



UiO : **Department of Technology Systems**
University of Oslo

**EuCNC 2021 workshop: “6G for Connecting the Unconnected
in Rural and Remote Areas to Meet UN SDG’s”, 8Jun2021**

Societal needs as driver for a decentralised 6G

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United Nations Sustainable Development Goals



How to address the SDGs? as in the Western World



Electric cars



“Circular Economy”

E-waste adds up to approximately 50 million metric tons of garbage every year.

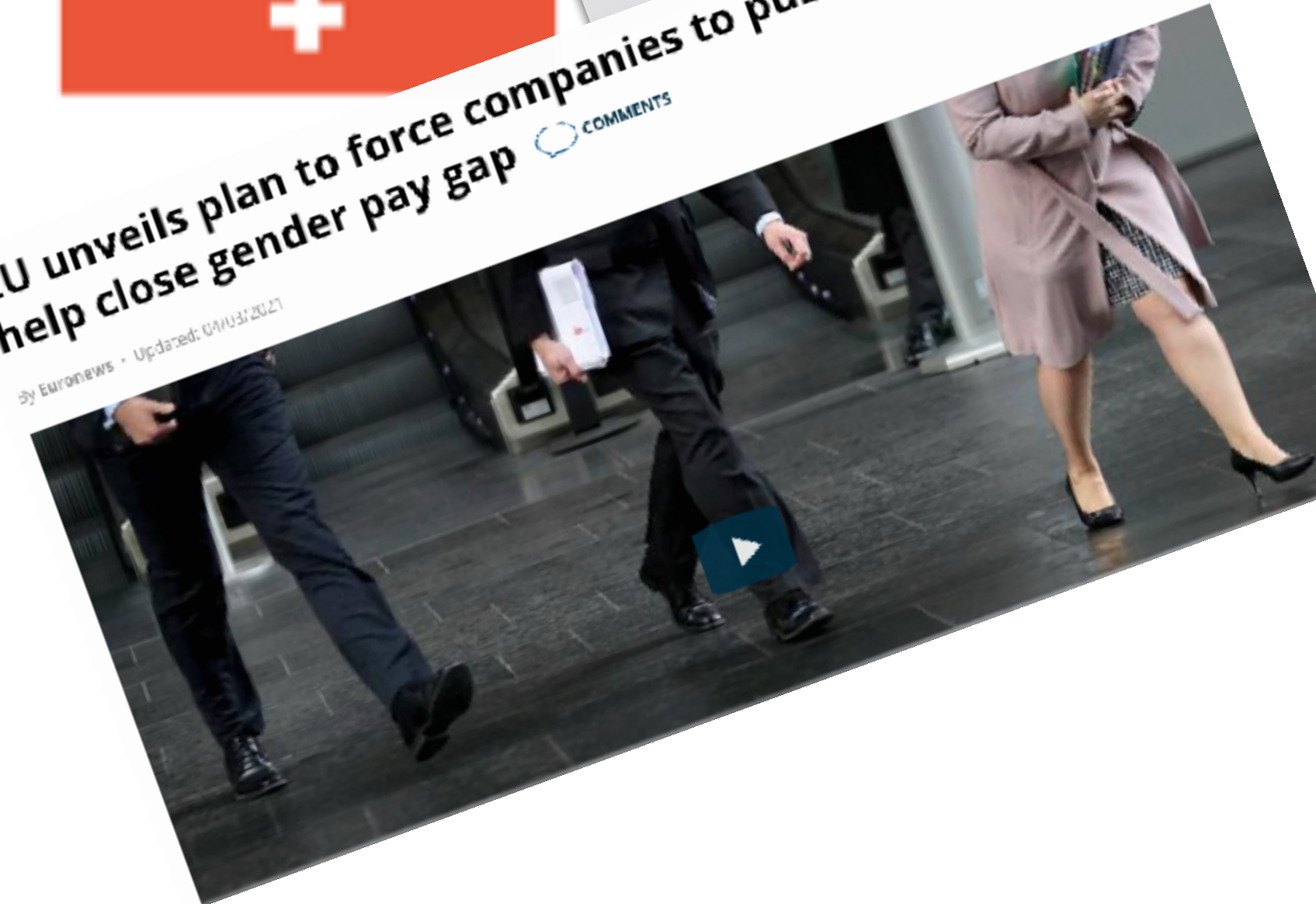


Transition to renewable energies



women in power

EU unveils plan to force companies to publish wages to help close gender pay gap



The Guardian

How to spot the difference between a real climate policy and greenwashing guff

... slashed electric car incentives, new oil and gas exploration, a failure to ... It is also the only company currently building a new gas power plant ...



[Source: The Guardian, 6May2021]

[Source: Euronews, 4May2021]

Address SDGs in Africa

Source: afrobarometer.org

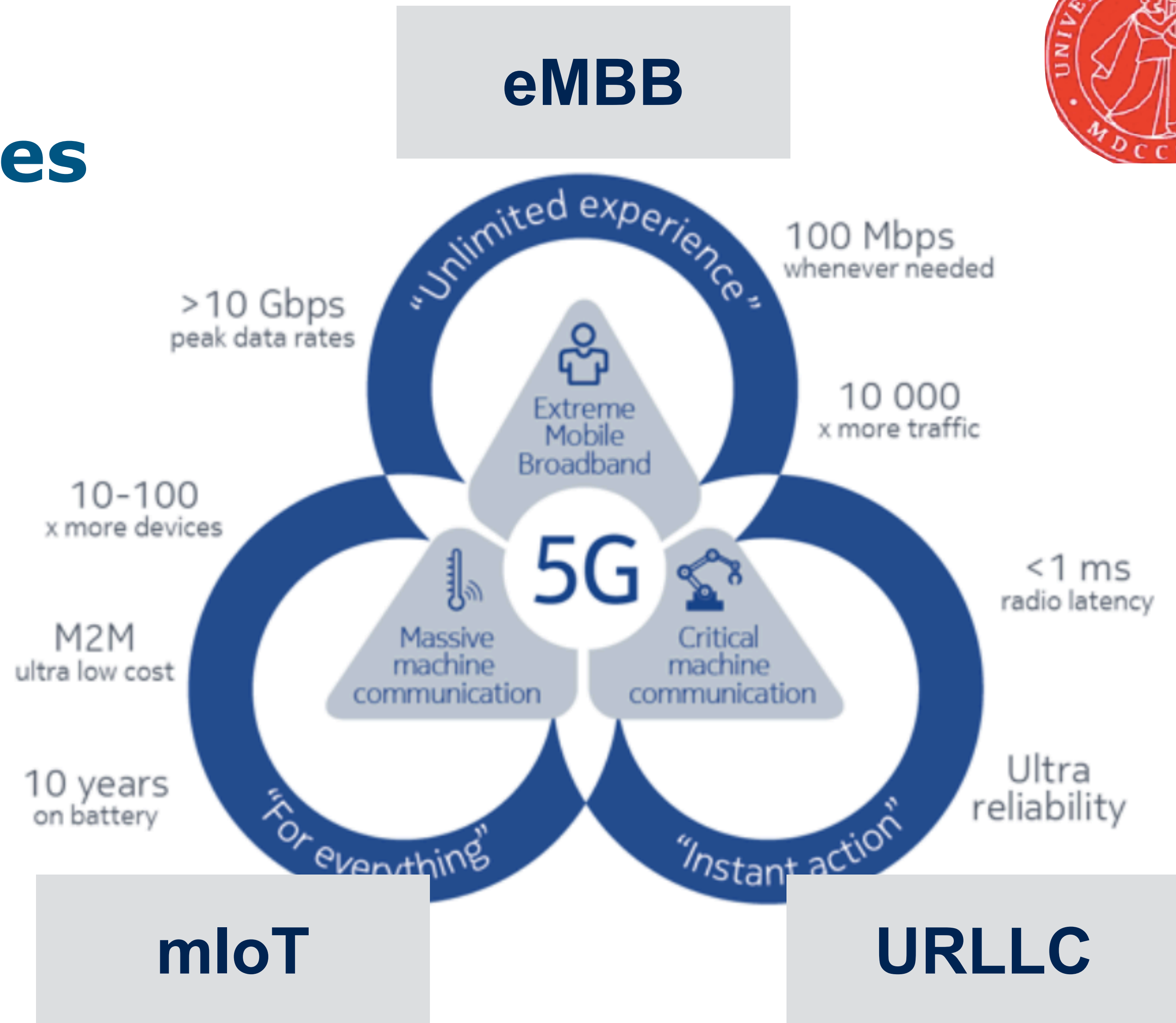
- Public Opinion on SDGs
- Priorities by people in Africa
 - decent work
 - zero hunger
 - good health
 - ...



Our area today: 5G: Industrial Challenges

- enhances Mobile Broadband
- massive IoT
- ultra Reliable, Low Latency communication

“5G will contribute to the digital divide”



[source: Nokia <https://networks.nokia.com/5g/get-ready>]

Starting Point:

JOSEPH E. STIGLITZ

WINNER OF THE NOBEL PRIZE IN ECONOMICS

THE PRICE OF INEQUALITY

#5Gfor All?

“Internet had the ability to
dismantle the divide.
Internet failed miserably, the
divide is bigger than ever.”

Kate Gilmore, Human Rights, UNO

HOW TODAY'S DIVIDED SOCIETY
ENDANGERS OUR FUTURE

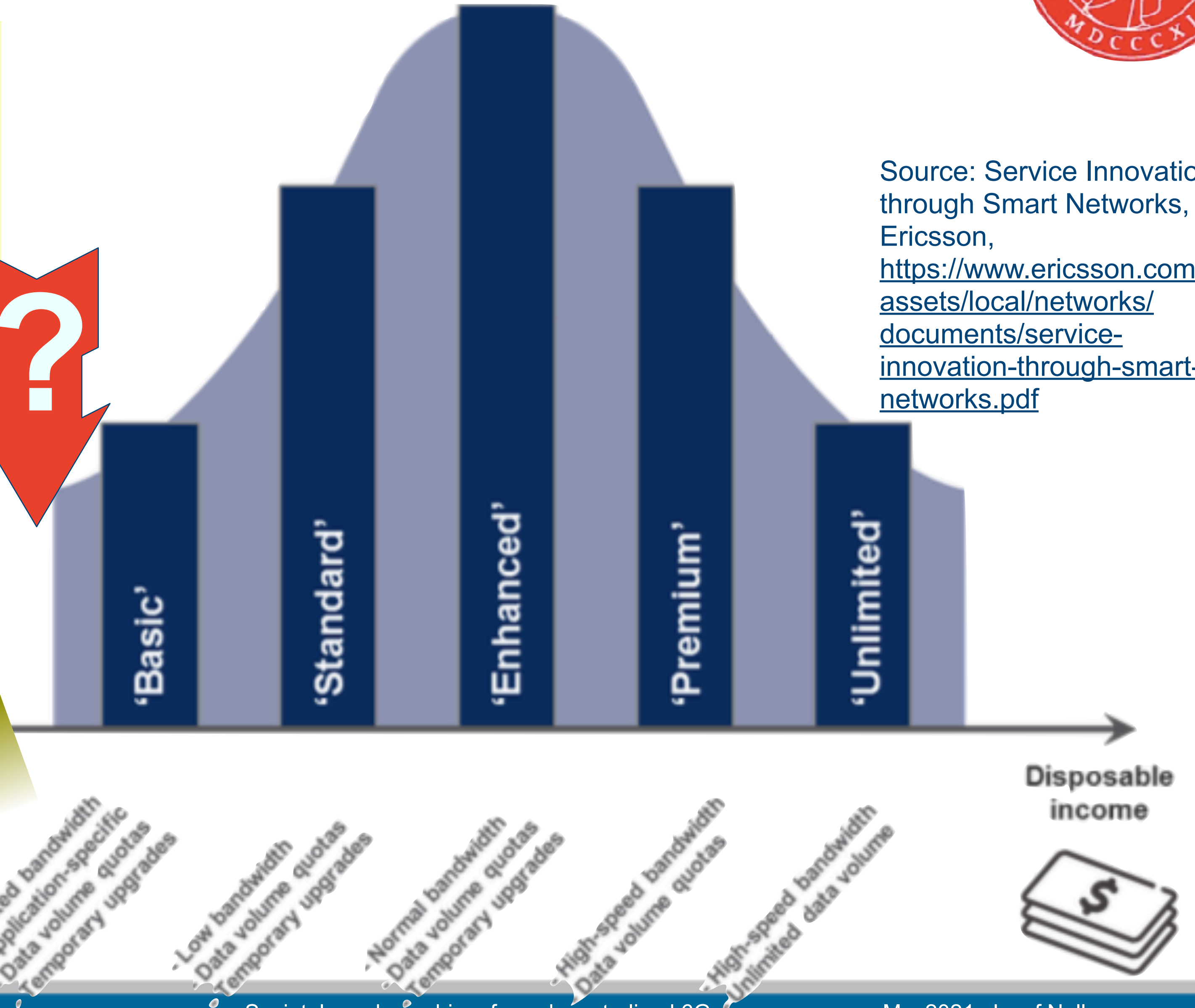
Our Mindset is wrong!

Addressable Market



“3.9 Billion People are not connected”
[Internet Government Forum, 2018]

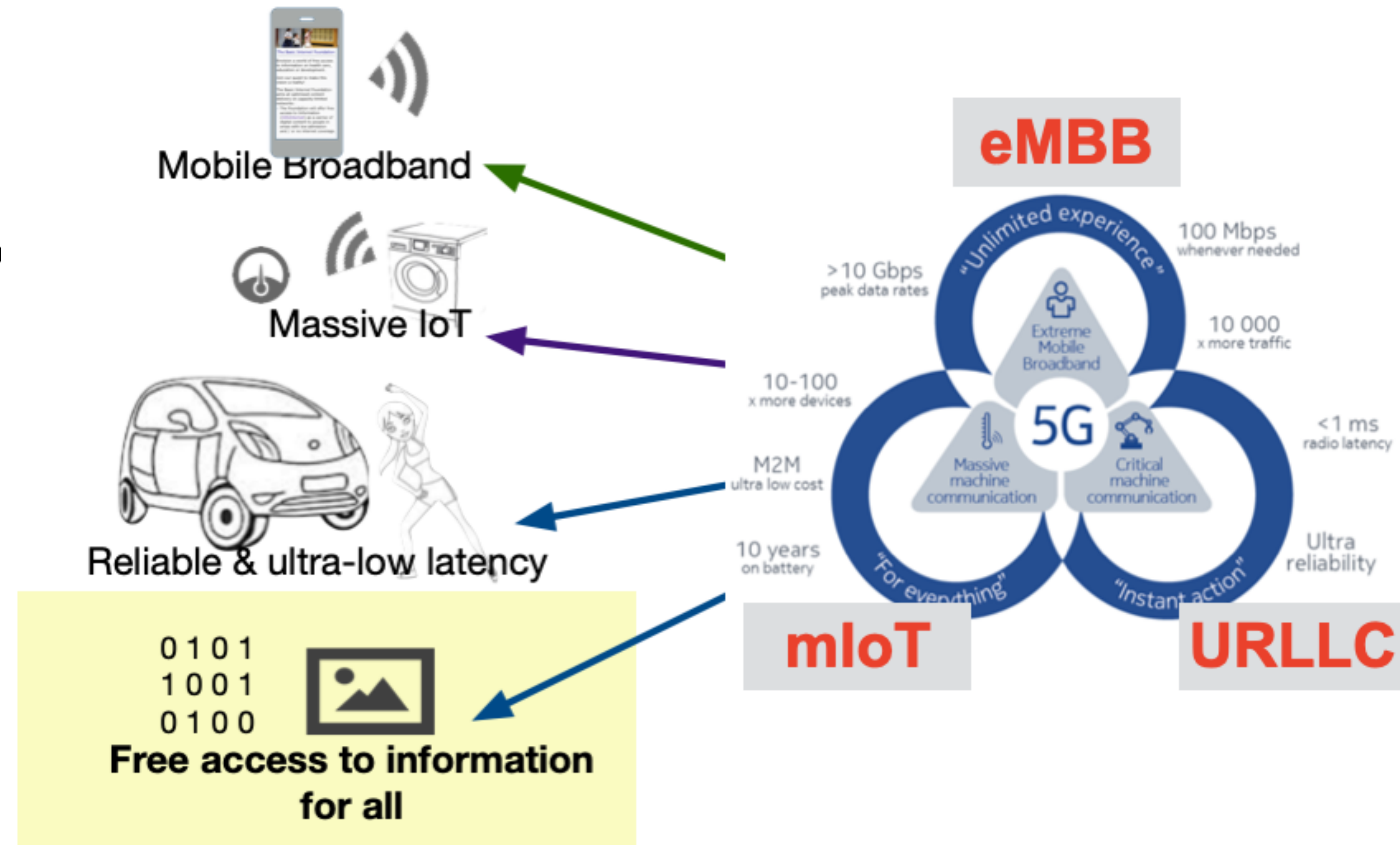
“In Tanzania 75-80% of all connections are 2G”
[Vodacom Information, May2020]



Source: Service Innovation through Smart Networks, Ericsson,
<https://www.ericsson.com/assets/local/networks/documents/service-innovation-through-smart-networks.pdf>

#5GforAll - Is it that difficult?

- Rural coverage
 - Large cell,
 - low OPEX sites (low density areas)
- **freemium model** for access
 - **free** for **information**
 - premium for the full web



Reality of the Digital Divide

- ➔ “Boys have the toys”
- digital divide in both devices
 - ▶ Example Smartphone ownership:
33% male, 16% female (Bangladesh)
- mobile broadband access

TZ: 640 USD for 4 Mbit/s
 GH: 600 USD for 5 Mbit/s
 KE: 600 USD for 10 Mbit/s
 “every single month”

More than
coverage

CAPEX

OPEX



Providing 6G for All

- **Free access to Information** (Internet Lite)
 - 1) Access - one **Information Spot** per village
 - 2) Skills - Health, Education, Agriculture
 - 3) Regulations - Freemium model
 - 4) Inclusion -
Free access for all #LeaveNoOneBehind
- Internet Lite & **Freemium** model for access
 - **free access to National Knowledge Portal** for all
 - **premium** access to **broadband**
 - sustainable solution

+18 dB
>20 km

“Providing Internet to the basic of the pyramid isn't a question of affordability, but rather a question of sustainability”
Internet Governance Forum, Panel, WIN

At least
one Information Spot
per village

6G for decentralised value creation

Internet Lite to the Migoli High School

josef

8 months ago

The Migoli High School has 1271 pupils (Apr2019) and 35 full-time teachers. The high school is located about 3 km outside of Migoli in the Iringa district in Tanzania.

Migoli (Nyerere High School)



1271 pupils, 34 full-time teachers

- 6G - the super **high-way** for connect
 - empower local communities
 - free access to **Internet Lite**
- support Community Networks
 - democratise the access to the Internet
 - **InfoSpots** with local content
 - ▶ increase the value in the society

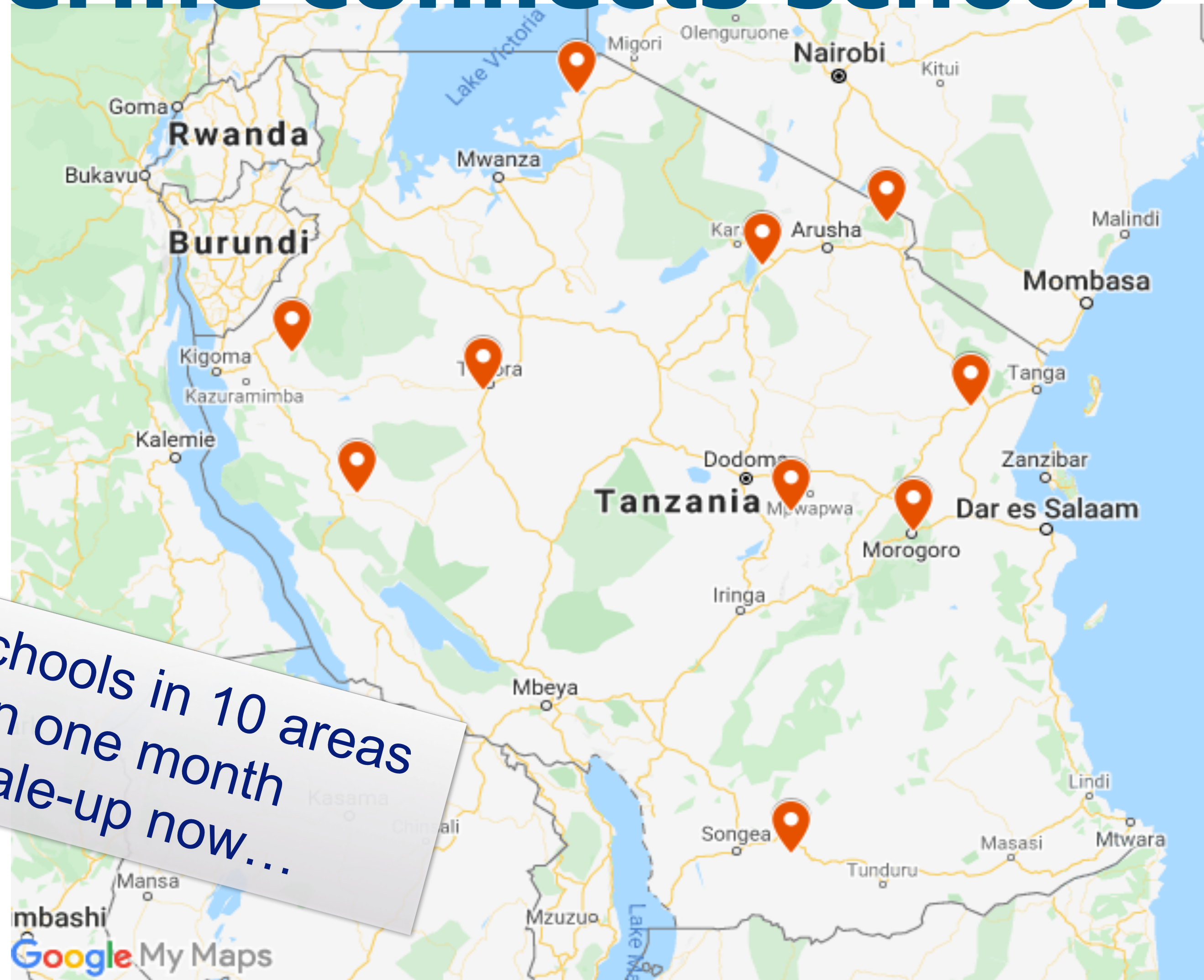
<https://basicinternet.org/internet-lite-to-the-migoli-high-school/AMP/>

6G: supporting Education 5.0 and Global Challenges

- ➔ Cognitive skills *Edu 3.0*
 - literacy and numeracy
 - critical thinking
 - problem solving
- ➔ Social and emotional skills *Edu 4.0*
 - empathy, teamwork
 - leadership, cultural awareness
 - **fraternity & social friendship**
- ➔ Global challenges *Edu 5.0*
 - **Climate, Sustainability (SDGs)**



Communities driving the change: Catherine connects schools



10 schools in 10 areas
in one month
scale-up now...









Conclusions: 6G as catalyst for the SDGs a Digital World through Innovations & Collaborations



Meaningful connectivity to the Internet and *skills* for using an *appropriate device* with *enough data* and a *fast connection*.

