# Breaking Dawn of a New Era in Wireless Innovation

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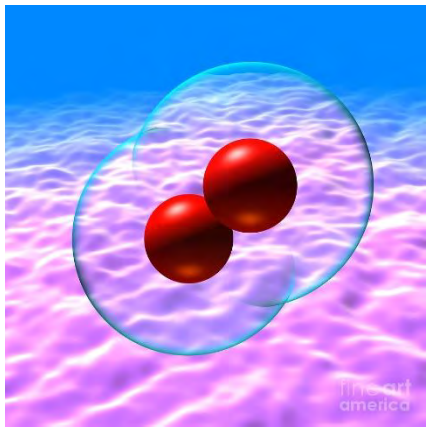
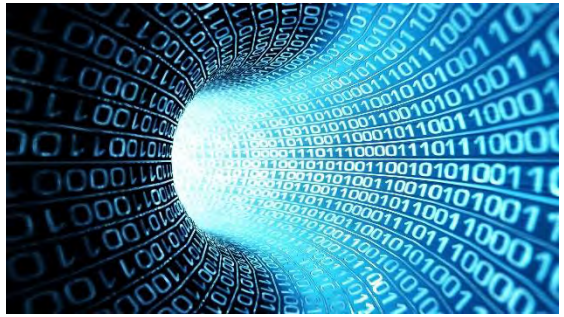
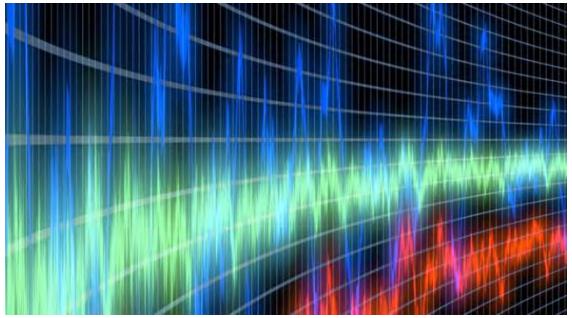
Microsoft

# Transition to a Digital Economy







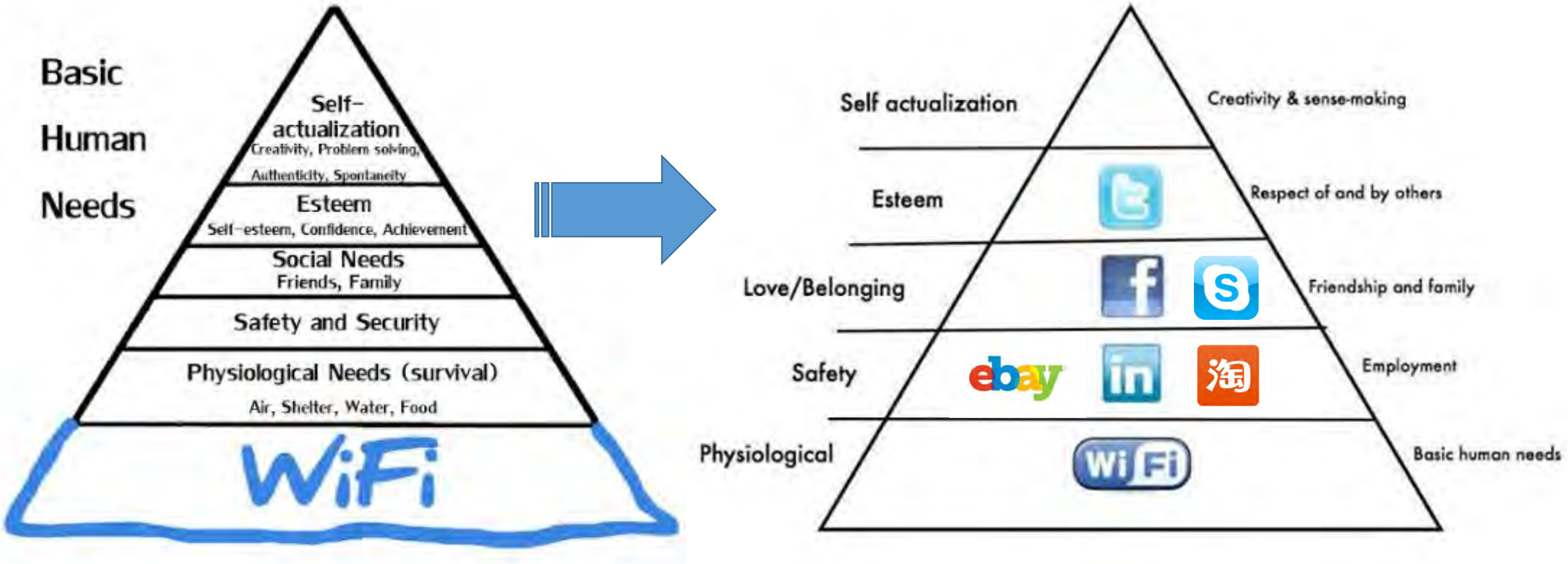
**Broadband** is the new Highway

**Data** is the new Currency

**Spectrum** is the new Fuel…

… and the new Oxygen

# Transition to Digital Living




Wireless Connectivity has become a ***Fundamental*** Human Needs in digital living.

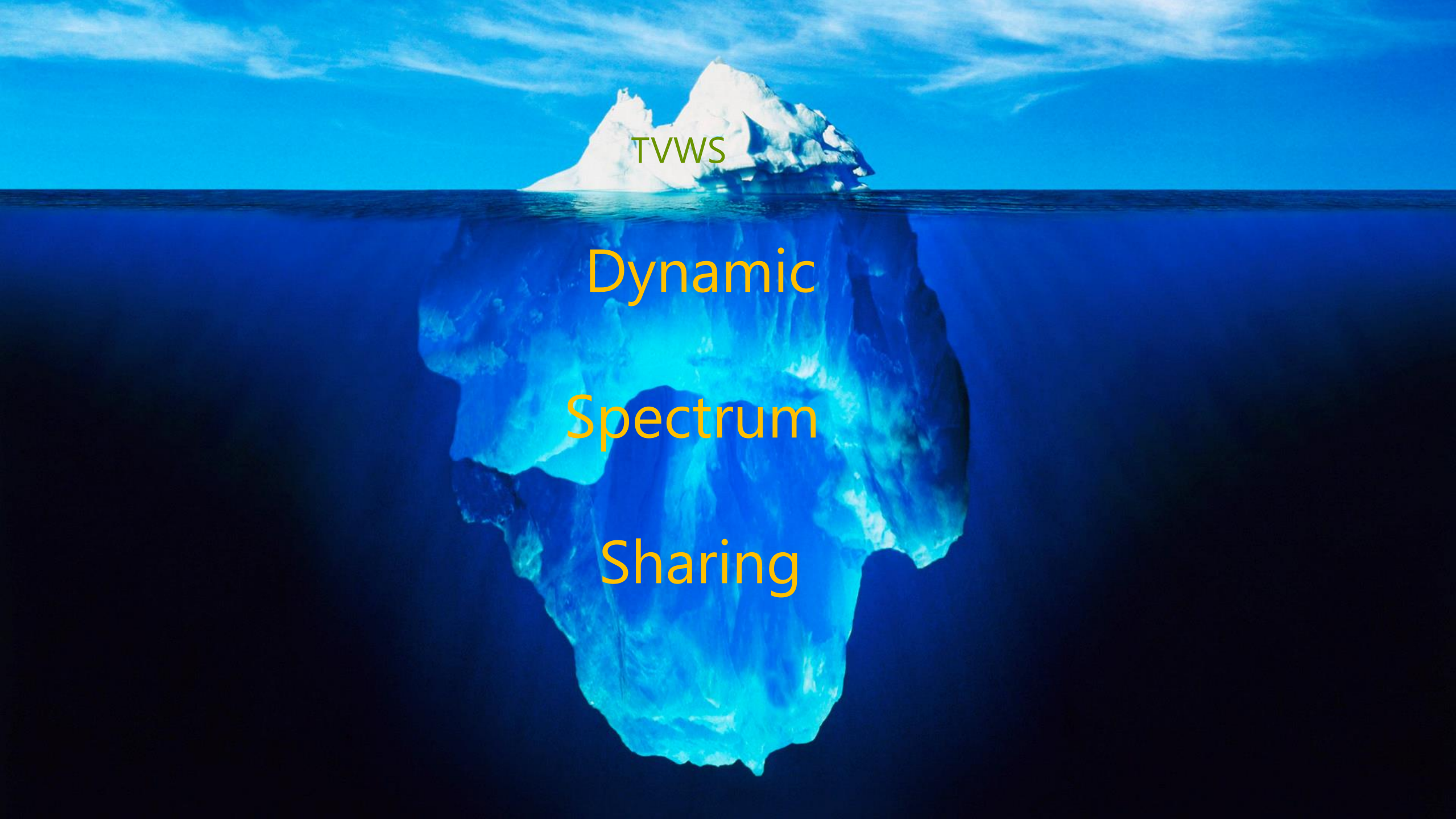
# Radio Spectrum is the Fuel of Wireless Innovation

# Spectrum Today: Static, Exclusive, Scarce

# Spectrum Futures: Dynamic, Shared, Abundant

- Connecting the Other 5 Billion – An Inclusive Global Village
- Powering the Next 50 Billion – An Expansive Internet of Things

## The Dawn of Spectrum Abundance


TVWS
Dynamic
Spectrum
Sharing

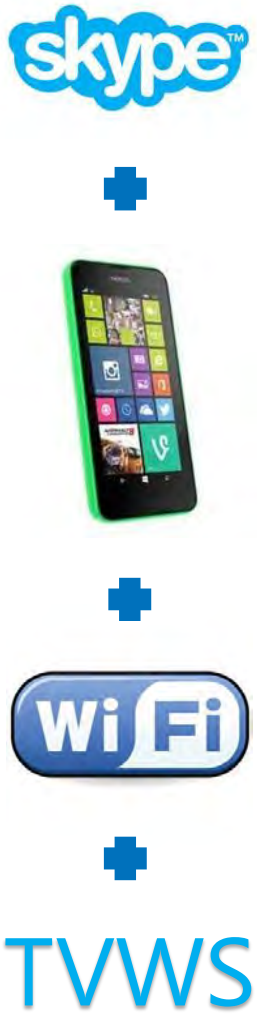
# Microsoft-ISP Partner TVWS Projects

| | | | | |
|---|---|---|---|---|
| 68 K-12 Schools Being Connected | 36,000 K-12 Students Being Connected | 8 University Campuses Being Connected | 100,000 University Students Getting MSFT Devices & Services | 185,000 Population Under Coverage |

How school girls from rural India Skyped with the CEO of Microsoft

MIYAKO

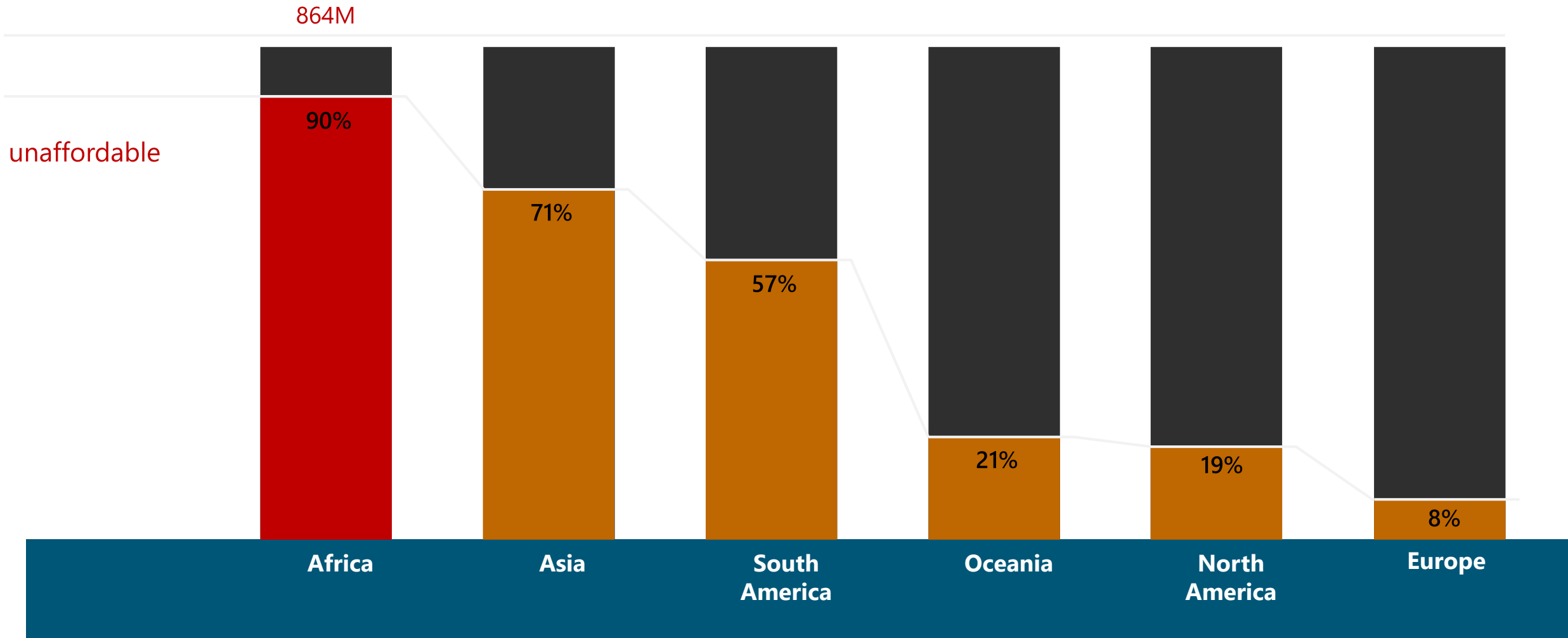
SAFETY



"I believe this was the first time she smiled after the earthquake with her eyes very emotional but dried of all tears."
***Allen Bailochan Tuladhar*** | Microsoft Nepal

# Closing the Digital Divide – the *Affordability* Challenge

The proportion of people who would find fixed broadband unaffordable by country



# Enable the Internet of Things: the *Abundance* Challenge

The internet of things

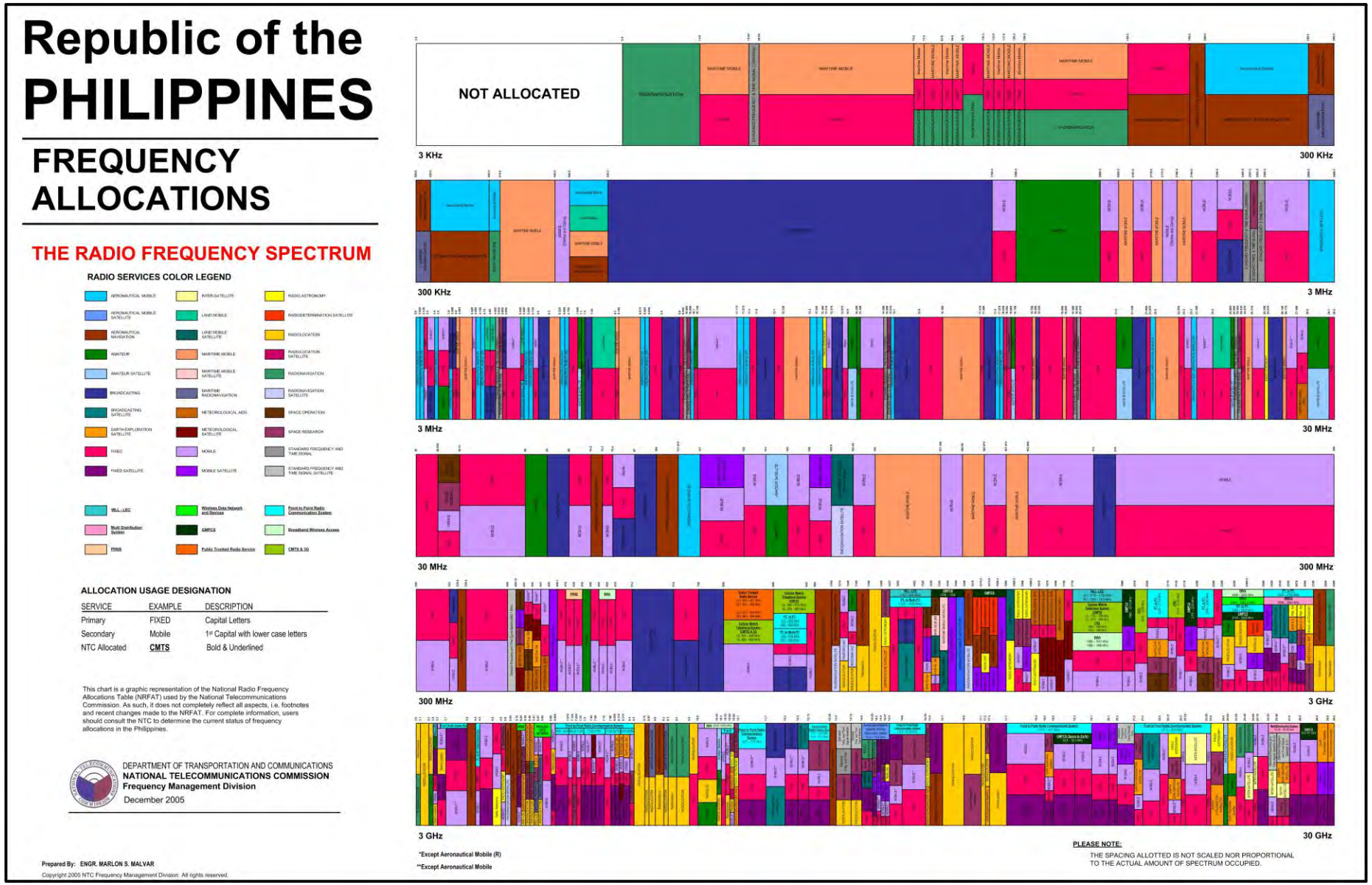
50 billion by 2020

Spectrum is the oxygen of a digital economy

# Recommendations from Major International Think-Tanks

…and examples from leading economies

# Alleviating the “Spectrum Crunch”



# UN Broadband Commission Policy Recommendation

http://www.broadbandcommission.org/Documents/reports/bb-annualreport2014.pdf

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POLICY RECOMMENDATIONS TO MAXIMIZE THE IMPACT OF BROADBAND

Countries must prioritize both supply- and demand-side policies to develop a full range of broadband infrastructure, applications and services. National strategies to increase broadband adoption and use must take into account the full range of government actions or policies and their impact on the cost to consumers of services, devices and relevant apps.

## 7.1 Monitor, Review and Update ICT Regulations and regulatory approaches to spectrum

As noted in Chapter 2, policy-makers and regulators must review and update their ICT regulatory frameworks to take into account the provision of similar services by market players from different industries. They must also help create a supportive environment, encourage investment and ensure sufficient availability of quality spectrum. Governments and regulators and industry should work together to define harmonized approaches to infrastructure-sharing, and ensure that spectrum is released quickly to operators and new entrants. Optimizing approaches to spectrum policy, allocation, and management becomes an important aspect of governments' overall broadband policy portfolio. Today, policy-makers are also considering fresh approaches to spectrum management, including Dynamic Spectrum Access (DSA). Featured Insight 18 describes the experience of Singapore in launching its regulatory framework on TV white space.

While exploring fresh approaches to spectrum management, it is essential to take into account the needs of different services (e.g. mobile and satellite services, among others). Including coverage obligations in licenses can help fulfil universal service goals more efficiently. Depending on the current state of spectrum band assignation, simultaneous auctions of different bands (high and low bands) can also prove helpful, but these are unlikely to be available in many countries.

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"…considering fresh approaches to spectrum management, including Dynamic Spectrum Access (DSA). Featured Insight 18 describes the experience of Singapore in launching its regulatory framework on TV white space."

# World Economic Forum

# WEF Recommendations – Addressing Growth in Wireless Data Traffic

http://www3.weforum.org/docs/WEFUSA_DigitalInfrastructure_Report2015.pdf

WORLD ECONOMIC FORUM

COMMITTED TO IMPROVING THE STATE OF THE WORLD

Industry Agenda

## Expanding Participation and Boosting Growth: The Infrastructure Needs of the Digital Economy

Prepared in collaboration with The Boston Consulting Group

March 2015

**Figure 14:** Regulatory Support Required to Ensure Low Cost of Small-Cell Roll-out

Key to Addressing Growth in Wireless Data Traffic

xx *Cost to add capacity equivalent to a BTS w/fibre*

| Indoor installation: cost-effective but heavy regulations | Outdoor installation: About 4-6x more expensive than indoor driven by rent and backhaul costs | | |
|---|---|---|---|
| 0.25x | 1x | | 1.5x |
| | Small cell | Dense area | Wireless backhaul / Operator |
| 70-85% of mobile traffic is generated indoors | DSL backhaul | | |
| **Regulations** | **Location rent** | **Interference** | **Backhaul affordability** |
| • Current regulations **treat small cells like BTS** – requires professional installation, equip. registration, etc. | • Monthly rental **>50% of cost**: in the range of $10-36 per light mast | • **Interference** issues given multiple operators | • Backhaul main cost driver of small cells |
| • Contingent on **radiation limits,** allow small cell deployment **similar to Wi-Fi** routers: owner installed and maintained, configured remotely by MNO | • **Govt. should facilitate rent reduction**<br>- Increase availability of sites<br>- Avoid predatory pricing | • **Introduce higher spectrum bands** suitable for small cells<br>• Could be traditionally licensed or shared [1]<br>• Allow Dynamic Spectrum Access (DSA) | • **Ensure affordable backhaul** via DSL network<br>• Provide affordable backhaul spectrum (mm wave)<br>• Prioritize spectrum access for backhaul use |

1. Authorized shared access. 2. Dynamic spectrum access.
Note: DSL = digital sub
Source: BCG Analysis,

G experience

ing Participation and Boosting Growth: The Infrastructure Needs of the Digital Economy 27

Allow Dynamic Spectrum Access (DSA)

# WEF Recommendations – Addressing IoT Network Requirements

http://www3.weforum.org/docs/WEFUSA_DigitalInfrastructure_Report2015.pdf

**Figure 16:** Key Recommendations to Address IoT Network Requirements

| | Solution | Description | Demand addressed | Regulatory support needed |
|---|---|---|---|---|
| Spectrum | Allocate new spectrum types | • Sub-1GHz unlicensed spectrum<br>• High frequency spectrum<br>• Experimental spectrum | ■ | • Drive allocation of new types of licensed and unlicensed spectrum for different IoT needs |
| Spectrum | Low-cost alternative ways of using spectrum | • Dynamic spectrum access<br>- Unused analogue TV spectrum<br>- ASA/LSA/PA[1]/Unlicensed | ■ | • Allow regulatory flexibility to adopt different spectrum usage approaches<br>- TV white space<br>- Authorized shared use/access |
| Spectrum | Advanced spectrum technologies like LTE A or 5G | • Potential to solve for new requirements<br>- Multi-spectrum operability<br>- Capacity, security and availability | ■ ■ ■ | • Define R&D, stan… roadmap for new sp…<br>• Reduce burdens of spe… experiments to drive innov… |
| Standard and Protocols | Common open standards for IoT communication | • Scaled down equivalent of internet protocols for the IoT world<br>• Standardization among multiple competing platforms | ■ ■ | • Strengthen/accelerate the st… roadmap for IoT communica…<br>• Ensure standards are global… interoperable |

■ Security and Availability ■ Protocols and Standards ■ Spectrum needs

1. Authorized shared access/Licensed shared access/Priority access.

"In all markets, greater regulatory flexibility is needed to try new models for IoT purposes, including dynamic spectrum access approaches such as repurposing unused analogue TV spectrum, or the authorized shared access approach for specified spectrum bands."

DSA
DYNAMIC • SPECTRUM • ALLIANCE

# Dynamic Spectrum Alliance

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