providing regulatory incentives as well as having effective sanctions
Eliminates the volatility of the shares of private operators	Does not leverage private sector financing ⇒ A possible remedy is to not only market services capacity or routing of traffic, but also Irrevocable Use Rights (IRU) or dark fiber

Early 2013, about 7400 km of optic fiber infrastructure was already constructed, with the backbone being extended to eight border points with Kenya, Rwanda, Burundi, and Zambia. This aims at fulfilling government's commitment to connect the landlocked countries to the submarine cables landing in Dar es Salaam (currently SEACOM AND EASSy) and thereby making Tanzania a hub for ICT infrastructure in the region.

Recommendations

The new Horn of Africa and East Africa transoceanic cable systems provide an opportunity for Djibouti to review its national ICT strategy and associated policy.

The above sector analysis was used to identify the following three broad reform categories:

Dialogue, Assessment, and Strategy

- Initiate dialogue/consultation with sector actors (Djibouti Telecom and its main communications services customers) in order to (i) identify the main development challenges facing the telecommunications sector; (ii) establish a map of existing networks; and (iii) discuss possible solutions to improve access to existing networks and deploy new infrastructure in underserved areas (private cofinancing, PPP). This dialogue, which should be coordinated by the lead technical body (Ministry of Communication), could also cover multiple sectors (roads, water, electricity) and the region (incorporate regional networks and projects).
- Conduct a household survey to identify the main obstacles preventing households and businesses from gaining access to broadband services and equipment.
- Prepare an appraisal of the fiscal and parafiscal charges in the ICT sector (including telecommunications and broadband).
- Develop and implement a national five to ten year ICT plan including for the development of mobile telephone and broadband services and specifying the targeted strategies, objectives, rationales and metrics.
- Develop and implement a national plan to modernize the public sector (computerization of services), e-government (State-citizen-business relationships), and further catalyze development of knowledge economy (focusing on initiatives such as e-education and e-health), all of which could increase demand for broadband connectivity.

Regulation and Competition

- Strengthen, update, and apply the regulatory, legal (2004 law), and institutional framework for the telecommunications sector. In particular, establish an independent, qualified regulatory authority.
- Make provision for a capacity-training program for the Ministry of Communication.
- Make provision for a capacity-training program for the independent regulatory authority aimed, inter alia, at establishing an observatory for the telephone and Internet sector.
- Strengthen and enforce the regulations on sharing telecommunications infrastructure owned by the national operator and the alternative infrastructure operators (electricity, railway, etc.).

- Launch the restructuring process for Djibouti Telecom in order to strengthen its presence in the telecommunications sector and boost its technical and financial capacity through a strategic partnership with a world-renowned operator.
- Award a new mobile license and authorize the entry of an Internet Service Provider (ISP) in order to introduce controlled competition in the mobile telephone and Internet market.

Deployment of Infrastructure

- Promote intersectoral synergies between electricity, water, and transport projects that are being prepared or are underway. This entails consideration of the development of terrestrial fiber optic backbones authorizing access to excess fiber optic capacity deployed along the power and railway lines.
- Put in place the conditions required to boost investments in terrestrial fiber optic network infrastructure, including through PPP mechanisms between the private and public sectors and in accordance with international best practices.