HOW TO CONNECT EVERYONE
WHAT IF I TOLD YOU

WE CARE MORE ABOUT CONNECTING REFRIGERATORS THAN POOR PEOPLE
Internet as a Mutant Super Power
The Mobile Revolution

• First mobile networks in Africa in 1994
• Gained critical mass and impact on the poor within a decade
• Unprecedented spread of communication technology.
But Now Subscriber Growth is Slowing

Source: GSMA Intelligence

- **2010**: 3.2 billion unique subscribers (46% of the population)
- **2017**: 5.0 billion unique subscribers (66% of the population)
- **2025**: 5.9 billion unique subscribers (71% of the population)

**Unique subscribers (billions)**

**Percentage of population**

Source: GSMA Intelligence
The Impact of Fibre Optic Infrastructural Growth

The growth of undersea fibre optic capacity has been a catalyst for change.
Access to fibre optic infrastructure opens up the potential to offer global competitive services for municipalities, communities, entrepreneurs.

https://afterfibre.nsrg.org
Spectrum Has Become a Barrier

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 manufacturers are looking for a new home.
Pace of Regulatory Change Too Slow

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 in 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 by 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 Kavous 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.

The inherent flexibility offered by digital terrestrial broadcasting will support mobile reception of video,
## Spectrum Auctions: a Burden on Winners and a Barrier to Market Entry

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>Spectrum</th>
<th>Price</th>
<th># successful bidders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nigeria</td>
<td>2014</td>
<td>2.3GHz (30MHz)</td>
<td>$23,000,000</td>
<td>1</td>
</tr>
<tr>
<td>Ghana</td>
<td>2015</td>
<td>800MHz (20MHz)</td>
<td>$67,500,000</td>
<td>1</td>
</tr>
<tr>
<td>Nigeria</td>
<td>2016</td>
<td>2.6GHz (60MHz)</td>
<td>$96,000,000</td>
<td>1</td>
</tr>
<tr>
<td>Mozambique</td>
<td>2013</td>
<td>800MHz (10MHz)</td>
<td>$30,000,000</td>
<td>0</td>
</tr>
</tbody>
</table>

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.

All Your Spectrum Are Belong To Us
Unlicensed Spectrum Growth

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

- 1985: ISM Spread Spectrum rules adopted
- 1989: New general ISM emissions limits
- 1993: Approval of unlicensed PCS
- 1999: 802.11a Standard Released
- 1998: Approval of U-NII
- 1999: 802.11b Standard Released
- 1999: Bluetooth Specification Released
- 2002: Rules for 915/2.4/5GHz expanded to permit OFDM
Unlicensed Spectrum Potential

Phenomenal Cosmic Powers

Itty Bitty Living Space
New Generation Technologies

Parallel Wireless

VANU

Carlson Wireless Technologies

World Telecom Labs

6Harmonics

BaiCells

Adaptrum
Current Regulatory Frameworks For Spectrum Are A Bit Like a 19th Century Hotel

Perhaps we need more of an Airbnb approach
Filling the jar.

Regulation must enable small-scale operators to address niche markets, geographies, and to stimulate access innovation.
Technological Diversity Matters

Identical technologies lead to identical business models which lead to a “race to the bottom”

Access diversity breaks oligopolies.
Thank you!

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manypossibilities.net