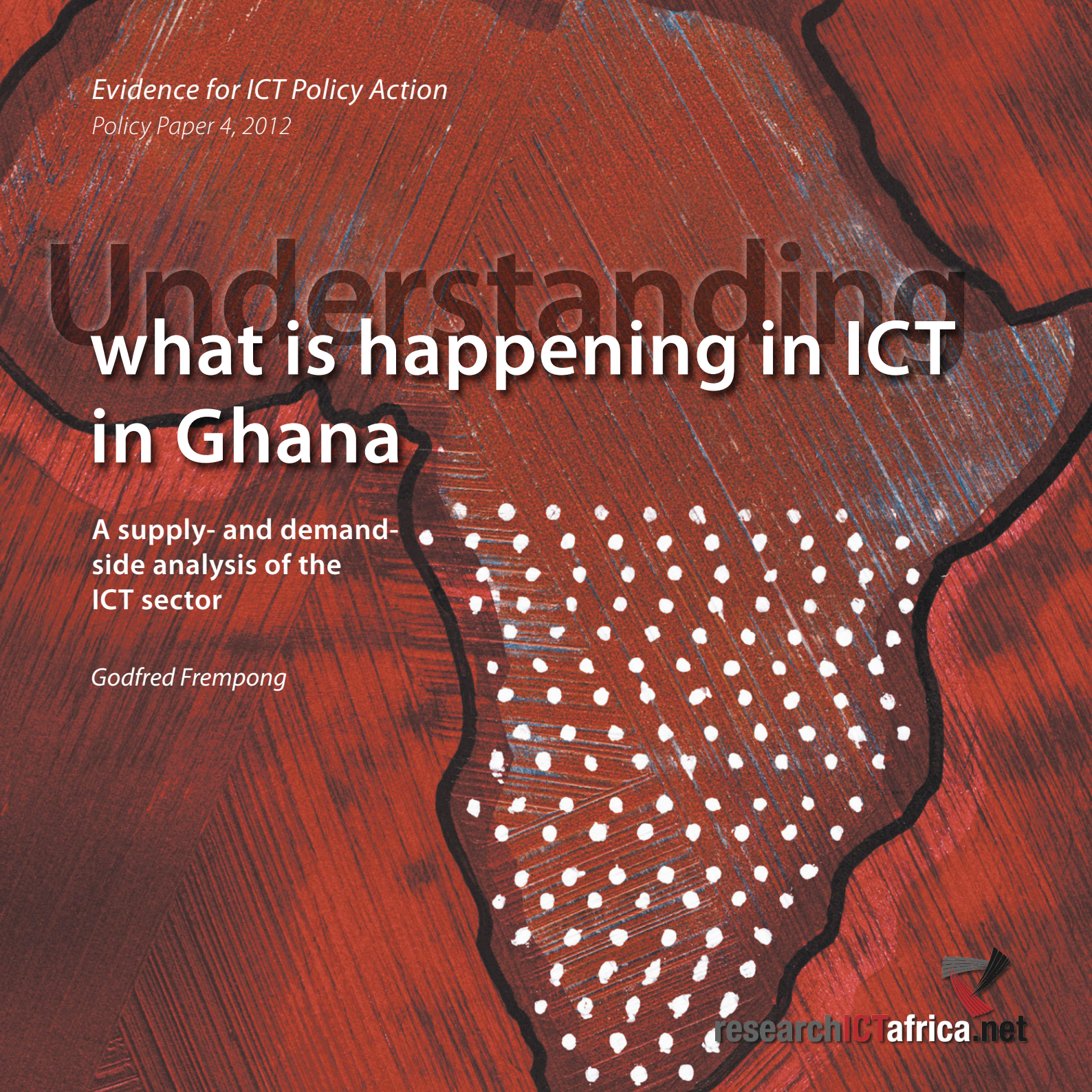
Evidence for ICT Policy Action
Policy Paper 4, 2012

Understanding what is happening in ICT in Ghana

A supply- and demand-side analysis of the ICT sector

Godfred Frempong



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Research ICT Africa (RIA) is an information and communication technology (ICT) policy and regulation research network based in Cape Town, South Africa, under the directorship of Dr. Alison Gillwald. As a public interest think tank, RIA fills a strategic gap in the development of a sustainable information society and knowledge economy. The network builds the ICT policy and regulatory research capacity needed to inform effective ICT governance in Africa. RIA was launched a decade ago and has extended its activities through national, regional and continental partnerships. The network emanates from the growing demand for data and analysis necessary for appropriate but visionary policy required to catapult the continent into the information age. Through development of its research network, RIA seeks to build an African knowledge base in support of sound ICT policy and regulatory design, transparent implementation processes, and monitoring and review of policy and regulatory developments on the continent. The research, arising from a public interest agenda, is made available in the public domain, and individuals and entities from the public sector, private sector and civil society are encouraged to use it for purposes of teaching and further research or to enable them to participate more effectively in national, regional and global ICT policymaking and governance.

Series Editor: Alison Gillwald

Editorial assistance: Broc Rademan

Copy-editing: Chris Armstrong

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This research is made possible by significant funding received from the International Development Research Centre (IDRC), Ottawa, Canada, and RIA network members express their gratitude to the IDRC for its support. The network consists of members in 18 African countries, and RIA researchers in 12 countries were able to participate in the supply- and demand-side reviews of their national ICT sectors (as detailed in this and other national Sector Performance Reviews for 2012). The national reviews for 2012 were led by the following RIA network members: Dr. Patricia Makepe (Botswana); Prof. Olivier Nana Nzèpa (Cameroon); Dr. Lishan Adam (Ethiopia); Dr. Godfred Frempong (Ghana); Prof. Tim Waema (Kenya); Francisco Mabila (Mozambique); Dr. Christoph Stork (Namibia); Fola Odufuwa (Nigeria); Louise Karamage (Rwanda); Dr. Alison Gillwald (South Africa); Mary Materu-Behitsa (Tanzania); and Ali Ndiwalana (Uganda).

RIA's Household and Individual ICT Access and Use Surveys and Informal Sector ICT Access and Use Surveys conducted in 12 countries – used to inform the national SPRs of 2012 – were led by Dr. Christoph Stork who, together with Mariama Deen-Swarray, was responsible for preparation of the statistical data and data analysis for the 12 sets of national findings – and the comparative analyses across the 12 countries. The Telecom Regulatory Environment (TRE) assessments, the compilation of supply-side indicators, and the collection and presentation of the pricing data, were coordinated across the 12 study countries by Enrico Calandro and Mpho Moyo. Additional peer-reviewing to that done amongst partners was undertaken by Steve Esselaar and Enrico Calandro.

Author

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Design and layout: Grant Logan, Creative Storm | Cover image: Amy DeVoogd, Photodisc

Executive summary

Many countries see information and communication technologies (ICTs) as a necessary foundation for sustained, long-term socio-economic development. Consequently, such countries have developed policies and strategies to harness the potential of ICT. The findings of previous Research ICT Africa (RIA) Sector Performance Reviews (SPRs) in Ghana – conducted in 2007 and 2010 (see Frempong, 2007a, 2010) – have been instructive and have contributed to the sector's development. The SPRs have also supported academic and policy research on Ghana's ICT sector and how it compares to other national ICT settings in Africa.

The Ghanaian ICT policy and legal environment has not seen drastic changes since the previous RIA SPR of 2010. However, the Ministry of Communications did, in 2011-12, work towards finalisation of a National Broadband Strategy, which aims to influence the development of broadband by ensuring competition and encouraging both deployment and innovative use of broadband. Further, it has been decided to introduce universal/unified licences and broadband wireless access (BWA) licences. The import of the universal licences is that they will allow the licensees to introduce new services without recourse to the regulator for a fresh licence. The BWA licences were introduced by the regulator, the National Communications Authority (NCA), in order to enhance competition in the broadband space and to accelerate bridging of the urban-rural ICT divide.

In terms of Telecom Regulatory Environment (TRE) assessment scores, Ghana was found in the previous SPR of 2010 to be exhibiting some dynamism. In this SPR, however, it is found that there has been less regulatory dynamism than before, and some setbacks. In the previous SPR, Ghana had positive TRE scores for market entry and interconnection, but the scores are negative for these categories in the latest TRE assessment. These negative scores are largely due to a very poor TRE score for broadband services. However, in spite of the negative TRE ranking for interconnection, there is evidence in the market of industrial harmony and acceptance by all operators of the regulator-imposed interconnection pricing regime.

RIA's analysis reveals that Ghana is among the African countries with the most competitive prices for mobile telephony services. In terms of the cheapest prepaid mobile product in the country, Ghana ranked 5th in affordability out of 44 African countries indexed by RIA in the first quarter (Q1) of 2012, and jumped to 4th position in the first quarter of 2013. Ghana's relatively good performance in this market segment is primarily due to competitive pricing among the six mobile companies operating in the country. In terms of ICT services in general, mobile telephony remains the dominant platform.

The 2012 RIA Ghana Household and Individual ICT Access and Use Survey found that only 8.5% of the surveyed Ghanaian households have a computer at home, and only 3% of these computer households have internet connectivity via the home computer. The home is thus only somewhat important in Ghana when it comes to access to computers. It was found that internet cafes are the more popular access points for the internet.

The adoption and use of mobile money services was found by the RIA research team to still be in its formative stage in Ghana, with only 1% of the survey sample having used a mobile money service.

The recommendations arrived at via this RIA SPR are as follows:

- The NCA and the Ministry of Communications should expedite actions to operationalise the issuance of the universal/unified licences in order to enable the potential benefits to be realised.
- Broadband services need to be regulated to improve the quality of service (QoS) to end-users.
- Mobile operators should take advantage of their universal licences, once operational, to use their existing infrastructure to provide broadband services to households.
- There is a need to sustain lower tariffs in the mobile telephony market in order to enable more people, especially those living below the poverty line in the base of the pyramid (BoP), to effectively utilise mobile telephony.
- Internet public access venues in Ghana are largely dominated by the private sector, with government-established venues under-performing. An in-depth study needs to be conducted to identify the operational problems of internet public access venues (both private-sector-run and government-established), in order to inform policy measures that can help support growth of these facilities.

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Acronyms and abbreviations

ARPU	average revenue per user
BoP	base of the pyramid
BWA	broadband wireless access
CAGR	compound annual growth rate
CIC	Community Information Centre
DTH	direct-to-home
GCI	Global Competitiveness Index
GHS	Ghanaian cedis
GIFEC	Ghana Investment Fund for Electronic Communications
HDI	Human Development Index
ICT	information and communication technology
ISP	internet service provider
ISSER	Institute of Statistical, Social and Economic Research
ITU	International Telecommunication Union
KITE	Kumasi Institute of Technology, Energy and Environment
LBS	location-based service
MNP	mobile number portability
MTR	mobile termination rate
NCA	National Communications Authority
NRI	Network Readiness Index
OECD	Organisation for Economic Co-operation and Development
PoP	point of presence
PPP	purchasing power parity
QoS	quality of service
RIA	Research ICT Africa
SAT3	South Atlantic Terminal 3 submarine cable
SPR	Sector Performance Review
SMP	significant market power
ToP	top of the pyramid
TRE	Telecom Regulatory Environment
UN	United Nations
UNDP	UN Development Programme
UNECA	UN Economic Commission for Africa
US$	US dollar
USO	universal service obligations
VoIP	voice over Internet Protocol
WEF	World Economic Forum

Introduction

Ghana has formulated two polices, the ICT for Accelerated Development Policy of 2003 and the National Telecommunications Policy of 2005, aimed at facilitating the country's development into an information society. Ghana has a vision of developing its economy to a middle-income level, and thus requires the development and exploitation of ICT both as a business sector and as an enabler of other sectors. Current demographic indicators show that Ghana has a population of 24.7million (Ghana Statistical Service, 2012a), and that the country's adult literacy rate for people aged 15 years and older stood at an estimated 66.6% in 2010 – only fractionally higher than the African average of 65% and lower than countries such as South Africa (88.7), Namibia (88.5%), Kenya (87.0%) and Botswana (84.0%) (UNDP, 2012).

Figure 1 below illustrates the trend in Ghana's GDP growth. Ghana registered GDP growth from 2005 to 2008, before suffering a dip in 2009 and then picking up again in 2010. In 2011, the country's GDP registered one of the highest growth rates on the continent, at 14.4%, due largely to the influx of revenue from Ghana's oil sales.

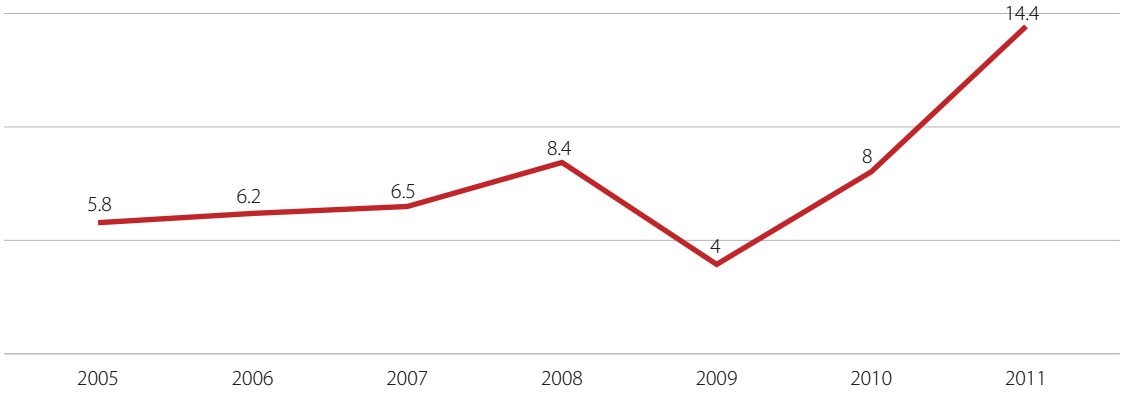

Figure 1: Trend in real GDP growth (%), 2005-2011

Source: IMF (2011a)

Ghana's services and ICT sectors have grown in GDP contribution

Ghana's economy has traditionally been agro-based with agriculture (mainly exporting raw cocoa beans, worth roughly US$2billion in export earnings in 2010) contributing significantly to the country's foreign exchange earnings. However, the agriculture sector contributes less than a third of Ghana's GDP, and agriculture's portion of GDP contribution has fallen in recent years. Between 2006 and 2010, agriculture's contribution to GDP fell from 30.4% to 29.9% (ISSER, 2011). The services sector has demonstrated significant growth, from a contribution of 48.8% of GDP in 2006 to 51.4% in 2010. And in 2011, the high-growth segments of Ghana's economy were:

- mining and quarrying (206.5%);
- construction (20%);
- trade (17.9%);
- ICT (17%); and
- manufacturing (13%). (Ghana Statistical Service, 2012b)

In Figure 2, Ghana's GDP per capita, based on purchasing power parity (PPP), is compared to per capita GDP in four other West African countries. The data indicate that Ghana's GDP was better than the other selected countries between 2005 and 2011. (As anticipated, given its decade-long civil war begun at the turn of the millennium, Cote d'Ivoire had the lowest growth rate among the five countries featured in Figure 2.)

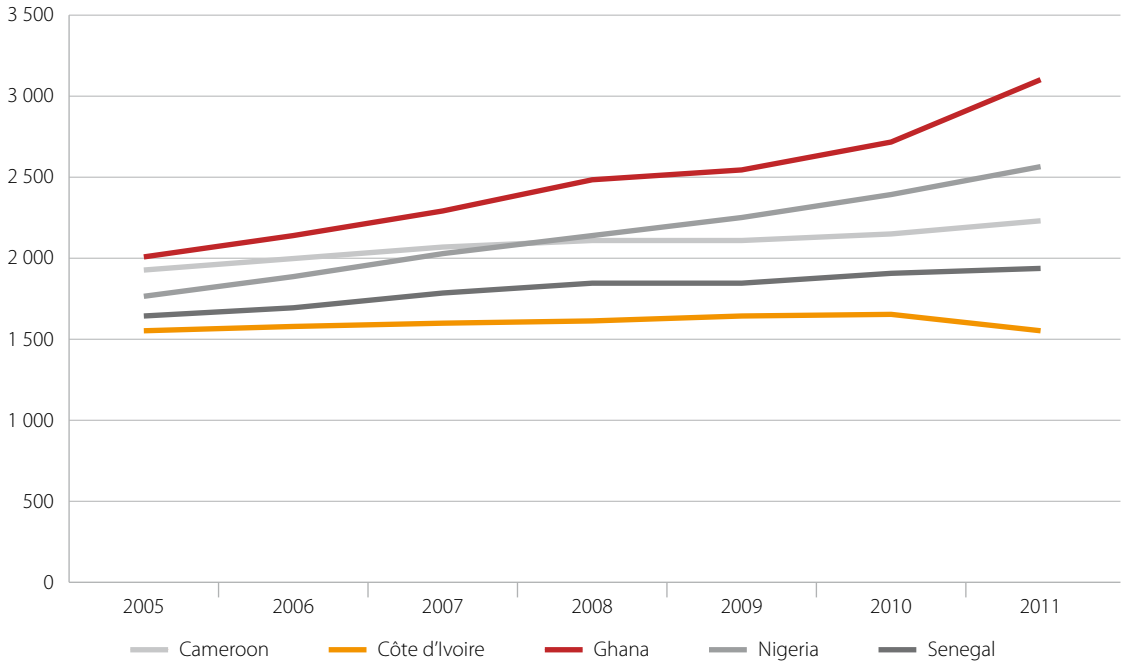

Figure 2: Comparison of per capita GDP based on PPP

Source: IMF (2011b)

Ghana has been categorised as a medium-human-developed country by recent editions of the annual UN Development Programme (UNDP) *Human Development Report*. Ghana was ranked 130th in terms of the UNDP Human Development Index (HDI) in 2010, but descended to 135th in 2011 (UNDP, 2012).

Due to the growing importance of ICT in acceleration of economic development, the World Economic Forum (WEF) has developed a Network Readiness Index (NRI) to measure the likelihood of a nation being able to take advantage of ICT to foster economic growth. (Within the last decade (2002 to 2012), the WEF's NRI framework has undergone some small adjustments to better reflect the rapid pace of change in the technology environment.) Between 2009 and 2011, Ghana's NRI rank moved up from 103rd out of 134 economies to 99th out of 138 economies, while Nigeria, within the same period, descended on the NRI ladder from 90th to 104th. Table 1 below illustrates Ghana's score on key NRI indicators, with Ghana scoring 3.6, and ranking 82nd, in the environment component and scoring 4.1 in the readiness component (and ranking 80th in this category). Ghana scored poorly in the use component, where it ranked 108th with a score of 2.6.

Table 1: Ghana's NRI scores and ranks, 2010-11

	Score	Rank
Environment component	3.6	82
Readiness component	4.1	80
Use component	2.6	108

Source: WEF (2011a)

In terms of the WEF Global Competitiveness Index (GCI), Ghana ranked 114th out of 139 countries for 2010-11, higher than countries such as Ethiopia (119th) and Nigeria (127th), but below Kenya, which ranked 106th, and Namibia, which ranked 74th (WEF, 2011b). Ghana's GCI ranking is worrying, since a strong GCI score provides a good basis for attracting investors to the economy. The low ranking suggests a need to put in place policy and regulatory frameworks that can improve the country's competitiveness.

This paper reviews the performance of Ghana's ICT sector by unravelling the policy developments within its regulatory framework before monitoring the price trends of telephony and broadband services. Thereafter, analysis of ICT supply and demand in Ghana is conducted to better visualise the accomplishments and shortcomings of the sector thus far, before taking a look at how people make use of the sector's services, as well as its associated behavioural trends. Earmarking of the common findings throughout these sections is made evident in the penultimate section: Emerging issues.

Policy and regulatory frameworks

In 2008, an array of laws was passed to bolster the development of Ghana's ICT industry, including:

- the National Communications Authority Act 769 of 2008;
- the National Information Technology Agency Act 771 of 2008;
- the Electronic Transactions Act 772 of 2008; and
- the Electronic Communications Act 775 of 2008.

However, the laws are yet to be fully implemented. For example, the National Communications Authority Act and Electronic Transactions Act make provision for the establishment of an Electronic Communications Tribunal to arbitrate in industry-related disputes. The Tribunal will potentially be very important in ensuring industrial harmony, by providing opportunities for operators to seek redress or clarifications on decisions of the regulator. However, the Tribunal had not, by 2012, been established (four years after the promulgation of the Acts). The Acts mandate the Public Service Commission to appoint the members of the Tribunal, without specifying who is to initiate the Tribunal's actual establishment. So while the laws recognise that the ICT industry is dynamic and associated with rapid technological changes requiring new mechanisms to ensure its effective functioning, at least one of the planned mechanisms, the Tribunal, has yet to come into being.

National broadband strategy

Many countries are developing mechanisms to support the growth of broadband access and use, as broadband offers high-speed data transmission, enables multimedia communication, improves access to information, and supports high-quality internet connectivity (Kim *et al.*, 2010). To ensure Ghanaians enjoy the potential of broadband services, the Ministry of Communications has, in 2011-12, been working to complete development of a broadband policy for the country – a process which began in 2009 with publication of the draft National Broadband Strategy for Economic Growth and Development (based on the National Telecommunications Policy of 2005).

When finalised, the National Broadband Strategy will seek to influence the development of broadband through:

- promoting robust competition in the broadband market;
- encouraging the deployment, adoption and use of broadband in areas where the market alone is not providing these sufficiently, particularly in underserved areas where the cost of deployment is too high for operators' to earn a return on private capital or where households cannot afford a connection;
- providing firms and consumers with incentives to extract value from the use of broadband, particularly in sectors such as education, trade, transportation and healthcare;
- encouraging broadband deployment, adoption and use to aid, *inter alia*, private sector investment, entrepreneurial activity, job creation and economic growth; and
- encouraging the use of innovative technologies, such as broadband over power lines, to increase broadband availability.

Licensing

A significant new development in the licensing environment in 2011 was the move by the NCA to begin to issue service-neutral universal/unified licences to all telecommunications operators. The NCA has made a proposal to the Ministry of Communications for approval of the issuance of said licences, based on a proposed fee schedule. The importance of these licences is that they will allow operators to introduce new services without recourse to the regulator for fresh licences. For example, mobile telephone companies will be able to enter the data service market without applying for a new licence. This approach has been adopted by a number of other African countries, including Botswana, Kenya, Uganda and Rwanda. It will be important to monitor the impact of this licence policy on developments in the market, especially regarding the provision of broadband data services.

Another development in 2011 aimed at facilitating the deployment of broadband service was the issuance by the NCA of BWA licences in the 2500MHz to 2690MHz band. (BWA licences were first issued in 2010 but had to be re-issued in 2011 after the successful companies could not raise the minimum required licence fees.) The issuance of BWA licences is aimed at helping achieve the objective, proposed in the draft National Broadband Strategy, of increasing broadband deployment by 50% by 2015. Other key motivations underlying the issuance of the BWA licences are enhancement of competition in the broadband space and acceleration of the bridging of the urban-rural divide in employment, income and tax revenues. One significant change in the BWA licensing of 2011 (compared with the previous effort in 2010) was the reduction in the total number of spectrum licence slots, from five to four slots. In the 2010 licence procedure, three out of the five spectrum slots were for 30MHz blocks and two were for paired 2x15MHz. In the latest BWA licensing procedure, two slots have been allocated for 30MHz and two slots for 2x15MHz, making a total of 4 slots. The requirement of a minimum of 30% local ownership, via a joint venture or consortium, has been retained in the most recent BWA licensing.

Another significant development in 2011 was the regulator NCA's provision that allowed companies issued with BWA licences to provide voice communication only after meeting minimum criteria enshrined in the licence document, which include, *inter alia*, attaining some degree of coverage in 100% of districts in the country and achieving at least 60% coverage in each zone of the country. And in contrast to the 2010 BWA licensing procedure, which did not make any provision for voice communications, this time around service providers can offer voice communications after one year. The rationale is to indirectly introduce competition into the fixed-line telephone market, which is at present in a near-monopoly situation with poor (and even negative) growth figures. For example, while the compound annual growth rate (CAGR) for mobile telephony between 2005 and 2010 was 43.4%, fixed-line growth was negative, with its CAGR shrinking 2.1% (ITU, 2011). The NCA hopes the new BWA provisions will lead to the introduction of competition into, and revival of, the fixed-line market.

TRE assessment

RIA completed its latest Telecom Regulatory Environment (TRE) assessment for Ghana in 2012. The underlying objective of the TRE assessment methodology (see LIRNEasia, 2008) is to collect the opinions of key stakeholders from three categories[1] that exist in each of the three telecommunications market sub-sectors of fixed-line telephony, mobile telephony and broadband. TRE assessments are based on the following seven indicators, as applied to each of the three sub-sectors:

- market entry;
- access to scarce resources;
- interconnection;
- tariff regulation;
- regulation of anti-competitive practices;
- universal service obligations (USO); and
- quality of service (QoS).

The NCA has not turned regulatory experience and erratic improvements into positive TRE scores

This was the third TRE assessment conducted by RIA in Ghana, following previous assessments in 2006 and 2009. Figure 3 presents a combined analysis of TRE results from the three assessments – an analysis that provides mixed results. Ghana registered improvements in regulation of market entry and interconnection in the TRE of 2009, but the scores for these indicators were negative in the 2006 assessment and in the most recent 2011 assessment. The negative scores in the most recent TRE assessment, after more positive showings in the previous TRE exercise, are perhaps surprising considering how well the ICT sector is doing overall, particularly in the area of mobile telephone prices. (It can potentially be argued that the negative scores exist because improvements in the regulatory environment are erratic and the regulator seems not to be building effectively on the regulatory experience it has gained.)

Looking at the sub-sector TRE scores individually, in the 2012 TRE it was found that Ghana has maintained its positive scores for regulation of market entry[2] and interconnection in both the fixed-line and mobile sub-sectors. But all three sub-sectors have had persistently negative scores for the regulation of other indicators, particularly USO, QoS, access to scarce resources and anti-competitive practices. Evidence exists of the NCA making some efforts to regulate QoS by

1 The three categories of stakeholders surveyed were:
- Category 1: stakeholders directly affected by telecom sector regulation, e.g. operators, industry associations, equipment suppliers and investors.
- Category 2: stakeholders who analyse the sector with broader interest, e.g. financial institutions, equity research analysts, credit rating agencies, telecom consultants and law firms.
- Category 3: stakeholders with an interest in improving the sector to help the public, e.g. academics, research organisations, journalists, telecom user groups, civil society, former members of regulatory and other government agencies, donors and current government employees from organisations related to the telecom sector (excluding those in the telecom regulatory and policy hierarchy, i.e. excluding anyone from the regulatory agency, a policymaking body (Ministry or similar), the Minister in charge of telecommunications).

2 When the scores across all three sub-sectors are combined, Ghana had a negative market-entry score in 2011 (though not as negative as the score for some of the other indicators).

monitoring the operators and their fulfilment of their licence obligations.[3] In three consecutive rounds of monitoring, certain operators have been penalised for poor QoS. In April and September 2011 as well as March 2012, the NCA monitored QoS in a number of locations and those operators that were seriously in breach of their licence conditions were sanctioned, while others were given deadlines before which to improve upon their services in identified locations. For instance, Airtel was given until June 2012 to complete its expansion programme in Brong Ahafo, so as to reduce call congestion in that region. The positive effects of QoS sanctions are not yet being felt by consumers, thus potentially explaining the negative ranking across all three sub-sectors for QoS regulation in the 2012 TRE. The effects of QoS monitoring exercises may impact more positively on the next TRE.

Figure 3: Ghana TRE scores in 2006, 2009, 2012

Source: RIA TRE assessment data

Ghana is not alone in experiencing negative perceptions of its regulatory environment in this most recent TRE assessment, as 10 other countries assessed by RIA have negative overall TRE scores, as demonstrated in Figure 4. Among the RIA countries with negative TRE scores, Rwanda has the least negative ranking, followed by Tanzania, Kenya and Ghana. Countries with the worst scores are Ethiopia, South Africa and Mozambique. (However, it must be borne in mind that a country's political culture will influence the perception of the telecommunications environment (and stakeholders' willingness to critique the regulatory environment), making definitive comparative assessment between countries problematic. For this reason, longitudinal comparisons of TRE results for individual countries are likely to be more useful in determining improvements or setbacks in a national regulatory environment.)

One factor which seems clearly to contribute to poor TRE performance in Ghana is the poor performance of broadband services. The very negative TRE responses for broadband regulation consistently bring down Ghana's overall TRE results.

3 The key QoS indicators are call congestion rate, call-drop rate and call set-up time.

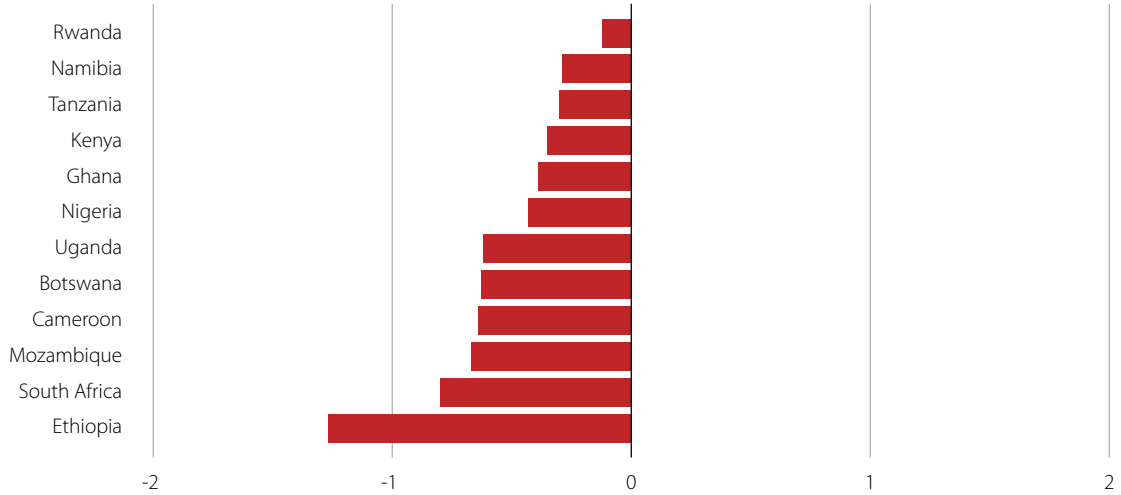

Figure 4: Overall TRE scores in 11 RIA study countries

Source: RIA TRE assessment data 2011-12

The NCA's low regulatory scores reflect poor provision of broadband services

The very poor TRE scores for broadband in Ghana illustrate the need for regulation of this market segment, which is currently unregulated. The rationale behind the unregulated nature of the service area is that market forces are to be allowed to control broadband growth. However, the TRE results point to the need for the regulator to devise strategies to support the penetration of broadband. The availability of two international submarine cables (and others poised to land in the country), and fuller utilisation of the national terrestrial fibre backbone (and similar backbones owned by most of the mobile telephone companies), should be increasing access and speed, as well as reducing costs, for broadband services. The NCA clearly hopes that the aforementioned introduction of universal licences, and the newly licensed BWA providers, will lead to improved and expanded broadband service provision.

Pricing of services

The pricing of telecommunications services and products is integral to promoting accessibility and use. The general price level needs to cover the operational costs of the operators and, at the same time, to be affordable to most of the citizenry. One of the most important policy objectives of the Government of Ghana is facilitation of uptake of telecommunications services by all segments of the population, in order to increase productivity and reduce poverty. In Ghana, with the exception of regulated fixed-line telephony and regulator-set frequency spectrum allocation charges, market forces are supposed to determine price levels. Indeed, evidence from the market indicates strong pricing competition in some segments, especially in mobile telephony.

Fixed-line telephony

As in other emerging economies, Ghana does not have a well-developed fixed-line telephony market. Fixed-line subscriber numbers are falling as people increasingly use mobile telephony as their principal means of communicating. Even in business and residential areas served by fixed-line infrastructure, people rely more on mobile connections for their communication needs. In developed economies, mobile telephones are seen as complementary to fixed-line telephones, which have extensive coverage and high penetration rates. In emerging economies such as Ghana's, mobile services have become a substitute for fixed-line, with mobile telephone subscriptions far outpacing those of fixed.

One can expect relatively little fixed-line growth during the next five years, which has implications for the evolution of broadband services in the country. Presently, Ghana's fixed-line market is made up of two operators, Vodafone and Bharti Airtel. Vodafone has over 90% market share. This high concentration of the fixed-line market in the hands of one operator has hindered competition, in contrast to the competitive environment in the mobile sector (which has six operators). The market share of fixed-line telephony as a percentage of the total telecommunications market stands at only 1.3% (NCA, n.d.1).

Between 2009 and 2012, Vodafone charges remained the same, at GHS0.06[4] per minute for calls on fixed-line networks and GHS1.14 for calls between fixed and mobile networks. At Airtel, there was a price reduction during the same 2009 to 2012 period, from GHS0.12 to GHS0.08 per minute for calls on fixed-line networks. Airtel's actions led to a reduction in the average price of local fixed-line telephony, from GHS0.09 to GHS0.07 per minute. Table 2 provides the June 2012 call charges of Vodafone and Airtel and the industry average.

4 GHS stands for Ghanaian cedi. Where US$ values are provided in this report, they are calculated at a rate of GHS2 to US$1.

Table 2: Fixed-line tariffs of telephony operators (prepaid, per minute, in GHS), June 2012

	Vodafone	Airtel	Industry average
On-net	0.06	0.053	0.0565
To other local fixed network	0.06	0.053	0.0565
To local mobile network	0.1368	0.084	0.1104
To the UK	0.3	0.36	0.33
To the US	0.13	0.19	0.16
To Canada	0.13	0.19	0.16
To Italy	0.86	0.49	0.675
To Nigeria	0.3	0.36	0.33
To South Africa	0.86	0.39	0.625
To Germany	0.44	0.36	0.4
To China	0.13	0.19	0.16
To UAE	0.44	0.39	0.4150
SMS on-net		0.04	0.04
SMS on other networks		0.044	0.044

Source: NCA (n.d.2)

Mobile telephony

Meanwhile, in the mobile market segment, there is evidence to suggest that competition is affecting pricing. Between 2009 and 2012, the average on-net price fell by 27.8%, from GHS0.12 to GHS0.09 per minute. In the same timeframe, the average off-net price (for calls to numbers on other networks) dropped by 17.7%, from GHS0.14 to GHS0.12 per minute. Tigo, whose on-net price level dropped from GHS0.15 per minute in 2010 to GHS0.03 per minute in 2012, largely brought about the fall in the average mobile call price.

A key development in the mobile industry's pricing system occurred in the third quarter of 2010, when Vodafone and Airtel introduced a one-rate tariff (for both on- and off-net calls) of GHS0.08[5] (US$0.042) per minute for their mobile subscribers. This was the first time that the one-rate tariff had fallen below GHS0.10 per minute.

5 In the case of Vodafone, the subscriber has to register before he/she can receive the reduced tariff. Non-registered subscribers pay a higher tariff (GHS0.144 per minute for both on-net and off-net).

Table 3: Tariffs of mobile operators (prepaid, per minute, GHS), June 2012

	MTN	Tigo	Vodafone	Airtel	Glo	Expresso	Industry average
On-net	0.09	0.03	0.144	0.084	0.08	0.0954	0.0872
Off-net (other local networks)	0.13	0.102	0.144	0.084	0.09	0.1494	0.1166
To UK	0.3	0.354	0.3	0.36	0.44	0.2118	0.3276
To US	0.144	0.132	0.13	0.19	0.11	0.2118	0.1530
To Canada	0.14	0.132	0.13	0.19	0.11	0.2118	0.1530
To Italy	0.44	0.54	0.86	0.49	0.275	0.3601	0.4942
To Nigeria	0.192	0.198	0.3	0.36	0.165	0.2118	0.2378
To South Africa	0.44	0.354	0.86	0.39	0.275	0.3601	0.4465
To Germany	0.44	0.54	0.44	0.36	0.275	0.3601	0.4025
To China	0.144	0.132	0.13	0.19	0.11	0.2118	0.1530
To UAE	0.44	0.354	0.44	0.39	0.44	0.3601	0.4040
SMS on-net	0.04	0.0403	0.04	0.04	0.04	0.0424	0.0405
SMS other networks	0.05	0.0477	0.0424	0.044	0.04	0.0438	0.0447
MMS	0.18	0.212	0.19	0.18			0.1905
Data, per MB	0.06	1	0.2	0.06	0.05	0.05	0.2367

Source: NCA (n.d.2)

Table 3 shows the tariffs for all mobile operators in the country in June 2012. The cheapest operator in terms of on-net calls is Tigo, while Airtel is the cheapest for off-net. Vodafone and Expresso have the most expensive tariffs for off-net calls.

MTN and Airtel have introduced dynamic pricing whereby the per-minute price depends on the traffic situation within a particular cell site or zone (where the call is originating) and the time of the day.[6] For instance, with the MTN Zone pricing scheme, subscribers receive a per-minute call rate between GHS0.02 and GHS0.10 per minute, depending on the traffic and capacity available on the network in the area.

Table 4 shows the top 25 countries in Africa for affordability of prepaid mobile according to RIA's Price Transparency Index (RIA, n.d.). (The US$ figures in the table are based on the tariffs of the cheapest operator in terms of the 2010 OECD monthly low-user basket definition.[7]) Ghana ranked 6th out of 25 countries in the first quarter (Q1) of 2011, 5th in Q1 2012 and 4th in Q1 2013.

6 MTN introduced its zonal (Zone) services in 2010, while Airtel unveiled Smart Zone pricing in 2012.

7 To at least partially overcome comparative pricing complexities, the Organisation for Economic Co-operation and Development (OECD) has developed a "price benchmarking baskets" methodology – the methodology which was used to generate the price comparisons in Table 4. The 2010 OECD low-user basket definition is based on 40 calls per month with a distribution of calls across different times of the day and across both on-net and off-net use.

Table 4: Cheapest prepaid product per country (according to OECD low-user basket, in US$ per month)

#	Countries	Q1 2011	#	Countries	Q1 012	#	Countries	Q1 2013
1	Kenya	3.24	1	Sudan	1.72	1	Sudan	1.72
2	Sudan	3.61	2	Guinea	2.41	2	Guinea	2.41
3	Ethiopia	3.88	3	Kenya	3.24	3	Kenya	2.58
4	Uganda	3.94	4	Ethiopia	3.88	**4**	**Ghana**	**3.9**
5	Mauritius	4.13	**5**	**Ghana**	**3.9**	5	Egypt	4.01
6	**Ghana**	**4.22**	6	Uganda	3.94	6	Mauritius	4.13
7	Tanzania	4.59	7	Mauritius	4.13	7	Ethiopia	4.3
8	Egypt	5	8	Egypt	4.67	8	Tanzania	5.01
9	Rwanda	5.83	9	Nigeria	5.77	9	Nigeria	5.77
10	Guinea	6.26	10	Tanzania	5.82	10	Sierra Leone	6.28
11	Sierra Leone	6.28	11	Sierra Leone	6.28	11	Uganda	6.32
12	Gambia	6.85	12	Algeria	6.48	12	Tunisia	6.36
13	Algeria	9.53	13	Gambia	6.85	13	Rwanda	6.37
14	Nigeria	9.55	14	Libya	6.88	14	Algeria	6.48
15	Tunisia	9.89	15	Rwanda	8.04	15	Gambia	6.85
16	D.R. Congo	12.43	16	Zambia	9.86	16	Libya	6.88
17	Benin	12.45	17	Tunisia	9.89	17	Congo Brazzaville	7.82
18	Mauritania	12.59	18	Botswana	11.75	18	Botswana	11.75
19	Namibia	12.8	19	Namibia	12.2	19	Namibia	12.2
20	Libya	12.87	20	Liberia	12.37	20	Mauritania	12.33
21	Liberia	13.25	21	D.R. Congo	12.43	21	Liberia	12.4
22	Malawi	13.86	22	Benin	12.45	22	Benin	12.45
23	Congo Brazzaville	14.66	23	Mauritania	12.59	23	South Africa	12.57
24	Senegal	14.93	24	Congo Brazzaville	13.48	24	Cote d'Ivoire	12.75
25	Burkina Faso	14.95	25	Sao Tome and Principe	13.54	25	Senegal	12.76

Source: RIA Price Transparency Index (see RIA, n.d.)

With mobile prices now very low in many African countries, it is anticipated that mobile operators in these countries will increasingly turn their attention to coverage, network quality and value-added services, as areas where they can differentiate themselves.

Ghana is among those African countries with the lowest prepaid mobile telephone prices

Broadband services

Pricing of broadband services in Ghana is not nearly as competitive as it is for mobile voice. This can be attributed to lethargy in the market. Analysis of the pricing of broadband services is hampered by difficulties in obtaining information from internet service providers (ISPs). Thus, only selected ISPs whose data are readily available – InternetGhana, Vodafone and BusyInternet – were analysed for this study.

Table 5: Internet Ghana tariffs

Type of service	Browsing speed		Cost of starter pack (US$)	Monthly charges (US$)
	Download	Upload		
Prestige	256 kbps	128 kbps	350	52.5
Night-Shift [8]	256 kbps	128 kbps	350	38.5
Campus	128 kbps to 2 mbps		350	38.5

Source: Internet Ghana (n.d.)

InternetGhana (see Table 5) has three broadband packages: Prestige, Night-Shift and Campus. The equipment cost for each of the three packages is US$350, with a monthly charge of US$52.5 for Prestige. The other two packages have the same monthly charge of US$38.5.

Table 6: Vodafone fixed broadband tariffs

Type of service	Browsing speed		Installation	Monthly charges (US$)
	Download	Upload		
Browser Max	2 mbps	512 kbps	Free	35
Streamer Lite	4 mbps	1 mbps	Free	52.5
Streamer Max	8 mbps	2 mbps	Free	72.5
Downloader Lite	12 mbps	3 mbps	Free	92.5
Downloader Max	20 mbps	5 mbps	Free	100

Source: Vodafone (n.d.)

8 From 6pm to 8am weekdays, and all day on weekends, the data service is unlimited.

Table 6 shows the pricing levels for Vodafone's broadband packages. The data show Vodafone has faster download speeds, and comparatively cheaper rates, than InternetGhana. For example, a subscriber to Vodafone's Browser Max receives a download speed of up to 2 mbps and pays only US$35 per month. For a speed of up to 4 mbps (Vodacom's Streamer Lite), a subscriber pays US$52.5, while a subscriber to the Prestige package of InternetGhana pays the same amount for a speed of only 256 kbps.

Table 7: Busy Internet broadband services

Type of service	Browsing speed	Installation (US$)	Monthly charges (US$)
BusyPro	128 kbps	199	95
BusyMax	256 kbps	199	140
BusyUltra	512 kbps	199	230

Source: Busy Internet (n.d.)

Busy Internet (see Table 7) charges US$95 (GHS190) per month for a speed of 128 kbps, US$149 (GHS298) for 256 kbps, and US$230 (GHS460) for a speed of 512 kbps. Africa Online Ghana used to have three internet service packages (Infinet Pro, Classic and Lite). However, all these packages have now been collapsed into one called Infinet, which has a shared speed of 128 kbps with an initial charge of US$100 (GHS200) for the first three months, followed by a monthly charge of US$65 (GHS130). Companies such as Iburst Ghana and Teledata ICT are offering broadband services on a prepaid basis. A prepaid Iburst voucher valued at GHS100 (US$50) provides 1400MB of data.

Generally, Vodafone has the lowest broadband pricing in the country. Many analysts view Vodafone's pricing as predatory and having the potential to frustrate other ISPs out of the market (Balancing Act, 2009). (This might have been possible when Vodafone (then Ghana Telecom) had a monopoly over the submarine fibre cable SAT3. However, the current presence of two companies providing submarine fibre cable access (Vodafone and newcomer Main One) has resulted in a fall in wholesale prices to almost US$1 300 a month for 2 mbps duplex (though this has yet to reflect in the prices of ISPs other than Vodafone).) A critical issue is that most ISPs are relatively small and do not have the financial capacity to buy bandwidth at wholesale prices directly from one of the two submarine cable companies. Consequently, most ISPs buy from retailers at relatively high prices.

Mobile Termination Rates (MTRs)

Interconnection regulation, via determination of MTRs, is a major issue for the liberalisation of network services, and tends to underline tensions and conflicts among operators. MTR regulation is important for effective competition since it can enable consumers to more affordably communicate with subscribers on other networks, and it can make it easier for new players to enter the market competitively.

Prior to 2012, Ghana's MTRs were regulated symmetrically, i.e. there was a single, reciprocal (symmetric) call termination charge for all mobile operators in the market. Between 2008 and 2011, the MTR for mobile operators was set at US$0.025 (GHS0.049) per minute, a drop from the previous level of approximately US$0.035 per minute. The reduction was based on an MTR glide path established by the NCA with the support of the operators. In 2012, a new NCA-mandated glide path began, as outlined in Table 8.

Table 8: MTR glide-path, 2012-14, (US$)

	2012	2013	2014
Voice from mobile	0.025 (i.e. US2.5 cents)	0.023	0.02
Voice from fixed-line	0.025	0.023	0.02
SMS	0.035	0.030	0.025

Source: NCA (2011a)

The new glide path has introduced common termination charges across both fixed-line and mobile telephone services. The objective is to reduce distortions in traffic terminations or flows between fixed-line and mobile networks -- distortions which were being caused by differences in termination charges. (In the past, the termination charges for interconnection from fixed to mobile networks were lower than the charges for interconnection from mobile to fixed. Consequently, it was cheaper to terminate a call from a fixed-line network to a mobile one than was the case *vice versa*, and this resulted in unbalanced traffic flow between fixed and mobile networks. It also resulted in fixed-line operators paying more for termination charges to mobile network operators than *vice versa*.)

Asymmetric MTRs were introduced to support the growth of small operators

The new interconnection glide path has also introduced asymmetric interconnection rates, to be applied to new entrants and to operators with less than 5% penetration in the mobile market. Glo Mobile (a new entrant) and Expresso (with less than 5% penetration) have been beneficiaries of this new tariff structure. The asymmetric MTRs are intended to encourage new or smaller players by compensating for the high cost of network investment and the constraints faced by new entrants who do not enjoy the economies of scale of existing players. Under the new regime, calls originating from Glo Mobile and Expresso to any other network in the market attract a termination rate of US$0.2 per minute, while calls terminating on the Glo Mobile and Expresso networks attract charges of US$0.25 per minute. According to the NCA, the asymmetric MTR regime is a transitional initiative, with a maximum period of two years beginning in 2012, in order for beneficiaries to achieve the minimum threshold of 5% penetration. In essence, the asymmetric MTR regime forms part of the regulator's pursuit of the objective of achieving maximum levels of efficiency in the marketplace. The regulator has also developed a mechanism to monitor the market to prevent market distortion by the asymmetric MTR beneficiaries.

In the 2012 RIA TRE exercise, Ghana recorded a positive score for interconnection regulation in both the mobile and fixed markets (see Figure 5). The mobile interconnection glide path set by the regulator and the existence of two mobile operators (MTN and Vodafone) with significant market power (SMP) have contributed to the current enabling mobile interconnection regime. However, the country's overall 2012 TRE score for interconnection regulation became negative when the interconnection scores for mobile and fixed voice communication were combined with the score for broadband services – because, as indicated earlier, broadband is far less competitively priced.

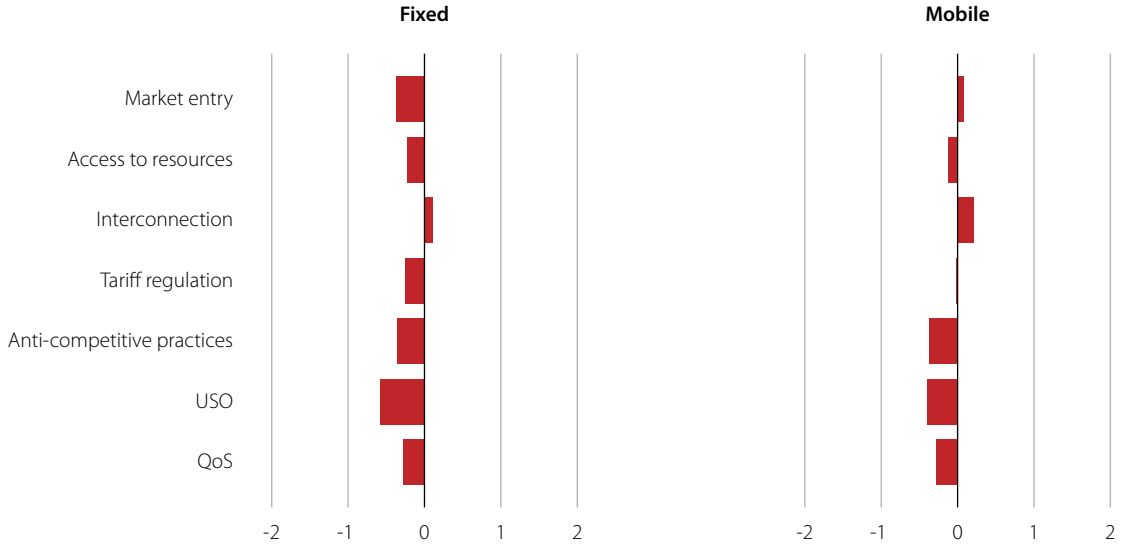

Figure 5: TRE scores for regulation of Ghanaian fixed and mobile telephony

Source: RIA TRE assessment data 2011-12

Negotiations took place to generate reduced broadband interconnection charges, and these negotiations generated considerable acrimony between the then-Ghana Telecom (which had a monopoly on international broadband access) and the ISPs. It took ministerial and parliamentary intervention before the wholesale price for 2 mbps duplex was reduced, between 2004 and 2010, from US$12 000 per month to US$4 500 per month, and this price level was still far higher than bandwidth prices in the US and Europe. Tension over pricing was reduced with the launch of the Main One submarine cable in the first quarter of 2011 to compete with Vodafone's SAT3 cable access, bringing the cost of 2 mbps duplex to a wholesale price of roughly US$1 300 per month in 2012.

Spectrum fees

The radio frequency spectrum, because it is a scarce natural resource with increased pressure on it in prime bands due to expansion of wireless services, has begun to attract new regulatory charges in recent years. In Ghana, such regulatory charges are of four types: application fees, initial fees, annual regulatory fees and annual spectrum fees. In 2010, the NCA increased the prices for all categories of use of the national spectrum.

In 2007, the radio spectrum was divided into three segments: urban, sub-urban and community. By 2010, the annual regulatory fee for urban radio broadcasting had increased from US$1 600 per year to US$2 000; sub-urban from US$1 200 to US$2 000; and community from US$800 to US$2 000. In the television market, the significant change in pricing occurred in relation to direct-to-home (DTH) satellite broadcasting. The DTH annual regulatory fee was raised to US$35 000, replacing the previous fee of 1% of net revenue that had been introduced in 2007. In the internet market, ISPs' annual regulatory fee for public data services went up by 25% to US$2 000 in 2010. (Meanwhile, there was a reduction in the ISP application fee from US$1 000 in 2007 to US$500 in 2012 (see Table 9). Further, the ISP initial application charge was also reduced, from US$8 000 to US$5 000, in 2012.)

For corporate organisations with licences to provide data services, there were incremental increases between 2007 and 2012 in all spectrum charges. The annual regulatory fee for corporate data service increased over 300%, from US$800 in 2007 to US$3 500 in 2012; the application fee was raised from US$500 to US$1 000; and the initial charge went up to US$7 000 from US$6 400. There is a likelihood that these increases in regulatory fees will be passed on to clients via increases in commissions paid on transactions. (For example, some banks charge commission on withdrawals from branches of the same bank which are not the customer's branch.)

Table 9: Fees, in US$, to the NCA for public and corporate data services

	Internet (public data service)		Corporate data service	
	2007	2012	2007	2012
Application fee (US$)	1 000	500	500	1 000
Initial fee (US$)	8 000	5 000	6 400	7 000
Annual regulatory fee (US$)	1 600	2 000	800	3 500

Source: NCA (n.d.3)

The changes in the regulatory pricing model are aimed at reducing the comparative financial burden of ISPs, which provide public internet and broadband access, and can be seen as a response to market demands. However, there is no evidence to suggest that these reductions have directly affected the overall pricing regime in the country.

Mobile number portability (MNP)

Ghana introduced MNP in July 2011, but by the end of 2011, only 60 000 mobile subscribers had taken advantage of the opportunity to port. This represented an insignificant 0.0025% of the total number of mobile telephone subscriptions in 2011, revealing that people are reluctant to port their numbers from one provider to another. Several other countries in Africa have experienced similar situations: the regulator introduces MNP with the hope of aiding competition, only to find the actual porting of numbers is sluggish. The promise of MNP did, however, contribute to compelling Ghana's mobile operators to ramp-up their capital expenditure, upgrade their infrastructure to facilitate new applications, improve QoS and offer promotions in order to try to retain their subscribers and to attract other subscribers away from rival networks.

Supply- and demand-side analysis

The analysis in this section is based on the findings of the 2012 RIA Ghana ICT Survey, augmented by supply-side data from the regulator, the NCA.

Penetration of fixed telephony

Although fixed-line penetration was always very limited and has been substantially overtaken by mobile penetration, it still has an important role to play in the country's socio-economic development.

The deployment of fixed telephone services at household level is very low in Ghana, with the 2012 RIA Ghana ICT Survey data showing that only 2% of households have a fixed-line telephone. Further, households with fixed-line telephones are predominantly found in the urban areas, with rural households accounting for only a third of fixed subscriptions. This one-third rural proportion is, however, up from the figure of 15.8% of fixed connections in the 2010 RIA Ghana ICT Survey. It is difficult to ascribe reasons to this increase, since there was no significant increase in total subscriptions, across both rural and urban areas, from 2009 to 2011. Fixed subscriptions over this period have an average annual growth rate of 3.2%.

Close to half (45.1%) of the households with residential telephones were found in the latest RIA ICT Survey to have acquired the service recently (i.e. 2009 or later) (see Table 10). Almost 30% acquired the service between 2005 and 2008, meaning that cumulatively 75% began their subscriptions to the service after 2005. The increased subscriptions are likely due to a great extent to promotion programmes by Vodafone, which has used fixed wireless technology to deploy fixed services to populous residential areas in the capital city Accra (such as the Sakumono and Adenta SSNIT Flats, the Atomic Hill Estate and Regimmanuel Gray Estates) and to populous areas in other large cities in the country. The residents of these estates are mostly middle- and upper-income earners.

Table 10: Year of acquisition of fixed household telephone connection

Period	%
Before 2000	2.0
2000-2004	23.3
2005-2008	29.6
2009 or later	45.1

Source: RIA ICT Survey data 2011-12

Table 11 presents the total fixed telephone subscriptions in the country in the years from 2005 to 2011. The data show that fixed-line growth has been only modest in recent years, and still has not regained the 2006 high from which it fell in 2007 and 2008. The market experienced incremental growth between 2005 and 2006, declined in 2007 and 2008, and picked up again in the subsequent years. (However, it must be noted that the decline in 2007 was to some extent due to an administrative decision to clean the data on fixed-line telephone subscribers, as part of measures to prepare the then-Ghana Telecom (now Vodafone) for sale. All inactive fixed-lines were removed from the database, and this contributed to bringing the total subscription figure down in 2007.)

Table 11: Total fixed-line telephony subscriptions

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

Sources: NCA (2012a, and previous NCA reports), ITU (2008)

Between 2006 and 2010, the CAGR for fixed telephony was negative, at -4.4% (partly due to the aforementioned cleaning up of the Ghana Telecom data). The overall negative growth rate in fixed-line telephony over the past decade mirrors the trend in other developing countries across the world, where growth in mobile is cutting into the fixed-line market and making mobile telephony a substitute for, instead of a complement to, fixed. As was also recommended in the 2010 RIA Ghana SPR (Frempong, 2010), there is a need for pragmatic policies geared towards reviving the fixed-line telephone market because this market still has an important role to play in the country's efforts to develop a knowledge-based economy and society. It is hoped that the issuance of BWA licences will propel strategic competition in the fixed-line voice and data markets.

Mobile telephone penetration

As in most other countries around the world, mobile telephony in Ghana has become ingrained in the communications system, becoming a strategic technology not only for voice but also for business applications (Frempong, 2009). The deployment of mobile telephones has been dramatic, particularly in the 2000s. The total number of mobile subscribers surpassed fixed-line subscriptions in 2002, and in 2011, Ghana had 21.2million mobile subscribers while fixed-line subscriptions (as outlined above in Table 11) numbered only 284 721. Data from the 2012 RIA ICT Survey indicate that almost 60% of the individuals sampled subscribe to a mobile telephone service, marginally up from 59.8% in the RIA Ghana Survey of 2008. Of this number, close to one- third (28%) have multiple SIM cards, an increase from the 2008 data, which found that only 11% of the sample had multiple SIMs.

Increased mobile subscriptions have negatively affected the APRU of mobile companies

It has been argued that recent increases in mobile subscription levels have affected the average revenue per user (ARPU) of the operators, because the recent increases are to a great extent the result of multiple SIM ownership. The argument is that as more poor people acquire multiple SIMs, the average use of an individual SIM drops and this affects the earnings of the mobile companies. Subscribers are now distributing their resources – which previously would have been used for one operator via a single SIM – over multiple networks. For example, with 10.5million subscribers in 2008, Ghana's mobile APRU was around US$10. ARPU fell to US$6 in 2010, based on 16million subscribers, and was further reduced to between US$2 and US$3 in 2011 (CitiFM, 2012).

Table 12 provides the breakdown of 2012 RIA Ghana ICT Survey respondents' subscriptions to Ghana's mobile companies. MTN Ghana was found to be the most subscribed-to network among respondents, with 57.7% of those surveyed indicating they have MTN SIMs, followed by Vodafone (21.9%), Tigo (8.8%), Airtel (4.9%) and Expresso (3.2%)

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Table 12: Penetration of mobile telephony operators

Operator	% of respondents who subscribe
MTN	57.7
Vodafone	21.9
Tigo	8.8
Airtel	4.9
Expresso	3.2
No SIM	3.5

Source: RIA ICT Survey data 2011-12

The official NCA data for 2011 on the market positions of the operators are provided in Figure 6. (It must be noted that the percentage shares of subscribers generated by the 2012 RIA ICT Survey do not, unlike the NCA numbers, include SIMs used for dedicated business purposes or surveillance and monitoring.) According to NCA market data, MTN has maintained a leading position since 1999, but its market share declined from 53% in 2009 to 48% in 2011. The net gainers have been Vodafone and Airtel. Vodafone has wrestled the second position in the market away from Tigo, while Airtel's market share has risen from 8% in 2009 to 12% in 2011.

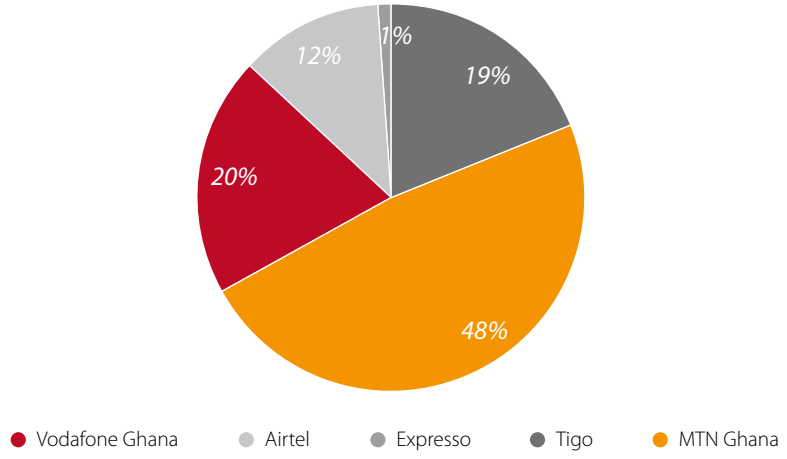


Figure 6: Market shares of mobile operators, 2011

Source: NCA (2012b)

In 2011, Ghana's mobile market grew by 21.4% from the year before, to reach the aforementioned 21.2million subscribers. The industry registered a net addition of 3.7million subscribers in 2011, a number second only to that of 2008 when 3.9million subscribers were added. Between 2007 and 2011, mobile subscriber numbers in the country almost tripled from 7.6million to 21.2million (see Table 13). A relatively large percentage of this increment may be due to multiple SIM ownership.

One of the effects of competition in the market is that SIMs have become virtually free. For example, Tigo ran a promotion giving free SIMs to all arriving passengers at Accra's Kotoka International Airport. Also relevant to soaring mobile phone uptake have been the reduced retail rates resulting from the aforementioned interconnection regulation and increased competition in the market. It is anticipated that competition will increase further due to the entry of Glo into the market in 2012. Table 13 provides the NCA's subscriber numbers for the mobile operators in 2011.

Table 13: Subscriber levels of mobile telephone companies, 2011

Mobile operator	No. of subscribers
Expresso	186 751
Tigo	3 921 754
MTN	10 156 112
Vodafone	4 275 521
Airtel	2 625 705
Total	**21 165 843**

Source: NCA (2012b)

Figure 7 shows the growth trend in the deployment of telephone services in the country between 2001 and 2011. Fixed-line telephone growth was almost flat throughout the period, while mobile telephones experienced consistently high growth rates. The ratio of mobile to fixed-line telephone subscriptions in 2010 was 63 to 1.

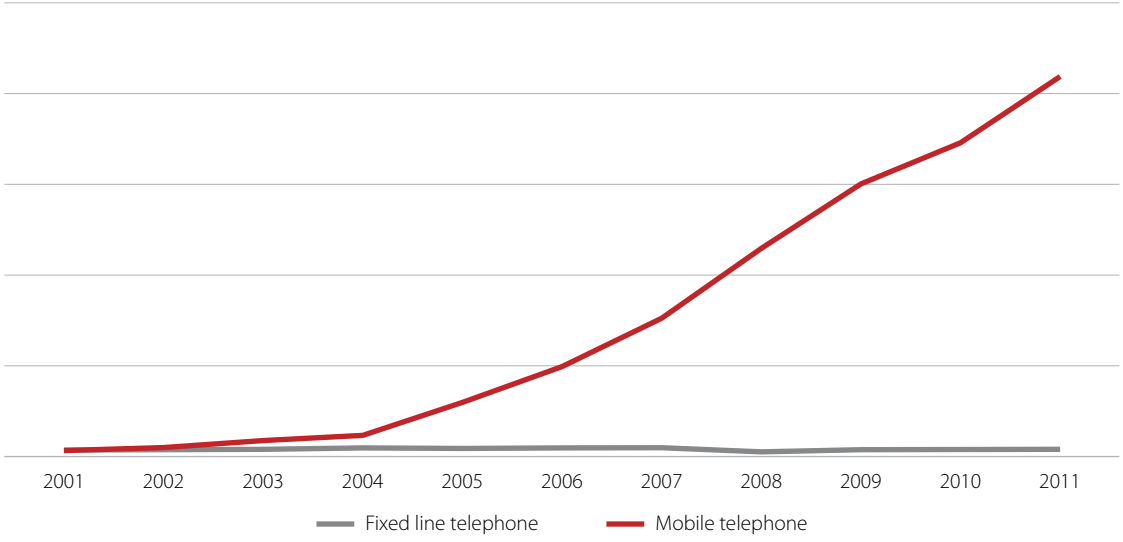


Figure 7: Trends in telephone deployment (2001-11)

Source: NCA (2012b)

Household access to computers and internet

Computer and internet access are centrally important to utilisation of the potential benefits of ICTs. Until recently, ownership of computers was essential to gain access to the internet, but today internet-enabled mobile telephony handsets provide primary internet access alternatives. With the introduction of low-bandwidth browsers and stripped-down social networking sites, low-cost access to the internet is now a reality. In line with this trend towards internet access via mobile phone, the 2012 RIA Ghana ICT Survey found that only 8.5% of Ghanaian households have a computer at home. Comparing this finding with the data for other 2012 RIA Survey countries reveals that Ghana's household computer ownership is similar to that of Cameroon (where 8.6% of households have computers), but considerably higher than in Tanzania (at 1.6%). There was improvement in Ghanaian household computer ownership in this 2012 RIA Ghana ICT Survey over the previous RIA Survey of 2008, from 5% in 2008 to 8% 2012.

In terms of household internet, it was found that only 3% of Ghana's households have internet connectivity, a low percentage but still up from 0.3% in the 2008 RIA Survey. Ghana's figure is higher than in Cameroon (1.3%) and Tanzania (0.8%), but considerably lower than in South Africa (nearly 20%). It was also found that only 25% of Ghanaian households with an internet connection are in rural areas, a mere 0.5% improvement on the portion of rural internet uptake found in the 2008 RIA Survey.

Internet access takes place through various channels, and Figure 8 lists the modes of internet access (and their prevalence of use) at the combined household and individual levels.

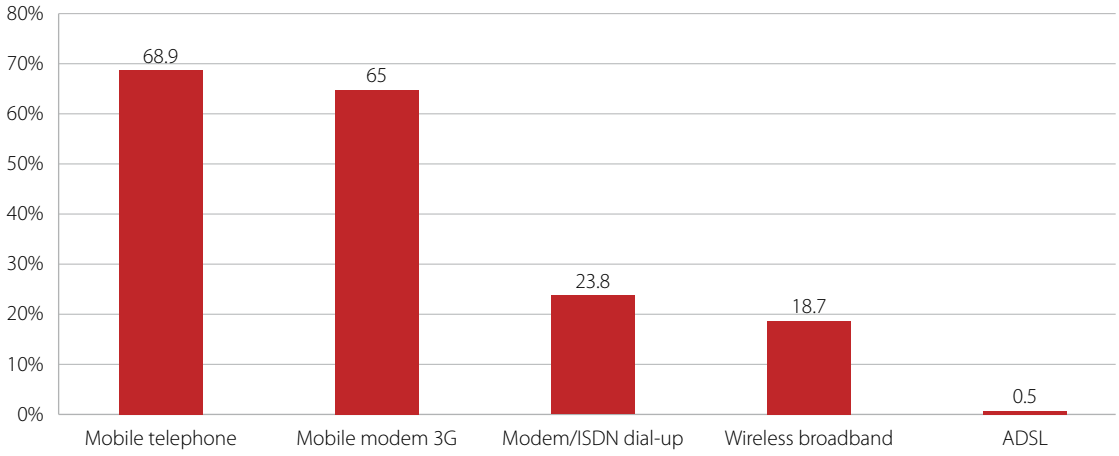


Figure 8: Types of household and individual internet access (%)

Source: RIA ICT Survey data 2011-12
Please note: Data is based on multiple responses

Mobile handsets and mobile modems (dongles) are the dominant connection methods for household and individual internet access. Access through ADSL connections is the least-common channel, which is not surprising since ADSL technology depends on the availability of fixed-line telephone connections, which (as seen above) are few in number. Access through wireless broadband is also uncommon.

What these data show is that ISPs need to design pragmatic strategies to use appropriate technologies, such as wireless platforms, to deploy service to households. Also clear is the fact that mobile dongles are an important internet access technology. Available data show 5.7million dongles in use in Ghana, of which MTN has the largest share at 67.5% (Gaisie, 2012). Most of the dongles are prepaid and competition among the mobile operators is constantly bringing dongle prices down. For example, in 2010, the price of a dongle was around GHS100 (US$50), and this fell sharply to an average level of GSH55 (US$27.50) in 2011. The provision of internet services by mobile operators has thus had a positive effect on overall internet access and penetration, especially at the individual user level.

Mobile telephones and dongles are the main internet access devices used by households

Radio and television

Radio is one of the oldest, and enduringly popular, communication media in Ghanaian households. Almost 72% of the households in the 2012 RIA Survey own a radio set. The popularity of radio arises not only because it is one of the oldest ICT platforms, but also because of the influx of cheap sets from China, which has contributed to radio's increased affordability in households. Presumably another contributor is radio's provision of relevant information, education and entertainment services in local languages not often readily available online. Also contributing to increased desire to own a radio set is the proliferation of FM radio stations in the country. There were 220 operational FM stations across the country at the end of 2011 (Table 14), concentrated in four main regions: Greater Accra, Ashanti, Western and Brong Ahafo.

Table 14: Authorised FM radio stations, December 2011

Region	Authorised stations	Public	Community	Campus	Commercial	Stations not in operation
Greater Accra	41	5	6	2	28	4
Ashanti	34	3	0	2	29	0
Brong Ahafo	33	3	3	0	27	2
Western	34	5	2	1	26	2
Central	22	2	7	3	11	4
Eastern	25	2	4	1	18	5
Volta	18	3	3	1	11	3
Northern	23	7	4	0	12	4
Upper East	9	1	3	1	4	1
Upper West	8	3	5	0	0	2
Total	**247**	**34**	**37**	**11**	**166**	**27**

Source: NCA (2012c)

The four main regions account for over 57% of the FM broadcasting market, while the least-served regions are Upper East and Upper West. The majority of Ghana's FM radio stations are largely commercially run (as opposed to public- or community-run), and urban stations command a 67% share of the FM market.

About 54% of households in the 2012 RIA Ghana Survey sample were found to have a TV set. Of the households that own TV sets, 37.6% are in rural areas. This penetration of TV sets in rural areas is relatively encouraging due to the initial cost involved in acquiring a set relative to the low income levels of most rural dwellers. In addition, a household's non-ownership of a TV set may not necessarily mean exclusion, since there is communal TV use, particularly in rural areas. The 2012 RIA Survey found that only 4.4% of the sample subscribe to pay-TV. The leading pay-TV operator in the country is the South African-based satellite DTH broadcaster MultiChoice.

The NCA has granted licences to 28 TV stations. Out of this number, 20 are free-to-air, seven are subscription services, and one is for research purposes. An important development in the broadcasting sector, especially in television, is the migration from analogue to digital broadcasting, prompted by a number of rationales, including:

- compliance with the Geneva 2006 (GE06) Agreement of the International Telecommunication Union (ITU);
- adoption of spectrum-efficient methods in management of scarce radio frequency spectrum, so as to broaden frequency spectrum's utility as a resource;
- prevention of dumping of obsolete analogue transmission equipment into the country, so as to protect the environment, investors and consumers;
- enhancing the quality of TV services by improving terrestrial TV transmission and reception; and
- promoting environmental objectives through co-location of broadcast transmission infrastructure with telecommunications infrastructure (NCA, 2010a).

The television stations that will migrate their transmissions from analogue to digital platforms include: Ghana Television (GTV), TV3, TV Africa, Net-2 TV, Crystal TV, Metro TV, Viasat1, e-TV Ghana, Coastal TV, GhOne and Top TV. A digital pilot project is being carried out among the Ghana Broadcasting Corporation, Next Generation Broadcasting and Ghana's four major TV channels (GTV, TV3, TV Africa and Net-2 TV). Ghana has set December 2014 as its deadline for completion of digital migration.

Public payphones

Use of public payphones has substantially decreased in urban areas

Public payphones have traditionally played an important role in Ghana's efforts to provide universal access to telecommunication services. According to the Telecommunication Accelerated Development Plan launched in 1994 by the then-Ministry of Transport and Communications, the universal access policy was to provide a public payphone to every community of 500 or more people (Frempong, 2007a). But with the proliferation of mobile telephones use, public payphone deployment and use have declined tremendously, especially in the urban areas where the patronage was initially high.

The 2012 RIA Ghana ICT Survey data show a massive decline in public payphone use since the previous RIA Survey in 2007. In 2007-08, there was 47% public payphone patronage among urban respondents; in the 2012 Survey, the figure is only 17%. Furthermore, the use of public payphones is now primarily a rural phenomenon, with only 5% of the sample in urban areas having used a public payphone in the past three months.

Rapid growth of mobile telephony and introduction of recharge vouchers in smaller denominations have undermined the operations of the public payphones, particularly those belonging to the two national fixed-line operators. The trend towards mobile is also evidenced by the types of public payphones used by the few respondents who do use them. As shown in Table 15, fewer than 1% of the payphone users used fixed-line payphones, while most (91.5%) use the telephone kiosks and umbrella outlets using mobile networks.

Table 15: Payphone users' mode of access during past three months

Facility	%
Telephone booth (fixed-line operator)	0.9
Telephone kiosk, umbrella outlet (mobile operator)	91.5
Other types of payphone access	5.7
Method of use not specified	1.9

Source: RIA ICT Survey data 2011-12

Use of ICT Services

This section looks at the various ICT services use by respondents to the 2012 RIA Ghana Survey. In order to provide context for some of the findings, this section also includes some socio-economic profile information.

Mobile telephones

The mobile telephone has become an increasingly important technological device in Ghanaian society. Its importance relates not only to the flexibility it offers for voice communication, but also to the fact that its platform supports many innovative activities such as location-based services (LBSs),[9] mobile money services, and access to critical information.

Individual income levels affect the amount that a person can afford to pay for mobile telephony services. It is significant, therefore, that nearly 50% of those individuals surveyed had no regular monthly income and another 15% earned less than GHS100 per month.

Table 16: Individual monthly income, in GHS

Income range	%
No income	49.5
Less than 100	15.4
100 – 200	17.4
201 – 300	6.4
301 – 400	4.3
401 – 500	2.6
501 – 600	1.8
Above 600	2.6

Source: RIA ICT Survey data 2011-12

Table 17 shows that, 54.1% spend between GHS1 and GHS10 per month on mobile telephony and 26.2% spend between GHS11 and GSH20 monthly. Further, 7.6% spend between GHS21 and GHS30, and 4% spend between GHS41 and GHS50, while 3.3% spend more than GHS70 monthly. Cumulatively, 80% of the sample spend between GHS1 and GHS20 monthly on mobile telephony.

9 An LBS is an information service that is accessible through a mobile handset and is based on the geographic location of the mobile device.

Table 17: Individual monthly mobile telephony expenditures, in GHS

Expenditure range	%
1 – 10	54.1
11- 20	26.2
21 – 30	7.6
31 – 40	3.6
41 – 50	4.0
51 – 60	1.2
61 – 70	0
Above 70	3.3

Source: RIA ICT Survey data 2011-12

There is an apparent correlation between individuals' income levels and their expenditure on mobile telephony. In Table 16 above, it was seen that almost half (49.5%) of respondents said do not earn an income, while over a quarter (26.2%) earn less than GHS200 per month. This situation, whereby roughly 76% of respondents have either no income or little income, links to the finding that 80% of the individuals surveyed spend only between GHS1 and GHS20 (the lowest spending bracket) per month on mobile telephony.

An attempt was made to find out how changes in mobile pricing would affect use and expenditure (see Table 18). It was found that 45.6% of respondents would slightly increase their use of the service. For 22.7% of respondents use would remain the same, while 24.8% would double their use and 6.5% would more than double their use.

Table 18: Reaction to 50% reduction in call charges

Anticipated reaction	%
Unchanged phone use	22.7
Slight increase in use	45.6
Double phone use	24.8
More than double phone use	6.5
Don't know	0.5

Source: RIA ICT Survey data 2011-12

It is evident from the data that there would likely be a dramatic change in the use patterns of roughly 31% of the users if mobile call prices were to be cut in half, while for about 46% of those surveyed the change would be only slight. As for users' likely reaction to a situation where call charges were doubled (see Table 19), 22.4% indicated their pattern of use would not change, 38.8% would decrease their use slightly, 25.3% would reduce their use by half, and 13% would reduce their use by more than half.

Table 19: Reaction to doubling of call charges

Anticipated reaction	%
Unchanged phone use	22.4
Slight decrease in use	38.8
Reduce phone use by half	25.3
Reduce phone use by more than half	13.0
Don't know	0.5

Source: RIA ICT Survey data 2011-12

Household use of mobile telephones at the base of the pyramid (BoP)

Because household income, whether for rural or urban respondent households, can be expected to affect use of ICTs, the 2012 RIA Survey in each RIA country sought to analyse use in households living below the US$2.5 poverty line (i.e. the base of the pyramid). These BoP households constituted 36.8% of the households surveyed, a percentage similar to that for the South Africa survey sample (which had 36% of respondents in the BoP) but a lower percentage than for most other 2012 RIA ICT Survey countries. (The BoP average among the ten 2012 RIA Survey countries featured in Table 20 is 55.1%, with the Ethiopia Survey sample having the largest percentage (91%) of households living below the poverty line.) Although the percentage of surveyed households with income below the poverty line in Ghana is smaller than several other countries in the 2012 RIA Survey, the percentage is still high and can be expected to affect Ghanaians' ICT use.

For mobile voice use, as indicated in Table 20, it was found that high percentages of households in the BoP do not necessarily mitigate their use of mobile voice telephony.

Table 20: BoP household use of mobile voice (BoP calculated as household income of US$2.5 PPP per day or less)

Country	No	Yes	Total	% households below poverty line (i.e. in the BoP)
Uganda	2 938 871	4 096 321	7 035 192	58.2%
Tanzania	2 885 939	6 326 339	9 212 278	68.7%
Rwanda	696 092	1 942 416	2 638 508	73.6%
Ethiopia	1 561 498	15 967 190	17 528 688	91.1%
Ghana	3 003 679	1 746 032	4 749 711	36.8%
Cameroon	1 815 370	1 748 067	3 563 437	49.1%
Nigeria	9 975 883	11 995 430	21 971 313	54.6%
Namibia	187 892	226 061	413 953	54.6%
South Africa	8 097 950	4 562 651	12,660 601	36.0%
Botswana	357 693	141 488	499 181	28.3%

Source: RIA ICT Survey data 2011-12

However, in terms of volume of use of mobile voice telephony, the cost of calls was found to have a stronger effect on households within the BoP than on those not living in absolute poverty. In Ghana, 65% of households surveyed in the BoP cite call charges as a challenge to increased use of mobile telephony, and the figure is 68% in Cameroon, 69% in Uganda, 78% in Rwanda, and 81% in Ethiopia. Furthermore, 71% of the respondent households from the BoP in Ghana indicated that they would make more calls should the call charges be cheaper. At the same time, only 31% of households in the BoP said they would reduce their calls by half should call charges be increased by 100% (i.e. doubled).

Table 21 shows surveyed Ghanaian household (i.e. all households, not just BoP households) and individual uses of mobile handsets. The use which tops the list is making and receiving calls, as nearly all mobile-using respondents (99.1%) use the handset for this purpose. The next highest uses are the "flashing" functions (missed call/call-back-request) at 64.5% and sending and receiving SMS (60.5%). Also getting high use indications are use of the handsets' radio/music capabilities (47.9%), use of the phone as a personal organiser (47.7%), taking photos or video clips (38.8%) and playing games (37.3%).

Table 21: Household and individual uses of mobile telephones (%)

Activities	%
Making and receiving calls	99.1
Flashing (use of missed call and call-back-request)	64.5
Sending and receiving SMS messages	60.5
Listening to radio/music	47.9
Using as personal organiser	47.7
Taking photos or video clips	38.8
Playing games	37.3
Making international calls	26.9
Downloading applications for mobile phone	11.8
Sending SMSs to radio or TV programmes	8.2
Transferring airtime	7.1
Sending and receiving money	3.0
Using Skype/VoIP	2.8
Roaming when travelling abroad	2.2

Source: RIA ICT Survey data 2011-12
Please note: Data is based on multiple responses

Computer use

Computer access, when coupled with computer literacy, grants the user the ability to utilise computer programmes, e.g. word processing, calculations, data management analysis, graphics, music and games. In addition, computer access provides opportunities to access the internet for various activities and services, including social networking, governance, education, health, commerce and other online services. It is thus important that all citizens of a country have some access to, and capacity to utilise, computers. The capacity to utilise is to some extent dependent on literacy levels in the population, since some level of literacy is required to understand and use computer technology. About 14.1% of the Ghanaian respondents in the 2012 RIA ICT Survey who were classified as being in the top of the pyramid (ToP) (i.e., having high income levels) use computers, as against only 2.9% of those in the BoP.

Table 22 provides the educational background of the 2012 RIA Ghana sample: 32.7% with no education, 24.3% with only primary education, 31.3% with secondary education and 11.8% with tertiary education. Thus, cumulatively, 57% of the sample has no education beyond primary level. Many such people are presumably handicapped in their attempts to effectively utilise ICTs, since many ICTs are knowledge-intensive and require a certain level of literacy

for use. Indeed, only 10% of Ghanaian respondents indicated that they have used a computer – a level of individual computer use far behind that of the RIA respondents in South Africa (26.7% computer use) and Cameroon (15.1%), but better than Tanzania (1.9%). Ghana's low figure of 10% is somewhat surprising given the growing popularity of computer technology at schools, workplaces and internet cafes.

Table 22: Highest educational level

Level	%
None	32.7
Primary	24.3
Secondary	31.3
Tertiary: diploma/certificate	9.1
Tertiary: BSc/BA	2.2
Tertiary: Master's	0.2
Tertiary: PhD	0.3

Source: RIA ICT Survey data 2011-12

The 10% computer use statistic suggests that Ghana's government programmes aimed at increasing ICT use have not been effective. One such programme is the initiative to establish Community Information Centres (CICs) which are meant to provide internet access and basic training in computer literacy to beneficiary communities. Another programme, underway since 2010, is one whereby the Ghana Investment Fund for Electronic Communications (GIFEC) has invested in ICT infrastructure at educational institutions in the country. GIFEC provides ICT equipment and broadband internet to all colleges of education, to the National Vocational Training Institute, to technical schools and to selected health institutions. These investments are geared towards equipping students with hands-on ICT experience and contributing to the ICT skills build-up in the country.

The 2012 RIA Ghana Survey found that the home is a key location for (albeit limited) computer use in Ghana, with 72.6% of respondent computer users saying they use a computer at home (see Figure 9). The next most-cited places of computer use are internet cafes (45.6%), schools (44.5%) and work (42.9%). Library computers are the least-used (by only 6.2% of respondents) among the computer use locations surveyed, arguably because equipping libraries with computers is only a recent phenomenon in Ghana. (As part of its programmes to increase ICT access, GIFEC's Library Connectivity Project, started in 2010, has equipped all of Ghana's 10 regional libraries with computer and internet resources and has provided internet connectivity to the mobile library vans that travel to rural areas.

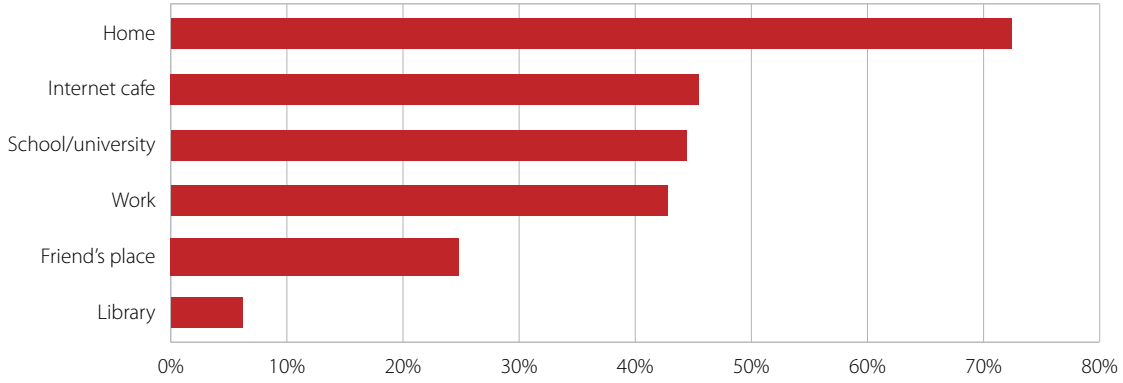


Figure 9: Places of computer use (%)

Source: RIA ICT Survey data 2011-12
Please note: Data is based on multiple responses

Figure 10 summarises the various activities that respondents said they engage in on computers. The main activities are writing and editing documents (82%), playing games (80%), doing calculation (60%), internet browsing (56%) and remixing content (mainly music and videos found online, 50%), while the least activity is programming.[10] It should be noted that the survey did not probe the precise nature of use in each activity.

By way of comparison, in Nigeria, almost 76% of computer users use them to browse the internet, while the figure in South Africa for internet browsing is 71%, compared to the aforementioned figure of 56% in Ghana. In terms of playing games, 80% of the sample in Ghana uses the computer to play games (see Figure 10), compared to 72% in Namibia, 66% in Nigeria and 62% in South Africa.

Computers in Ghana are mostly used for word processing and playing games

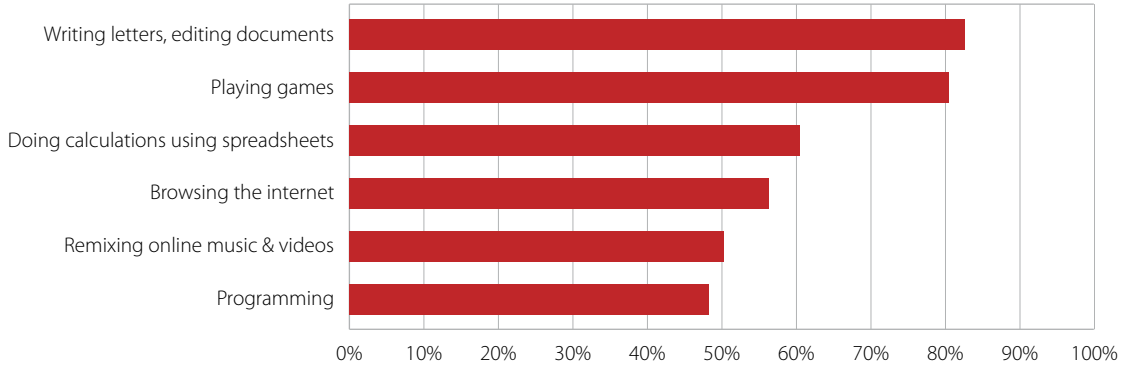


Figure 10: Computer uses (%)

Source: RIA ICT Survey data 2011-12
Please note: Data is based on multiple responses

10 The data is based on multiple responses

Internet use

The importance of the internet in the contemporary world cannot be over-emphasised. Therefore, its fullest deployment and utilisation have become important public policy issues. The 2012 RIA Ghana Survey found that a majority (70.5%) of respondents who have access to the internet first gained access through desktop computers or laptops, and a minority (29.5%) first gained access through a mobile handset.

It was found that those who have used the mobile internet for between one and three years are the largest group (45.7%), followed by those who have been using mobile internet for between four and six years (38.8%) (see Table 23). Cumulatively, almost 85% of the sample has used the internet for between one and six years. This period corresponds to the era where mobile internet, either through internet-enabled mobile handsets or mobile dongles, became popular in the country.

Table 23: Years of use of mobile internet

Period (years)	%
1-3	45.7
4-6	38.8
7-9	9.5
10-12	4.8
13-15	0.6
16 or more	0.5

Source: RIA ICT Survey data 2011-12

The 2012 RIA Survey sought information on the uses made of internet services and the frequency of their use (see Figure 11). It was found that social networking is the leading activity for daily engagement with the internet, followed by: finding or checking of a fact or definition of a word; formal educational activities; instant messaging; and downloading music, movies, images or watching internet television. Activities respondents occasionally use the internet for include sourcing educational materials, getting information from schools and downloading software.

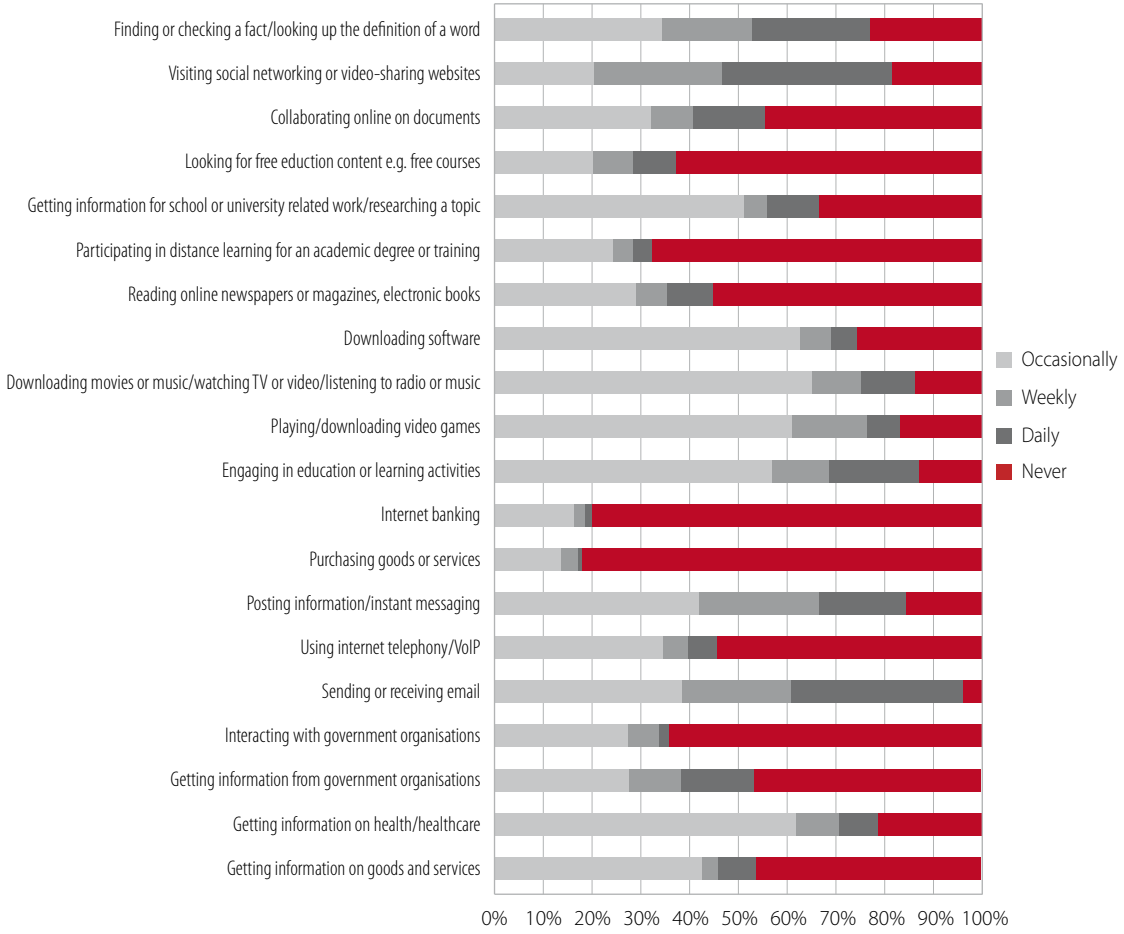
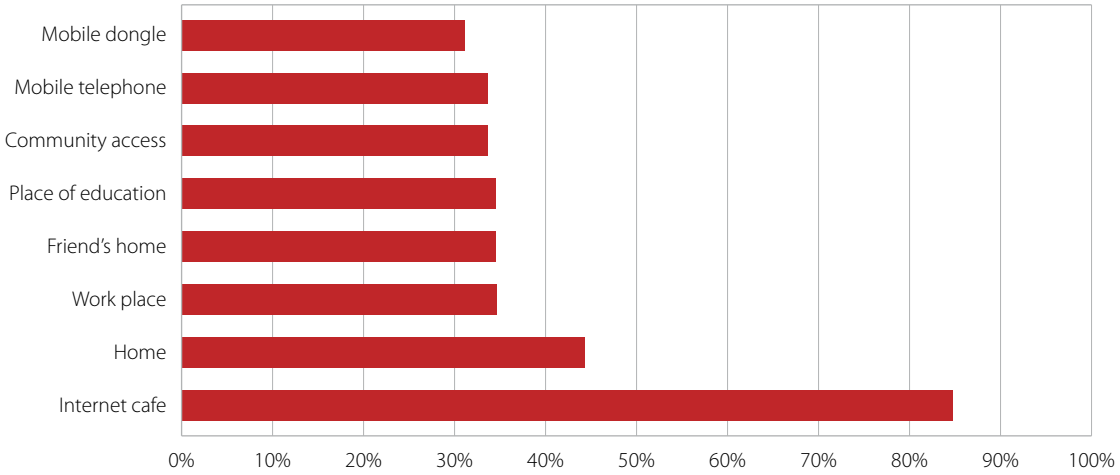


Figure 11: Purposes and frequency of internet use

Source: RIA ICT Survey data 2011-12

The least-frequent internet activities are internet banking, distance learning, voice communication, purchasing and ordering of goods and services (e-commerce) as well as collaborating on online documents.

In terms of place of internet use (see Figure 12), internet cafes play an important role, with nearly 84.7% of internet users patronising internet cafes, followed by use at educational facilities (50.9%) and at home (44.3%). Mobile dongles are used for internet access by 31%. Efforts by the government to participate in the diffusion of internet use by supporting CICs appears to have had only limited success, as only 33.6% of internet users patronise such centres. The continued dominance of internet cafes as the most popular access and use points should spur policymakers to support this industry, which is largely private-sector-led. Government support could be in the form of training – in technical matters, business and financial management, customer relations and bookkeeping – in order to help internet cafes thrive.



Internet cafes continue to be popular internet access facilities

Figure 12: Place of internet use

Source: RIA ICT Survey data 2011-12
Please note: Data is based on multiple responses

Limitations on internet use

Various factors are cited as limiting the use of internet services (see Figure 13). Access/use cost is the main limitation factor cited, followed by having few people to interact with on the internet, and the slow speed of the service. Lack of interesting content and absence of local languages are the least-cited hindrances.

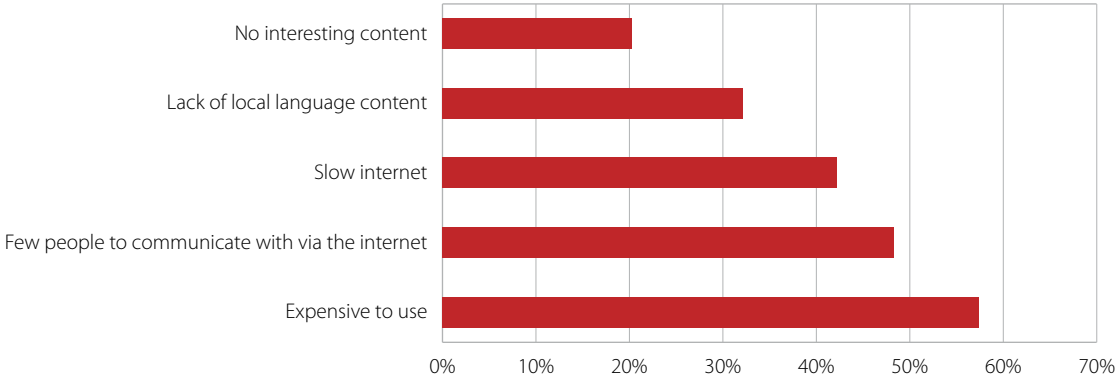


Figure 13: Limitations on internet use

Source: RIA ICT Survey data 2011-12
Please note: Data is based on multiple responses

Social networking

Social networking provides a virtual space for individuals to interact with others, find others with shared interests, establish forums for discussion and/or exchange personal news with others (Ahn *et al.*, 2007). Social networking also has an important role to play in enterprise development, by providing spaces for workers to interact. Consequently, some companies have established intra/internal social network platforms through which their workers can interact. It is strategically sound for corporate organisations to be interested in social networking since the new generation of employees is using social platforms as its dominant communication channel (DiMicco *et al.*, 2008). DiMicco *et al.* (2008) further argue that it is important for enterprises to bridge generational gaps and boundaries by supporting communication among employees.

There are various types of social networking platforms, including those for primarily non-work interaction (such as those that share pictures and videos), those for professional networking (e.g. LinkedIn) and those for work uses such as sharing documents. The growing importance of social networking platforms has resulted in many organisations using them to reach out to their target groups. For example, the ICT, Science and Technology Division of the UN Economic Commission for Africa (UNECA) uses the Facebook platform to cultivate interaction among African scientists and policy analysts.

Many Ghanaians are participating in social networks. Among 2012 RIA Ghana respondents who connect to the internet, 81% are signed up to at least one social network. Facebook is the most popular social networking site in Ghana. According to one source, in 2011 over 1.2million Ghanaians were subscribing to Facebook, representing 4.95% of the country's population (Social Bakers, n.d.). Most Facebook users are in the 18-to-24 age group, which emphasises the point that social networking is mainly a youth phenomenon. A report published in January 2012 by Portland Communications states that Ghana was among the top 20 African countries for use of Twitter in the last quarter of 2011. South Africa had the highest number of tweeters in Africa (5 030 226 in 2011), followed by Kenya (2 476 800) and Nigeria (1 646 212), while Ghana's number (though fourth in size) was comparatively small at 2 150 (Portland Communications, 2012).

Mobile money

As argued by Donner (2008), the mobile telephone is now perceived as a device for delivering various services. Many people utilise mobile handsets innovatively to deliver social, economic, cultural or political services, and these innovations have made the mobile handset a strategic socio-economic development tool (Frempong, 2009).

The mobile telephony platform now serves as a platform for money transfer, a service traditionally reserved for financial institutions. Mobile money transfer has gained in popularity since its introduction in, among others, Kenya, the Philippines, Uganda, Tanzania and South Africa. Mobile money use is predominantly for internal remittances (Suri and Jack, 2010) and targets the unbanked.[11] The platform is now also being adopted for a variety of financial transactions, including, *inter alia*, bill payments, loan receipts and repayments, purchases of goods and services and micro-insurance.

The 2012 RIA ICT Survey attempted to ascertain the extent of adoption and use of mobile money services in Ghana. It was found that only 1% of the sample uses such a service in the country. This low mobile money uptake is in spite

11 The unbanked are people without formal bank accounts who operate in a cash economy and are limited in their ability to take out loans and maintain savings (see Medhi *et al.,* 2009).

of the fact that three companies (Airtel, MTN and Tigo) have introduced the services in Ghana. This uptake is not as vigorous as in Kenya, Tanzania and Uganda. One possible reason for the low mobile money uptake in Ghana is that most remittances that take place are international, a service area where Western Union, MoneyGram and others have captured the market. Secondly, unlike Kenya, where mobile money agents can disburse cash, the mobile operators in Ghana still depend on traditional banks for cash disbursements – and this does not cater to the general apprehension the unbanked have towards traditional financial institutions.

Another factor in the low mobile money take-up in Ghana is likely the country's relatively strong rural/community banking sector. Since the mid-1970s, Ghana has pursued the concept of rural and community banking. Rural banks were identified as necessary because the bigger commercial banks could not accommodate the financial intermediation problems of the rural poor (Kwapong, 2004). As of 2011, there were 135 rural/community banks in the country. Besides these rural banks, there are also a host of non-formal financial institutions regulated by the Bank of Ghana to provide financial services to the unbanked segment of the population. It can be argued that this flexible financial environment has supported the establishment of formal and informal financial institutions to serve the needs of Ghanaians, particularly in rural communities, thus diluting demand for mobile money platforms.

Mobile money uptake in Ghana has been poor

The 2012 RIA ICT Survey found that MTN is in the lead in the still-nascent mobile money business in Ghana, with MTN's services being used by 40.3% of the small number mobile money users, while 15.5% use Tigo and 13.1% use other providers. MTN has been the most aggressive mobile company provider.

In terms of length of use (Table 24), the majority (81.4%) of the mobile money users have been using the service for between one and three months. Those who have used the service for 10 or more months constituted 9% of the sample, followed by 5.9% who have used mobile banking for between seven and nine months, and 3.7% who have used the service for between four and six months. Hence, it is clear from the findings that the facility is still in its formative stage in Ghana, and will require aggressive marketing strategies to make it popular.

Table 24: Duration of use of mobile money

Months of use	% of users
1-3	81.4
4-6	3.7
7-9	5.9
10 +	9

Source: RIA ICT Survey data 2011-12

In terms of the commission charged, mobile money is competitive with other money transfer services. For example, the Ghana Commercial Bank's domestic money transfer (called GCB Express) charges GHS4 for a transfer of up to GHS500, while a transfer of up to GHS1 000 costs GHS6. The MTN mobile money system charges a commission of GHS0.5 for a transfer of up to GHS50 and 1% on any transfer above this figure. Thus, one would pay GHS4 to transfer GHS200 using Ghana Commercial Bank, and GHS2 to transfer GHS200 with MTN mobile money system.

In comparing mobile money to other forms of money transfer, almost 56% of those who use the service rank it as cheaper than other forms. But in terms of other indicators (safety, speed, convenience, ease of use and trustworthiness), mobile money is ranked below other platforms (Figure 14).

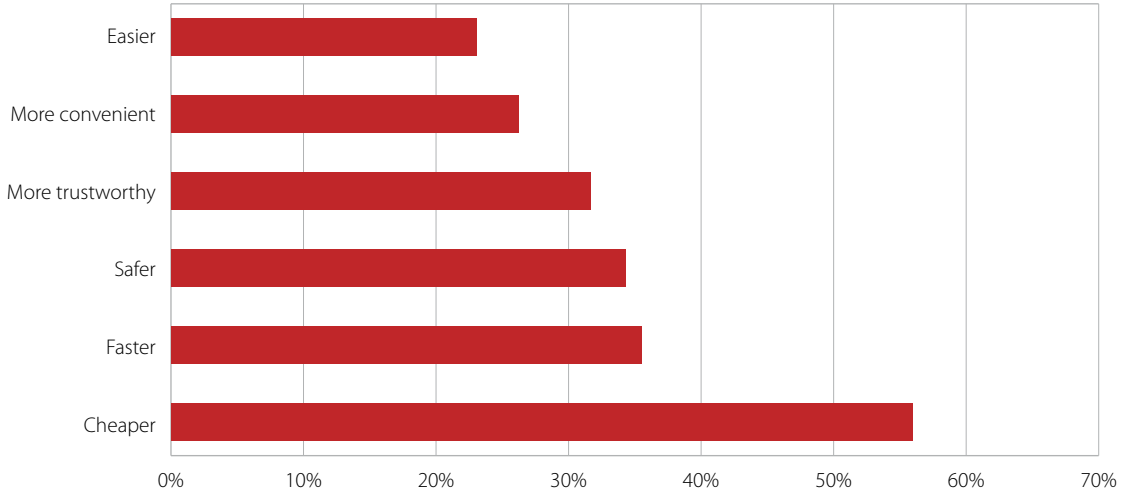


Figure 14: Perception of mobile money vs. other transfer platforms (% of sample)

Source: RIA ICT Survey data 2011-12

Among the small number of mobile money users, the types of payments performed are primarily mobile phone airtime top-ups, receipts of payments and, to a lesser extent, payment of bills. Other payment types – such as salaries, insurance and pensions – are scarce, as shown in Figure 15.

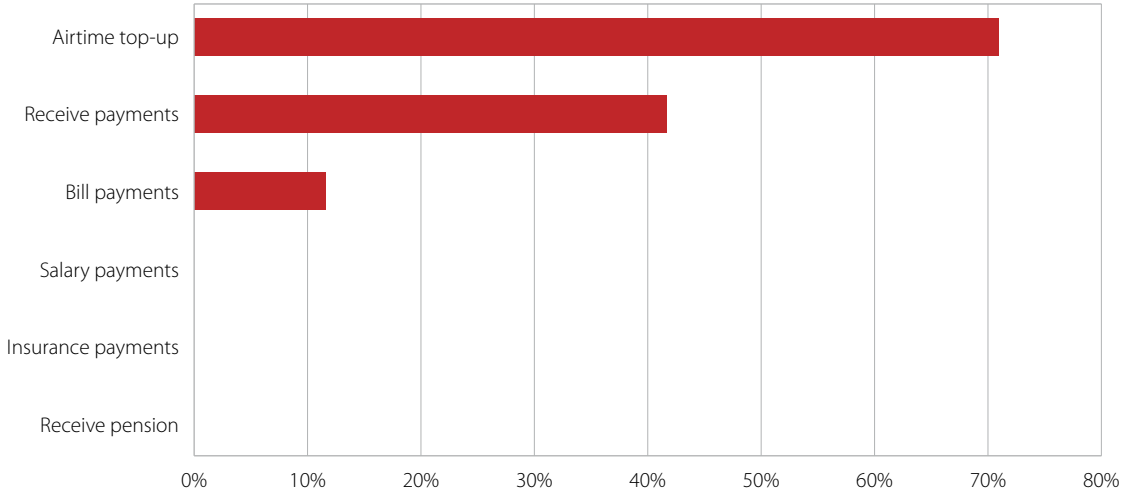


Figure 15: Purpose of mobile money transfers (% of mobile money users)

Source: RIA ICT Survey data 2011-12

Figure 16 shows respondent views of the value and purposes of mobile money services. A large majority of the small number of mobile money users agree that mobile money saves time and transportation costs, that it can help in managing their finances, and that it is now the only money transfer service they use. These responses suggest that there is pent-up demand for mobile money services, and that more aggressive marketing strategies and competition are needed in order to attract users.

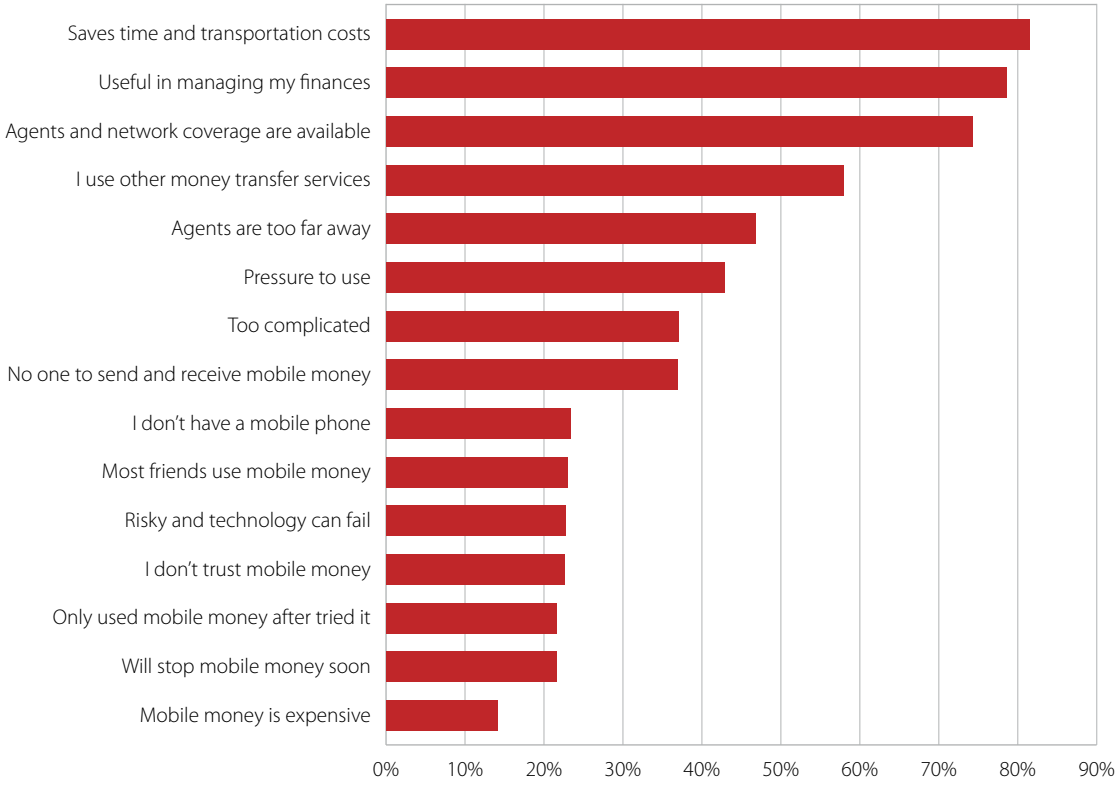


Figure 16: Opinions on mobile money (% of mobile money users)

Source: RIA ICT Survey data 2011-12

Emerging issues

A number of emerging ICT issues in Ghana require policy and regulatory attention.

Mobile telephone pricing

As shown above, Ghana is among the African states with the cheapest prepaid mobile telephony tariffs. Ghana has six mobile telephone operators and the evidence suggests that these operators have used pricing as a strategy to improve or maintain their positions in the market, meaning that the low prices can be seen as due to the existence of a competitive market and a somewhat favourable regulatory environment in the country. This situation needs to be sustained in order for consumers to continue to benefit from low tariffs.

Lower mobile pricing could potentially endanger operators' interests in market network expansion and investment

However, one danger with the low tariffs is the potential threat to the operators' ability to gain return on their investments and, in turn, to plough the profits back into their businesses. A slowdown in investment in the mobile market is thus likely in the near future. Such an investment slowdown would affect further deployment of services, especially in rural areas that need the services for their socio-economic development. An investment slowdown could also affect companies' abilities to ensure QoS, due to the overloading of switching equipment.

QoS problems are already evident in the market and have resulted in the NCA imposing penalties on operators. Results of QoS monitoring conducted by the NCA in June 2010 in certain locations in Greater Accra are shown in Table 25. With the single exception of the Tigo service in Prampram and Dawhenya (which met the allowable call congestion rate of 1%), call congestion rates were higher than allowed.

Table 25: Call congestion rate (%), June 2010

	MTN	Vodafone	Tigo	Airtel	Expresso
Accra	3	17	27	12	10
Tema	7	4	3	4	10
Prampram and Dawhenya	3	2	1	4	6

Source: NCA (2010c)

Consequently, the NCA imposed a total of GHS1.2million (US$600 000) in fines on the five companies in the market at the time – for breach of their contractual obligations on call congestion levels. It is important that operators reduce the costs of their operations, so that the low mobile tariffs do not negatively affect quality and development of services.

Universal/unified licences

The NCA intends to issue universal licences to all telecom operators in the country in the course of 2012. This author's discussions with the NCA reveal that significant background work has been completed and the NCA's proposals (in particular on the matter of the fees to be charged for the licences) have been submitted to the Ministry of Communications for approval. These service-neutral licences will allow operators to provide any services for which they have capacity, without having to secure new licences from the regulator.

The issuance of the universal licences can be expected to have significant effects on the ICT market in the country. Of particular importance, the licences have the potential to facilitate the deployment of broadband-to-home services. Currently, internet use at the household level, as per the 2012 RIA Survey data, is 3%, which is lower than countries such as Kenya, Namibia and South Africa. Most of Ghana's operators, particularly the mobile firms, already have existing infrastructure which can be used to roll out fixed-wireless internet services to homes for individual use. All that is required is the last-mile connectivity.

Ghana's local ISPs have, to date, concentrated on corporate clients as their targets, and most of their strategies have revolved around how to maintain good connectivity for these clients. As a result, most of the points of presence (PoPs) of the local ISPs are concentrated in Ghana's major cities. For example, Greater Accra, where major corporate organisations operate, has 51 PoPs, followed by the Ashanti Region with 10 (Gaisie, 2012). Most of the ISPs are diversifying their activities – especially into provision of network data services to corporate and institutional clients – and moving away from the provision of internet services to households and individuals. Companies such as InternetGhana, K-Net, UCM and Superlock have branched out into network data services. But high-speed, always-on internet access is needed not only at the corporate and institutional levels but also at the household level – for education, entertainment, health and general participation in the information society, and for the country to build its global competitiveness.

The small improvements in internet access at the household level have to date been mostly as a result of the deployment strategies of Vodafone (which has been aiming its fixed internet services at households living in the sprawling middle-income enclaves in the country) as well as a result of the increased use of internet-enabled mobile devices. The mobile operators have begun to upgrade their networks to 3G in order to provide mobile broadband to households. The direct participation of big players such as the mobile telephone companies in the data market has the possibility of improving broadband internet access and use generally, and at the household level in particular.

There is some concern that universal licences may negatively affect the market position of the already weak local ISPs. (However, as already mentioned, the ISPs are diversifying their activities, and this should reduce the negative effects of the universal licences on ISPs.) For the sake of the overall development of the data market, the NCA and the Ministry should expedite all their actions in relation to the universal licence policy. There is also, to some extent, need for policy in support of the local ISPs, to ensure they can stand on their own feet in the new market environment that will emerge.

Public access venues

Internet cafes are an important access mechanism for internet and general broadband services, because internet access is minimal at the household level. Data from the 2012 RIA Survey and from other studies show the importance of these public access facilities. The 2008 RIA Ghana ICT study found that 77% of the sample patronised internet cafes to access internet services, with the next most common place for internet access being the workplace (19%). In the 2012 RIA Survey, it was found that 84.7% of those accessing the internet are doing so through internet cafes.

The development of public access venues requires support

And there is evidence that public access internet venues are being used by Ghanaians across socio-economic strata. The 2012 RIA Ghana Survey found that about 80% of those who access the internet at public access venues are not in the BoP. Therefore, public access facilities are facilities not just for the poor. In the absence of affordable high-speed bandwidth, public access venues need to be part of the country's development agenda. At present, the development of public access venues is largely private-sector-led. Like supply-driven access initiatives in other parts of the continent, the Ghanaian Government's direct intervention in this service sector, through the aforementioned CICs, has not had great success. There is a need for government to enable private-sector-driven or community-driven interventions to provide this important service, potentially through public-private partnerships.

An example of such a public-private partnership is the Easy Business Project begun in 2010, through which GIFEC and the Kumasi Institute of Technology, Energy and Environment (KITE) assisted the private sector in expanding internet access to rural communities. Under this collaboration, containers equipped with ICT infrastructure are provided to private entrepreneurs across the country – with the recipients required to make a down payment of GHS1 000 (US$500) and a monthly payment of GHS200. By the end of 2011, 20 Easy Business Project pilot facilities had been provided to private individuals, and there were plans for an additional 80 containers to be rolled out. An effective evaluation of this programme will need to be conducted in order to determine its successes and shortcomings.

Improving broadband services

The importance of broadband is undeniable. It is increasingly important for accessing information that can facilitate, *inter alia*, better governance, business competitiveness, new technology use and knowledge of market prices (Kelly *et al.*, 2009). The importance of broadband services to national development efforts is attested to by the Ghanaian Government's efforts at developing an overall policy, the National Broadband Strategy. The current sub-optimal status and quality of broadband services is generating a need for policy intervention not only to provide a suitable market framework but also to ensure that consumers get value for money. The 2012 RIA Ghana TRE results show that most of the negative overall scores among the TRE indicators were caused by poor scores on broadband services – which cumulatively affected the overall rankings of the sector. Figure 17 shows the Ghanas 2012 TRE scores for regulation of broadband services.

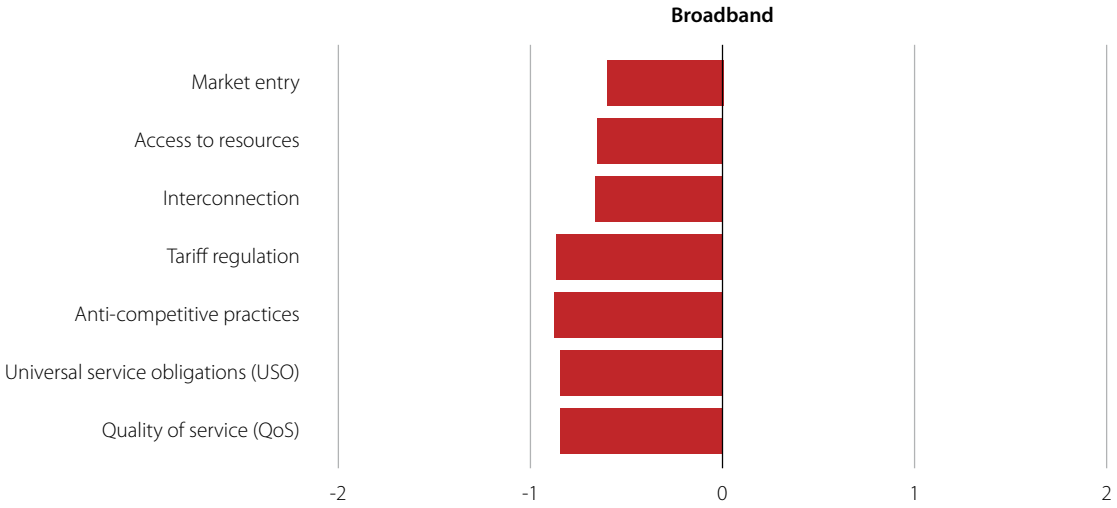


Figure 17: TRE scores for broadband services

Source: RIA TRE assessment data 2011-12

Currently, the broadband market is unregulated, and market forces dictate its competitiveness and pace of development. The 2012 TRE scores show that there is a need to stimulate the broadband market so that it can provide the services required for socio-economic development. The NCA must exercise some regulatory control over this market. Among the measures the NCA will need to take is extension of its QoS monitoring exercises to monitoring of broadband delivery, in order to measure and regulate the speed, reliability and strength of broadband links.

Mobile money

While mobile money services have gained much popularity in countries such as Kenya, Uganda and Tanzania, the case is different in Ghana. As outlined above, only 1% of the 2012 RIA Ghana ICT Survey respondents use mobile money services, in contrast to the 60.3% of respondents in Kenya, 14.1% in Tanzania and 13.9% in Uganda. The data also indicate that most Ghanaian users of mobile money have only been patrons for between one and six months, indicating that the service is still in its formative stages. Growing the service will require aggressive marketing by market players.

It is notable, meanwhile, that the mobile money operators have signed partnership agreements with banks for the payment of remittances. For example, Airtel has a partnership with Ecobank, GT Bank, Standard Chartered Bank, Unibank, United Bank of Africa, Zenith Bank, Energy Bank and Databank. This kind of agreement with the banks may make the mobile money service not much different from other money transfer systems, potentially rendering mobile money less attractive than in several other African countries.

Conclusions and recommendations

In an effort to get a complete picture of the ICT sector in Ghana, this SPR has looked at both supply- and demand-side indicators. Access, use and costs of services have been assessed, as well as a review of TRE assessment scores. This SPR has also outlined the efforts of the Government of Ghana to provide new policy directions to strengthen the sector and to create an environment conducive to the sector's growth. For example, the universal licences, once operational, can be expected to boost provision of varied services to Ghanaian consumers. Accordingly, it is this author's recommendation that the NCA, working in tandem with the Ministry of Communications, operationalise the licences as soon as possible in order to realise the potential benefits.

The TRE assessment exercise outlined in this review reveals that Ghana scores negatively in regulation of market access and interconnection, primarily due to the poor scores it has for regulation of broadband services. Broadband services, as they stand now, are unregulated, and the time is ripe for the regulator to introduce some form of regulation to ensure that consumers get value for their money. The present situation illustrates the market's failure to generate competition in the broadband market segment, and requires urgent policy intervention.

Further, mobile money uptake has not been as dramatic in Ghana as in East Africa and other parts of the world. Most of the operators did market surveys to identify the market potential for the service in the country, but it is now necessary for the mobile operators to go back to the drawing board and identify the obstacles to greater uptake. At the same time, however, it should be noted that the success of a service in other parts of Africa does not necessarily mean that it will be successful in Ghana, since economic and socio-cultural dimensions differ from country to country.

Internet availability and broadband provision at the household level, while improving, still remain low compared to some other African countries – as a result of, *inter alia*, ISPs concentrating on the delivery of services to the business community. The introduction of internet-enabled mobile handsets and mobile dongles, and to some extent the provision of internet services to well-off residential areas, have all contributed to a marginal increase in internet use at the household level. The importance of the internet at the household level cannot be over-stated, and it is hoped that many companies, especially the mobile telephony operators, will take advantage of their universal licences, when operational, to extend their existing infrastructure so as to provide broadband services to more households.

It is also important that the low mobile tariffs currently available in the country are sustained so as to enable many people, especially those sitting in the BoP, to effectively utilise telephony services. The competitive mobile telephony market in the country, with the resultant low tariffs, makes the sector one of the most competitive in Africa. It is important that all players in the market work hard to maintain this competitiveness and, by extension, ensure widespread use. At the same time, care must be taken to ensure that QoS is not compromised by low tariffs. The NCA should intensify its QoS monitoring activities to ensure consumers get the best out of the operators.

In addition, the data from the 2012 RIA Ghana ICT Survey and from other studies reinforce the importance of public access venues for broadband internet access. This is a sector led largely by private entities, and efforts should be made to support these entities. GIFEC, through the Easy Business Project, has tried to give support by helping the private sector to get access to the basic infrastructure needed for operating public access internet venues. Thorough evaluation must be undertaken of this Easy Business Project, and of the government-funded CICs and the fully-private-sector-initiated facilities, so as to identify operational problems and provide a policy environment that can support the growth of these important public access facilities.

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