Is broadband data worth the money?

While expansion of mobile networks across the continent continues to be constrained by the failure to assign high demand broadband spectrum, operators are devising ways around this by recycling their spectrum in order to offer high-speed and quality broadband bundles. The range of 4G services now becoming available creates another divide between countries' ICT sectors, their regulators and their operators. The development of innovative bundles and pricing strategies is helping to facilitate the move away from traditional voice services and towards higher data consumption, as well as demanding price basket adjustments. Other developments can also be seen in the creation of more time-based bundles as well as the appearance of the first data-only provider in Africa - Smile.

RIA Broadband Policy Brief No 3   **June, 2014**

Constrained spectrum availability

Of all ICT policy and regulatory bottlenecks, the biggest is arguably the failure to assign high demand spectrum for LTE. The failure to assign LTE spectrum has resulted in operators having to use existing licensed spectrum not optimal for LTE.

Increased LTE services

Operators have had to work around the policy and regulatory constraints in order to ensure the evolution of their business. Smile is Africa's first data-only provider and it did not dare to enter this exclusive market without the deployment of an LTE network behind it.

Value for Money Index

RIA's new Value for Money Index shows how well some operators, like Safaricom in Kenya and Vodacom in South Africa, supplement their affordable prices with quick average download speeds. This displays what the consumers receive in return for their money.

More time-based offers

There has been a surge in the provision of uncapped data offers. While these are currently limited mostly to one day (or only a few hours), they are proliferating beyond the meagre "Megabyte" barriers of the past.

Move away from voice

Operators in the countries under review appear to be refocussing their business from voice to data to meet the pent up demand for broadband internet and compensate for the losses in voice and SMS revenues.

Introduction

Research ICT Africa (RIA) monitors broadband prices across 12 African countries every quarter. It does so by establishing the cost of a broadband basket for both fixed and mobile products from all operators in each country under investigation. One of the main findings from the analysis of prices collected in Q1 2014 is that new 4G networks have sprung up despite a suitable amount of spectrum not being allocated.

Mobile operators are having to refarm their existing spectrum in order to venture into the 4G realm. Long-term Evolution (LTE) technology - the next generation of GSM technologies is winning the battle for high-speed broadband popularity based on its mobility (usually) while WiMAX appears to be waning rather than expanding. This trend is reflected in the number of mobile operators upgrading their networks to provide LTE services. Africa's prepaid mobile broadband products have continued to enjoy growing demand, giving rise to greater competition and the associated price decreases. This is seen not only in the birth of new broadband products from operators, but also in the establishment of Africa's first data-only operator in Tanzania, Uganda and Nigeria: Smile.

Many regulators in Africa have failed to procure more spectrum for operators, and have thus left them to reuse much of their existing spectrum in order to try and keep up with swelling demand for faster internet.

There is little ADSL outside of the major centres in African countries, with countries such as Nigeria, Uganda and Rwanda not having fixed broadband products available. Even in countries such as South Africa, which has the highest penetration of ADSL in sub-Saharan Africa, the poor quality and high prices of ADSL mean that many individual and residential users opt for mobile wireless products. With most of those accessing broadband services doing so with a mobile device. GSM 2, 3 and 4 are the *de facto* standard in Africa, despite some CDMA and WiMAX networks.

Due to regulatory delays and bottlenecks in allocating LTE spectrum (including the refarming of existing spectrum), operators are forced to re-use their existing spectrum for the purpose of rolling out LTE services). This short-term solution will allow operators to provide 4G services but at speeds below what would be provided if the International Telecommunications Union's (ITU) recommended frequencies[1].

Methodological adjustments

With the vast majority of consumers in Africa on prepaid services, and with the focus of RIA pricing research concerned with affordable access, RIA no longer collects postpaid mobile broadband data and instead focusses on prepaid mobile broadband data bundles and their implications in terms of pro-poor outcomes.

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[1] For more detail see: http://www.itu.int/dms_pubrec/itu-r/rec/m/R-REC-M.2012-1-201402-I!!PDF-E.pdf

To be representative of the increases in personal data demand, a 1GB price basket is used to compare prices in Africa. However, while demand has stimulated more internet use, large 10GB data bundles are seldom in the price range of a mobile internet user in Africa. A further development has taken place in the prepaid broadband market with the growth of time-based data provision. While "Day" offers are not necessarily new to the market, they have traditionally had a small bundle cap of about 25MB or less. There has recently been an increase in the number of Day bundles that allow uncapped internet use for a few hours, if not the whole day. Most of the providers of such a product have retained the smaller bundles mentioned above as well. To capture these market developments in broadband data products, RIA's Broadband Pricing Index utilises a "Day Basket" (in addition to its data baskets) for uncapped data bundles valid for at least eight hours of one day.

To add to its analytical tools, RIA has introduced a Value for Money Index. This Index aims to include internet speeds in its price analysis in order to get a clearer picture of the kind of service each operator is offering compared to what it is charging. Average download and upload speed are obtained from the Ookla database and aggregated to form an average internet speed. This speed is then divided by the operator's 1GB basket price resulting in an Index score that increases as its associated average internet speed does, and declines if the 1GB basket price is more expensive.

Fixed broadband has only been able to hold its own against mobile broadband by providing uncapped broadband services available for the entire month. But since the provision of uncapped services almost always entails a fair use policy restricting the access speed of the ADSL line after a certain amount of data has been used, strictly speaking it is incorrect to describe the service as "uncapped".

RIA has accordingly reformed its fixed line baskets. Instead of capturing commercially labelled uncapped bundles, a breakdown of 1GB, 5GB and 10GB has been adopted in order to capture baskets that are both comparable with mobile ones as well as those that are representative of the high data supply in the fixed market.

These capped baskets are captured in Table 3 at the following advertised speeds:

- < 1 Mbps;
- 1 Mbps ≤ and < 4 Mbps;
- 4 Mbps ≤ and < 10 Mbps; and
- > 10 Mbps.

Who provides an LTE service?

The RIA Broadband Pricing Index only collects data for operators who have launched 4G services for purchase or subscription in 12 selected countries in Africa[2], and those with a network (or with networks under construction) are noted.

After Angola's Unitel (excluded from RIA broadband analysis) was the first to launch an LTE network in 2012, Namibia, South Africa and Tanzania followed suit by the end of the year. It was Mobile Telecom Communications (MTC), Vodacom and Smile in those respective countries that finally broke into the market after more than two years of about-turns and regulatory delays.

In Namibia, MTC has recently been joined by Telecom Namibia Mobile who released a 4G service at the end of November 2013. In South Africa, MTN and Telkom Mobile (8ta) also applied competing pressure to Vodacom in the 4G market, which Cell C has yet to enter.

After Tanzania, Smile entered the Ugandan mobile broadband market in 2013 along with MTN and Orange to spark a healthy period of competition that appears to have brought prices down. Nigeria was next on the list where Smile beat Spectranet and Mobitel[3] to the mark.

Although it might be assumed Mascom in Botswana benefits from an LTE network, there is little to suggest its 2012 pilot project has evolved sufficiently to provide all of their subscribers with 4G services. There are also claims of Vodafone, Surfline and Alcatel-Lucent setting up LTE networks in Ghana by 2014, but there is not evidence of these being operational yet.

Although Ethio Telecom in Ethiopia has contracted Huawei Technologies for $1.6billion to rollout its 4G network in the capital, Addis Ababa, in August last year, no services were available from Ethio Telecom at the time of writing. Rwanda has performed a similar manoeuvre by contracting South Korea's KT Corp for $140million in a deal to rollout a wholesale access 4G network spanning 95% of the country's population. As yet, none of the Rwandan operators offers a service on this network.

Infrastructural delays seem to explain the market setback in Ethiopia and Rwanda but Kenya's case is more puzzling. While Orange Kenya has been providing 4G services and devices, it

Table 1: Cost of LTE products (USD)			
Country	Operator	1GB	Day basket
Kenya*	Orange	8.81	11.63
Namibia	TN Mobile	87.47	
	MTC		25.41
Nigeria	Smile	11.01	
South Africa	MTN	13.72	4.6
	Telkom Mobile	16.57	
	Vodacom	13.72	
Tanzania	Smile	10.92	
	Vodacom	9.36	
Uganda	MTN	14.79	
	Orange	13.8	
	Smile	14.79	

Note: Although Kenya has yet to roll out an LTE network, Orange is selling the device and service required for its use. Thus, when the network is available, the customer would effectively already have access to the service.

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[2] The countries included are: Botswana, Cameroon, Ethiopia, Ghana, Kenya, Mozambique. Namibia, Nigeria, Rwanda, South Africa, Tanzania and Uganda.

[3] Spectranet and Mobitel are excluded from RIA's broadband pricing index since they only offer speeds of up to 4 Mbps where 4G services are capable of above 21.6 Mbps. Furthermore, Mobitel offers only a WiMAX service.

was only announced this year that its host country had entered into LTE network deployment planning. It is quite simple for a company to stock and sell devices that are capable of 42 Mbps downlink speeds, but the owners of this device are unable to use it for this purpose because the underlying infrastructure does not yet support it.

In Cameroon, there is no LTE network provider although YooMee has been a WiMAX operator in the country since 2011 (previously branded as 4G Africa). It has also recently moved into Cote d'Ivoire and is looking to expand its services to other areas of Sub-Saharan Africa. Alvarion, the company that agreed to set up YooMee's WiMAX network in Cameroon, also got given the rights to do the same in Mozambique (MyBroadband, 2011).

As Table 1 illustrates, Kenyan, Namibian and South African operators offer the only LTE Day baskets of the study countries, with MTN in South Africa having the cheapest offer at USD4.6. This is significantly lower than Orange Kenya (USD11.63) and MTC in Namibia (USD22.1), however, Orange Kenya provides an uncapped service for a full month (as opposed to the eight-hour minimum) and Orange makes up for it by offering the cheapest 1GB on an LTE network at USD8.81.

As highlighted in Table 1 Orange Kenya does not own a functioning LTE network yet, Vodacom in Tanzania provides the cheapest 1GB bundle available at USD9.36 followed closely by its country competitor, Smile (USD10.92), together giving the country affordable LTE services (but with the small penetration percentage of 3.5%). Smile's LTE services in Nigeria (USD11.01) are only slightly more expensive than its LTE services in Tanzania. In all Smile host countries, the respective LTE networks cover solely the major cities of Dar es Salaam and Arusha (Tanzania), Lagos and Ibadan (Nigeria), and Kampala (Uganda).

MTC offers an expensive Day Bundle at USD25.41 but its competitor, TN Mobile, due to an expensive out of bundle rate (USD0.09/MB) charges USD87.47 for 1GB - six times greater than the next cheapest basket (USD16.57 from Telkom Mobile/ 8ta in South Africa). Another reason for this is that the operator does not offer bundled data but instead charges an out-of-bundle rate (NAD0.95) for each megabyte used. The rest of the operators from South Africa (MTN and Vodacom) and Uganda (MTN, Orange and Smile) all charge between 8ta's and Vodacom Tanzania's prices for 1GB of mobile data, thereby representing some level of parity across African operators in the 4G market.

Smile and its implications

Smile is Africa's first data-only provider and it did not dare to enter this exclusive market without deploying an LTE network behind it. Operating as a low-cost data provider out of South Africa (with headquarters in Mauritius), it has entered the Nigerian, Tanzanian and Ugandan broadband markets.

Prior to this endeavour, the company tried its hand at operating a WiMAX network in selected African countries but chose to leapfrog into LTE after realising that the more pragmatically sustainable and evolutionary opportunities were in LTE technology.

This decision is reflective of the point made earlier regarding the success of LTE in Africa.

Smile's decision to provide 4G services in its host countries, together with its provision of data-only services is indicative of the rise of data services even amongst traditional voice networks with the increased demand for broadband and voice over IP services.

Africa's prepaid mobile broadband prices

1GB basket comparison

RIA's new 1GB baskets reflect the bread-and-butter services in demand in the mobile broadband sector. The baskets also reflect users' preference for prepaid services, which are as a result provided by almost every operator. With the pricing complexity that has arisen with bundled, time-based and dynamically priced products, this simple measure allows for price comparison across multiple markets which is illustrated in Figure 1.
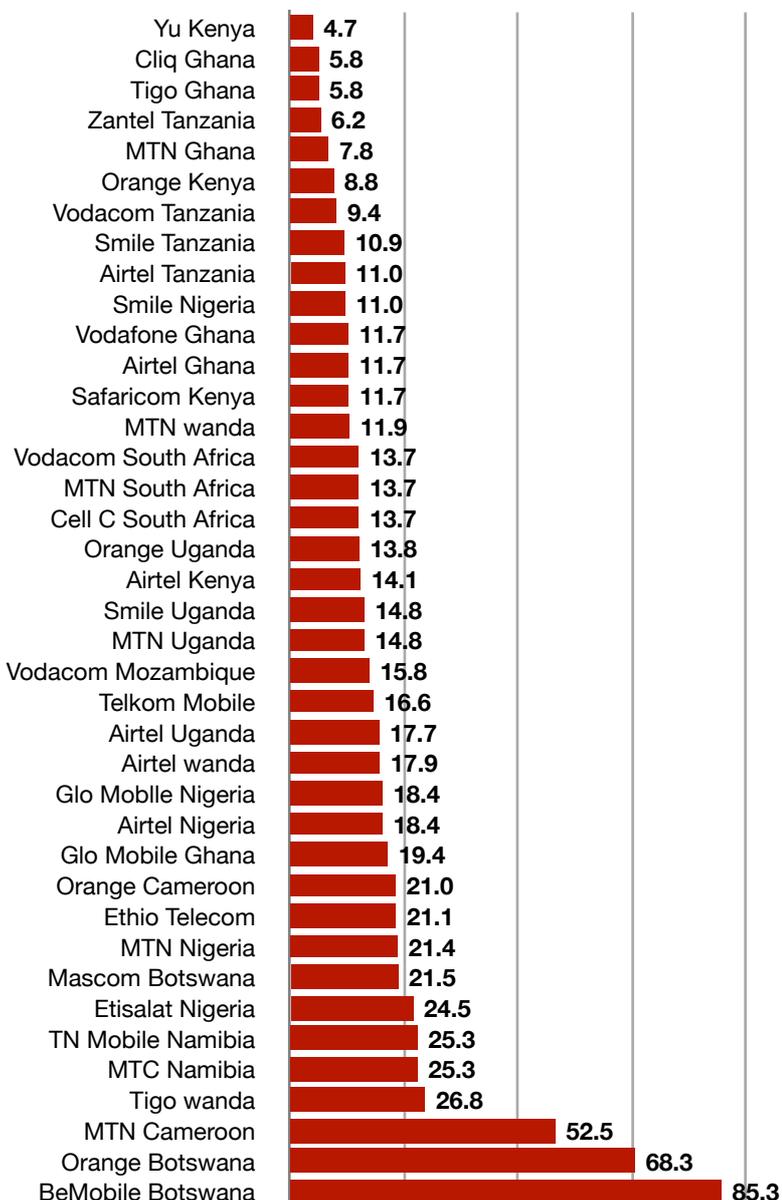

Yu Kenya	4.7
Cliq Ghana	5.8
Tigo Ghana	5.8
Zantel Tanzania	6.2
MTN Ghana	7.8
Orange Kenya	8.8
Vodacom Tanzania	9.4
Smile Tanzania	10.9
Airtel Tanzania	11.0
Smile Nigeria	11.0
Vodafone Ghana	11.7
Airtel Ghana	11.7
Safaricom Kenya	11.7
MTN wanda	11.9
Vodacom South Africa	13.7
MTN South Africa	13.7
Cell C South Africa	13.7
Orange Uganda	13.8
Airtel Kenya	14.1
Smile Uganda	14.8
MTN Uganda	14.8
Vodacom Mozambique	15.8
Telkom Mobile	16.6
Airtel Uganda	17.7
Airtel wanda	17.9
Glo Mobile Nigeria	18.4
Airtel Nigeria	18.4
Glo Mobile Ghana	19.4
Orange Cameroon	21.0
Ethio Telecom	21.1
MTN Nigeria	21.4
Mascom Botswana	21.5
Etisalat Nigeria	24.5
TN Mobile Namibia	25.3
MTC Namibia	25.3
Tigo wanda	26.8
MTN Cameroon	52.5
Orange Botswana	68.3
BeMobile Botswana	85.3

Figure 1: 1GB basket cost (USD)

BeMobile and Orange in Botswana, as well as MTN Cameroon stand out as the most expensive providers of 1GB prepaid bundles with prices of USD85.3, USD68.3 and USD52.5 respectively. Tigo Rwanda, MTC and TN Mobile in Namibia, followed by Etisalat in Nigeria form the next most expensive cluster between USD26.8 and USD24.5.

At the other end of the scale, Yu Kenya undercuts its Ghanaian competitors (Cliq and Tigo) by more than USD1. While this is a celebratory-low price, the QoS data RIA uses from Ookla[4] did not include Yu Kenya operating speeds, which could reveal poor performance. Zantel, Vodacom and Orange from Tanzania make the country competitive and, in addition to MTN Ghana, join the lowest priced operators in the prepaid 1GB data category with prices below USD10.

With Kenya, Ghana and Tanzania so well represented in the sub-USD12 category, South Africa's prices are disappointing. MTN, Vodacom and Cell C all share the USD13.7 price and Telkom Mobile sells 1GB for USD16.6. Ugandan operators provide similar prices (USD14.8 - USD15.8) and Nigeria's prices are spread out over the more expensive echelons.

Figure 2 compares the cheapest 1GB bundles within each country. Kenya, Ghana and Tanzania retain the highest ranking,with Nigeria and Rwanda climbing up slightly ahead of South Africa and Uganda. Mozambique, Cameroon and Ethiopia again have the more expensive products while Namibia and Botswana switch places for the most expensive.

This comparison can be qualified by taking into account the purchasing power parity of each country, which reveals a reshuffle in the lower half of the ranking. Notably, Ethio Telecom becomes the most expensive for a 1GB prepaid bundle, with operators in Botswana and Namibia following suit.
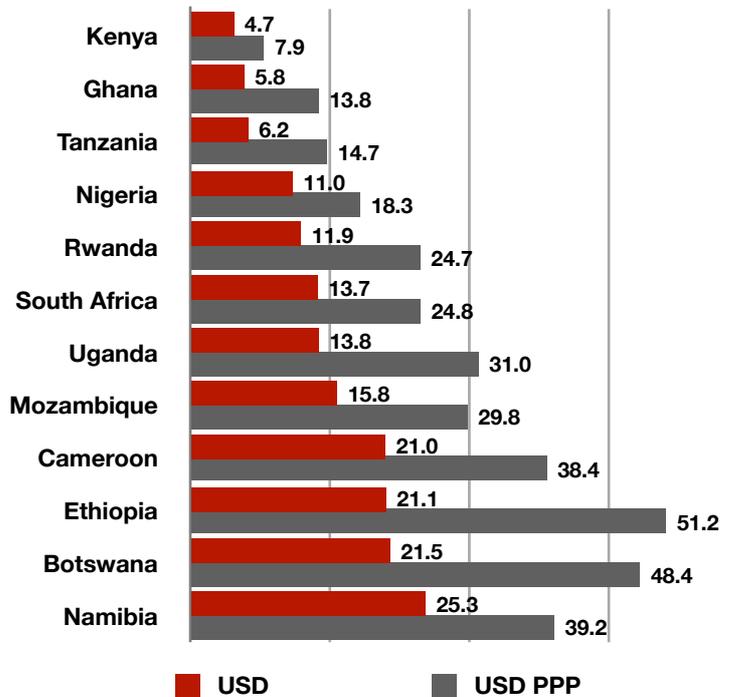

Average combined (kbps) Download speed (kbps)
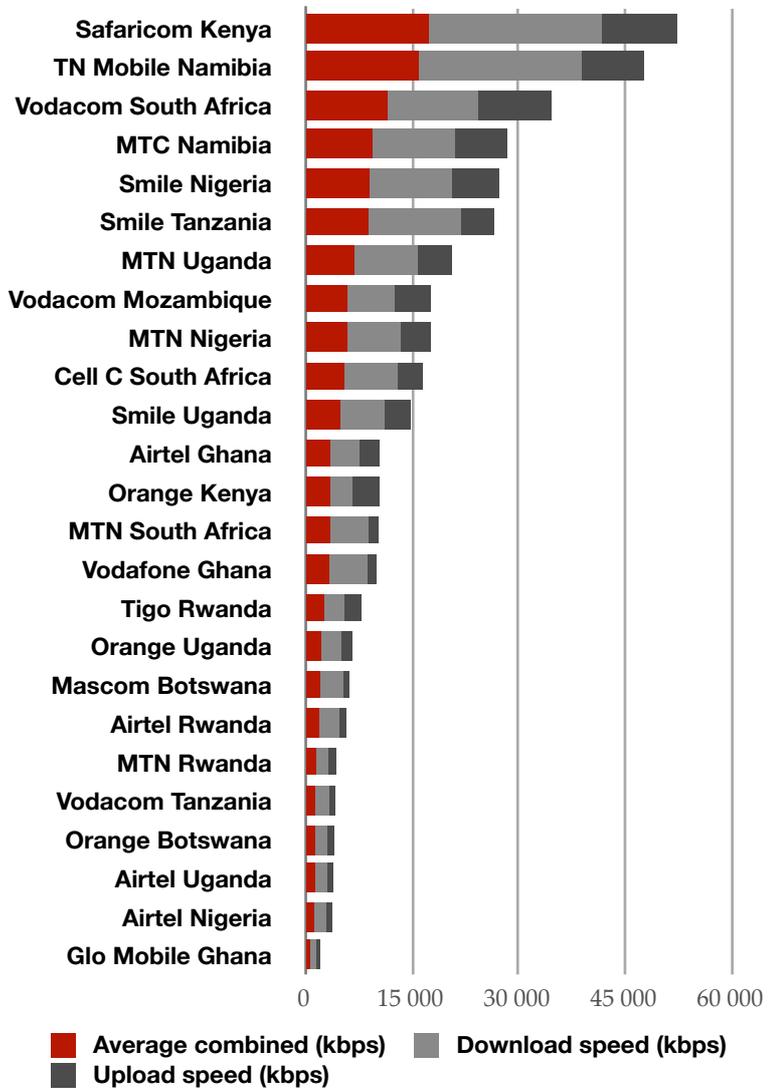Upload speed (kbps)

Figure 3: Average broadband speeds (from Ookla)

Figure 2: Cheapest 1GB basket per country

Value for Money Index

With internet speed data from Ookla, the price rankings can be given an additional dimension linking what operators are charging with what they are charging for. Figure 3 demonstrates how TN Mobile's high pricing shown in Table 2 above, is accompanied at least by the high internet speeds. It is closely followed by its national competitor, MTC creating a relatively high standard for quality of service in the country.

Dominant operator, Safaricom, on the other hand, makes a good name for itself by being competitively priced in Kenya and supplying superior internet speeds to its users. The same can be said for South Africa's Vodacom. Smile follows in both Nigeria and Tanzania reflecting the strength of LTE internet speeds. It must be mentioned, however, that Smile's network only operates in the capitals of those countries and therefore not exposed to the QoS challenges of trying to provide high speeds at national level.

Figure 3 also reveals that while prices of Ghana's Glo Mobile are the most competitive, this seems to detriment the speed it provides. Operators from Nigeria and Uganda (both Airtel),

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[4] The average download and upload user speeds obtained from Ookla are used to calculate an average speed of "use". This data does not allow for separation of prepaid internet speeds, thus postpaid internet speeds are included in the average internet speeds.
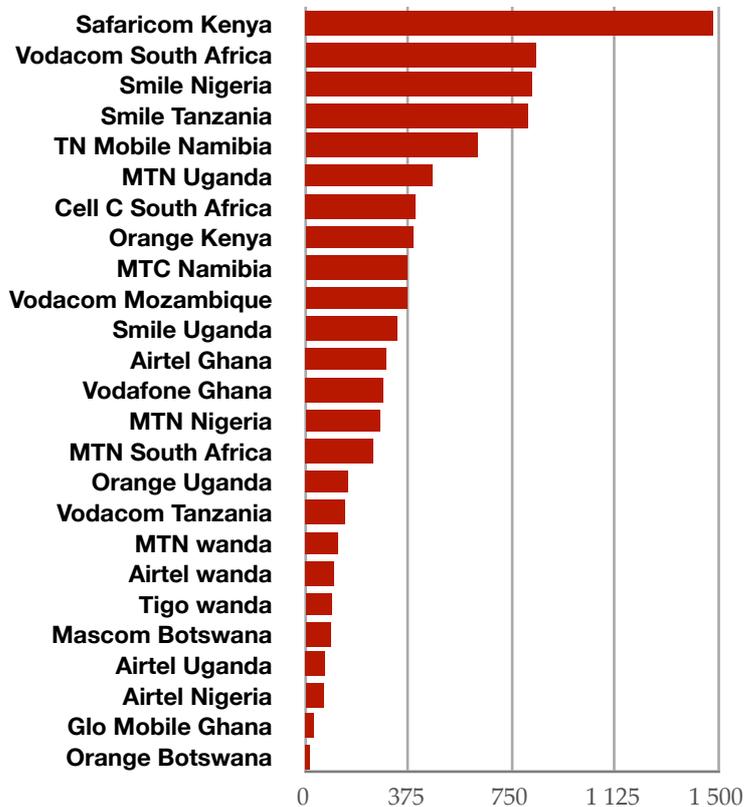
Figure 4: Value for Money Index

Bar chart values (Value for Money Index):
- Safaricom Kenya
- Vodacom South Africa
- Smile Nigeria
- Smile Tanzania
- TN Mobile Namibia
- MTN Uganda
- Cell C South Africa
- Orange Kenya
- MTC Namibia
- Vodacom Mozambique
- Smile Uganda
- Airtel Ghana
- Vodafone Ghana
- MTN Nigeria
- MTN South Africa
- Orange Uganda
- Vodacom Tanzania
- MTN wanda
- Airtel wanda
- Tigo wanda
- Mascom Botswana
- Airtel Uganda
- Airtel Nigeria
- Glo Mobile Ghana
- Orange Botswana

X-axis: 0, 375, 750, 1 125, 1 500

Botswana (Orange), Tanzania (Vodacom), and Rwanda (MTN and Airtel) all have very low internet speeds. The Value for Money Index, considers prices in relation to speed. While the pricing and quality of service indices separately provide greater transparency to these two issues, the value for money index provides a far more nuanced comparison. It compares the price of 1GB of data with how fast that data can travel on the provider's network.

This is done by dividing the average internet speed of an operator as obtained from Ookla by the prepaid price of 1GB. The higher the price, the smaller the Index value; and the higher the speed, the higher the Index value. Hence, a higher Index value is preferable to a lower one.

Again Kenya's highly dominant operator, Safaricom's high internet speeds and below average price set it far apart from other operators in the Index. Vodacom in South African and Smile in Nigeria and Tanzania all display strong QoS and prepaid data pricing.

Uganda, South Africa, Kenya and Mozambique all offer the greatest value. Rwanda, Botswana and Tanzania remain stuck with lower Value for Money indices. The cases of Orange in Botswana and Ghanaian operator Glo Mobile are concerning given what poor quality of services their customers are receiving. Airtel in Nigeria, Uganda and Rwanda have little to boast about by having indices near the lowest in the ranking.

While it is clear that speed data from Ookla for many operators is still needed, this value for money exercise demonstrates the importance of price in relation to the speed offered and the advertised speed. The strong correlation between Index values and their respective internet speeds indicates there are greater variances between internet speeds than between prices. Therefore, while it is important to make broadband services affordable to African users, the consistency and reliability of internet products also need to improve for better broadband services on the continent.

Day Basket comparison

RIA also collects data for "Day" bundles which consist of at least eight hours of unlimited internet access and use. While not every operator provides this type of a service, its increase in popularity warrants attention and comparison.

Yu Kenya, in Figure 5, again displays strong pricing strength but is out-priced by Airtel Tanzania by only USD0.1. Both MTN in Rwanda and Orange Cameroon are below the USD1.00 mark while Rwanda's other operator, Tigo, is also priced competitively.

In Namibia, MTC is again priced far higher than other African networks. However, again some examination of quality reveals that this is a high speed hourly service provided on MTC's 4G network: Netman.

This superior speed quality is reflected in its high (fourth) ranking in Figure 3. In light of its poor performances elsewhere, it is unsurprising to see Mascom from Botswana also priced quite highly at USD9.1, but it is unusual that Orange Kenya should be even higher with a product costing USD11.6.

These stark variations between Day Bundles offered on African networks represents more uncertainty regarding this new type of product compared to more established data bundles. As with other unlimited offers, the Day bundle can be burdensome to an operator's network as it exposed it to high internet use. Such a strain on the network's speed can effect other users and operators might charge more to compensate for this. On the contrary, the addition of an unlimited user for only one day might not be perceived as a high network cost and is therefore charged relatively little. It will be interesting to see how this product develops and what sector developments, such as the release of spectrum, will have on the range of unlimited products.
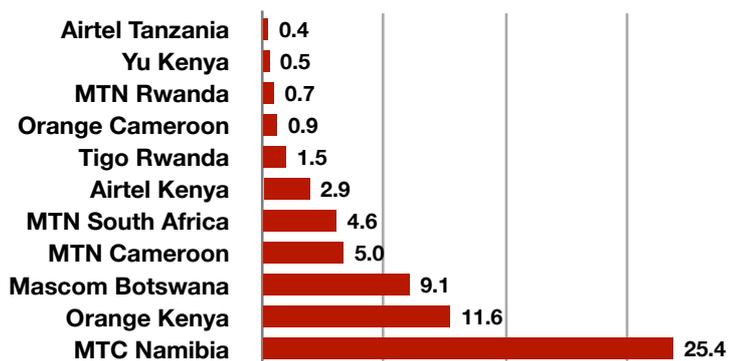

Bar chart values (Cost of Day bundle):
- Airtel Tanzania: 0.4
- Yu Kenya: 0.5
- MTN Rwanda: 0.7
- Orange Cameroon: 0.9
- Tigo Rwanda: 1.5
- Airtel Kenya: 2.9
- MTN South Africa: 4.6
- MTN Cameroon: 5.0
- Mascom Botswana: 9.1
- Orange Kenya: 11.6
- MTC Namibia: 25.4

Figure 5: Cost of Day bundle (8 hours uncapped)

Value for Money per megabyte

Another addition to the RIA broadband baskets is a model capturing the cheapest price per megabyte. Such a model illustrates the relevant market pressures at play in the broadband sector by providing a visual representation of which operators are providing the most amount of data in a bundle for
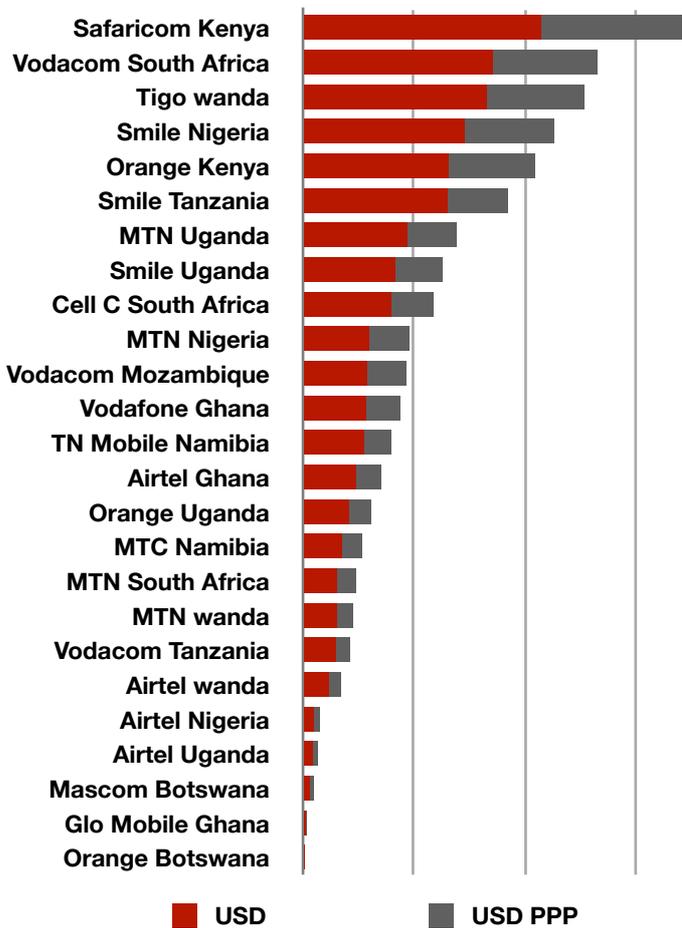
Chart categories (top to bottom):
- Safaricom Kenya
- Vodacom South Africa
- Tigo wanda
- Smile Nigeria
- Orange Kenya
- Smile Tanzania
- MTN Uganda
- Smile Uganda
- Cell C South Africa
- MTN Nigeria
- Vodacom Mozambique
- Vodafone Ghana
- TN Mobile Namibia
- Airtel Ghana
- Orange Uganda
- MTC Namibia
- MTN South Africa
- MTN wanda
- Vodacom Tanzania
- Airtel wanda
- Airtel Nigeria
- Airtel Uganda
- Mascom Botswana
- Glo Mobile Ghana
- Orange Botswana

Legend: ■ USD   ■ USD PPP

Figure 6: Value for money based on 'per megabyte price' and average speeds.

the lowest relative price i.e. it divides the cost of a bundle by the associated megabytes.

The similarity of Figure 6 to Figure 4 seems obvious but the two Figures compare completely different products. Where Figure 4 compares the speed per 1GB*price* (Value for Money), Figure 6 examines the speed per 1MB*price.* These 1MB prices are derived from large data bundles in order to calculate how much each of their megabytes cost.

Again, Figure 6 shows Safaricom to have the most affordable megabytes at high speeds available to subscribers, with Vodacom (South Africa) and Tigo Rwanda close behind. Smile is represented close to the top as well with Orange Kenya also in the mix.

The two Botswana operators (Orange and Mascom), Ghana's Glo Mobile and Airtel again have their high costs and low speeds exposed by low Value for MoneyIndex.

Fixed broadband

The cost of copper line installations, monthly line (telephone and ADSL) rentals, connection devices and the comparatively slower speeds has kept the fixed-line industry from any major growth. What fixed broadband retains on its side is the capacity for un-capped broadband which mobile operators struggle to provide.

The nature of fixed-line infrastructure excludes fixed-line opera-tors the capacity strain faced by mobile operators. This allows fixed operators the space to capture the only segment not claimed by mobile operators: high data demand. Hence, it is largely households and offices that purchase fixed services for cable and WiFi networks.

It is slightly too good to be true and the catch, in most cases, comes in the form of a fair use policy that operators use to pro-tect themselves from "overactive" users who, through high download trafficking, compromise network speeds for other users. These fair use policies set download limits that are moni-tored at peak times and if a user surpasses this limit, their serv-ice speed is throttled and taken down to a much lower speed (as low as 256 Kbps).

This deterrent, while effective, means that the service is not truly uncapped and RIA has accordingly adjusted its fixed line bas-kets. Instead of capturing commercially labelled uncapped bun-dles, a breakdown of 1GB, 5GB and 10GB has been adopted in order to capture baskets that are both comparable with mo-bile ones as well as those that are representative of the high data supply in the fixed market.

Table 3 shows the country currently providing the cheapest 1GB's worth of fixed internet at an advertised speed of less than 1 Mbps is Ethiopia's Ethio Telecom (USD14.45) and, as such, only reaches 0.9% of the population (BuddeComm, 2013). As a monopoly operator, such prices are not a result of competition but rather artificially or politically set prices. Ethio does not, however, maintain this pricing strength throughout the other broadband baskets.

Mozambique's TDM (USD21.59) provides the cheapest 5GB and 10GB bundles at this speed, while Ghana's Vodafone

Table 3: Cost of different ADSL bundles at different advertised speeds													
Country	Operator	1GB up to 1 Mbps	1GB up to 4 Mbps	1GB up to 10 Mbps	1GB above 10 Mbps	5GB up to 1 Mbps	5GB up to 4 Mbps	5GB up to 10 Mbps	5GB above 10 Mbps	10GB up to 1 Mbps	10GB up to 4 Mbps	10GB up to 10 Mbps	10GB above 10 Mbps
Botswana	BTC	46.97	61.81	119.63		46.97	61.81	119.63		46.97	61.81	119.63	
Cameroon	Camtel	62.81	1002.1			62.81	1002.06			62.81	1002.06		
Ethiopia	Ethio Telecom	14.45	30.25	337.90		30.25	30.25	337.90		59.19	78.72	337.90	
Ghana	Vodafone	26.89				26.89				26.89			
Kenya	Orange	77.04	124.02			77.04	124.02			77.04	124.02		
Mozambique	TDM	21.59	91.10	136.91		21.59	91.10	136.91		21.59	91.10	136.91	
Namibia	Telecom Namibia	36.74	64.36	336.69		36.74	64.36	336.69		36.74	64.36	336.69	
South Africa	Telkom	37.68	37.68	68.53	86.18	37.68	37.68	68.53	86.18	47.81	47.81	68.53	194.1
Tanzania	TTCL	71.74				71.74				71.74			

(USD26.89) also beats Ethio's price. Also at this advertised speed, both Kenya's Orange (USD77.04) and Tanzania's TTCL (USD71.74) are the most expensive.

At speeds from 1 Mbps up to 4 Mbps, Ethio Telecom provides 1GB (USD30.25) and 5GB (USD30.25) cheaper than any other but Telkom South Africa provides 10GB at USD47.81 - the cheapest amount out of the 12 countries. Cameroon's Camtel charges the ridiculous amount of USD1002.06 for 5GB of data in this speed category and Orange in Kenya (USD124.02) is the second most expensive.

It is in the speed categories of 4 Mbps up to 10 Mbps, and 10 Mbps and above that Telkom's fixed network shows its superiority by providing both speeds at much cheaper prices to a portion of its 870,505 subscribers (1.74% of the population) (Telkom, 2013). All other operators, however, provided uncapped services at these speeds where Telkom's cheapest products were 10GB offers. Both Ethio (USD337.90) and Telecom Namibia (USD336.69) were the most expensive providers of bundles at these high speeds - both of which are uncapped bundles.

Conclusions

The broadband sector in Africa is caught between demand and supply side pressures. Operators in the countries under review appear to be refocussing their business from voice to data to meet the pent up demand for broadband internet ((RIA Policy Brief No.2, April 2014). This has seen faster growing revenues accrue from data services than from voice, which are nonetheless still significant. Data pricing under these circumstances in the top performing countries is competitive and, in some instances, their quality of service is high. For many of the operators this has required significant investment in the upgrades of their infrastructure despite limited access to high demand and "digital dividend" spectrum required for LTE services. This compelled them to find innovative but not always optimal ways of using their currently assigned spectrum for high-speed broadband.

The competitiveness of data services in many of the leading markets is reflected in the different offerings geared towards the diverse needs and incomes of users. This is reflected in bundled services, time based services and dynamically priced products. There has been a surge in the provision of uncapped data offers to meet the high use needs of lower income customers who would otherwise be unable to access such services. While these are currently limited mostly to one day (or only a few hours), they are proliferating beyond the meagre "Megabyte" barriers of the past

The rise of the data market is also evidenced in the entry of the data only operator, Smile, in different African markets. Its introduction in markets such as Tanzania appears to have put pricing pressure on incumbents. However, it should be noted that Smile is operating mainly in urban centres only, and it will be important to see if the low prices being introduced do have a positive impact in countries with intractably low internet penetration rates (despite policy and regulatory attention), such as Tanzania.

Mobile operators in Kenya lead the affordability and Value for Money charts in this Brief. With the exception of Airtel, it is safe to say Kenya's broadband services offer good prices and reliable speeds with enough variation to suggest strong market competition. However, the absences of an LTE network and affordable fixed products constrict its overall broadband market performance.

Although Ghana has a better priced fixed service and cheap 1GB bundles, it too does not boast a commercial LTE network and its QoS cushions it in the middle of the pack. Smile offers a welcome boost to its operating speeds.

Tanzania's operators have maintained their profile of comparatively cheap services and in this review it has Smile's 4G speeds to boast about. Its fixed operator, however, has much room for improvement. Rwanda shares a similarly "cheap" profile with Tanzania but has neither a fixed operator nor an LTE network to rescue its slower 3G speeds.

Ethio Telecom in Ethiopia has an even more dire service. It offers competitively priced fixed services but its mobile broadband bundles are the most expensive in USD PPP terms. And since speed data was not available for Ethio, Value for Money could not be established.

The speeds of Cameroon's operators could also not be attained, although 3G networks and ADSL speeds of greater than 1 Mbps have not yet been rolled out due to regulatory barriers. This compounds its exhorbitantly expensive fixed prices and above average mobile broadband costs. Botswana's operators were similarly expensive in the mobile broadband comparisons leaving too much for their speeds to make up for. The fixed operator BTC has no remedy to its being ranked among the more expensive fixed operators.

Vodacom in Mozambique was ranked between the average and the more expensive mobile categories but its speeds compete with those of LTE network operators which redeems its Value for Money score. The country does not, however, enjoy the presence of a healthy fixed competitor.

Uganda's fixed operator does not advertise commercially available ADSL services, hence, its mobile companies have the liberty of charging higher prices. However, both Smile and MTN can claim to be compensating for operating LTE network services.

Namibia's fixed operator, Telecom Namibia, is also confined to providing affordable rates for slower cable speeds (4 Mbps and below). And although its mobile operators also seldom compete for "cheapest" bundles, they make up for it with some of the quickest 4G speeds, which unfortunately is only on offer to postpaid customers.

The mobile sector in Nigeria does not have to compete with a fixed operator, which in part speaks to the varied prices and speeds offered. But again, it is Smile who dominates the prices and speeds categories putting together the third best Value for Money score on the chart.

Lastly, South Africa has the strongest performance in the fixed broadband rankings but mobile broadband has mixed results. Prices in all mobile categories are extremely similar but different

services (MTN's Day Bundle), cheaper MB (Cell C's per MB offerings) and higher speeds (Vodacom) set the mobile operators apart.

Arguably the biggest policy and regulatory bottleneck in Africa is the failure to assign high demand spectrum for LTE. South Africa is a case in point. Operators have been ready to introduce LTE services for years. The failure to assign LTE spectrum at 2.6GHz has meant operators have had to use existing licensed spectrum not optimal for LTE. Although there are clear intentions to exploit the fixed-line market, the offer by Vodacom to purchase Neotel in South Africa is undoubtedly to gain access to the valuable 800MHz spectrum that they alone are licensed to use. The outcomes of this may be positive, both in the fixed broadband market, where it might provide some competition to Telkom, and also in its ability to offer 4G mobile broadband. Operators have had to work around the policy and regulatory constraints in order to ensure the evolution of their business. Creating an enabling environment for this to happen is likely to have outcomes of fairer competition as well as the potential entry of competitors and service providers able to innovate and increase broadband services.

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