GHANA INFRASTRUCTURE SHARING AND OPEN ACCESS STUDY

Photo source: Sankofa

FINAL REPORT AND RECOMMENDATIONS

PREPARED BY

VIEIRA DE ALMEIDA & Associados Sociedade de Advogados, SP RL

IN COORDINATION AND WITH INPUTS FROM A4AI

MARCH 2017

Foreword

It is with great pleasure that we share with you the results of our study on infrastructure sharing in Ghana. The Alliance for Affordable Internet (A4AI) started collaborating with the Government of Ghana and with stakeholders from across the country's public, private, and civil society sectors in 2014; in that time, it has become clear to us that great progress has been made toward expanding affordable access and further developing the Ghanaian telecoms market, but that urgent actions need to be taken in order to realise this vision fully. Over the next few years, it will be critical to take steps to secure the right incentives for a healthy, competitive market that leads to lower costs for consumers, and to advance affordable access to and meaningful use of the internet by all Ghanaians.

Infrastructure sharing is a critical component for turning this vision into reality. Based on valuable input and insights from a wide range of Ghanaian stakeholders, expert advice from the Vieira de Almeida team, and other international experts in the space, this report provides concrete options and recommendations for making strides toward a market environment where industry cost structure can be reduced and market efficiencies realised to the benefit of all users.

We are continually encouraged and motivated by the openness with which policymakers in Ghana have addressed options to reduce cost and increase affordable internet access, with an eye particularly toward steps that can be taken to reduce the gender digital divide. We look forward to continued collaboration and discussion around how infrastructure sharing is utilised -- and can be further encouraged -- to achieve our mutual goal of full digital inclusion for all Ghanaians.

We look forward to your insights and suggestions, as well as active engagement through the A4AI-Ghana Coalition, to support the government of Ghana to implement this report's recommendations!

Sincerely,

Sonia Jorge, Executive Director, A4AI

Eleanor Sarpong, Deputy Director-Policy Lead, A4AI

A Note from the Consultants

The purpose of this document, following the Inception Report and Accra workshops on the matter, is to provide recommendations for infrastructure sharing in Ghana and suggest possible next steps to be taken towards implementing said recommendations, both by public legal and regulatory authorities and by private market players.

Indeed, as established throughout this project, the benefits of infrastructure sharing are various and wide-ranging and ultimately benefit the clients and users of telecommunications services and the general population. While Ghana is a dynamic economy, with proven potential and a focus on improvement and growth, we believe implementing measures towards infrastructure sharing will be a useful tool for placing Ghana at a solid forefront of the African telecommunications market.

In light of the above, taking into account the specific needs and characteristics (economic, social, technical and geographic) of Ghana, as well as relevant international best practices on infrastructure sharing, this report sets out various possible actions and strategies through which public and private entities in Ghana may contribute towards streamlining, facilitating, and encouraging infrastructure sharing as a tool for efficient, adequate, and affordable access to telecommunications services.

We thank the A4AI team, the Ministry of Communications, National Communications Authority and all market players and agents contacted throughout the scope of this project. This final report takes into account not only our analysis of the specific characteristics of the Ghanaian market, but also the valuable information and input provided by local players, national and international sources, as well as the A4AI team.

Sincerely,

Magda Cocco, Partner

Isabel Ornelas, Senior Associate, Vieira De Almeida

Abbreviations

- Ghana Infrastructure Sharing and Open Access Study (the Project)
- Alliance for Affordable Internet (A4AI)
- Vieira de Almeida & Associados (the Project Team)
- Final Report for the project focusing on “Ghana Infrastructure Sharing and Open Access Study” (the Final Report/ the Report)
- Information and Communication Technology (ICT)
- The affordability index under A4AI’s 2015-16 Affordability Report (the Affordability Index)
- The 2005 Ghanaian Ministry of Communications’ National Telecommunications Policy (National Telecommunications Policy)
- The 2008 Ghana Electronic Communications Act (Electronic Communications Act)
- The Ghanaian National Communications Authority (NCA)
- Guidelines for the Deployment of Communication Towers (Guidelines)
- Environmental Protection Agency (EPA)
- Ghana Civil Aviation Authority (GCAA)
- Ghana Atomic Energy Commission (GAEC)
- Metropolitan, Municipal and District Assemblies (MMDAs)
- Radiation Protection Institute (RPI)
- NCA 2016 Quality of Service Regulations (QoS Regulation)
- Ghana Investment Fund for Electronic Communications (GIFEC)
- Third-generation wireless mobile telecommunications technology (3G)
- South Atlantic 3 submarine cable (SAT3)
- Main One submarine cable (Main One)
- Glo-1 submarine cable (Glo-1)
- West Africa Cable System (WACS)
- Africa Coast to Europe submarine cable (ACE)
- Internet Service Provider (ISP)
- Mobile network operator (MNO)
- Operating expenditure (Opex)
- Capital expenditure (Capex)
- Wireless technology (Wi-fi)
- Second-generation wireless telephone technology (2G)
- Fibre-to-the-home (FTTH)
- National Information Technology Agency (NITA)
- American Tower Company (ATC)
- Consumer Price Index (CPI)

Table of Contents

A. Executive Summary

This is the Final Report for the project focusing on "Ghana Infrastructure Sharing and Open Access Study" (the "Project"), prepared by Vieira de Almeida & Associados (here and after the "Project Team") for A4AI – Alliance for Affordable Internet, according to the terms of the contract for this assignment.

This Final Report also includes extensive information and input provided by Ms. Eleanor Sarpong, whose role was instrumental to the conclusion of this document. The remainder of the A4AI team also provided essential support throughout the Project, including for this Final Report.

This Final Report follows from the Inception and Public Consultation reports[1] and provides the final recommendations for infrastructure sharing in Ghana. It further suggests next steps to be taken to implement said recommendations.

The Report's final recommendations are in line with the discussions held in the Public Consultation carried out on October 25th, 2016 in Accra and are the following:

- **Approval of/adjustments to different policies, laws and/or regulations for each of the main areas connected with the Project;**
- **Closely follow international practices on infrastructure sharing and related policies applicable to the telecommunications market;**
- **Allocation to current ministries or entities of supervisory competencies where relevant with the possibility of revisiting such allocation in light of future developments in the country and in capacitation matters.**

Chapters D-F of this Final Report sets out the various recommendations suggested in the context of the infrastructure sharing scenario in Ghana in the context of the country's policies, laws and regulations, in light of the information collected and the inputs received throughout the project.

[1] Both reports are publicly available at http://a4ai.org/who-we-are/where-we-work/a4ai-ghana-multi-stakeholder-coalition/

B. Scope

This Report aims at providing the final recommendations for infrastructure sharing in Ghana.

The recommendations and suggestions made are based on the analysis and study carried out during the preceding parts of the Project, i.e., the analysis of international best practices and the country's specificities, taking into account the information available. It is also based on the relevant feedback and input provided by the relevant Ghanaian stakeholders.

Prior to the public consultation held in Accra in the context of the Project, stakeholder interviews were carried out with representatives of the following entities/working groups, who provided significant in-depth input on the matter on infrastructure sharing in Ghana, the country's challenges and potential:

Without prejudice to the references made throughout this document to the input and feedback received from the consulted stakeholders, a general summary of the main comments received from said stakeholders are attached hereto as Schedule I).

During the public consultation, discussions were also held regarding the main topics associated with infrastructure sharing in Ghana. A list of the participants in the workshop is included as Schedule II to this Final Report.

Based on the analysis carried out and the feedback received, this Final Report:

- Provides final general policy recommendations for infrastructure sharing in Ghana;
- Indicates possible next steps to be taken for the purpose of implementing said recommendations; and
- Makes final recommendations with relation to other areas that may need to be addressed in Ghana to fully promote infrastructure sharing in the country.

We understand that the Ministry of Communications is currently carrying out and/or preparing to carry out several initiatives directly and/or indirectly impacting the promotion and application of infrastructure sharing initiatives in the country (such as the ongoing preparation of the country's Broadband Policy). Any such initiatives may have an impact on the practical application of the legal recommendations made under this Report.

Also, Ghana is part of four major African Organizations (African Union, Economic Community of West African States (ECOWAS), Community of Sahel-Saharan States and West African Monetary Zone). In light of this, the legal and regulatory context of Ghana will likely be related also with the priorities and principles fronted by these organisations. Naturally, political guidance issued by these entities organisations must be taken into consideration and any policy, legal and regulatory decisions must take this into account.

C. Infrastructure sharing in Ghana

Overall context of the country

Ghana was a first mover in Africa in what concerns liberalisation processes and, overall, the market is quite sophisticated, including in what concerns infrastructure sharing principles.

In any case, from our analysis and from the input received from the various stakeholders during the course of the Project, we detected, through our analysis and through the interviews carried out with the various stakeholders.

Ghana currently ranks 9th out of 22 in lower-middle income countries included in the Affordability Driver's Index[2], and 26th overall with a total score of 50.01. This index takes into account two different criteria:

(i) Communications Infrastructures: concerning infrastructure deployment and existing policy and regulatory framework designed to incentivise and enable cost-effective investment in future infrastructure expansion. Ghana ranks 24th in the "communications infrastructure" sub-index; and

(ii) Access and Affordability: an indicator of price and adoption of broadband analysing policy and regulations created to promote access and reduce service costs. Ghana ranks 27th in the "access and affordability" sub-index. In this sub-index, we note that only 0.27 out of 100 people have access to fixed broadband, which puts Ghana in the bottom half of the developing countries ranking.

Given this data, there is still room for improvement in Ghana's ICT scenario and, taking into account the information ascertained in the context of the Project, infrastructure sharing has a crucial part to play in this process.

Infrastructure sharing – relevant policy/legal/regulatory provisions

There are various legal, policy and regulatory provisions in Ghana which impact on infrastructure sharing. While an overall analysis of the country's telecommunications scenario was included in the Inception Report for the Project, the notes below refer specifically to policy, legal and regulatory instruments with direct provisions on infrastructure sharing.

[2] Source: A4AI – The 2017 Affordability Report

Policy:

At a regional level

- In what refers specifically to infrastructure sharing, the implementation of infrastructure sharing related awareness is a priority for the African Union.
- The African Union's Commissioner for Infrastructure and Energy (Elham Mahmood Ahmed Ibrahim) emphasising to participants at 2016's eLearning Africa Conference that sharing infrastructure must be a top priority for African governments, with potential savings of billions of dollars and a consequential speeding up of the provision of universal broadband access.

At a national level

- The country's National Telecommunications Policy, which is dated 2005, sets out a general principle of promotion of infrastructure sharing ("access to public rights-of-way, towers, telephone poles, underground conduits, international cable landing stations, and other physical support structures will be shared among operators to the greatest extent possible").
- This policy does not establish preferences or rules on sharing models, associated formalities or pricing structures.

Legal

- The Electronic Communications Act 2008 is the main legislative piece for the telecommunications sector in the country, covering the overall regulation of electronic communications services and networks.

- This Act contemplates the understanding, in the National Telecommunications Policy, that infrastructure sharing should be encouraged. Moreover, it establishes the following major principles with an impact on infrastructure sharing in Ghana:

  - ➢ Operators must provide access to other operators that request access to facilities or public rights of way or statutory wayleaves that it owns or controls on a timely basis (no legal preference on sharing model or operational structure);
  - ➢ Public utilities may also request the use of operator facilities (i.e. establishing a general cross-sector sharing principle);
  - ➢ Negotiations between operators seeking the right of access to facilities, rights of way and statutory wayleaves are to be carried out on a non-discriminatory and equitable grounds;
  - ➢ Prices ought to be determined on a cost-oriented basis (although no rules on profit margins and exceptions to this rule are set out);
  - ➢ The National Communications Authority may intervene in resolving disputes or mediating negotiations and may regulate rates, terms and conditions for access.

Regulatory

- In what specifically concerns infrastructure sharing, the NCA has issued Guidelines for the Deployment of Communication Towers.

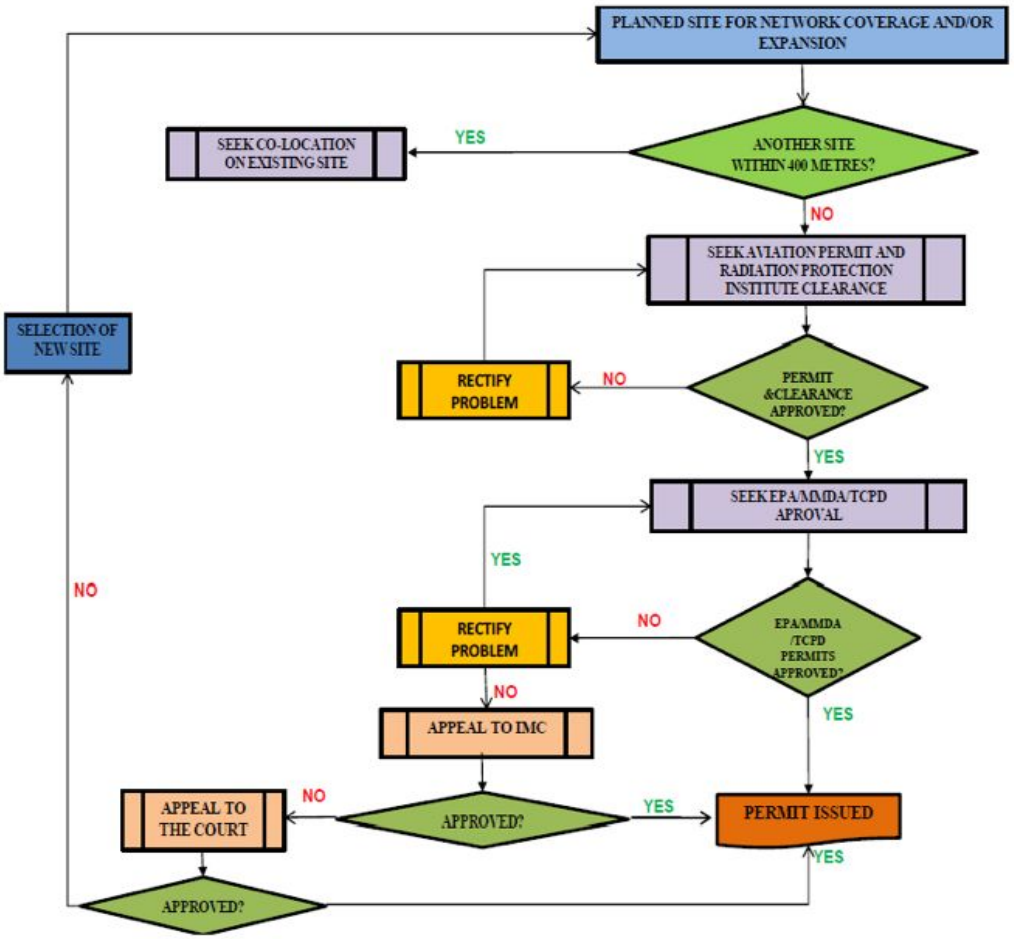
- These Guidelines for the deployment of communication towers establish the mechanisms and formalities applicable to the construction of towers and respective co-location requirements, from an administrative, technical and structural point of view.

- The purpose of these Guidelines was to establish a one-stop-stop mechanism for the deployment of communication towers, encompassing the formalities applicable before the NCA, the Environmental Protection Agency (EPA), the Ghana Civil Aviation Authority (GCAA), the Ghana Atomic Energy Commission (GAEC) and/or the Metropolitan, Municipal and District Assemblies (MMDAs).

- However, as illustrated in the **Figure 1.0** below (included in the Guidelines), the process towards building and co-locating communication towers, while thoroughly described, does not, in practice, establish a one-stop-shop mechanism.

- Indeed and as set out in the Guidelines, applicants "*shall be required to obtain all necessary approvals, permits and Licenses from relevant Government Agencies and Local Authorities before commencement of construction work. This shall be done through a single submission to the respective Metropolitan, Municipal and District Assemblies (MMDAs) after obtaining Ghana Civil Aviation Authority (GCAA) and Radiation Protection Institute (RPI) approvals*."

Figure 1.0 : Process workflow in Guidelines for the Deployment of Communication Towers



Source: Guidelines for the Deployment of Communications Towers document

- As a consequence, infrastructure sharing in this context is only one step in an overall process towards building communications towers and one that is carried out by the relevant operator, on a case-by-case basis.
- No specific procedure is set for infrastructure sharing procedures to be carried out in the context of already construed communications towers, or sharing initiatives to be carried out between operators and the various competent agencies, when applicable and convenient.
- These Guidelines determine that owners of towers must provide information to the NCA enabling this authority to maintain a database of towers that are available for collocation although, as far as we are aware, this is not fully accomplished.

During the course of the Project, the NCA also commenced the draft of the 2016 Quality of Service Regulations (the "QoS Regulation")[3], aimed at creating conditions for customer satisfaction by making known the quality of service to be ensured by providers of electronic communications services (including in what concerns interconnection, congestion, availability and drop rates, for example). This Regulation sets out parameters (and associated sanctions for breach) towards ensuring adequate quality of service (including in the scope of interconnection).

Infrastructure sharing- relevant players

Without prejudice to the overall intervention of the various market stakeholders in what concerns the sharing of infrastructures, some entities have specific powers and obligations in terms of regulating and imposing infrastructure sharing arrangements in Ghana:

Entity	Role
Ministry of Communications	Developing national policies, including the National Telecommunications Policy, which establishes the principle of infrastructure sharing among operators
NCA	Monitoring compliance with infrastructure sharing obligations; resolving disputes; setting out infrastructure sharing obligations in licences; advising the Ministry of Communications in relevant policies
GIFEC	Investing on infrastructure sharing arrangements as a means towards universal service

Table 1: Infrastructure sharing – relevant market data

[3] http://www.nca.org.gh/assets/Uploads/Draft-QoS-Regulations-April-2018.pdf

Overall, the feedback received was that consumers were not receiving all potential benefits on infrastructure sharing, namely in what concerns its potential towards the following points:

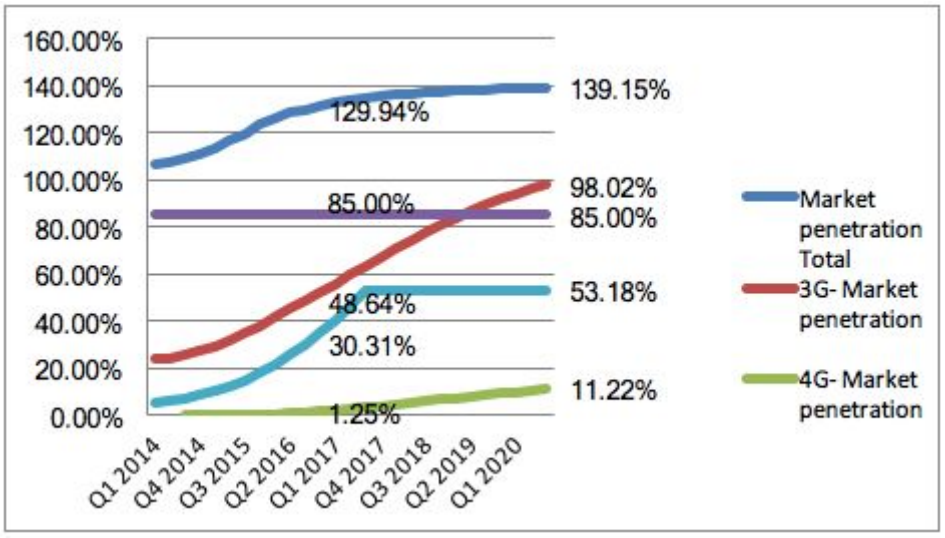
a) **Access and coverage**: current access to information and communication technologies is irregular, with some areas/populations having substantially lower level of access to this type of services (last mile coverage is an issue, with significantly lower levels of coverage and access in these areas). In what particularly concerns broadband services, there are significant gaps in access and associated prices are high.

Table 2: Total fixed-line telephone subscriptions

2005	2006	2007	2008	2009	2010	2011
334 798	360 375	275 000	143 244	267 389	277 897	284 721

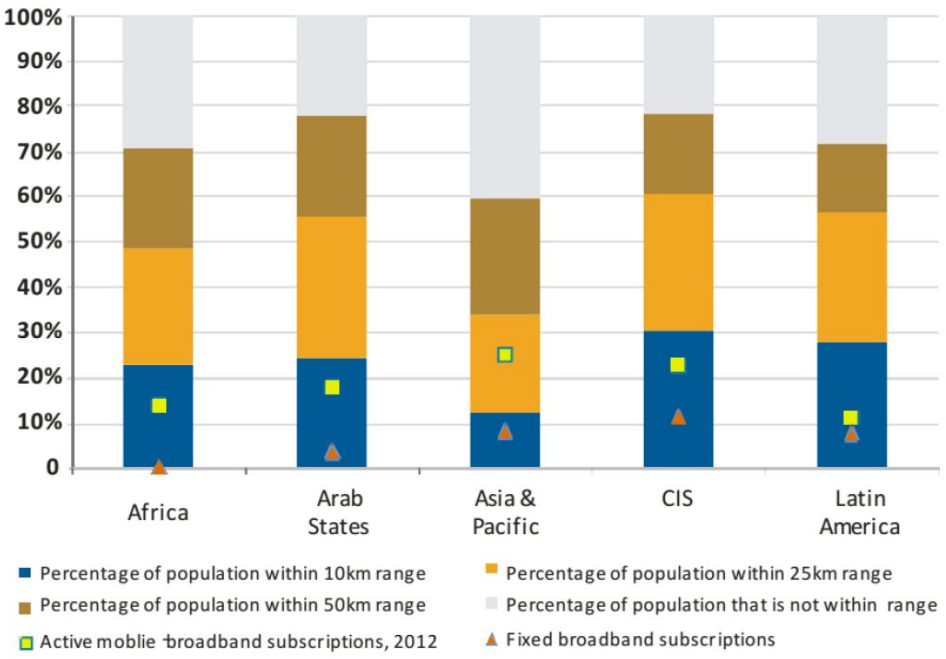
Source: National Communications Authority (NCA) (2012a, and previous NCA reports), ITU (2008)

Figure 2.0. 3G/4G Penetration



Source: GSMA

Figure 3.0 Broadband penetration per area



Source: The Economics and Policy Implications of infrastructure sharing and Minimisation in Africa

Access and the Digital Divide

On the subject of access/coverage, there is still a significant gap in access to information technology products and services, based on gender, location and qualification (the Ghana "digital divide"). In fact, it is possible to establish a user profile for ICT products and services in Ghana, which point towards users of these services being typically:

(i) Male (around 70% of overall users);

(ii) In their early 30s;

(iii) University-level educated and employed (typically working for Government bodies);

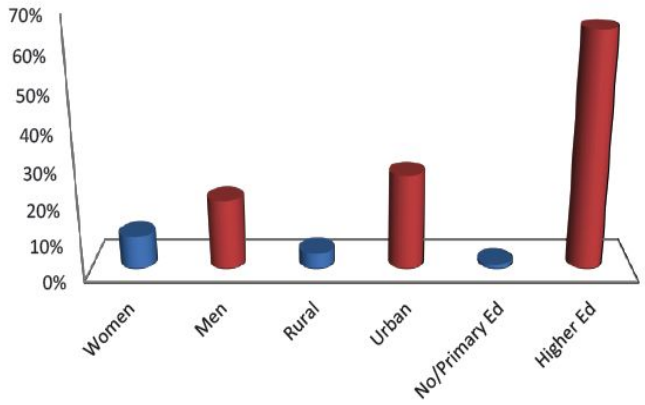
(iv) An inhabitant of Accra;

(v) Using mobile phones and 3G network to access the Internet;

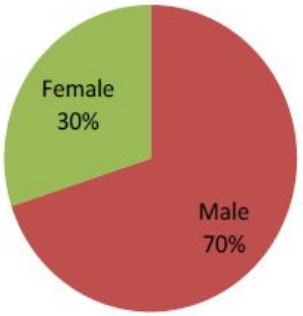
(vi) Users of Facebook, e-mail and online news sites.

Source: *ITU ICT Eye*

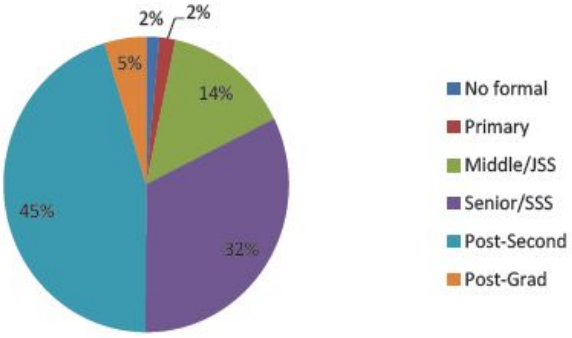
The Digital Divide in Ghana



Gender of internet users



Educational level of Users



Geographic spread of Users

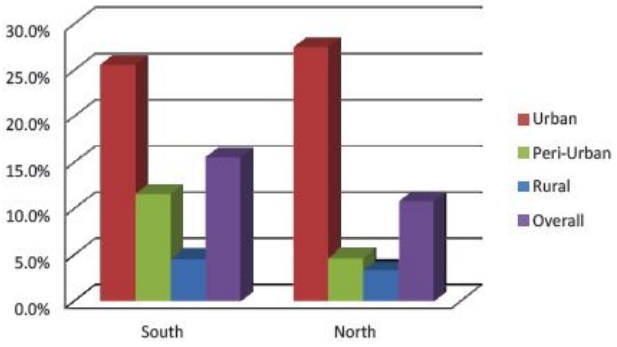


Figure 4.0 Statistics of User Profiles of ICT services along gender, Educational level and Geography in Ghana

Source: USAID Report for GIFEC 2013

In some areas and for some services, quality of service is poor and it is difficult to identify applicable service standards.

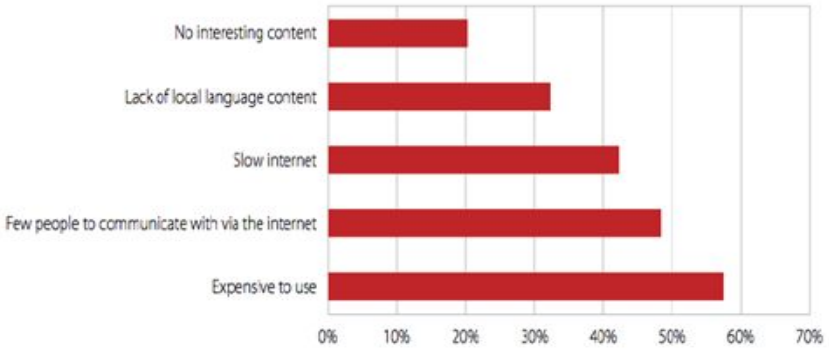
Moreover, as shown in *Table 3* below, prices for some services are still too high for the average Ghanaian user. Awareness towards internet and ICT importance and usage is still low, with people citing costs, low coverage and poor quality service as main impediments for frequent usage and access. (*Figure 5.0)*

Table 3: Comparison of Mobile broadband prices across select countries (2015)

Country	**ITU Mobile Prepaid Broadband Handset Prices (500MB) as a % of GNI p.c. 2015 - Rank out of 178 countries**	**ITU Mobile Prepaid Broadband Handset Prices (500MB) as a % of GNI per capita 2015**
Norway	1	0.07
Colombia	105	2.25
India	118	3.09
Sao Tomé and Principe	120	3.25
Ghana	126	3.96
Nigeria	130	4.41
Mozambique	135	5
Kenya	136	5.08
Tanzania	152	9.82

Source - ITU 2016

Figure 5.0 Reasons for not using the internet



Source: A4AI – Affordable Internet in Ghana: The status quo and the path ahead

b) **Dialogue between stakeholders**: A strong infrastructure sharing strategy is in part defined by the ability and availability of all relevant stakeholders to enter into relevant dialogue (through different possible forums) on the matter of the relevant actions, diligences and tools used in the context of pursuing infrastructure sharing, a point which could potentially be improved in Ghana.

c) **Streamlining infrastructure sharing procedures**: infrastructure sharing in Ghana could benefit from swifter, simpler and more streamlined rules and procedures applicable to the relevant parties;

d) **Gap in regulation**: Given the time elapsed since its implementation, the current policy, legal and regulatory framework for infrastructure sharing in Ghana does not fully contemplate all issues which arise from the country's telecom market, nor its foreseeable needs, potential and challenges. Infrastructure sharing has therefore so far proven to be carried out on a market-driven basis.

Stakeholders expressed a desire for regulatory sharing models and outputs to be aligned with the market's needs and trends, in order to ensure consistency and effective synergies between the authorities and the market players.

For example, passive sharing is still largely the norm, but active sharing initiatives exist, on a market-driven basis. Since passive sharing is technologically neutral, while active sharing can raise neutrality concerns, regulatory intervention should take into account the specific circumstances of each sharing arrangement, to ensure that the arrangements at stake are adequate and ultimately beneficial to the community.

Likewise, since TowerCos are an established infrastructure management model in Ghana, the applicable framework should reflect the current trend towards operators outsourcing certain management operations to the TowerCos.

1. Market potential

Various initiatives have been implemented or are expected to be implemented in Ghana, with significant potential to inject innovation, open up markets and facilitate access to ICT by the Ghanaian population:

a) Extended fibre network

There is currently a fibre corridor in Ghana (the eastern corridor), which was concluded in 2015 and spans almost 800 Km, connecting the North to the South through the Volta region. In order to capitalise on the potential of the fibre network, there are plans for the construction of a western corridor.

Any elements of this extended fibre network have the potential and ultimate use of contributing to ensuring and facilitating last mile coverage (currently an issue in Ghana), by creating incentives for operators to invest and deploy in areas that would typically not be attractive or profitable from a commercial standpoint.

Stakeholders have stated that the fibre corridors could do so by ensuring connections between the main structure and district capitals and reference points such as health facilities, schools, internet cafés and public institutions.

b) Submarine Cables

There are 5 submarine cables landing in Ghana, providing the market with over 12 Terabytes' bandwidth: South Atlantic 3 (SAT3), Main One, Glo-1, West Africa Cable System(WACS) and Africa Coast to Europe (ACE) cables:

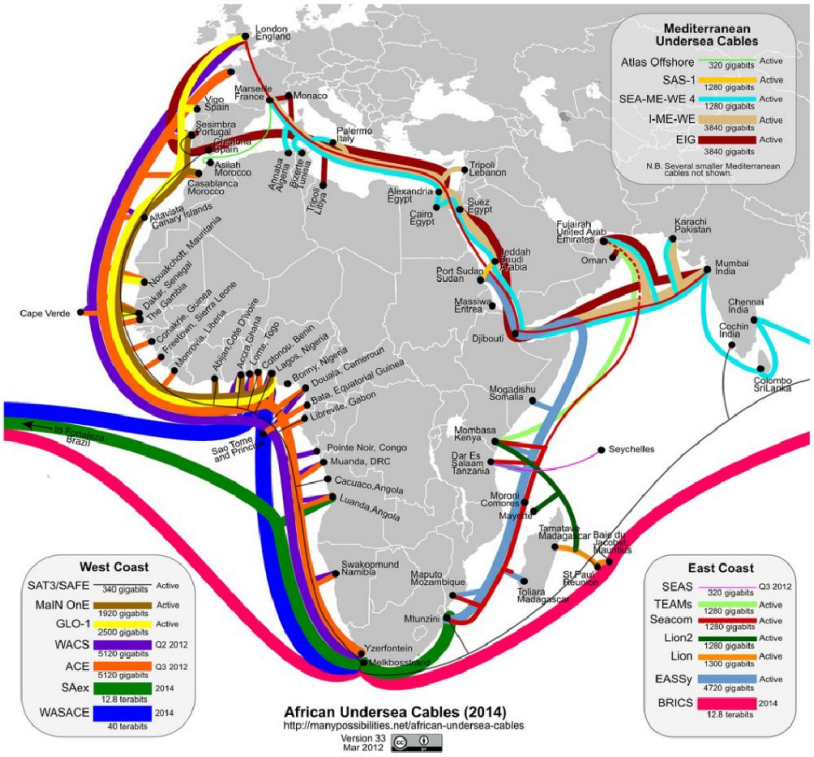


Figure 6.0 Map of Submarine cables landed on Africa's Coast

Source : https://manypossibilities.net

Submarine cables have enormous potential in developing and facilitating growth of the local telecoms market.

This potential lies not only in providing increased bandwidth, but also in incentivising public and private operators to promote the development of telecommunications infrastructures in the county.

This potential will only become a reality if adequate investment is made in building new infrastructures (and sharing adequate existing ones) in order to efficiently provide for inland connection, which is currently lacking in Ghana.

c) Google's project link

This project by Google aims at helping connect more people to fast and affordable broadband Internet by building a metro-fibre network that connects local providers to long distance fibre lines.

This project was born in 2013 and it begun with the construction of a metro fibre network in Kampala, and Project Link's consumers were quite positive about it and its impact on the market, as it allowed for service suppliers to expand far more rapidly than they otherwise would have been able to.

This project is aimed at allowing ISPs and MNOs to use fibre network to bring high quality Wi-Fi to locals, small business and mobile users at low prices through shared infrastructures – as a consequence, several service providers are incentivised to deliver service to poorly served populations, through a single network.

This flexible infrastructure sharing model not only incentivises the creation of new products, but emphasis is also put only on the volume of usage. As a result, the more an operator uses a given infrastructure, the less it pays as a result.

d) GIFEC rural telephony project

GIFEC's rural telephony project aims at extending mobile phone coverage into areas where there aren't typically enough economic incentives for operators to invest, namely because the present population on those areas is not sufficient to cover both Opex and Capex.

This project aims at providing 2G and 3G-based stations with small cellular antennas providing free Wi-Fi services in addition to traditional voice services, utilising green energy solutions taking advantage of solar energy.

This is to be achieved by GIFEC providing funding to operators to cover the full capital expenditure costs of extending mobile telephony services to the mentioned communities. In that sense, it allows telecommunications operators to extend their services into non-financial viable locations. It is predicted that this project provides for absolving about 70% of the telecommunication operator's cost in providing access to those communities.

This purpose of this project is a significant one, since it is aimed at reducing the rural/urban gap in terms of access and coverage. Moreover, this project is likely to have a significant impact in increasing economic activity in the rural areas with farmers and traders being able to transact business across geographical divides at a lesser cost.

GIFEC's main purpose with this project is to achieve virtually 100% mobile telephone service coverage in the country and to take advantage of environmentally-friendly technology for the provision of a wide range of communication services

2. Stakeholder Consultation/ inputs

Overall, the main outputs from the consultations with the stakeholders, before and during the public consultation, were as follows:

a. Need for new Ghana Infrastructure Sharing Policy

Overall consensus by the participants was that it was necessary to overhaul the existing framework for infrastructure sharing, so as to harmonise and improve on existing materials.

This overhaul should consider and try to instate in Ghana: (i) a better and clearer definition of the role of the Government in the sector and in the specific context of infrastructure sharing, towards an active Governmental role; (ii) a general principle of continuity of governmental plans and policies beyond the duration of electoral cycles; (iii) a multi-sector approach to infrastructure sharing; centralised administrative diligences and functions such as tax, permits, rights of way management's; (iv) revision of the terms in which the Universal Service Fund operates; (v) spectrum sharing terms.

The policy should have a clear end-game: increasing reliable access for end-users and incentivising activity and investment by the market players. It should also be well implemented with built in mechanisms to cater for dynamic changes.

b. Current impact of infrastructure sharing on consumers

Overall, the feedback received was that consumers were not fully receiving the potential benefits on infrastructure sharing.

In some areas and for some services, quality of service is poor and it is difficult to understand what the service standards are. Moreover, prices for some services are still too high for the average Ghanaian user, due to some costs eroding financial gain for operators (such as utility bills).

c. Need for new Ghana broadband policy

Some participants were uncertain in this respect, with a section unsure if a policy existed and was being implemented. Others stated that a new broadband policy is a priority for Ghana and that such a policy would be instrumental in revising penetration and innovation targets for the Ghanaian telecommunications market and in introducing FTTH (fibre-to-the-home).

A group however emphasised no need to reinvent the wheel to develop a new policy, preferring instead to enhance existing ones to accommodate new developments.[4]

d. Backbone sharing

Backbone sharing was considered desirable for Ghana and should be viewed under a regional and capital approach (i.e. backbone sharing should ensure links and ramifications into every region and capitals).

Some participants pointed out that any project in this context should be carried out only following a public consultation to this effect and managed by an independent 3rd party to ensure non-discrimination in pricing and service. Few participants mentioned the need to establish guidelines for fibre rollout including well enforced standards (management and maintenance) to ensure quality of service.

[4] The Ministry published the final copy of the 2012 Broadband Strategy at the end of January 2017 http://moc.gov.gh/sites/default/files/downloads/GhanaBroadbandStrategyFinal.pdf

e. The TowerCo model

Generally, participants believed that, due to the popularity and commercial importance of the TowerCo model, the activity of TowerCos in the express context of infrastructure sharing initiatives should be subject to specific regulation. The main issue mentioned in this respect was transparency and communication on price determination, since some participants mentioned that the price applied by TowerCos was higher than the growth rate for all MNOs in Ghana.

From the TowerCos' perspective, it was mentioned that a lot of variables go into the determination of the applicable price, including: significant costs associated with acquiring sites and building the passive infrastructure, price for purchase of equipment and raw material, as well as inflation.

It was suggested that sharing pricing formulas applied by TowerCos should be subject to regulation. However, some participants suggested that regulation in this respect was not necessary, stating that infrastructure sharing is currently working well on a commercially-driven basis and regulators should only intervene in the event of inefficiencies.

f. *The challenge of coverage*

Coverage expansion is a need for Ghana, due to the asymmetries currently existing throughout a country with different and challenging population densities.

Some participants suggested that allocation of GIFEC funds (namely, the fee collected from mobile operators, in the amount of 1% the annual net revenues) would be adequate for this purpose, since the areas that are either unserved or underserved are not profitable for operators and would not raise revenue.

GIFEC, due to its institutional mission and budget, would be most suited towards the achieving coverage expansion, by investing directly in unserved or underserved areas and by promoting dialogue with the various stakeholders in the market, so as to ensure synchronised building (dialogue with operators) and finding commercially viable options for investment in these non-profitable areas (dialogue with TowerCos).

Other participants suggested having a national infrastructure planning office with an official mandate and budget. This entity would be responsible for coordinating public works, managing construction and anticipating industry shifts and trends in this scope.

g. Deployment bottlenecks / A one-stop-shop mechanism

The participants agreed that existing bottlenecks cut down on time to market, result in revenue loss and discourage roll-out; therefore, they should be addressed through NCA guidelines to be prepared/reviewed and subject to a strict enforcement culture.

Roll-out should be streamlined under a "*1 application, 1 fee*" principle: applicants should submit one sole request and pay one sole fee to the NCA (through an existing NCA body or new body to be created therein for this purpose).

This application would include all necessary data and information for NCA to coordinate and synchronise its decision with relevant agencies and authorities, thereby eliminating the need for each applicant to obtain separate authorisations and licences from municipal, environmental, fiscal and other authorities.

h. The Eastern/Western Fibre Corridors

Some participants stated that the main challenge for the existing and planned fibre corridors were how to contribute to ensuring last mile coverage, by creating incentives for operators to invest and deploy in areas that would typically not be attractive or profitable from a commercial standpoint. The fibre corridors could do so by ensuring connections between the main structure and district capitals and reference points such as schools, health facilities, public institutions, internet cafés.

These participants believed that the fibre corridors have the potential to incentivise private investment, by lowering the cost of extension (due to the possible connections with the fibre corridors). Moreover, they see a potential for this fibre project in the context of launching and extending e-government initiatives.

i. Stakeholder dialogue

Participants agreed that dialogue between stakeholders was essential in order to coordinate initiatives and rationalise investments, as well as bringing certainty to the market and facilitating trust between the various different stakeholders, particularly considering the significant investments and projects currently in force in Ghana, such as the 5 existing submarine cables, fibre corridors, base stations, data centers etc.

This can be carried out through establishing different forums for communication and discussion across sectors such as Transport, Utilities, Roads and Highways, Communication and Environment. The publication of market information and carrying out public consultations should also come as a result of possible new policies and regulation on the matter of infrastructure sharing. The concern of participants was who the convener of these dialogues should be. Some suggested the NCA.

Overall, the input received in the context of the public consultation focused on the different market dynamics in Ghana in what concerns infrastructure sharing (including interaction between legal and commercial dynamics, practical enforcement of existing provisions and challenges arising from existing investments and projects), as well as the measures that may be undertaken to address and accommodate gaps in infrastructure sharing, to the ultimate benefit of consumers and users of electronic communications services in Ghana.

Stakeholders generally agreed that it was necessary to overhaul the existing framework for infrastructure sharing, so as to harmonise and improve on existing materials and capitalise on new projects in place/intended for the Ghana telecoms market, to the ultimate benefit of the population and of clients/users of ICT services in the country.

On the other hand, the fact that various relevant documents are between 8-10 years old raises the issue that these instruments do not fully reflect current telecommunications scenarios in Ghana, including in infrastructure sharing contexts (such as pricing and financing, last-mile incentives, broadband coverage goals, incentives to coverage on non-profitability regions, for example).

This intended overhaul should consider and try to establish in Ghana the following:

(i) A better and clearer definition of the role of the Government in the sector and in the specific context of infrastructure sharing, towards an active Governmental role;

(ii) A general principle of continuity of governmental plans and policies beyond the duration of electoral cycles;

(iii) A cross-sector approach to infrastructure sharing;

(iv) Centralised administrative diligences and functions such as tax, permits, rights of way managements ("one-stop-shop");

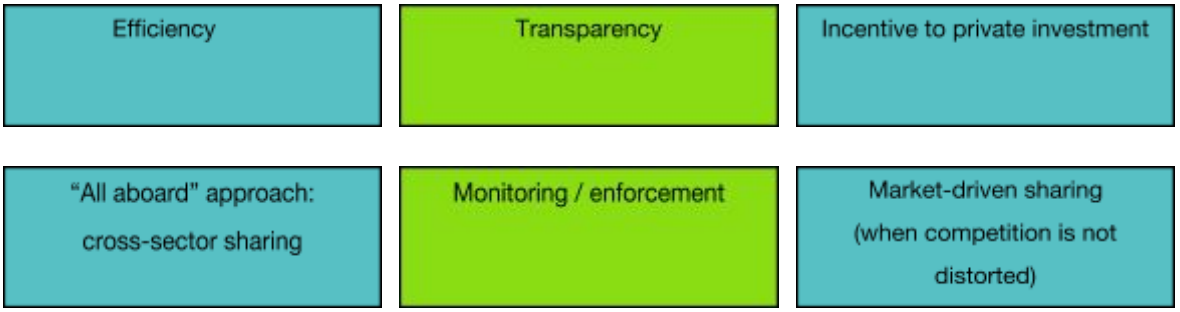
(v) Revision of the terms in which the Universal Service Fund operates;

(vi) Spectrum sharing terms.

D. Principles, Recommendations and Actions

D1. Basic Principles

As a first note and in order to ensure consistency and synergy between the various measures, diligences and approaches to infrastructure sharing in Ghana, we believe it is necessary to identify the major principles which should guide the dynamics of infrastructure sharing in the country. To this effect, we believe it is possible to identify the following general basic principles:



These principles are (mostly) generally reflected at a National Telecommunications Policy level, but not specifically and fully in what concerns infrastructure sharing.

In regard to these principles, we would like to note that they are aimed at ensuring that infrastructure sharing results in a competitive, coordinated, commercially driven market that adequately promotes and encourages natural synergies, while accommodating and addressing possible market distortions.

The five dimensions of sharing:

The 6 principles listed above are crucial to an adequate framework and processing of infrastructure sharing, by ensuring that the rules applicable to sharing go "all around", meaning they take into account, ***technologies, sourcing, geography, architectures and partners***;

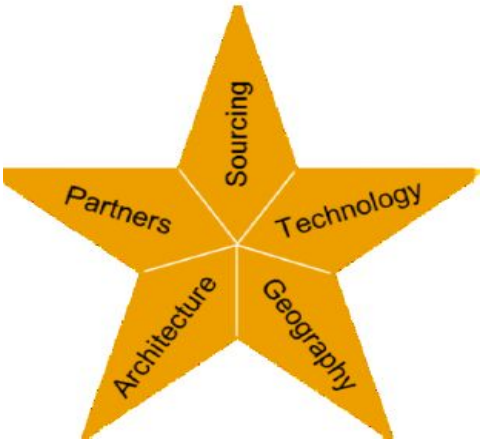


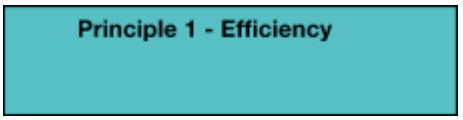
Figure 8.0 The Five dimensions of Sharing

Source: ITU Regional Workshop on Competition in Telecommunications Market ("Competition and Infrastructure Sharing")

The five dimensions of sharing have a significant impact in Ghana, due to differences in infrastructure sharing in light of geographic location (significant rural/urban divide), existing technology, available partners, architecture (with passive infrastructure being a more commercially-natural option) and sourcing (with mobile operators currently being the type of player most prone to infrastructure sharing).

Given the specific scenario of Ghana, the content, scope and application of its policy, legal and regulatory framework and its market dynamics, we believe that the application of these principles , through the specific recommendations noted below, is a suitable response to the country's needs in terms of infrastructure sharing.

Basic Principles in Detail

I. 

In order to instil more efficiency into infrastructure sharing, it is necessary to maximise the potential of existing infrastructure through streamlined processes and formalities, adequate allocation of powers to the competent authorities, as well as clear and solid monitoring and enforcement actions.

We suggest below specific actions to be taken in this respect, in order to potentiate efficiency in infrastructure sharing in Ghana.

II. 

Transparency is paramount to bringing all stakeholders on board in investing on infrastructure sharing, by ensuring that the various market players are informed of the existing circumstances surrounding infrastructure sharing (such as existing passive infrastructure available for sharing, their technical parameters and capability, as well as pricing).

In our specific recommendations below, we suggest various measures aimed at maximising transparency in the infrastructure sharing context in Ghana, such as for example, mandatory publication and provision of information and increased interactions between the relevant authorities and the remaining stakeholders, such as through public consultation procedures.

III. **Principle 3 - Incentive to private investment**

Incentives to private investment (i.e. actions aimed at encouraging market players to invest in infrastructure sharing of their own volition) should be encouraged, as, among other benefits, they give rise to positive spillovers of broadband expansion.

In what particularly concerns Ghana and as suggested below, we believe there is margin for improvement in the terms in which private investment is handled – namely, for example, by creating tax and regulatory fee exemptions applicable to entities opting towards infrastructure sharing arrangements (this will be particularly relevant in areas that are not currently attractive from a commercial standpoint).

Incentives to private investments are, nevertheless, without prejudice to state intervention and investment, whenever necessary to support infrastructure sharing, for example in the events that markets fail or externalities occur.

IV. **Principle 4 - "All aboard" approach: cross-sector sharing**

Cross-sector sharing is formally a reality in Ghana, to the extent that the law generally grants utilities providers with the right to request access to telecommunications infrastructure.

However, there is room for manoeuvre in order to benefit from the full potential of infrastructure sharing on a cross-sector basis (with its inherent advantages in terms of environmental impact, reduction in expenses, use of less space in congested areas and avoidance of infrastructure duplication).

This can be achieved by formalising cross-sector infrastructure sharing in the country's relevant policies, by promoting public-private partnerships across the board and by making cross-sector sharing mandatory for all relevant market players, in the terms recommended below.

V. **Principle 5 - Monitoring / enforcement**

Legal and regulatory provisions must be adapted to reflect current and foreseeable needs in this respect, both from a supply and demand point of view. In order for this to be the case of Ghana (where the relevant framework is not relatively new), it is necessary to ensure that the relevant authorities have the necessary powers/obligations, procedures and penalties in place to ensure that it is possible to act, as an authority, in order to avoid competition distortions, identify problems, impose conditions and fines/remedies in the event of breach.

VI. **Principle 6- Market-driven sharing (when competition is not distorted)**

The natural dynamics of infrastructure sharing in Ghana should be taken into account, to the extent that they do not involve competition distortion and that they contribute to the potential of infrastructure sharing as a means towards advancement of the telecommunications sector in Ghana.

D2. Recommendations

Based on the information collected and perceived during the Project, we summarise that various market stakeholders highlight an urgent need to ensure an update of the legal and regulatory framework of Ghana in the context of infrastructure sharing, as well as a desire to strengthen dialogue between the various agents in the Ghanaian telecommunications market and other sectors. Discussants and contributors to this study perceive these matters to hinder the market dynamics and the optimum function of the infrastructure sharing scenario in Ghana.

In response to the main concerns identified in this study, we have prepared the recommendations set out in this chapter under four focus areas . The purpose of these recommendations is to ensure a policy, legal and regulatory framework in Ghana that, in the context of telecom infrastructure sharing in Ghana: **(i) accommodates the current needs of the Ghanaian telecom market; (ii) foresees expectable trends in this context; (iii) removes existing barriers to competition, investment and innovation; and (iv) is politically feasible and can be implemented in the short-term.**

4 Focus Areas of Recommendation :

1. ***Set up of adequate institutional/ Coordination Framework***
2. ***Approval of/Adjustments to existing policies***
3. ***Approval of /Adjustments to existing laws/or regulations***
4. ***Other Complementary recommendations***

The above focus areas mentioned should be applied in addition to the *6 key principles* in section D1. These principles should be considered throughout any adjustments to the country's policy, legal and regulatory framework in what concerns infrastructure sharing, and specifically throughout the implementation of the general recommendations identified below:

1. ***Set-up of adequate institutional/coordination framework***

Recommendation n. 1	Capacity-building initiatives (training sessions, workshops and courses) for relevant authorities - Ministry of Communications/NCA/GIFEC
Recommendation n. 2	Coordination between GIFEC (activity to be aimed solely at financing, not building) and NCA (competent to monitor, enforce and regulate)
Recommendation n. 3	Set-up of general coordination committee/body representative of all types of stakeholders aimed at coordinating frequent interaction between relevant authorities.

2. *Approval of/adjustments to current policies*

Recommendation n. 1	**Adjusting** 2005 National Telecommunications Policy to reflect the principles arising from these recommendations (development of chapter on "Facility Sharing"), including encouraging cross-sector sharing of passive infrastructure and mandating as the last resort.
Recommendation n. 2	Periodically reviewing National Telecommunications Policy in order to adjust it to accommodate current and expected needs in terms of infrastructure sharing
Recommendation n. 3	Should National Telecommunications Policy not be possible in the short term, a specific infrastructure sharing policy should be established
Recommendation n. 4	Establishing exemptions from mandatory tax, administrative and bureaucratic proceedings and fees associated with infrastructure implementation, maintenance, upgrade and demolition
Recommendation n. 5	Promoting sharing culture through workshops, meetings with stakeholders, publishing relevant information in the websites of major players (Government, NCA, GIFEC, NITA)
Recommendation n. 6	Promote consultation of the market on major topics (for example, active infrastructure sharing (spectrum/fibre, among others), pricing/operational models, backbone project capitalisation and infrastructure sharing in the context of the inland connections for existing submarine cables)

3. *Approval of/adjustments to current laws and/or regulations*

i. Legal

In order to fully implement an infrastructure sharing strategy, it is fundamental to have a solid and comprehensive legislative basis. This includes a clear definition, by law, of the powers and attributions pertaining to the sector regulator, adjusted to the market's needs.

Indeed, the law should not appear solely as a force aimed at stopping abusive actions, but also as a mean to support and incentivise innovation and development in the market, based on adequate policies and complemented by adequate regulation.

Also, a legislative component is essential in the infrastructure sharing context in Ghana, due to an identified need to clarify, complete and frame both operators' obligations and regulatory powers to enforce compliance. This may entail not only amendments to the existing legal framework and the creation of new legal instruments.

Recommendation n. 1	Adjustment to Electronic Communications Act to clarify that passive infrastructure sharing is mandatory for all players (eventually, including TowerCos), to existing and future passive infrastructure, on a cross-sector basis – active infrastructure sharing possible approached following market analysis
Recommendation n. 2	Adjustment to Electronic Communications Act or approve complementary legislation to set maximum deadlines and minimum technical criteria for infrastructure sharing negotiations, prior to NCA intervention in mediating and deciding on sharing terms
Recommendation n. 3	Adjustment to National Communications Authority Act of 2008 nr. 769, in order to mandate NCA to carry out sturdy monitoring actions and imposing sharing and sanctions for breach (namely, monitoring, auditing and inspections on a regular basis, in the context of breach proceedings and/or upon justified NCA request, subject to fine, suspension or termination of licence or veto from obtaining certain rights while breach events are in ongoing)
Recommendation n. 4	Adjusting Ghana Investment Fund for Electronic Communications (GIFEC)'s legal framework to (i) establish GIFEC as an authority aimed solely at financing infrastructure sharing and construction, with no independent infrastructure construction
Recommendation n. 5	Establishing a specific legal regime for PPPs between telecom stakeholders and utilities authorities and providers
Recommendation n. 6	Adjusting National Information Technology Agency (NITA) Act 771, mandating infrastructure sharing between NITA and other stakeholders (also on a cross-sector basis)
Recommendation n. 7	Adjustment to Electronic Communications Act to include description of procedure applicable to NCA intervention in terms of dispute settlement (specific forms for submitting the request to NCA, reply and defence actions, possible outcomes of NCA decision)

ii. Regulatory

Firstly, we would like to note that regulatory intervention is not an end in itself. Indeed, regulatory intervention is unnecessary, whenever the market agrees on infrastructure sharing and the effects of these arrangements result in the major advantage applying to the service and prices made available to the final user (social welfare prevails over market agent welfare).

However, if this is not the case (i.e. infrastructure sharing is beneficial to a market agent's welfare but does not result in increased social welfare), regulatory interventions may be required to restore balance by taking into account natural market needs and dynamics.
In the specific case of Ghana, we believe that **there is still room for regulatory intervention** in the context of infrastructure sharing, in order to increase efficiency, competition and positive externalities.

Recommendation n. 1	Reinforcing the "one-stop-shop" principle, by enforcing a "one fee, one licence" mechanism - current formalities applicable towards municipal, tax, environmental, aviation and urban planning authorities are replaced by a single application submitted by any entity (telecom operator or not) wishing to benefit from sharing to NCA, with all information that is required for the submission of the necessary licences
Recommendation n. 2	Setting mandatory technical standards applicable to passive infrastructure sharing: minimum capacity requirements (no infrastructure suitable for single operators), taking into account the different characteristics of each area/region/installation. These technical requirements would take into account possible technical differences between the infrastructures of utility providers and those of telecom operators, as well as the various possible sharing models
Recommendation n. 3	Setting mandatory rules applicable to relevant entities (NCA, Ministry of Communications, GIFEC, NITA) to publish information on their respective websites regarding industry data on infrastructure sharing, including availability of infrastructure for sharing per region/area. Encourage cross-sector publishing of similar relevant infrastructure e.g in utilities sector.

Recommendation n. 4	Implementing mandatory rule that all entities sharing infrastructure must provide to NCA (and keep updated) information on the location, type, reference and operational status of all infrastructure being shared and/or available for sharing – information to be included in specific reserved area available through username and password at NCA website
Recommendation n. 5	Adjusting electronic communications regulations from 2011, in order to complete the principle that licence renewal is subject to the criteria "*the Authority considers necessary for the renewal*", by subjecting renewal to specific infrastructure sharing obligations in the regions and for the services included in the licence
Recommendation n. 6	Implementing rules (mandatory as last resort) applicable to infrastructure sharing pricing in consultation with market players.
Recommendation n. 7	Encouraging independent regulation on infrastructure installation on urban constructions, lands and buildings, as well as infrastructure connection to public networks (and respective infrastructure sharing obligations). Again, mandatory regulations as a last resort if market fails to comply.
Recommendation n. 8	Establishing obligation under which any entity operating passive infrastructure must publish and send to NCA a reference offer. NCA to determine mandatory technical, financial and operational content of reference offer, under principles of transparency and non-discrimination
Recommendation n. 9	Inclusion of a secure area in NCA's website, available only to the relevant entities (telecom operators, ISPs and utility providers sharing infrastructure), through username/password access, for submission of reports and regulatory information, as well as for access to financial and technical information aimed specifically and solely at these entities
Recommendation n. 10	Possible extension of obligation to publish reference offer to additional entities, following market analysis regarding passive infrastructure sharing terms

4. ***Complementary recommendations***

Recommendation n. 1	Implementing broadband policy under finalisation by the Ministry of Communications
Recommendation n. 2	Ensure technology-neutral infrastructure sharing provisions, in order to accommodate developments and characteristics of various sectors and players
Recommendation n. 3	Updating NCA website so as to provide periodically updated information on the telecom market, including service penetration rates; full list of providers of telecommunications services in the country; technical and financial criteria applicable to infrastructure sharing; complete, comprehensive national mapping of telecommunications and Internet infrastructure data in Ghana (total number of base stations, submarine cable landings and inland connections, fibre corridor connections to major networks, data centres, internet exchange points)
Recommendation n. 4	Ensure harmonisation between the objectives of infrastructure sharing framework with the objectives of the national broadband and USF plans

D3. Suggested Next Steps

- Review and follow through on recommendations of this report.
- In line with the study's analysis and recommendations, set up an implementation working group (or Cross-sector Coordinating Committee) across relevant sectors mentioned in the report to set targets, timelines and milestones, for developing and maintaining a database of existing infrastructure and to facilitate coordination of a **"dig once"** approach to infrastructure planning.

E. Conclusion

Infrastructure sharing is not a final goal in itself. It is, alongside other policy and regulatory topics one of the key drivers for ensuring affordable access to communications to the entire population. Having an existing infrastructure sharing policy and regulation in place has been consistently recognised as a "must have" in order to encourage lower cost structure for industry. This is well documented in A4AI's "Policy and Regulatory Good Practices[5]", which highlights streamlined processes for infrastructure deployment and sharing as a major driver for encouraging such lower costs. By implementing the an effective infrastructure sharing policy Ghana stands to gain from expanded access to rural areas, reduced cost of deployment of infrastructure , increased uptake of ICT services and overall affordable broadband services to its citizens.

[5] Policy and Regulatory practices Good practices : http://a4ai.org/policy-and-regulatory-good-practices/

Appendix I

Summary of interviews with stakeholders

As previously noted, the recommendations and suggestions in this Report are also based on the relevant feedback and input provided by the relevant Ghanaian stakeholders, carried out prior to the public consultation held in Accra on 25th October.

To this effect and as noted above in this Report, the following stakeholders were consulted:

Mobile Network Operators	National Communications Authority
Ghana ISP Association (GISPA)	Ministry of Communications
Tower Companies	Ghana Infrastructure Trust Fund
The Chamber of Telecommunications	Ghana Data Protection Commission
A4AI Consumer Advocacy working Group	A4AI Infrastructure Sharing and Open Access Working Group
Environmental Protection Agency (EPA)	MainOne
A4AI Ghana Tax Working Group	A4AI Ghana National Coordinator and Deputy
National IT Agency (NITA)	American Tower Company (Parent company of ATC)
Google	GIFEC

Overall and as a summary, the feedback received from the various stakeholders consulted prior to the consultation focused on essentially the same major issues, related to existing potential of infrastructure sharing as a tool towards increasing coverage, reducing prices and facilitating access.

Essentially, stakeholders agreed that there were various instances of infrastructure sharing in Ghana, both between providers of electronic communication services and between them and entities performing in other sectors (essentially utilities providers). Arrangements on infrastructure sharing are typically:

- Market-driven;
- Applicable to passive infrastructure (under the TowerCo model, although fibre sharing has taken place, under IRU agreements and has been particularly useful for ISPs, which buy fibre capacity from mobile operators);
- Carried out in commercially-advantageous areas;
- Carried out within the sector, with exceptions regarding infrastructure sharing on a cross-sector basis (essentially with utility providers)

Overall, the feedback received from the various types of stakeholders was that, while as a rule infrastructure sharing is carried out in Ghana, consumers are not experiencing the benefits on infrastructure sharing, due to:

- Poor quality of service in certain areas

  Both MNOs and the NCA noted that various rural and remote areas had no coverage (particularly in what concerns fibre coverage) and that certain infrastructure was not viable, nor were there sufficient incentives towards investing in said infrastructure.

  A note in respect of the impact of the state of the existing infrastructure to stress that, according to the Ministry of Communications, the intended goal would be, to the extent possible, to ensure that network and coverage expansion involved as little construction as possible, this favoring, if possible, the recovery and adjustment of existing infrastructure.

In this respect, various inputs were received as to the methods to be used for the purpose of improving coverage. Some MNOs stressed the potential of the existing and planned fibre corridors which, if adequate links and connections were implemented between the main structure and important local reference points, could create incentives for operators to invest and deploy in currently underserved areas.

According to the Ministry of Communications, this should also be profitable for operators - even if this does not result in extremely high profit margins, increases in revenue should compensate for this.

MNOs and ISPs stressed that allocation of GIFEC funds would be adequate for this purpose, due to GIFEC's institutional mission, the fact that it has its own towers/sites, and due to the fact that certain areas that are unserved/underserved are not profitable for operators and would not raise revenue.

GIFEC noted that it had several ongoing and planned initiatives aimed at improving coverage, including a GIFEC hub. In the context of this hub, GIFEC will control operation to provide V-Sat and rural telephony and operators will have only to pay for spectrum fees/costs; capex will be handled directly by GIFEC and opex will be significantly reduced (from an average 3000US$ to 300 US$). This hub project will be carried out in the scope of GIFEC's mandate towards coverage in rural areas and is aimed at increasing coverage in underserved or unserved areas.

- Difficulty in ascertaining quality of service standards[6];
- High prices, taking into account the revenues of the average users of telecommunications services in Ghana. On the matter of pricing, MNOs noted that prices necessarily reflected costs associated with taxes, utility bills and payments to Towerco companies.

  On the matter of the relationship between MNOs and TowerCos, MNOs noted that the popular TowerCo model would be the most adequate one, provided TowerCo prices were regulated and CPIs did not escalate annually.

  TowerCo companies themselves stated that prices applicable to MNOs reflected high costs in acquiring sites and equipment, relocating them and ensuring adequate operation, management and repair of said equipment, particularly in remote areas).

[6] The interviews with stakeholders were carried out prior to the publication of the draft 2016 Quality of Service Regulation by the NCA

According to both MNOs and TowerCos, the main obstacle to infrastructure sharing at an operational level is lack of profitability.

- Current legal and regulatory framework not reflecting the most recent trends and market dynamics in Ghana in what concerns infrastructure sharing.

  The various stakeholders noted that various relevant legal and regulatory documents are between 8-10 years old and do not reflect current telecommunications scenarios in Ghana, including in infrastructure sharing contexts. Both public and private stakeholders agreed that this had an impact on the matter of pricing and financing, last-mile incentives, broadband coverage goals, incentives to coverage on non-profitability regions. This was particularly noted by operators, TowerCos and ISPs.

  The NCA noted, in this respect, that tower sharing guidelines were under review by the NCA and an audit on cell sites was ongoing in order to map out the existing scenario and detect specific flaws and areas in need of intervention.

  The Ministry of Communications noted that existing policies did not reflect the current state of infrastructure sharing in the country and, taking this into consideration, the Ministry was promoting internal discussion on the matter, with the purpose of implementing a new telecommunications policy as early as possible in 2017.

  This policy would address overall market concerns, such as encouraging the expansion of services and creation of new services, without causing increased costs for operators, as well as incentivizing domestic roaming and centralizing regulation. Internal discussions within the Ministry over a “unified licence” were also reportedly advanced, on the date of the interviews.To this effect, the Ministry had met with operators and collected input towards possible initiatives towards capitalizing on existing telecom infrastructure.

  ISPs expressed particular concerns on active infrastructure sharing, due to the fact that most have ongoing arrangements with mobile operators on fibre sharing. In this context, ISPs expressed some reservations over the effectiveness of the Eastern Corridor, suggesting that specific guidelines on fibre network construction and sharing are required, in order to consolidate any action on fibre structure. Overall, ISPs considered that, whenever fibre sharing arrangements were intended by the intervening parties, government guidelines and/or policies should exist, from the roll-out stage to the management of fibre sharing arrangements.

Appendix II

Participants in the Public Consultation

Name	Title	Company
Hon. Ato Sarpong	Deputy Minister of Communications	Ministry of Communications (MOC)
Nana Defie Badu	Director, Consumer & Corporate Affairs	NCA
Kwasi Agyei	Director, Finance	Ministry of Communications
Mwiya Mukunyandela	Manager ePMP Business Development & Sales	Cambium Networks
Philip Engmann	Telecom Engineer and Founder of GISPA	GISPA
Francois Van Zyl	CEO	ATC Ghana
Derek Laryea	Head of Research	Ghana Chamber of Telecommunications
Sherrie Thompson	Founder/CEO	Global Resolve Africa
Kobe Sam	Software Engineer	Capital One
Pascal Ametorwogo	Solutions Architect	ATC Ghana
Victor Kwabena Nimo	Director	Dream Keepers Network
Yusif Amadu	ICT Officer	University of Ghana
Afua Koranteng	Head of Legal	ATC Ghana
John Ayitevie	Head of Sales & Business Development	Nokia
Abenaa Vondee	Project Officer	C -Squared
Fatima Sani	Business Development Manager	Google
Kwaku Agbesi	Sales Manager	Google
Ama Sekyere Boateng	Deputy Manager	National Communications Authority
Mohammed Bun Bida	Programmes Director	Muslim Family Counselling Services
Frederick Asumanu	Senior Manager	NCA
Precious Ankomah	Program Manager	Penplusbytes Ghana
Eric Kwabena Agbozo	Chief Executive Officer	Defence Against AIDS Poverty and Underdevelopment (DAAPU)
Obed Nyarko Antwi	Founder	ALL FOR US AFRICA FOUNDATION

Name	Title	Company
Wolako Dake	Marketing/Advocacy Officer	Education Support Services
Daniel Ganyoame	Executive Director	Africa ICT Right
Prosper Legbedze	Network Planning and Design Engineer	Airtel
Emmanuel Ahugah	Country Coordinator	ENO Ghana
Joachim Doe	IP/NMS Engineer	NITA
Clara Pinkrah-Sam	Innovation/ Digital Entrepreneurship and BPO Expert	E- Transform Project
Samuel Koranteng	Senior Manager, Regulatory Affairs	MTN
Kwame Boakye	President	Ghana Institution of Engineers
Teki Akuetteh Falconer	Executive Director	Data Protection Commission
Kwame Owusuansah	Technical Consultant	Bluetone Communications Ghana Limited
Wisdom Donkor	IT Manager / Technical Lead Ghana Open Data Projects	National Information Technology Agency
Cassandra MensahAbrampah	Commercial Operations Program Manager	Google
Shola Sanni	Public Policy Manager	GSMA
Kojo Boakye	N/A	Facebook
Brian Dzansi	Social Media Manager	Imani Ghana
Kwaku Antwi	Researcher	GIMPA
Charles Kwame Affum Aboagye	CEO	The Perfect Example Environmental Foundation
Emmanuel Berning	Programme Coordinator	The Perfect Example Environmental Foundation
Samuel Yeboah	Program Manager	Google Ghana Ltd
Peter Osei Mensah	Developments Director	ALL FOR US AFRICA Foundation
Eleanor Afful	ICT trainer in network engineering	AITIKACE
Kojo Akoto Boateng	Presenter	Citi FM
Eben Ankrah	Head of Communications	SOG Organisation
Solomon Richardson	Head of Infrastructure	NITA

Wilfred Glover-Akpey	RAN & IP Engineer	National Information Technology Agency (NITA)
Victor Teppeh	Director of Research	NCA
Name	**Title**	**Company**
Kafui Tsekpo	Advocacy and Communications Manager	Participatory Development Associates
Ahmed Futa	Valuer	Oasis Property Consult
Eric KumahBaku	Public Relations/Protocol	National Information Technology Agency
Nanjira Sambuli	Digital Equality Advocacy Manager	Web Foundation
Wilfred Glover-Akpey	RAN & IP Engineer	National Information Technology Agency (NITA)
Emmanuel Larbi Offei	Administrative Manager	Manbah Gas Co. Ltd
Benjamin Ato Afful	Government Relations Specialist	AIRTEL
Dr. Kwaku Ofosu-Adarkwa	National Coordinator	A4AI
Kafui Prebbie	CEO	TechAide
Ofoe Dorgble	NA	N/A
Mavis Obeng Aidoo	N/A	N/A
Abed Bandim	N/A	N/A
Other Interviewees via Focus groups or One-on-One(contacted before the public consultation)		
Kwaku Sakyi Addo	CEO	Ghana Chamber of Telecommunications
Ernest Brown	CEO	GISPA
Kofi Dadzie	CEO	Rancard Solutions
Reuben Opata	GM , Network group (focus Group)	MTN
Eric Akumiah	Director	NITA
Philip Sowah	CEO	Ghana Infrastructure Company
Kofi Datsa	Director of Regulatory Administration	NCA
Funke Opeke	CEO	MainOne
Kofi Ntim Yeboah- Kordieh	Regulatory Administration (focus group)	NCA
David Amoah	Regulatory Affairs (Focus group)	Vodafone

Appendix III

Documentation

Throughout this Final Report and in the course of the Project, we have used several sources of information in order to provide a well-informed report, namely by accessing information regarding the Telecommunications market in Ghana, but also the country's main economic and social policies and direct stakeholder input.

We have used both direct and indirect data: through the first one, we have obtained information by conducting several interviews with relevant stakeholders from the A4AI and others with relevant knowledge regarding the Telecommunications market, both prior to and during the public consultation held in Accra (as per Schedule I).

We have also used indirect data, including national and international legislation and policies, NCA decisions and guidelines and other relevant publications, as identified in the following list:

Industry Data
GSMA Intelligence
ITU indicators
World Bank Indicators
IHS data
Trading Economics Data
Ovum GMSD Informa Telecoms & Media's World Cellular Information Service
Global Finance Magazine Data
NCA Market Data
Ghana Chamber of Telecommunications Data
Government of Ghana Data
Ghana Investment Fund for Electronic Communications Data
National Information Technology Association Data
Ghana Investment Promotion Centre Data
Tower Xchange Data
Ghana Statistical Services

National legislation and orientations
Electronic Communications Act 2008, Act 775
National Communications Authority Act 2008 Act, 769
Lands (Statutory Wayleaves) Act 1963, Act 186
Guidelines for the Deployment of Communications Towers – 2010
Electronic Communications Regulations, L.I.1991 of 2011
Electronic Transactions Act 2008, Act 772
National Information Technology Agency Act, 2008, Act 771
Communications Infrastructure Licence (Communications Tower)

National Policies
National Policy on Public Private Partnerships (PPP) – July, 2011
National Telecommunications Policy – 2005
The Ghana ICT for Accelerated Development (ICT4AD) Policy – 2003
Economic and Financial Policies for the Medium Term – 2014-2017

NCA Decisions and publications
Offences for which penalties are provided for in the Electronic Communications Act, 2008, Act 775 and the electronic communications regulations, I.i.1991
National Communications Authority of Ghana - 2008 Annual Report
Guidelines for Application of Telecom Licences/Authorisations
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