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Impact of Communication Networks

Malaria Journal

BioMed Central

Research

Open Access

Role of information and communication networks in malaria survival

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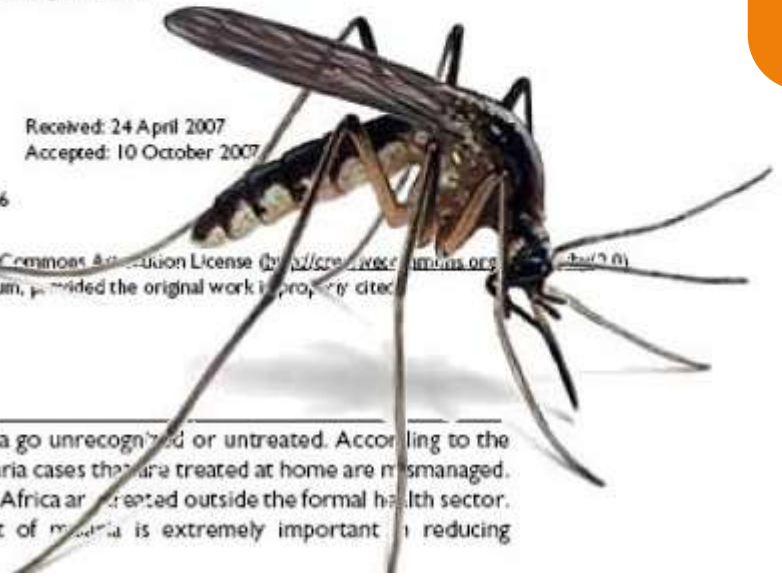

Abstract

Background: Quite often symptoms of malaria go unrecognized or untreated. According to the Multilateral Initiative on Malaria, 70% of the malaria cases that are treated at home are mismanaged. Up to 82% of all malaria episodes in sub-Saharan Africa are treated outside the formal health sector. Fast and appropriate diagnosis and treatment of malaria is extremely important in reducing morbidity and mortality.

Simple proximity to communication networks decreases the chance of dying from Malaria

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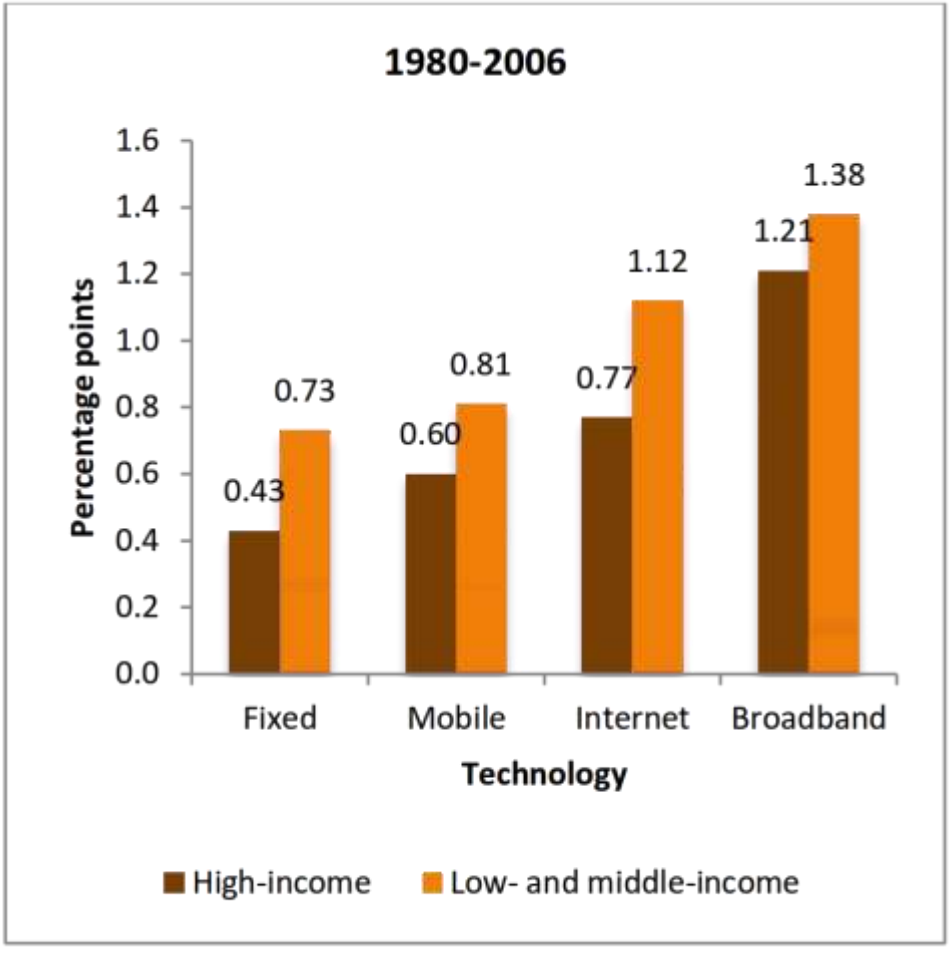
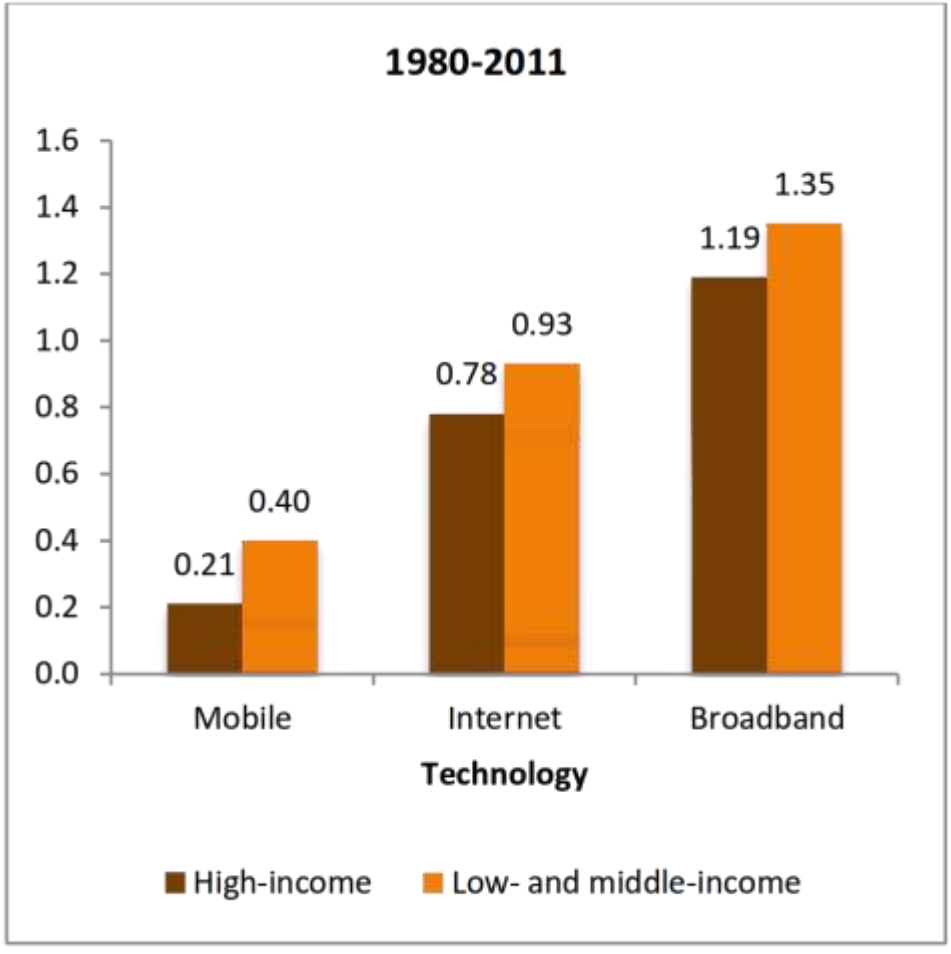
Impact of ICTs on GDP





Source: Qiang et al. 2009 and Scott 2012.

Izolo mobile diaries of the less connected

1.2 Thandiwe's mobile diary

34 years old, urban, female, low income, uses mobile Internet

Thandiwe looks after a small baby and does women's hair at home.

Phone: Alcatel Android

Phone use in diary: received and sent WhatsApp messages

Airtime balance at time of interview: R9 (US$0.70)

Diary day: Sunday

1.3 Vuyani's mobile diary

19 years old, rural, male, low income, uses mobile Internet

Vuyani is still at school, living with his grandmother and brother.

Phone: Samsung Young 2 Android

Phone use in diary: WhatsApp, voice and Facebook

Airtime balance at time of interview: R0

Diary day: Friday

https://opendocs.ids.ac.uk/opendocs/bitstream/handle/123456789/13348/RReport_LessConnected_FINAL.pdf

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Izolo mobile diaries of the less connected

1.5 Xoliswa's mobile diary

43 years old, rural, female, low income, mobile Internet

Xoliswa lives with her partner and two children; she does part-time work on local building sites and gets government child grants.

Phone: Samsung Android smartphone

Phone use in diary: listening to church recordings

Airtime balance at time of interview: R0

Diary day: Saturday

1.4 Sibusiso's mobile diary

39 years old, urban, male, very low income, no mobile Internet

Sibusiso is unemployed, living with his mother, grandmother and his daughter.

Phone: Nokia 105 (basic phone)

Phone use in diary: sent 'Please Call Me's', received calls from debt collectors

Airtime balance at time of interview: R0

Diary day: Thursday

https://opendocs.ids.ac.uk/opendocs/bitstream/handle/123456789/13348/RReport_LessConnected_FINAL.pdf

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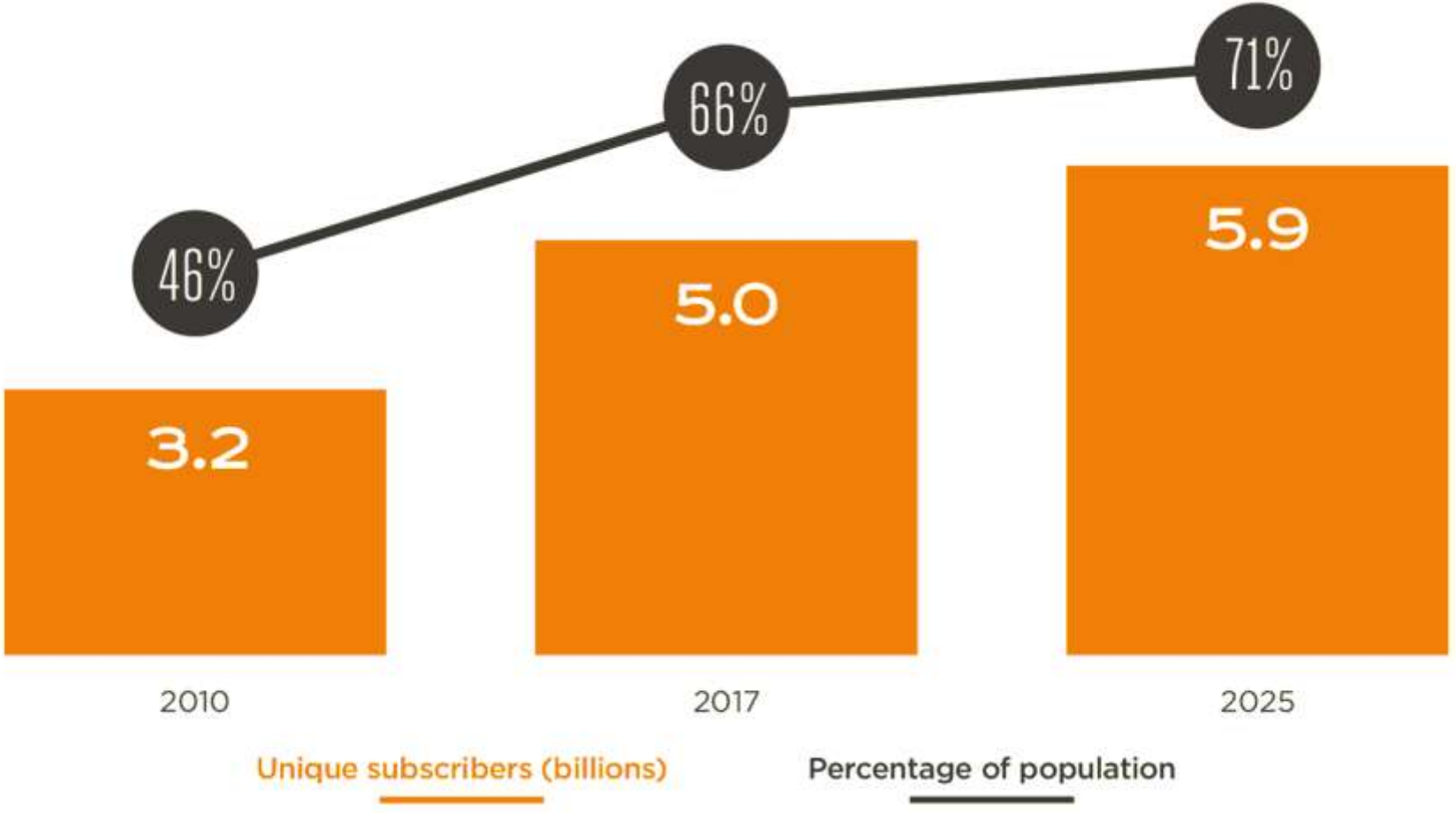
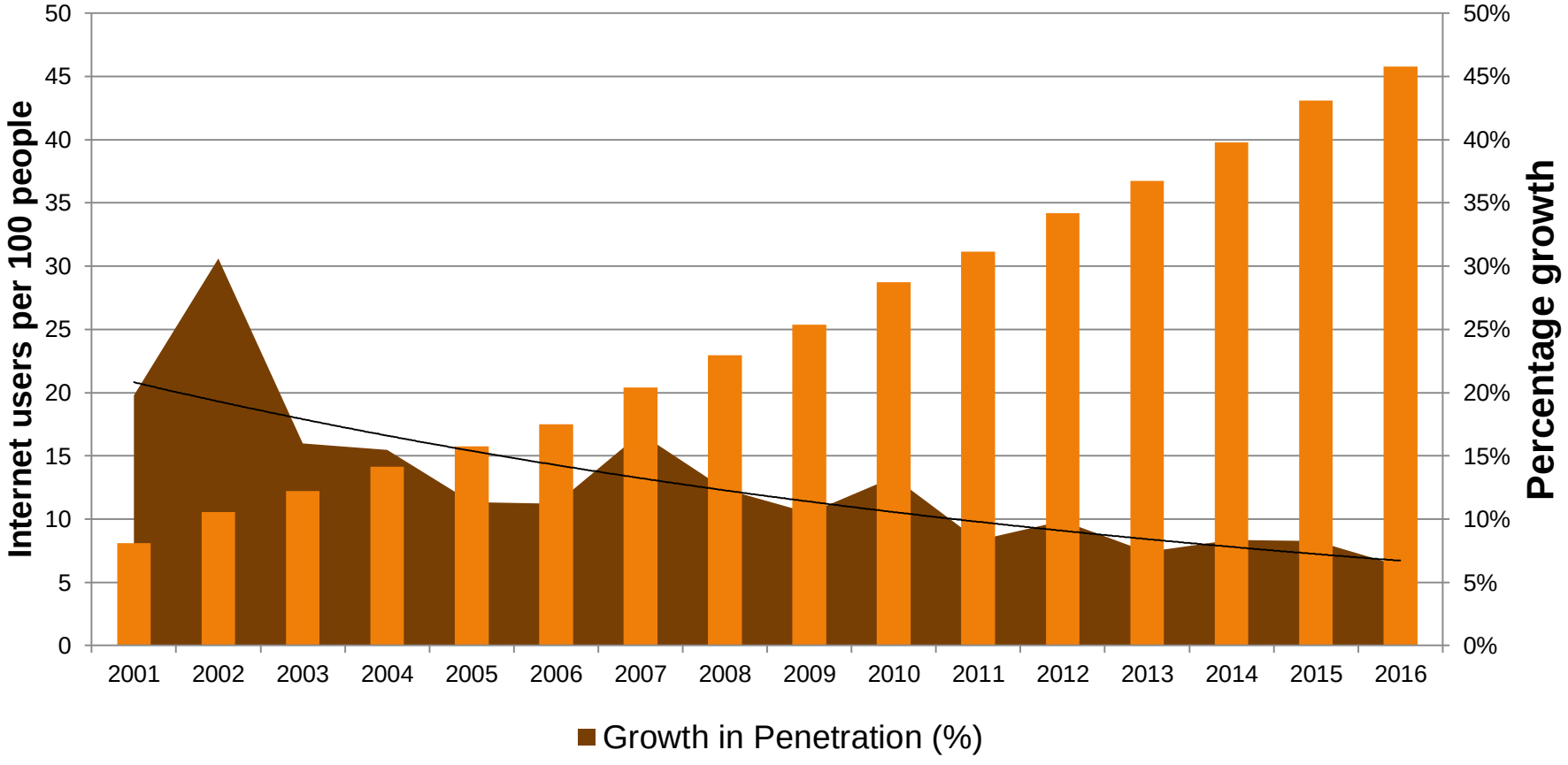
Mobile Subscriber Growth Slowing



Source: GSMA Intelligence

Internet Growth Slowing



Source: ITU/World Bank/Richard Thanki

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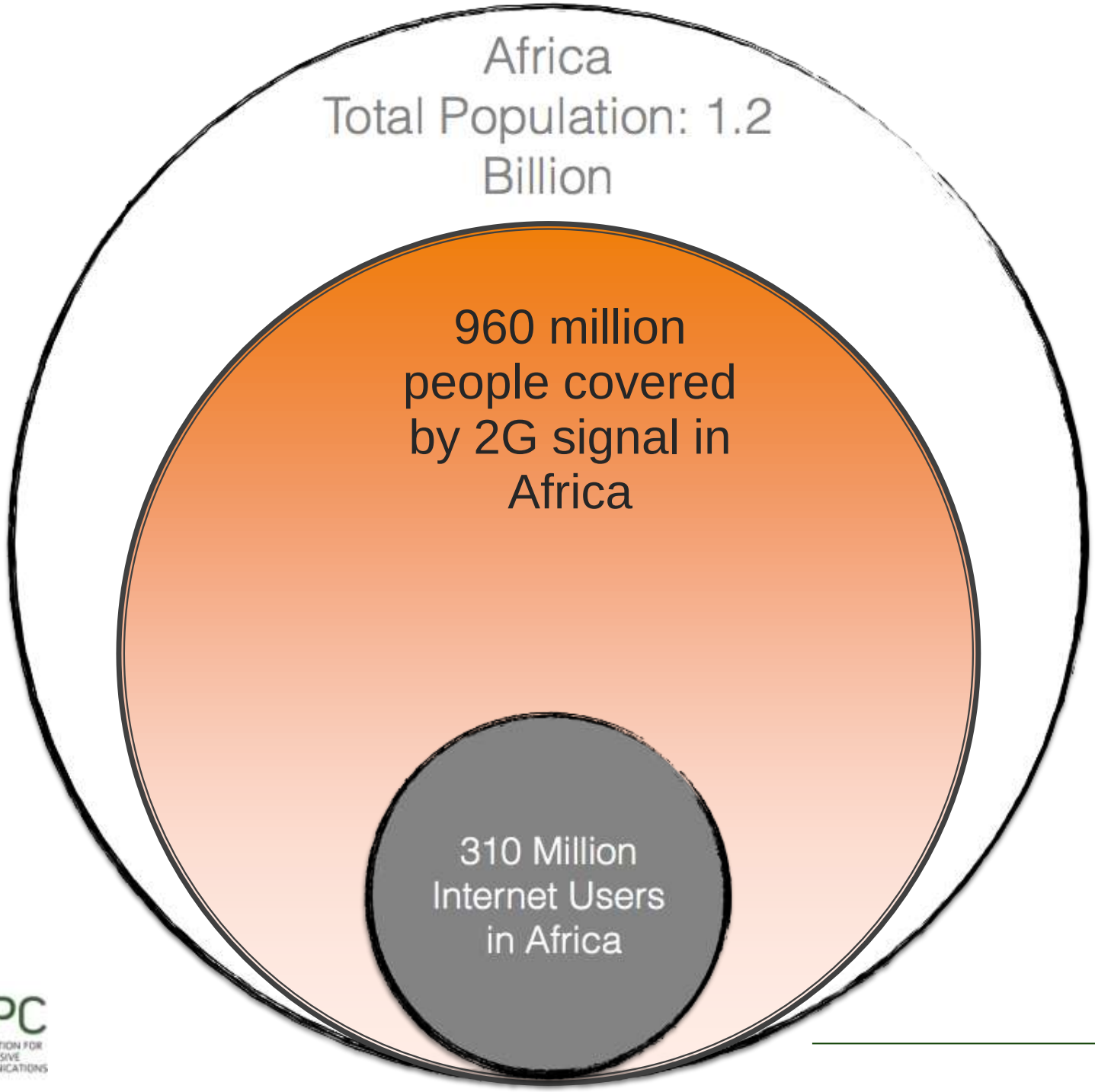

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Lack of affordability hampers the ability to discover value on the Internet

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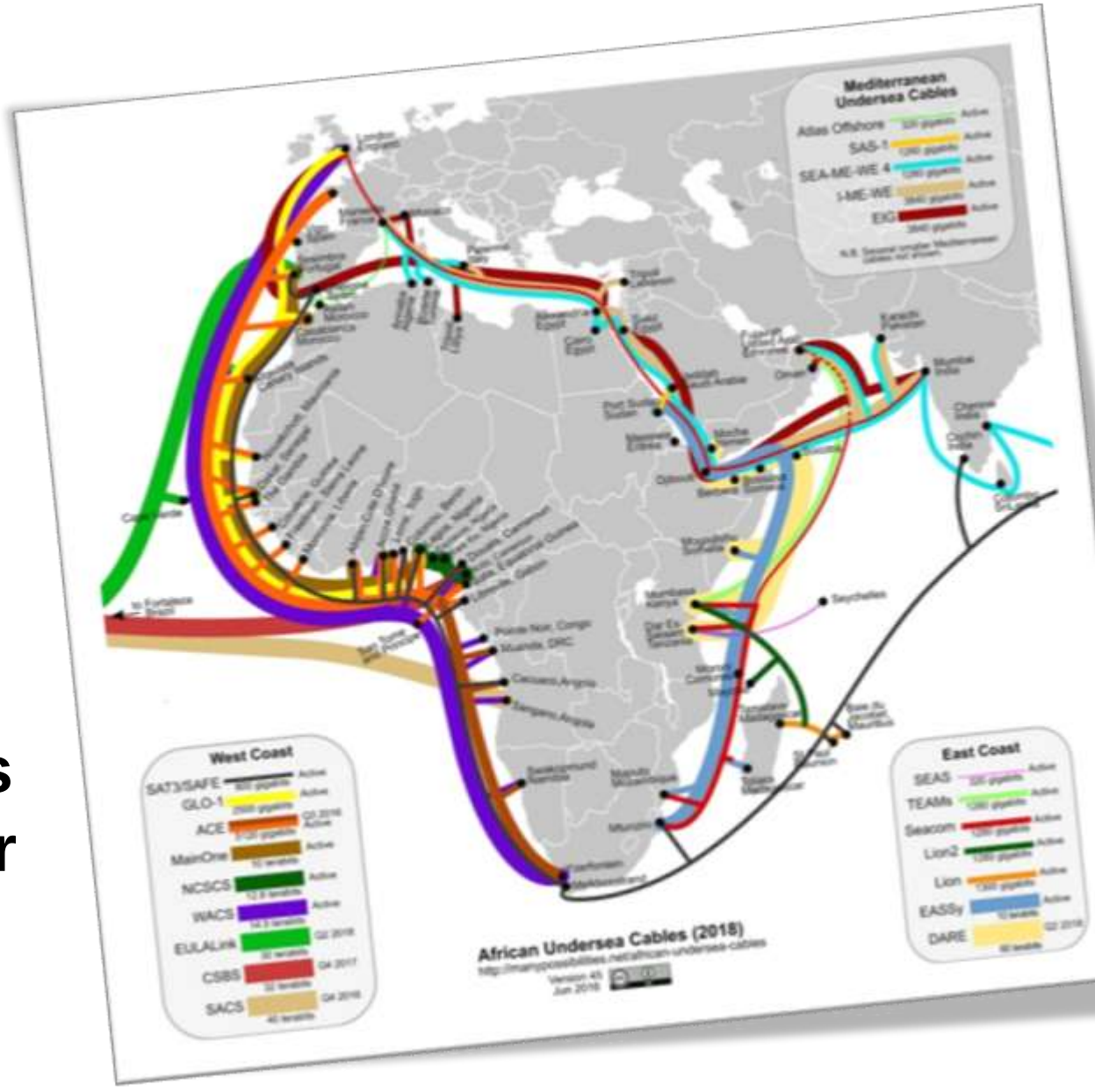
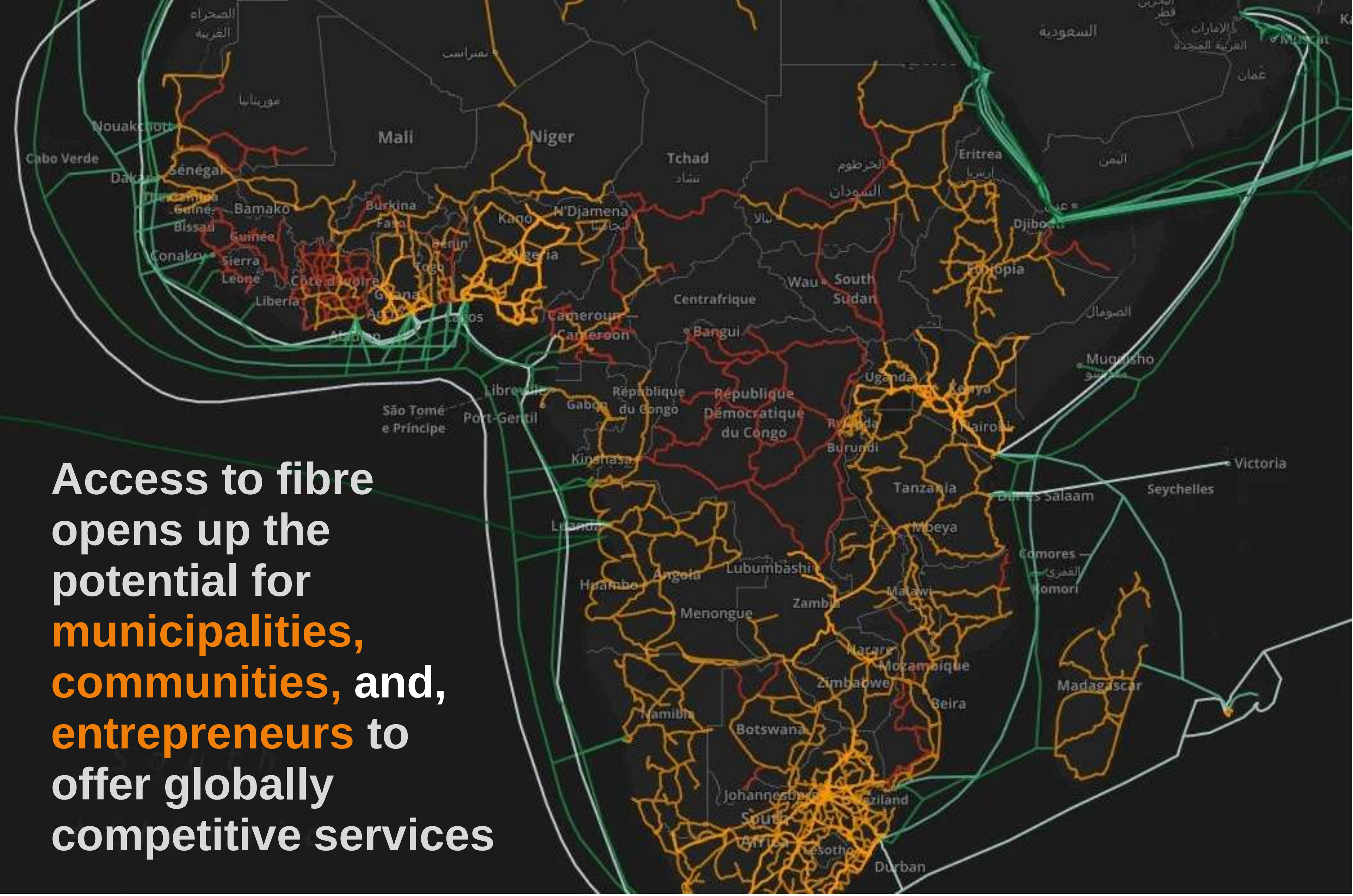
Opportunity

FIBRE OPTIC INFRASTRUCTURE

Impact of Fibre Optic Undersea Cables

The growth of undersea fibre optic capacity has been a catalyst for change.



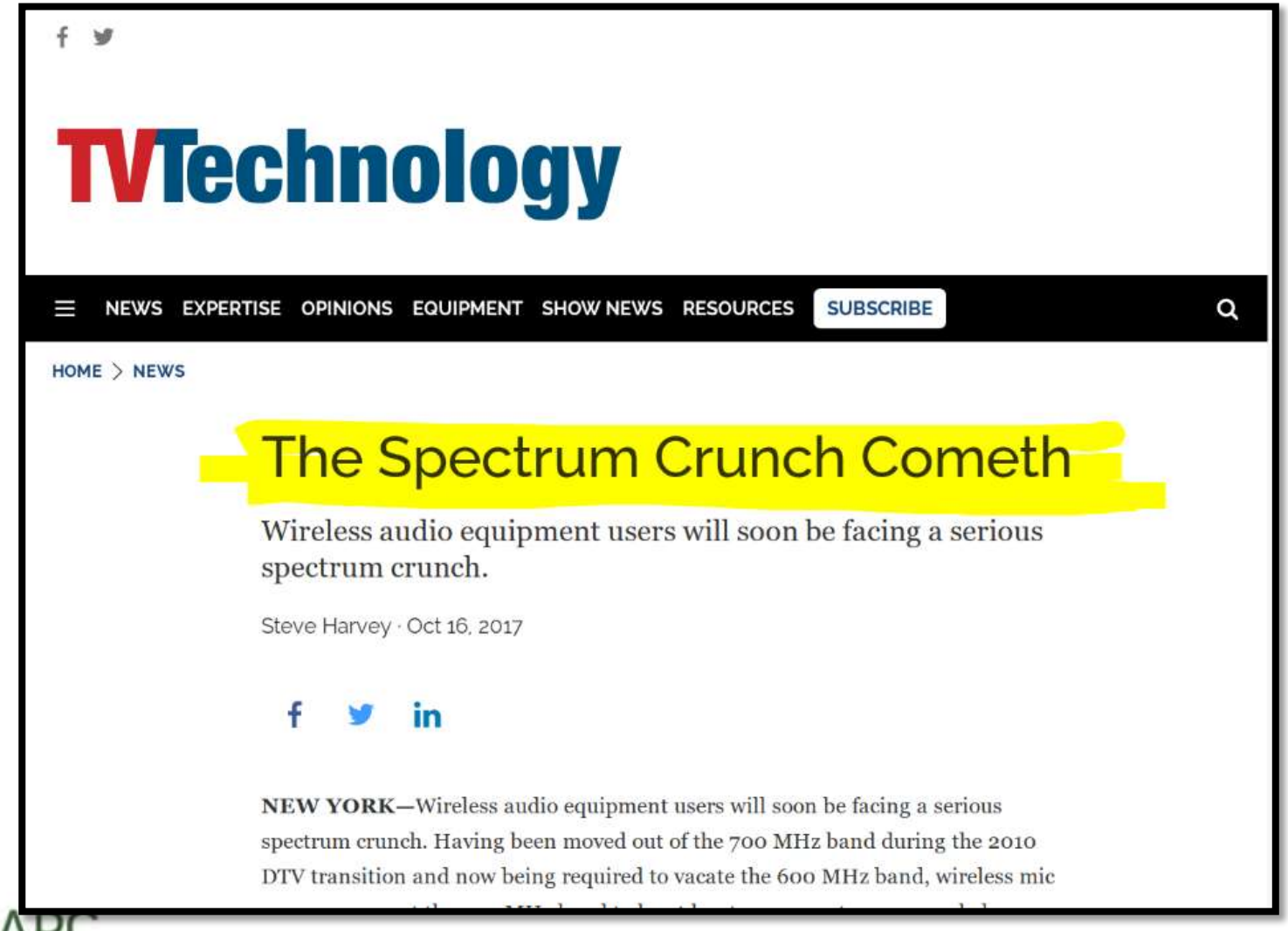


Access to fibre opens up the potential for **municipalities, communities,** and, **entrepreneurs** to offer globally competitive services

Challenge

ACCESS TO SPECTRUM

Access to Spectrum Has Become a Challenge for Regulators



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The Spectrum Crunch Cometh

Wireless audio equipment users will soon be facing a serious spectrum crunch.

Steve Harvey · Oct 16, 2017

NEW YORK—Wireless audio equipment users will soon be facing a serious spectrum crunch. Having been moved out of the 700 MHz band during the 2010 DTV transition and now being required to vacate the 600 MHz band, wireless mic

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Regulatory Change vs Tech Change

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Digital broadcasting set to transform communication landscape by 2015
Accord is major step in implementing World Summit on the Information Society objectives

Geneva, 16 June 2006 – A treaty agreement was signed today at the conclusion of ITU's Regional Radiocommunication Conference (RRC-06) in Geneva, heralding the development of "all-digital" terrestrial broadcast services for sound and television. The digitalization of broadcasting in Europe, Africa, Middle East and the Islamic Republic of Iran by 2015 represents a major landmark towards establishing a more equitable, just and people-centred Information Society. The digital switchover will leapfrog existing technologies to connect the unconnected in underserved and remote communities and close the digital divide.

"The most important achievement of the Conference," remarked Mr Yoshio Utsumi, Secretary-General of ITU, "is that the new digital Plan provides not only new possibilities for structured development of digital terrestrial broadcasting but also sufficient flexibilities for adaptation to the changing telecommunication environment."

The agreement reached at RRC-06 paves the way for utilizing the full potential of information and communication technologies to achieve the internationally recognized development goals. The date of transition to digital terrestrial broadcasting in the year 2015 is intended to coincide with the targets set b the Millennium Development Goals.

The regional agreement for digital services has been reached in the frequency bands 174 - 230 MHz and 470 - 862 MHz. It marks the beginning of the end of analogue broadcasting.

The Conference agreed that the transition period from analogue to digital broadcasting, which begins at 0001 UTC 17 June 2006, should end on 17 June 2015, but some countries preferred an additional five-year extension for the VHF band (174-230 MHz).

The Regional Radiocommunication Conference was chaired and brought to a successful conclusion by Mr Kavouss Arasteh of the Islamic Republic of Iran.

The digital dividend

The switchover from analogue to digital broadcasting will create new distribution networks and expand the potential for wireless innovation and services. The digital dividend accruing from efficiencies in spectrum usage will allow more channels to be carried across fewer airwaves and lead to greater convergence of services.

NETFLIX
2007

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Spectrum Auctions

NIGERIA

2013 - 2.3GHz

- 30 MHz of 2.3GHz spectrum
- 23 million USD
- won by Bitflux (a local consortium)
- 4 years later little evidence of roll-out

2014 - 2.6 GHz

- 14 lots of 2x5MHz of spectrum (140MHz in total)
- Launched and withdrawn twice in 2014 then 2015
- 2016, MTN successfully bids for 6 lots meeting the reserve of $16M per lot, a total of $96M

MOZAMBIQUE

2013 - 800MHz

- auction of five lots of 2x5MHz
- reserve price of $30M per lot
- no bids, auction withdrawn
- remains fallow with no published plans to re-auction

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Spectrum Auctions

SENEGAL

2015 - 800MHz (3 blocks 2x30MHz), 700MHz (4 blocks 2x20MHz) , 1800MHz (3 blocks 2x30MHz)

- in short... a lot of spectrum
- reserve price set at USD50M provoking letter of complaint from operators
- negotiations ensued with the result that the former fixed-line incumbent Sonatel agree to pay **$53M** for 2x10MHz in 800MHz band and 2x10MHz in 1800MHz band.

GHANA

2015 - 800MHz

- 2 lots of 2x10MHz (total of 40MHz)
- reserve price of 67.5M per lot (initially $92M per lot)
- MTN the only bidder to meet reserve price
- plans to auction rest of 800MHz spectrum to fund **digital terrestrial broadcast infrastructure**

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Spectrum Auctions

SOUTH AFRICA

2010 to present

- Three attempts since 2010 to launch auctions in 2.6GHz and 3.5GHz and more recently 800MHz
- Attempts to include national strategic objectives into the auction design resulting in significant pushback from operators

KENYA

2014 - 800MHz

- Kenyan government agrees on exchange with largest incumbent Safaricom. 2x15MHz spectrum in exchange for $56M plus promise to build police communications network
- Complaints filed by Airtel and Telkom
- Net result: all three operators get 2x10MHz and pay $25M each

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Spectrum Auctions: Not the whole answer?

Country	Year	Spectrum	Price	# successful bidders
Nigeria	2014	2.3GHz (30MHz)	$23,000,000	1
Ghana	2015	800MHz (20MHz)	$67,500,000	1
Nigeria	2016	2.6GHz (60MHz)	$96,000,000	1
Mozambique	2013	800MHz (10MHz)	$30,000.000	0

Source: Song, 2018 forthcoming

Evidence that high spectrum spends result in:

- Lower quality networks and reduced take-up of mobile data services owing to reduced incentives for investment;
- Higher consumer prices for mobile broadband data; and
- Lost consumer welfare with a purchasing power of US$250bn across a group of countries where spectrum was priced above the global median.

Source: https://www.gsma.com/spectrum/wp-content/uploads/2017/02/Effective-Spectrum-Pricing-Full-Web.pdf

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Can We Look Beyond Auctions?

Current regulation empowers large operators

Regulation ought to enable small-scale operators to address niche markets, geographies, and to stimulate access innovation.

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For Small Operators

Even Subsistence Operators

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Opportunity

UNLICENSED SPECTRUM (WIFI)

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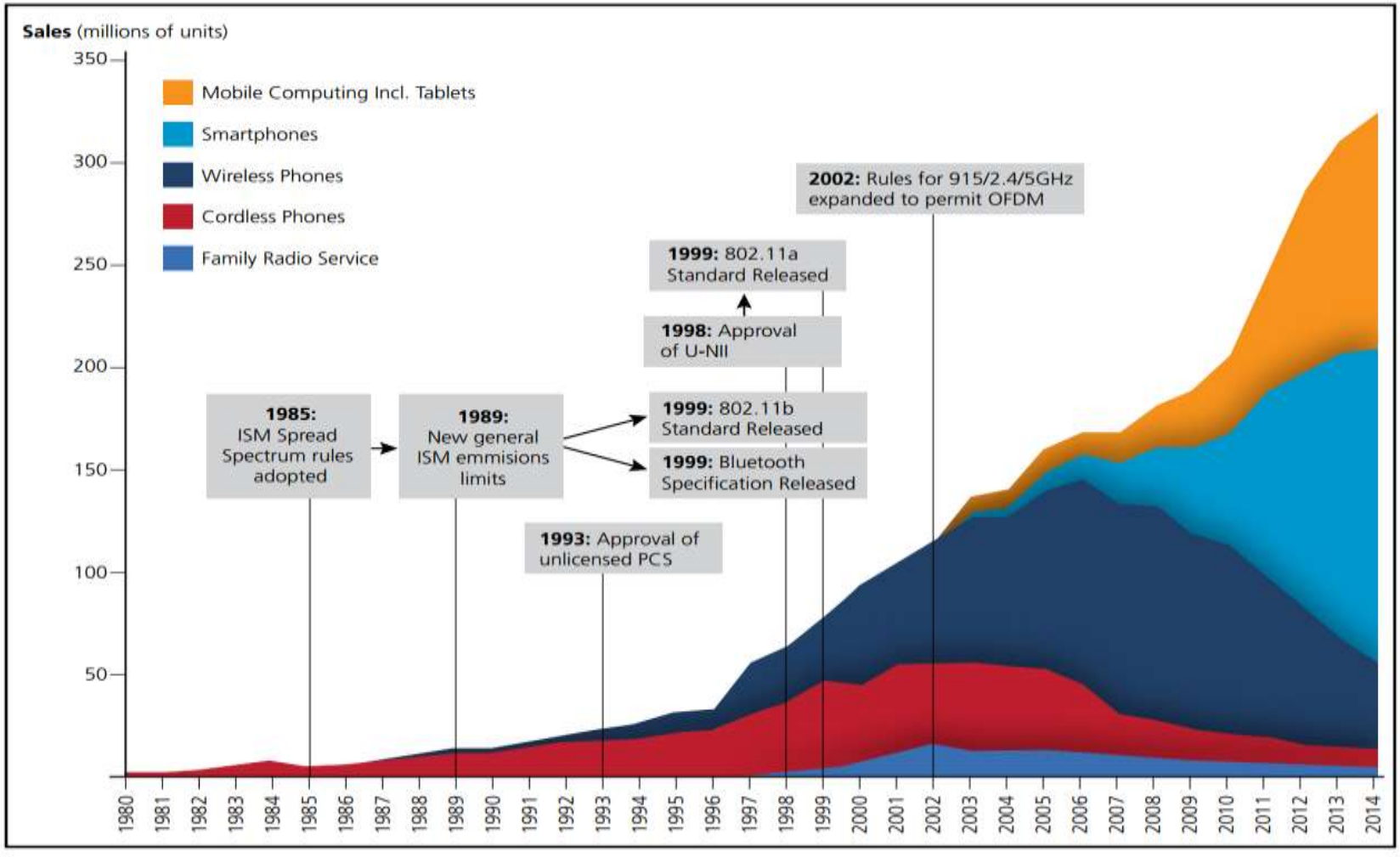
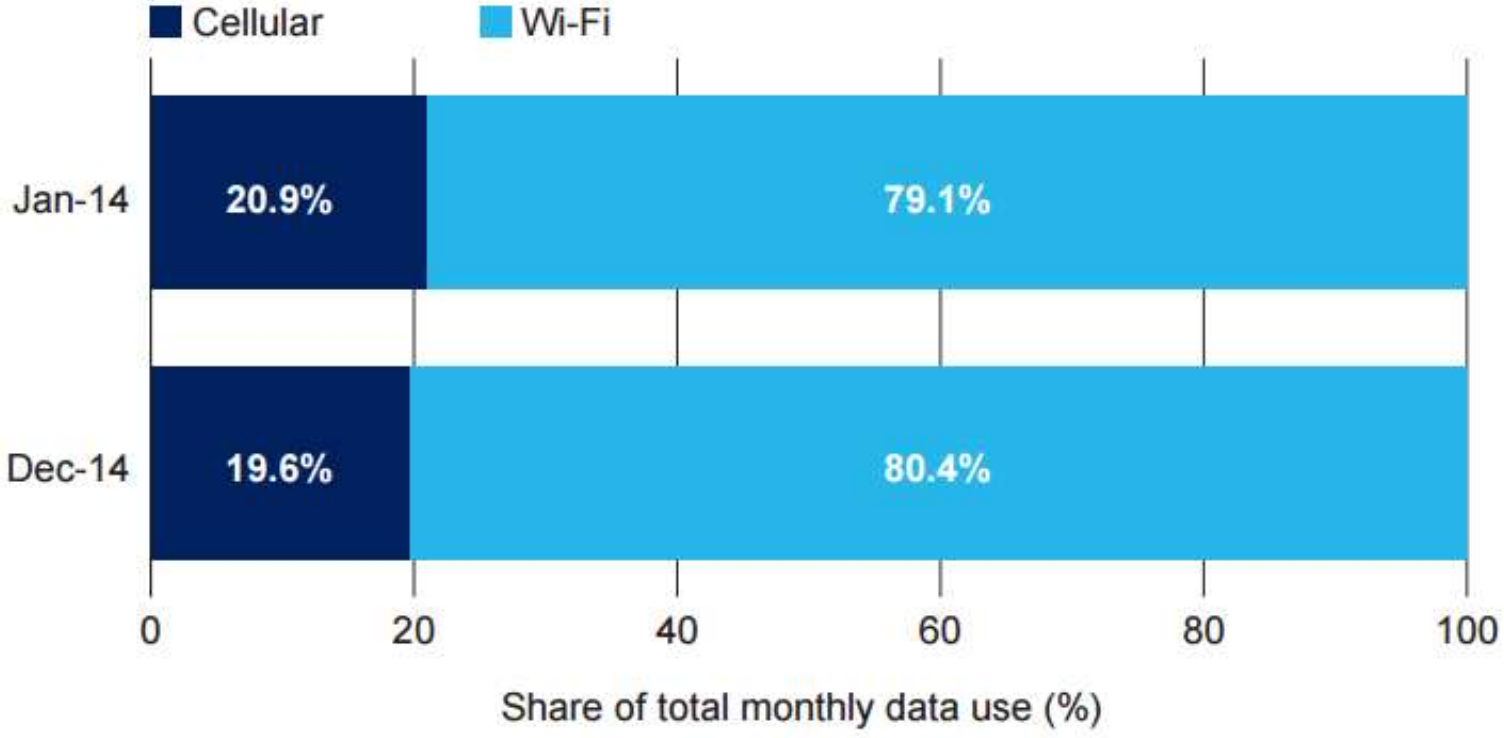
Unlicensed Spectrum Growth

Figure 1: Unlicensed Spectrum Milestones and Selected Device Categories – Growth Over Time



Growth of Unlicensed Spectrum Use

Figure 2: Global, cellular device users, cellular and Wi-Fi share of total monthly data use, January 2014 and December 2014



Source: Mobidia

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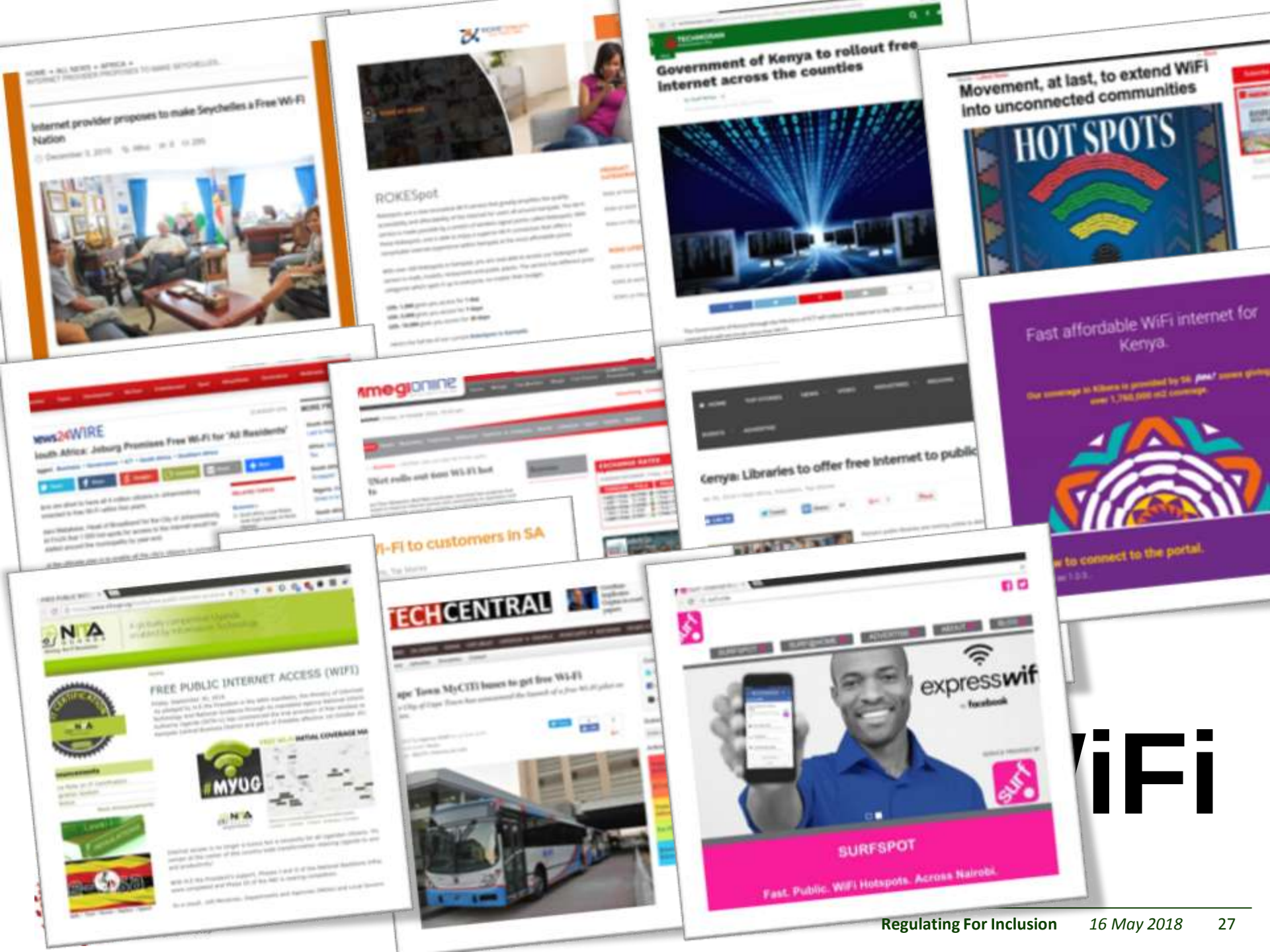
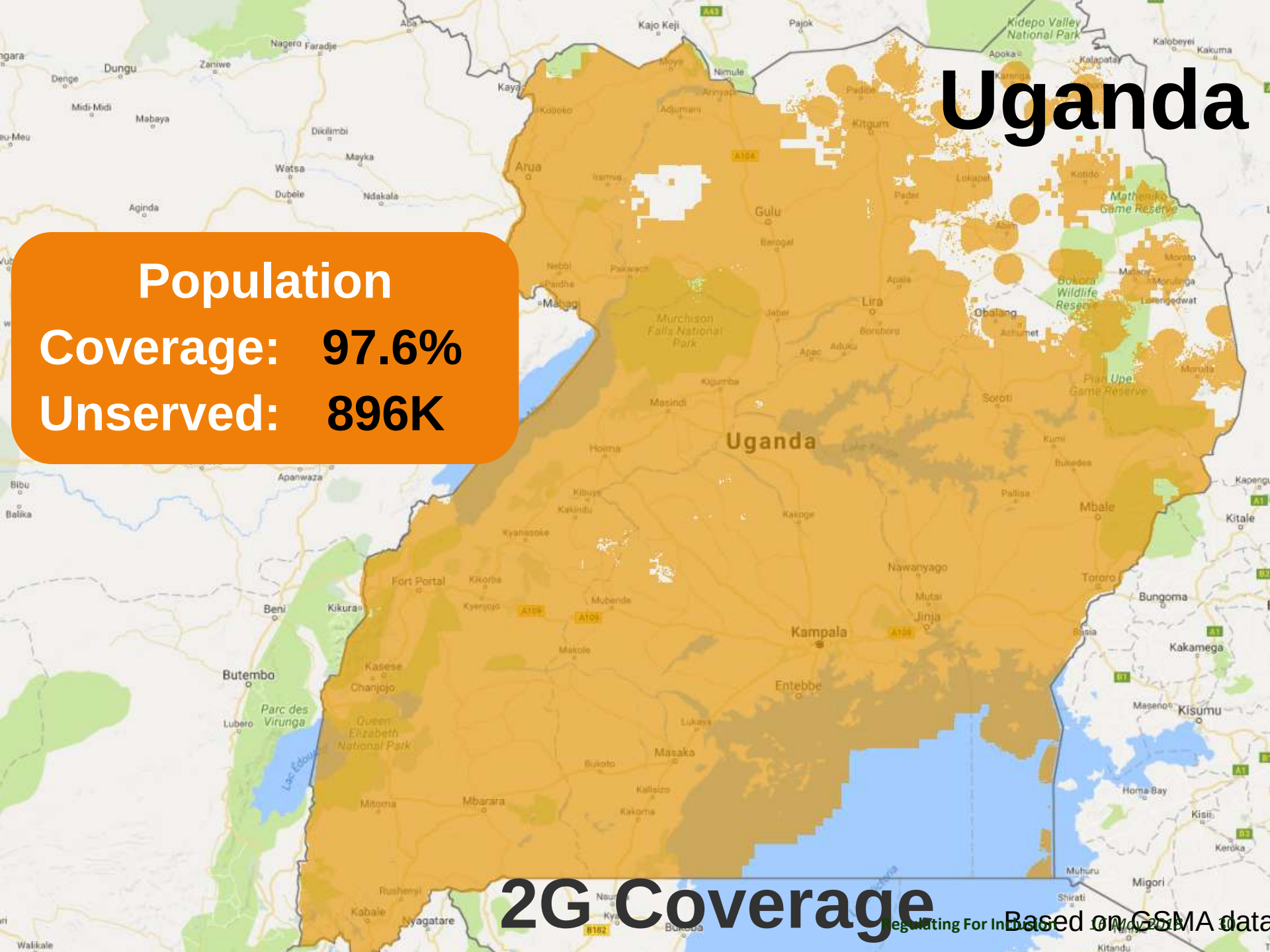

Internet provider proposes to make Seychelles a Free Wi-Fi Nation
ROKESpot
Government of Kenya to rollout free internet across the counties
Movement, at last, to extend WiFi into unconnected communities
HOT SPOTS
news24WIRE
South Africa: Joburg Promises Free Wi-Fi for 'All Residents'
Fast affordable WiFi internet for Kenya.
Kenya: Libraries to offer free Internet to public
FREE PUBLIC INTERNET ACCESS (WIFI)
#MYUG
TECHCENTRAL
expresswifi
SURFSPOT
Fast. Public. WiFi Hotspots. Across Nairobi.

Unlicensed Spectrum Potential

Opportunity

LOW-COST GSM

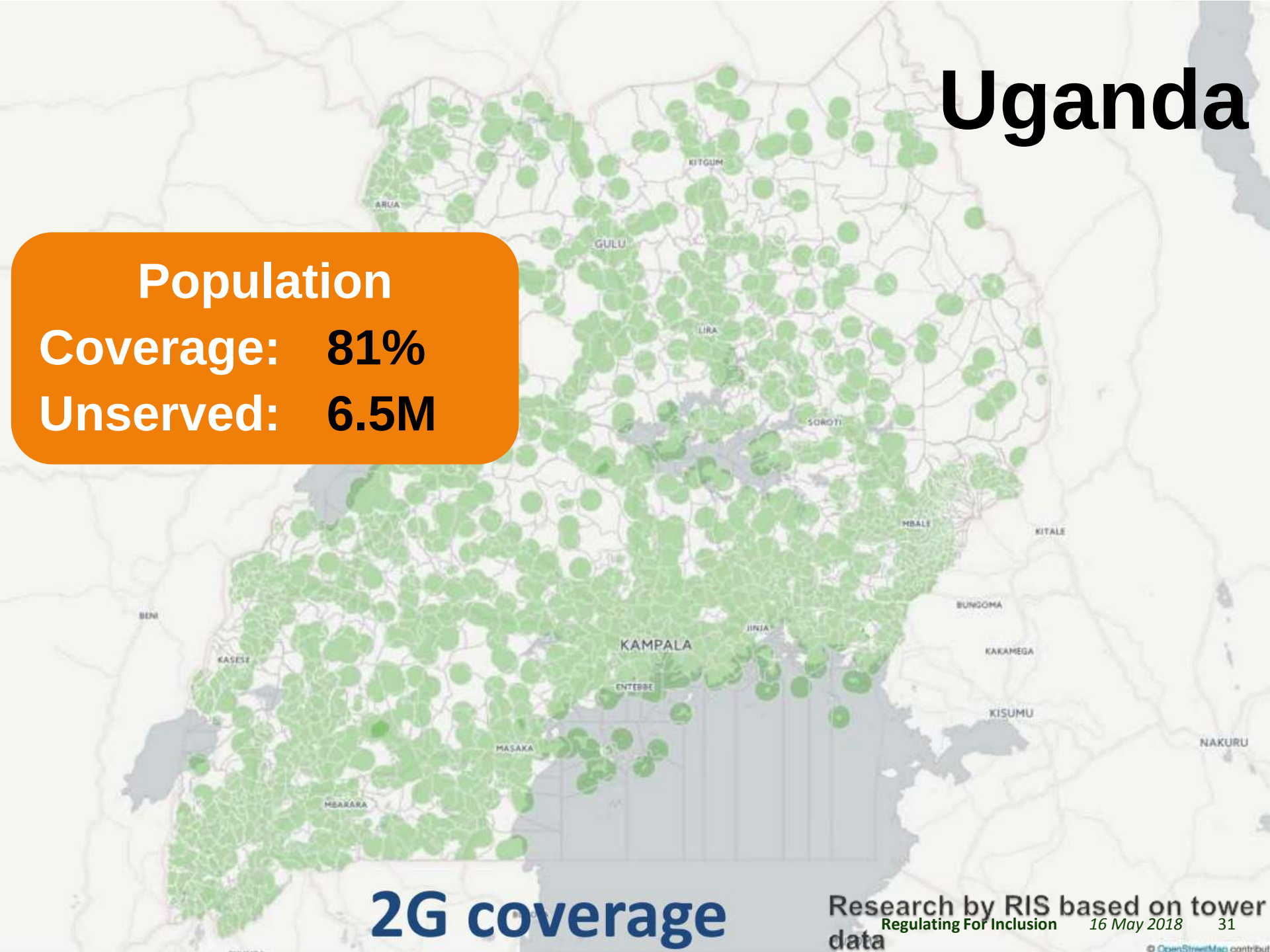

Uganda
Population
Coverage: 97.6%
Unserved: 896K
2G Coverage
Based on GSMA data

Uganda

Population

Coverage: 81%

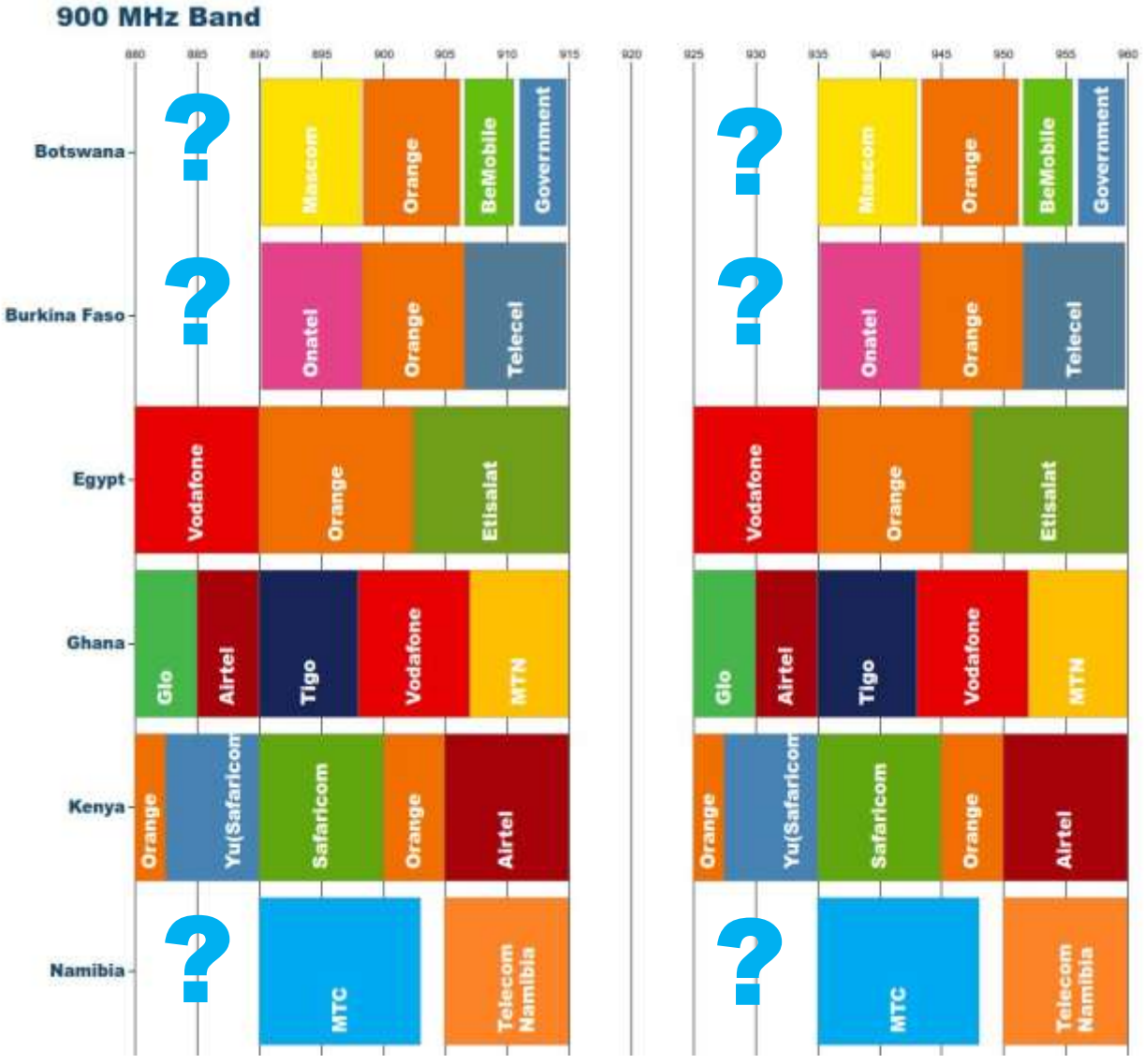
Unserved: 6.5M



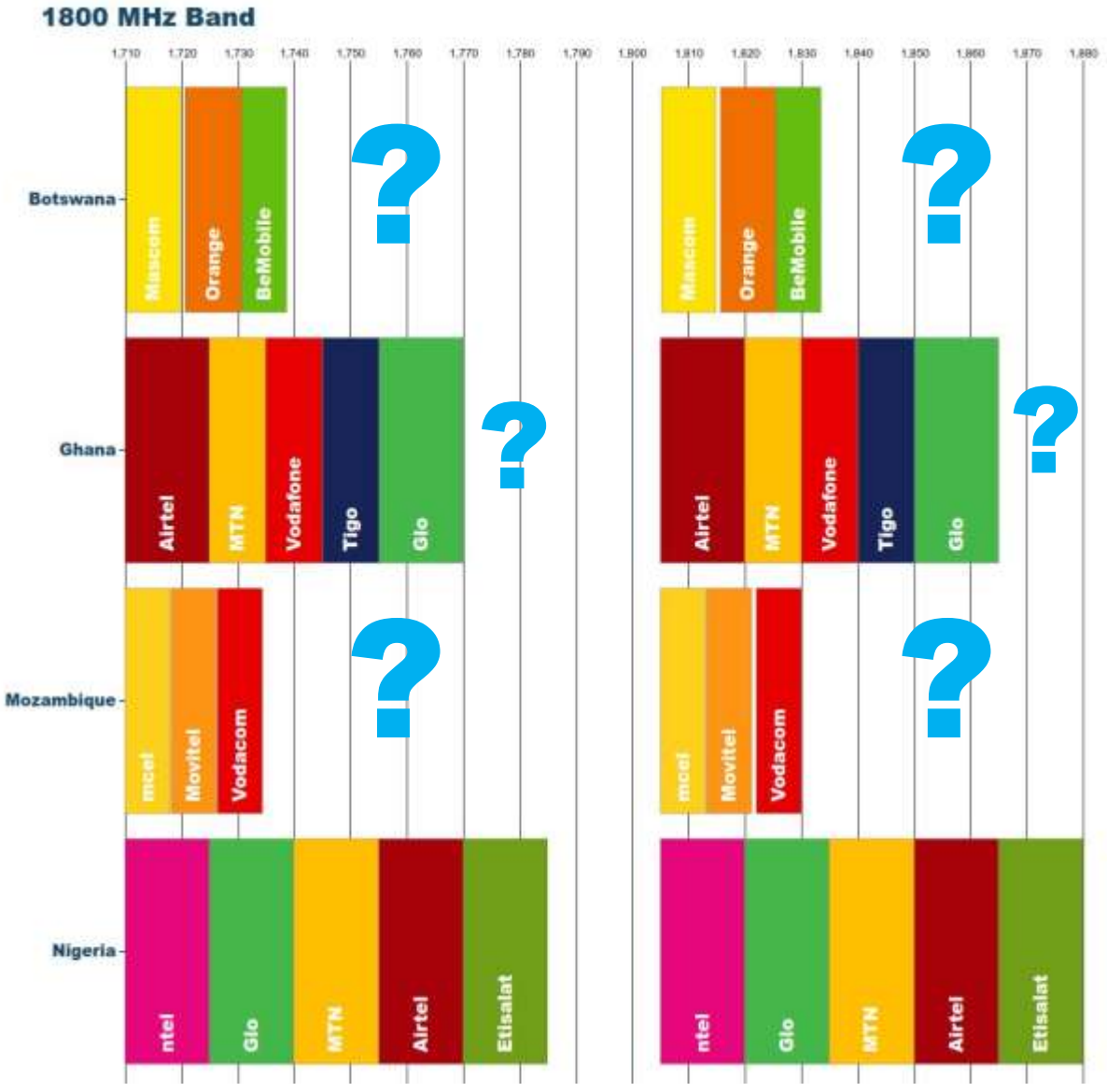
2G coverage

Research by RIS based on tower data

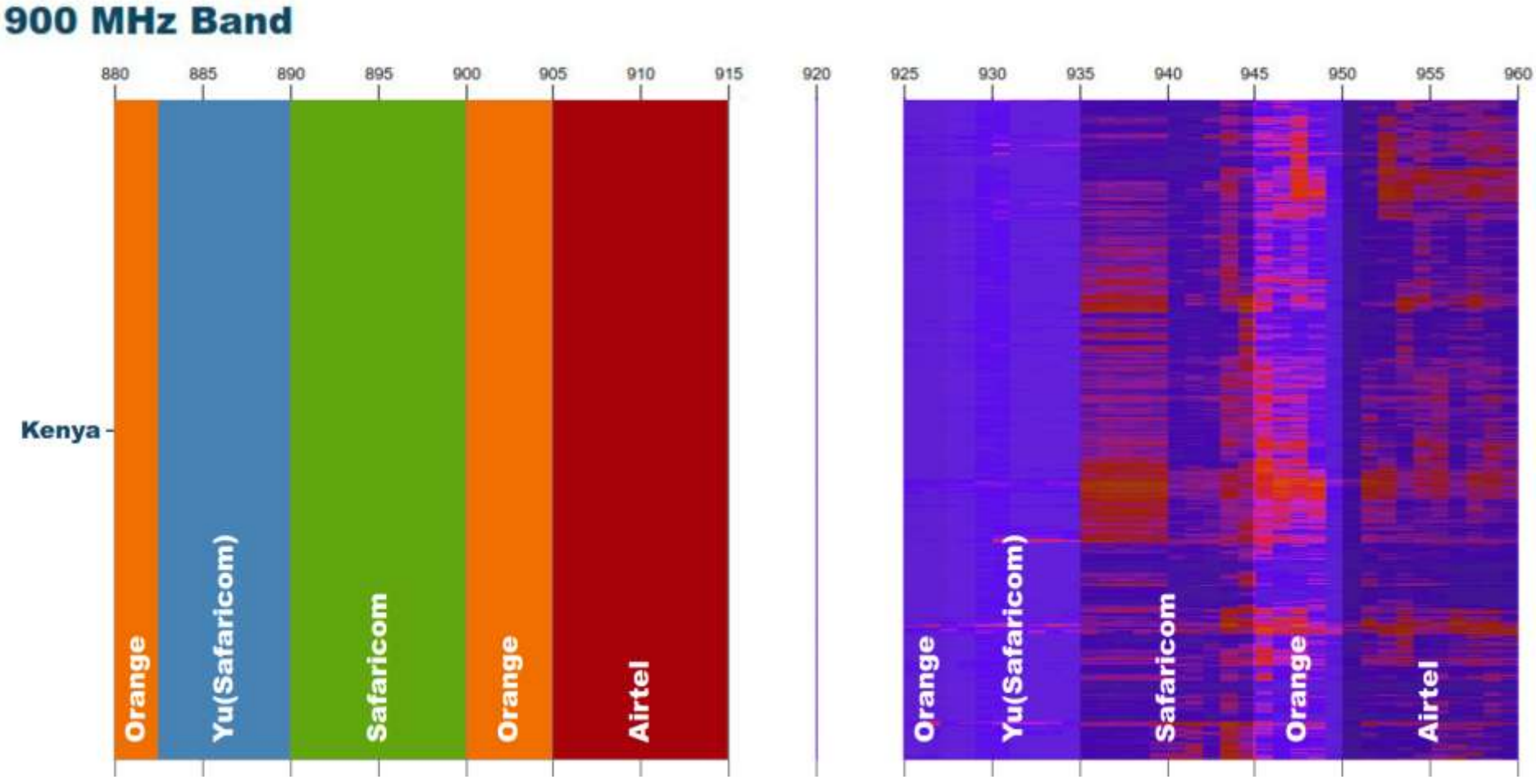
Spectrum Availability



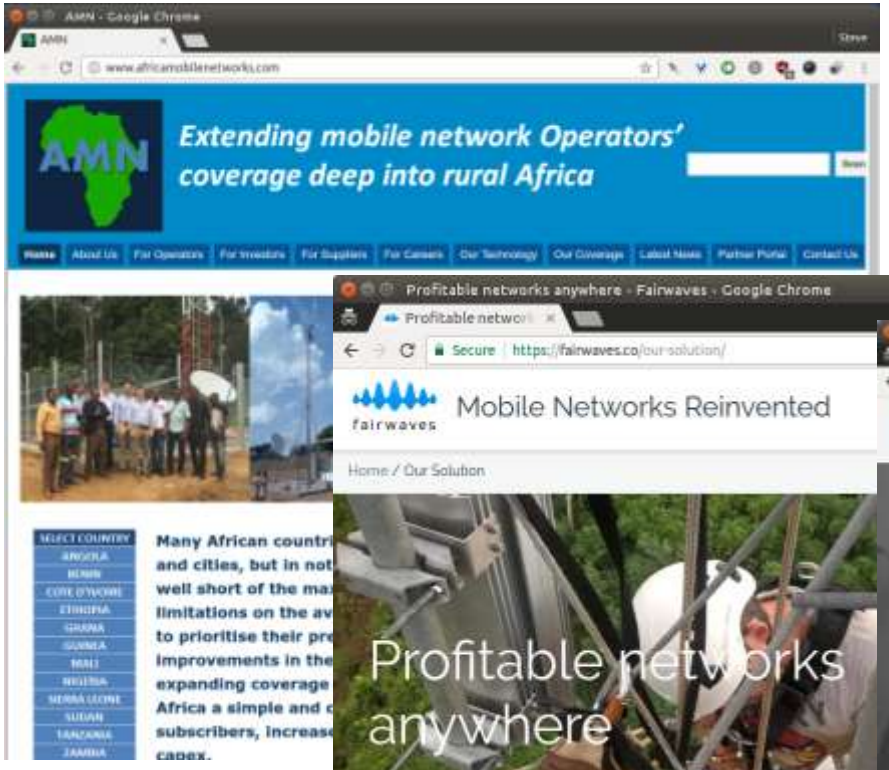
Spectrum Assignments

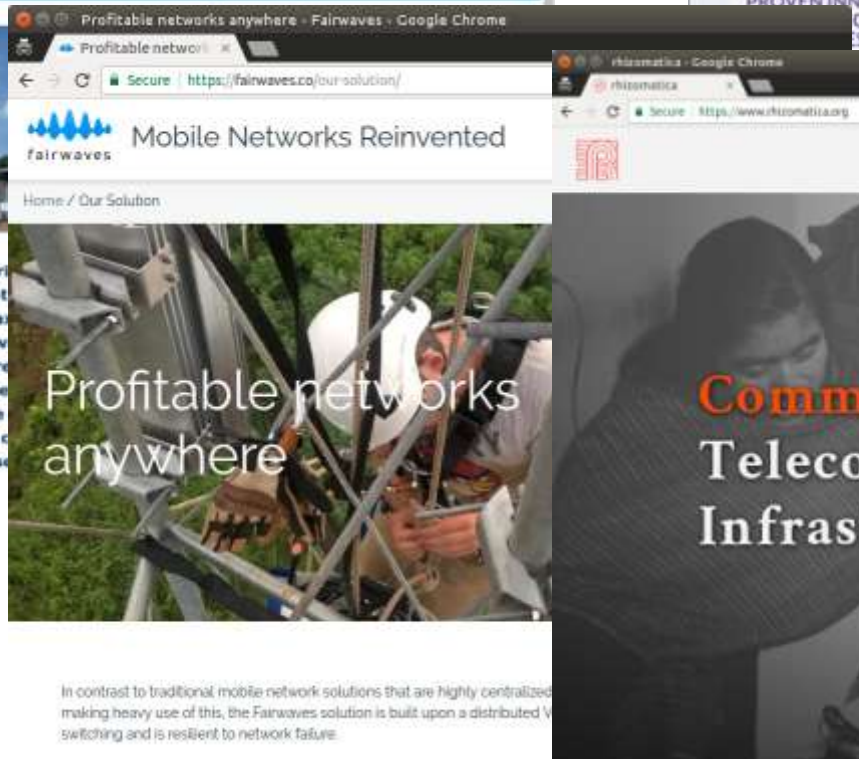


Monitoring Spectrum Use



New Generation Technologies





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Opportunity

DYNAMIC SPECTRUM

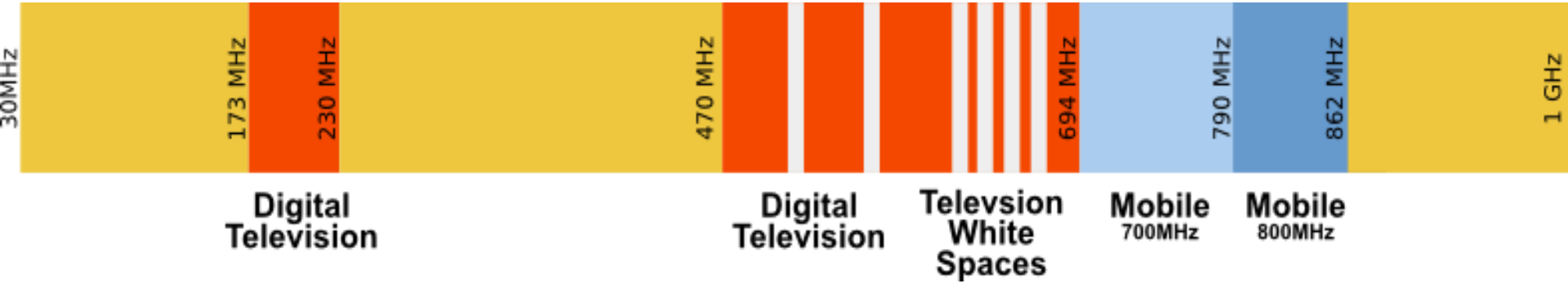
Television White Spaces

Allows for the dynamic re-use of spectrum without interfering with the primary spectrum holder

Ideal for rural access

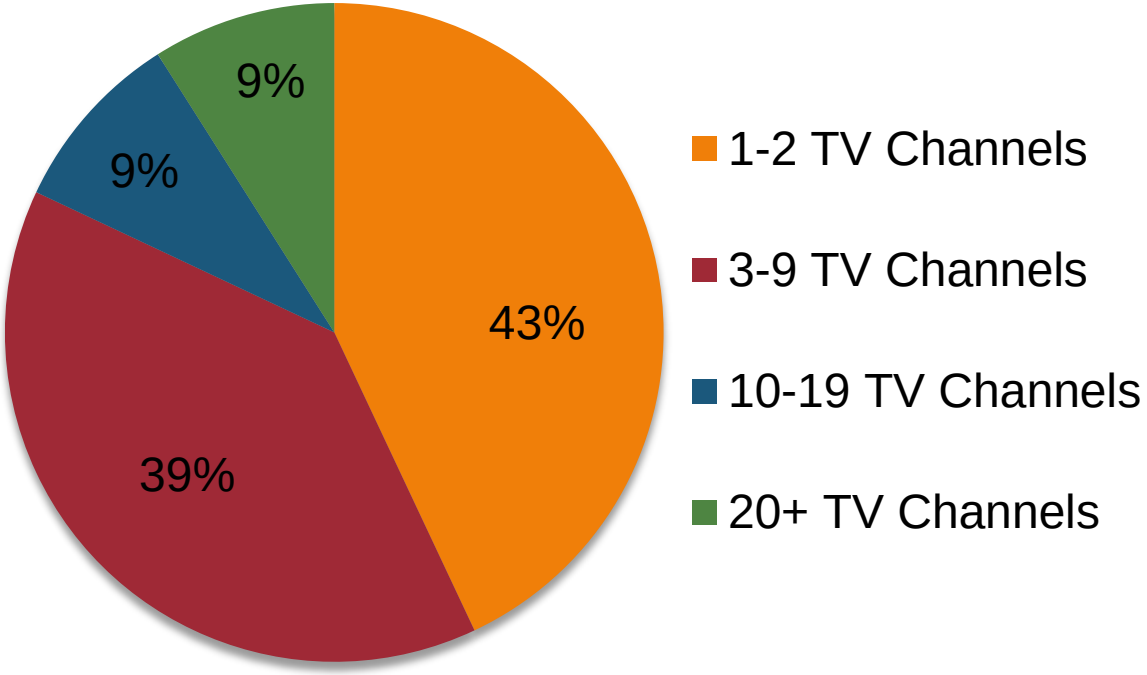
Low television spectrum occupancy in Africa

No re-allocation of spectrum required



UHF Spectrum Occupancy in Africa

Television Spectrum Occupancy in African Countries in 2012



In most cases, hundreds of megahertz of unused spectrum

Source: Balancing Act
Presentation to African Telecommunications Union (ATU) Digital Migration Summit (May 2014)
http://www.atu-uat.org/index.php/download-categories/category/10-afriswog-events?download=299:session-3-ppt-1-balancing-act-presentation

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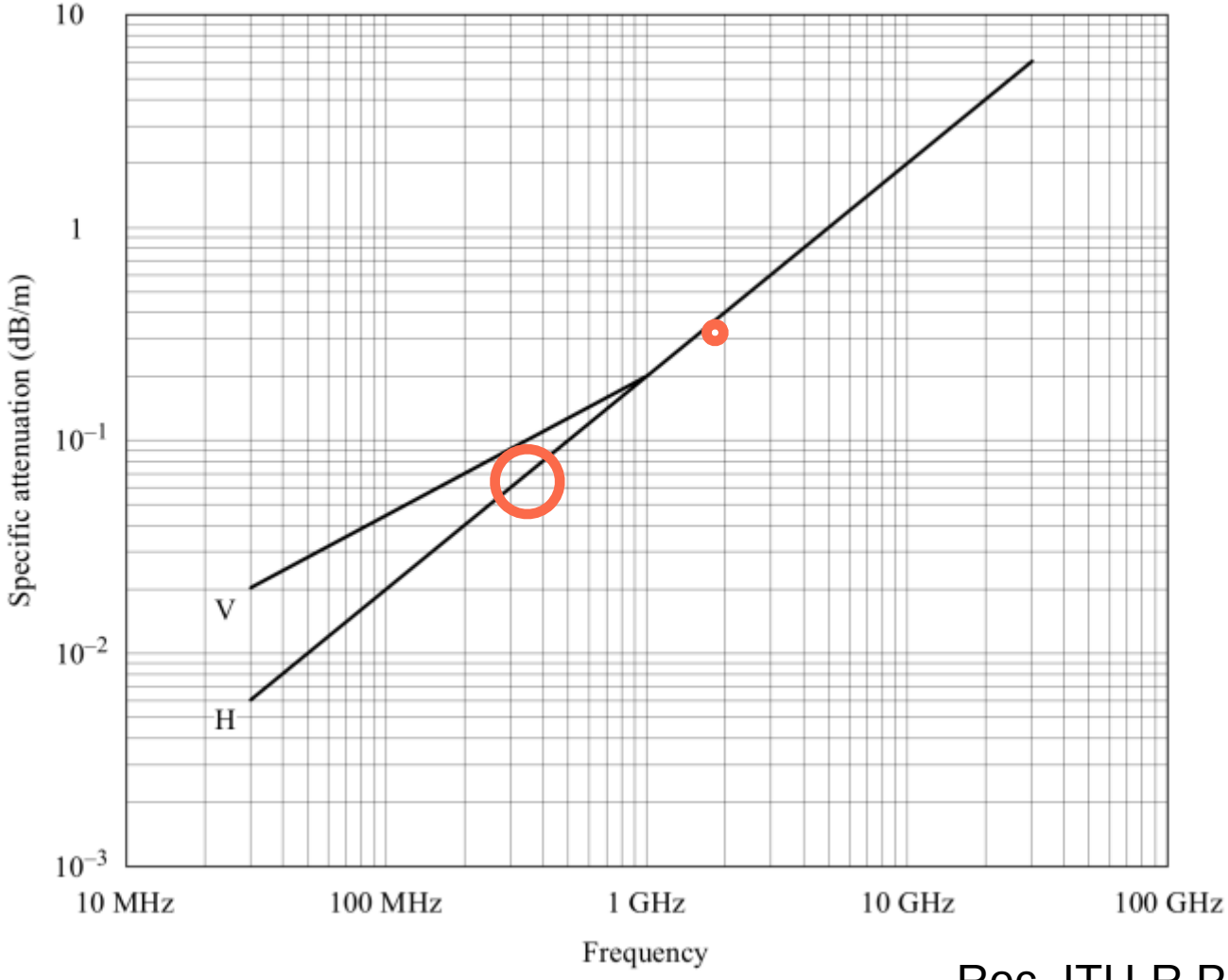
Radio Attenuation in Vegetation



Rec. ITU-R P.833-7

Dynamic Spectrum in Africa

2012 – 2018

Africa countries leading the world in deployments

Opportunity to use fallow UHF spectrum to connect under-served communities

Progress in 2018

- ✓ **Mozambique**
- ✓ **South Africa**

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New Generation Technologies

CONCLUSION