



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

***Twenty-second Strategic Workshop (SW'19), May 13-15, 2019***  
**Theme: Global Cities Digitalization (GCD)**

# **Empowering the RUrban for Sustainable Growth**

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## Outline

*“The last time I was connected by wire was at birth”*

- The challenges of the 21 century
  - ➔ Climate, Resources, Digitalisation
  - ➔ Rural, RUrban and Urban
- Mobile development
  - ➔ From Network development
  - ➔ To Societal Empowerment
- Societal Trust
  - ➔ IoT devices and challenges
  - ➔ People empowerment



Discussion



## Grand Challenges

- Grand Challenges

- ➔ Climate
- ➔ Resources (radio, minerals)
  - Kobald (East - DR Congo)
- ➔ Divide

- Digitisation

- ➔ Mobile Networks
- ➔ IoT
- ➔ Automation



“Internet had the ability to dismantle the divide. Internet failed miserably, the divide is bigger than ever.”  
Kate Gilmore, Human Rights, UNO





## Example: Decent Work

- Centre for Monitoring the Indian Economy:
  - 11 Million jobs lost in 2018
    - ➔ 9 Million in rural areas
    - ➔ 8.8 Million women lost work
  - 31 Million look for work
    - ➔ most of them in RUrban area
    - ➔ from 80/20% Rural/Urban to
    - ➔ 70 / 15 / 15% Rural / RUrban / Urban



Tall publisert i januar av Centre for Monitoring the Indian Economy (CMIE) viste at hele 11 millioner indiske jobber gikk tapt i 2018.

Brorparten av disse jobbene, rundt ni millioner, var på landbygda. Og hele 8,8 millioner av dem som mistet jobben, var kvinner.

Samme organisasjon rapporterte i mars i fjor at 31 millioner indere aktivt leter etter jobb.

### Feilslått pengepolitikk

Hurtig vekst har vært sentral i Modis politiske visjon om å gjøre India til Kinas største økonomiske utfordrer.

Et av hans mest omfattende økonomiske tiltak kom i 2016. Da trakk han 86 prosent av kontantene ut av sirkulasjon over

India



Republikken er v  
nest største land  
enn 1,3 milliarder  
gere og forvent  
passere Kina i f  
løpet av noen å

Josef Noll @josefnoll · Feb 8  
Dystert lesing i dagens @Aftenposten om at 11 Mio jobber gikk tapt i 🇮🇳 i 2018, og at 80% av de som mistet jobben var #Kvinner. Knappt 90% av jobber forsvant i Landsbyer. #DigitalInclusion #InternetLite #DigitalEmpowermentPlatform @dagiulstein @NorwayMFA @nikolaiastrup

# Challenge: Transport

- Transport (Example Norway, Feb2019):
- Petrol and Diesel **new** cars increased CO2 emission
  - due to ~50% electric cars, total of 64 g/km
  - Mar2019: >50% electric car sales + 18% hybrid
- Oslo: CO2 reduction by 8% (2015-2016)
  - 5% CO2 reduction in transport
  - Climate goals of 2017 reached in 2016
  - Travel to work: 30% bike + 41% public transport (only 27% car)



Bilsalget i februar ... <https://ofv.no> **TWEET**

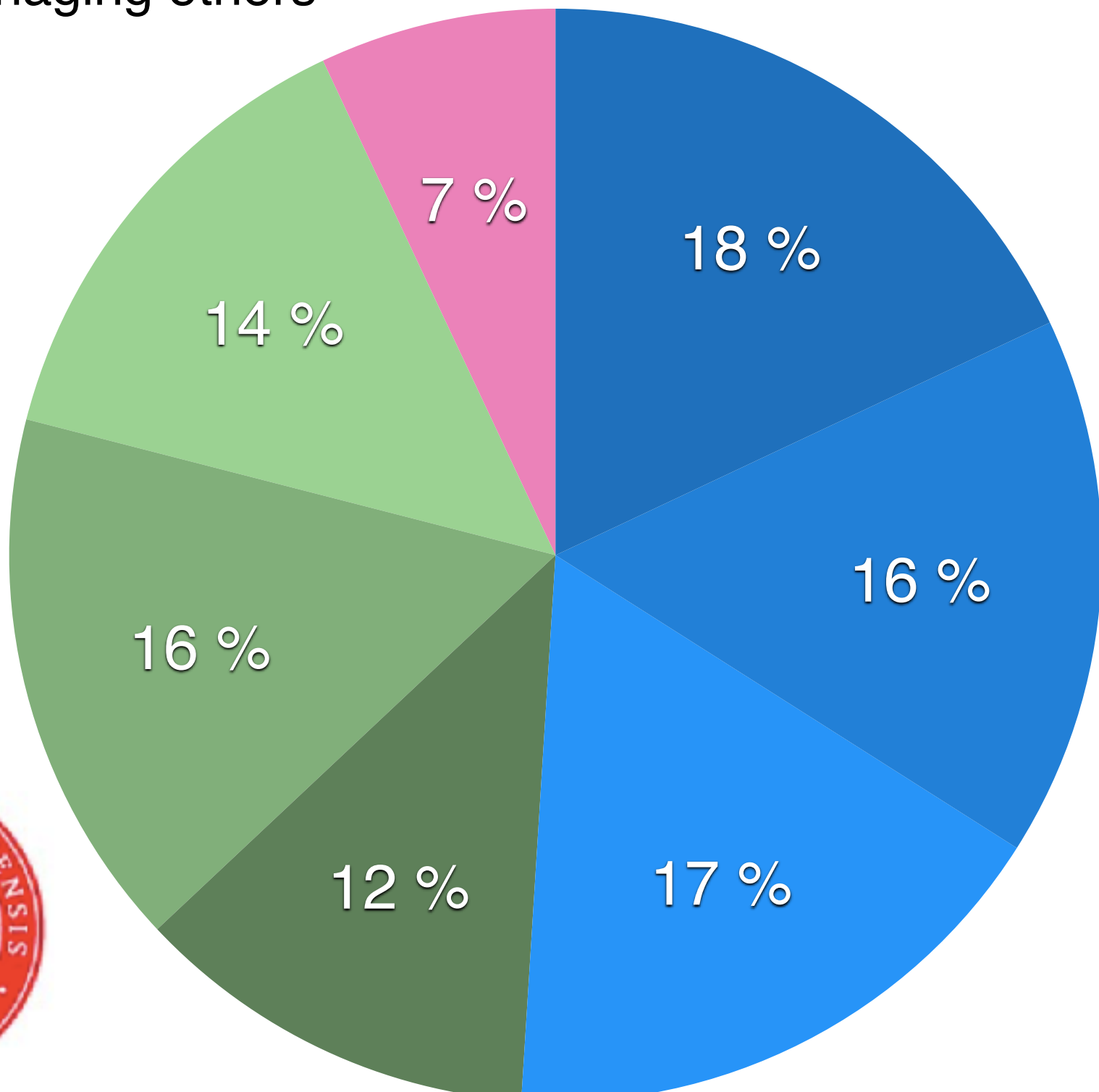
Personbiler	CO2-utslipp februar 2019
Alle personbiler	64 g/km
Bensinbiler (alle, inkludert bensin ladbare hybrider)	97 g/km
Diesalbiler (alle, inkludert diesel ladbare hybrider)	134 g/km
Varebiler klasse 2	155 g/km



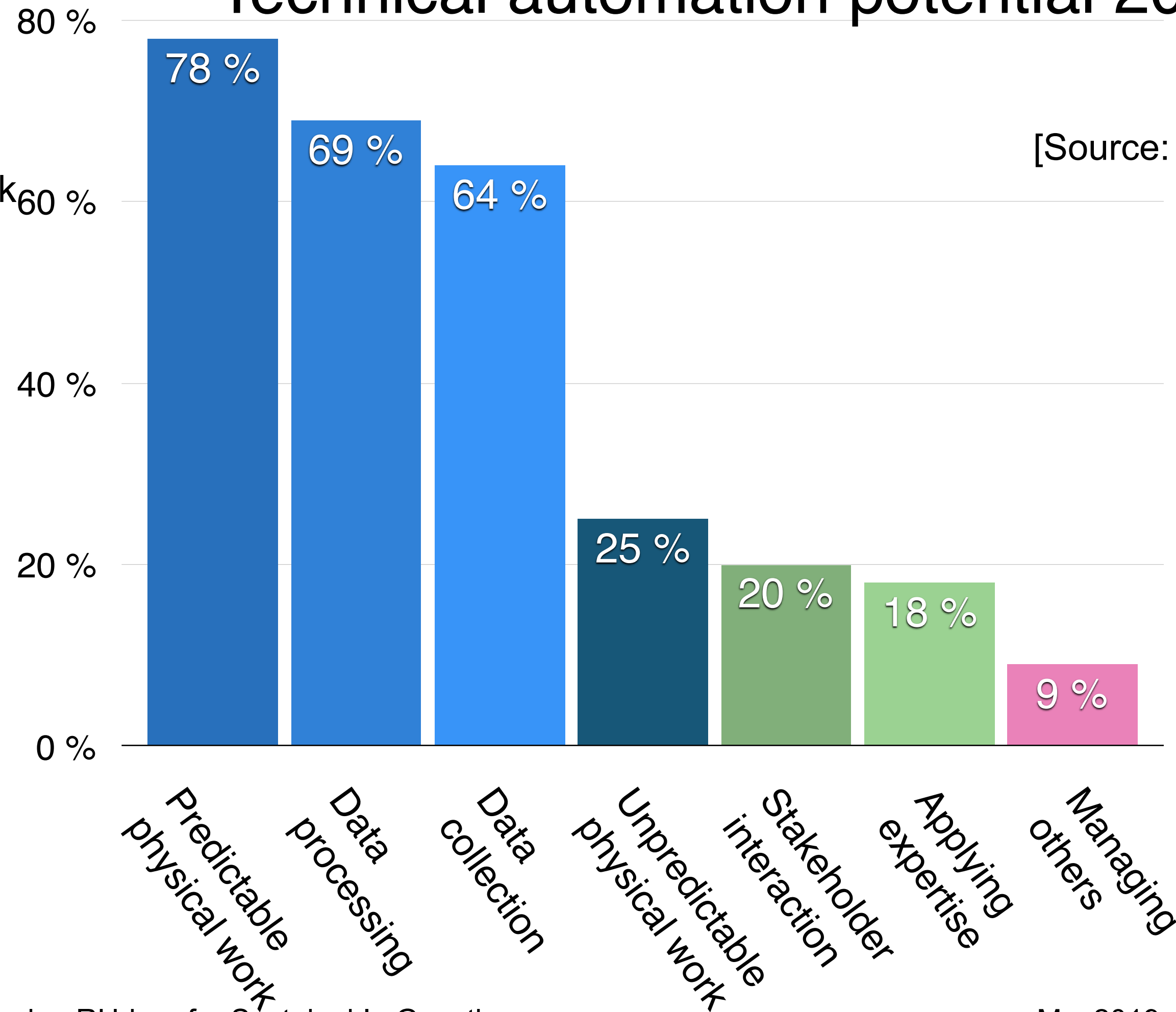
## The challenge from automation

USA work force time spent [%]

- Predictable physical work
- Data collection
- Stakeholder interactions
- Managing others
- Data processing
- Unpredictable physical work
- Applying Expertise



Technical automation potential 2016 [%]

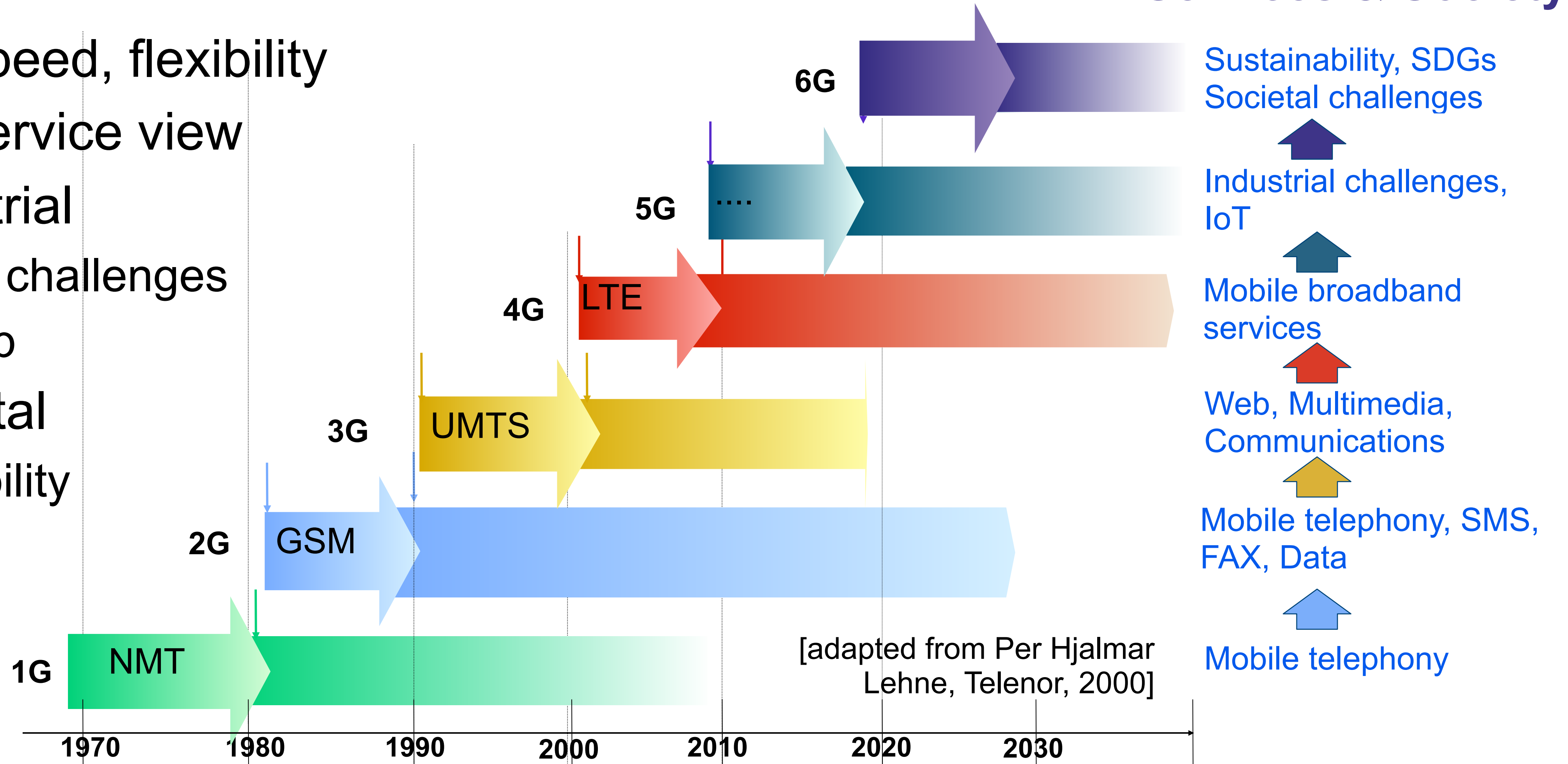


[Source: McKinsey, 2016]



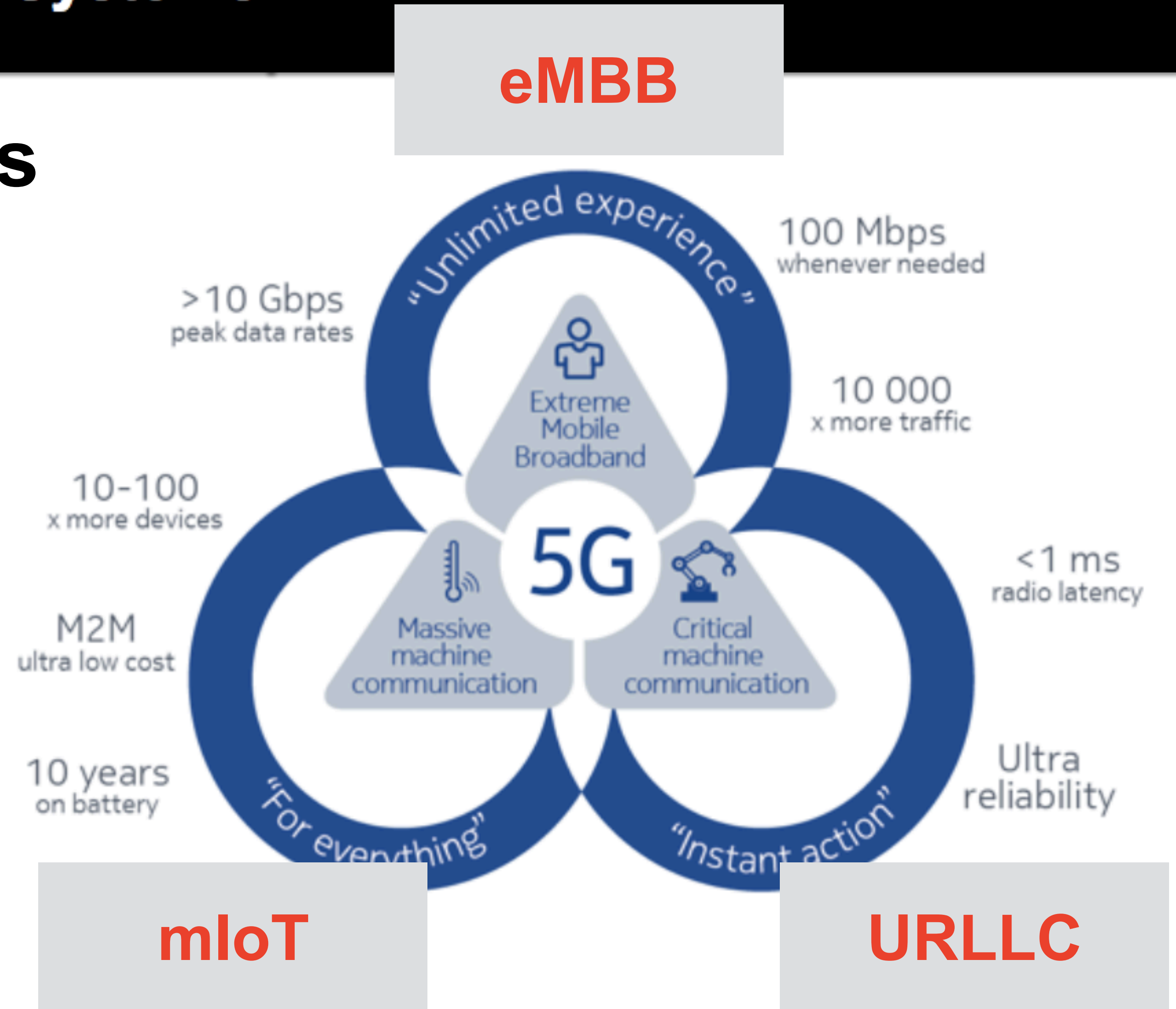
## 6G: Digitisation of the Society

- 1G-3G: Speed, flexibility
- 3G-4G: Service view
- 5G: Industrial
  - Business challenges
  - ownership
- 6G: Societal
  - sustainability



## 5G: Industrial Challenges

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

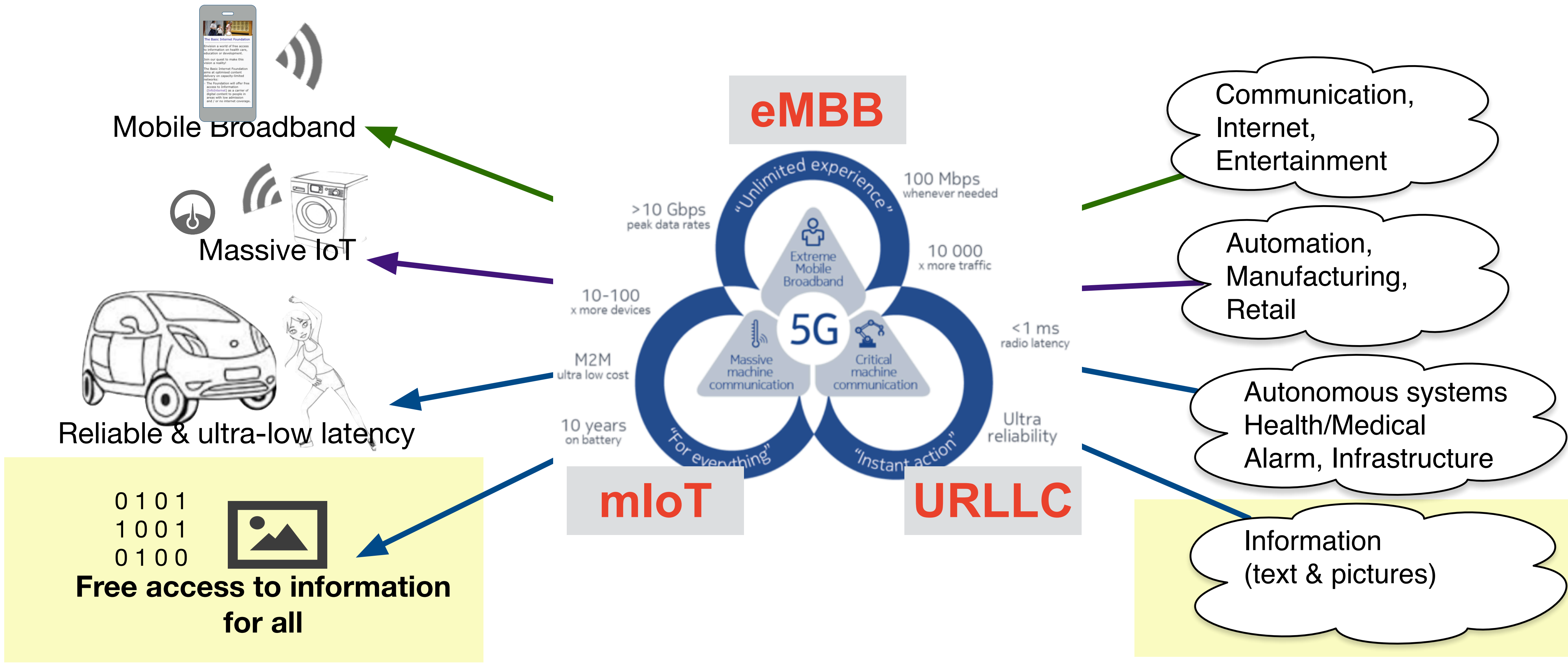


[source: Nokia <https://networks.nokia.com/5g/get-ready>]





# 5G network slicing for Free Access to Information for All



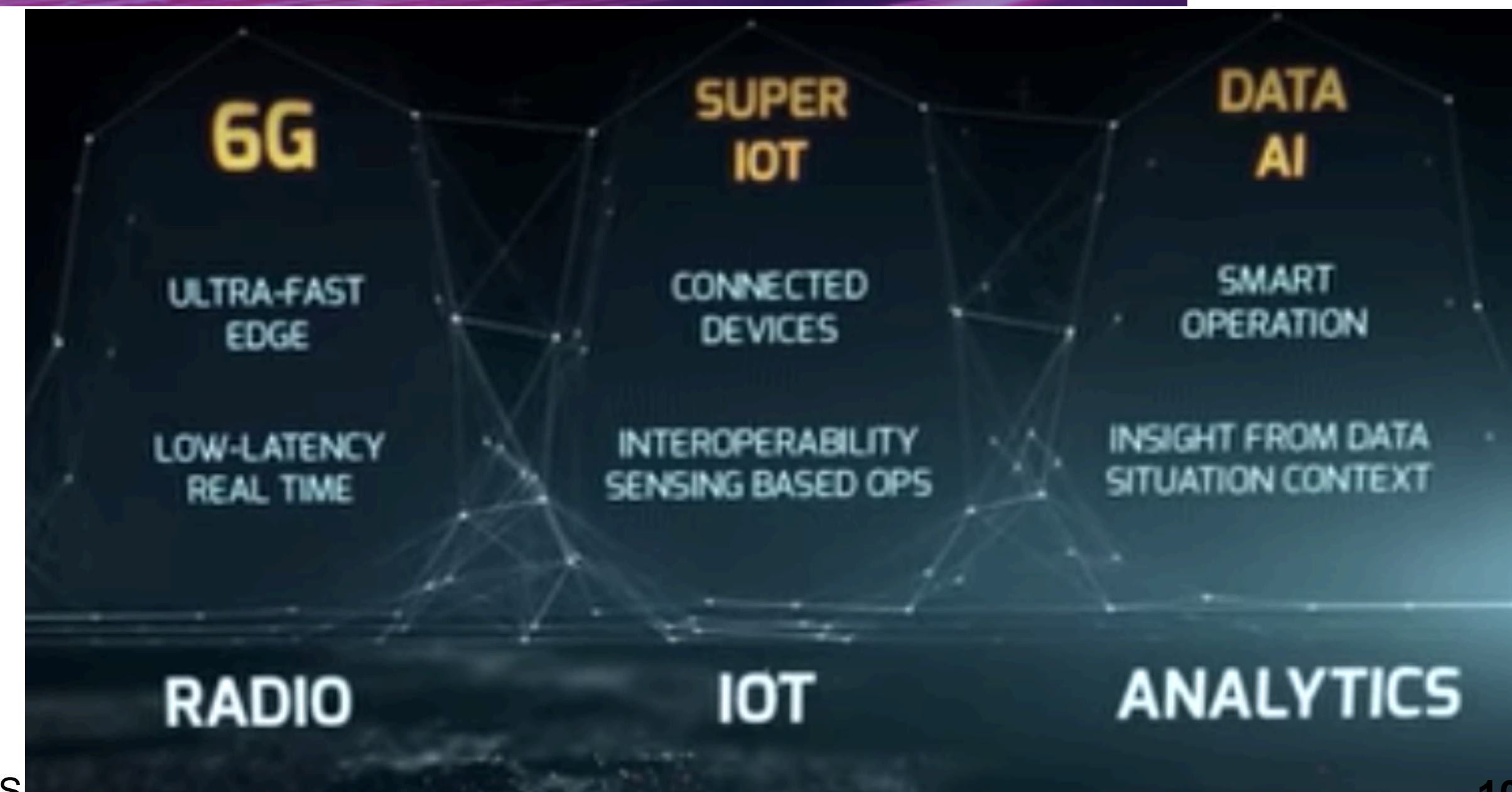


## 6Genesis.com by Oulu University

- Lighthouse project in Finland
  - ➔ 251 M€ funded
- Goals
  - ➔ Support industry in finalization of 5G
  - ➔ Develop the fundamental technology needed to enable 6G
  - ➔ Speed up digitalization in society
- Focus on Sustainable Development
  - ➔ FI, SE, NO, DK academic collaboration

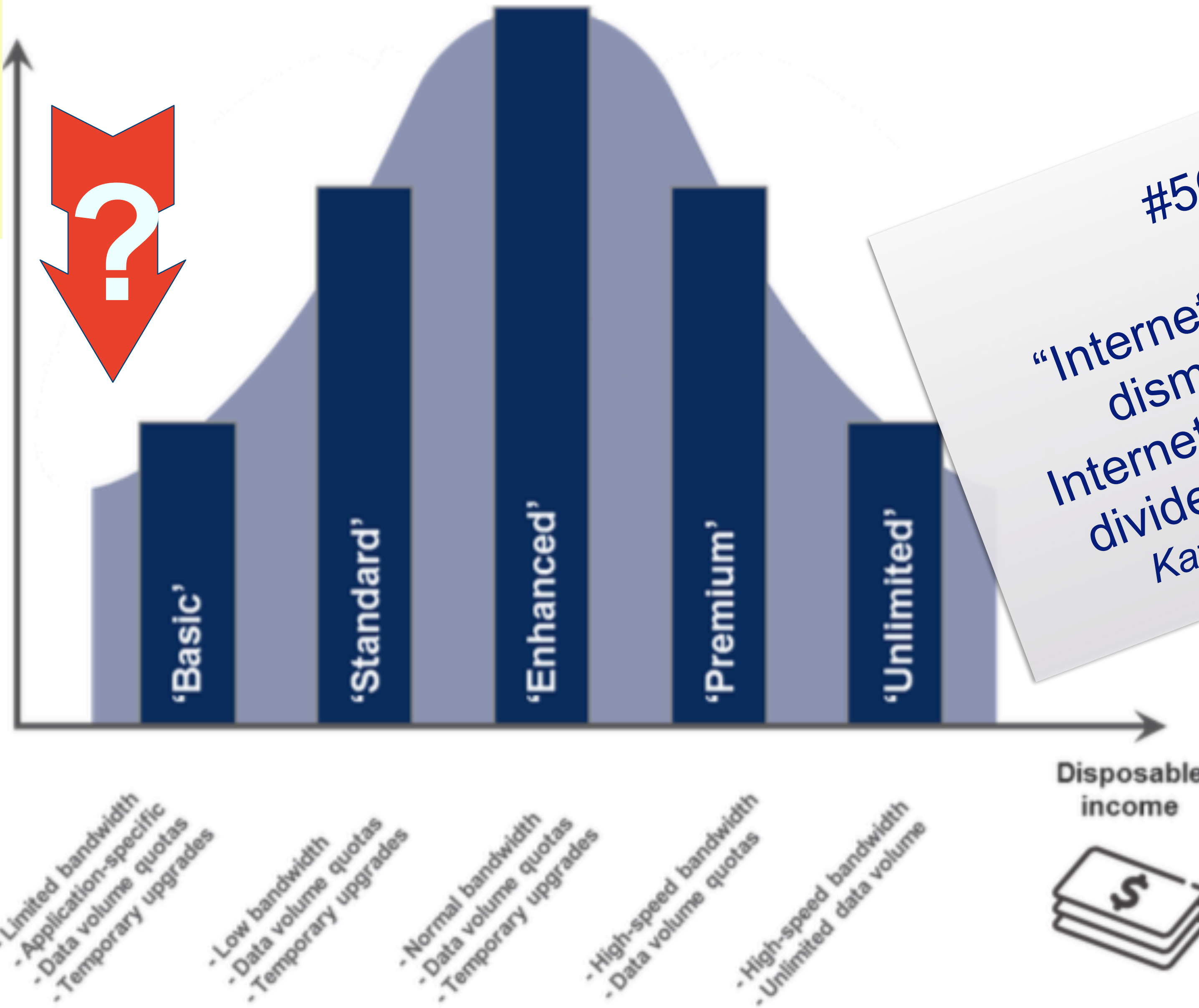
Discover how 6G  
will change our lives

Watch the Video



# Telecom view on digital inclusion

Addressable Market



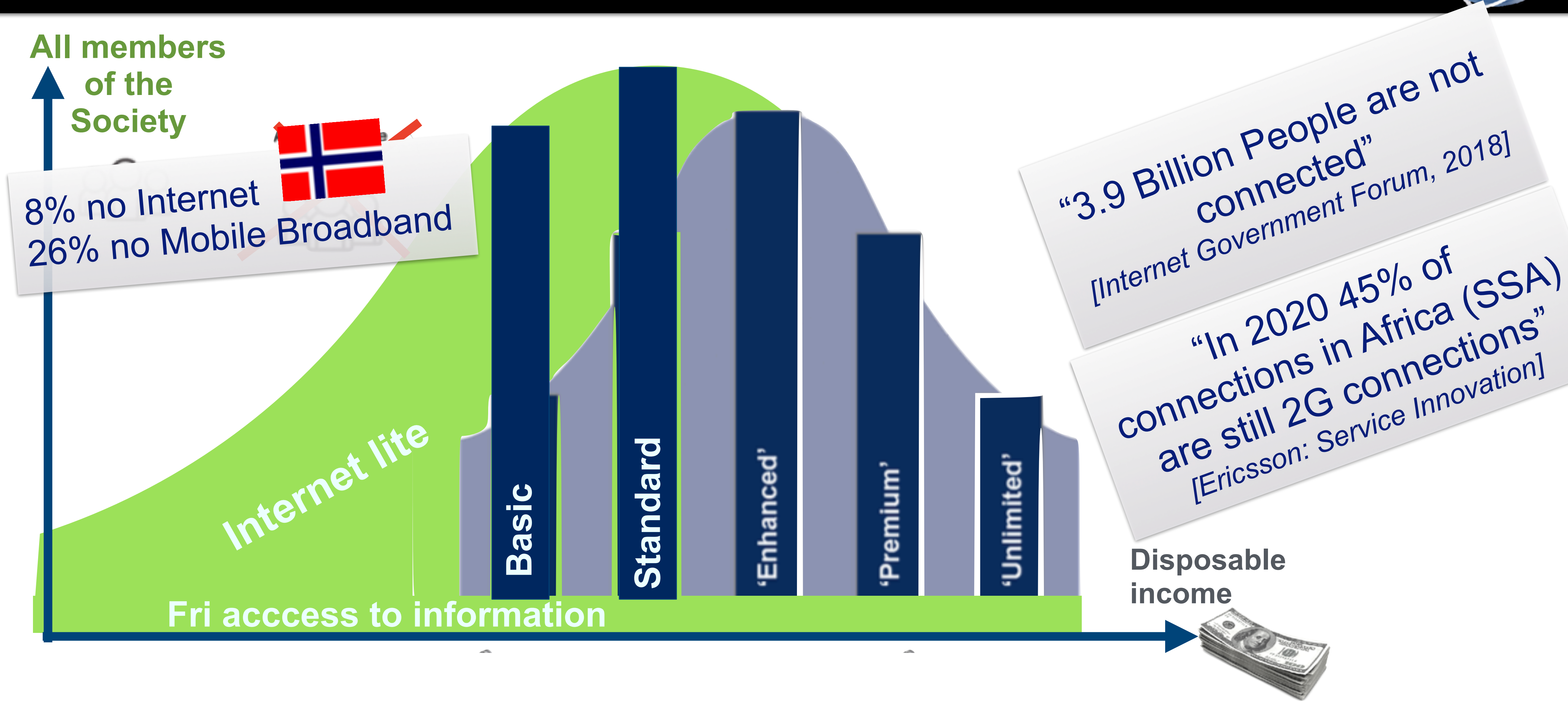
#5Gfor All?  
“Internet had the ability to dismantle the divide. Internet failed miserably, the divide is bigger than ever.”  
Kate Gilmore, Human Rights, UNO

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

# THE PRICE OF ~~OF~~ INEQUALITY

HOW TODAY'S DIVIDED SOCIETY  
ENDANGERS OUR FUTURE

# 6G (#5GforAll) for digital inclusion



[Adapted from: Service Innovation through Smart Networks, Ericsson, 2018]



**#Digital Inclusion**  
**#Societal Empowerment**  
**#Digital Health**  
**#Women and Girls**

# Esilalei



Mto wa Mbu

Lake Manjara

Esilalei

Dispensary

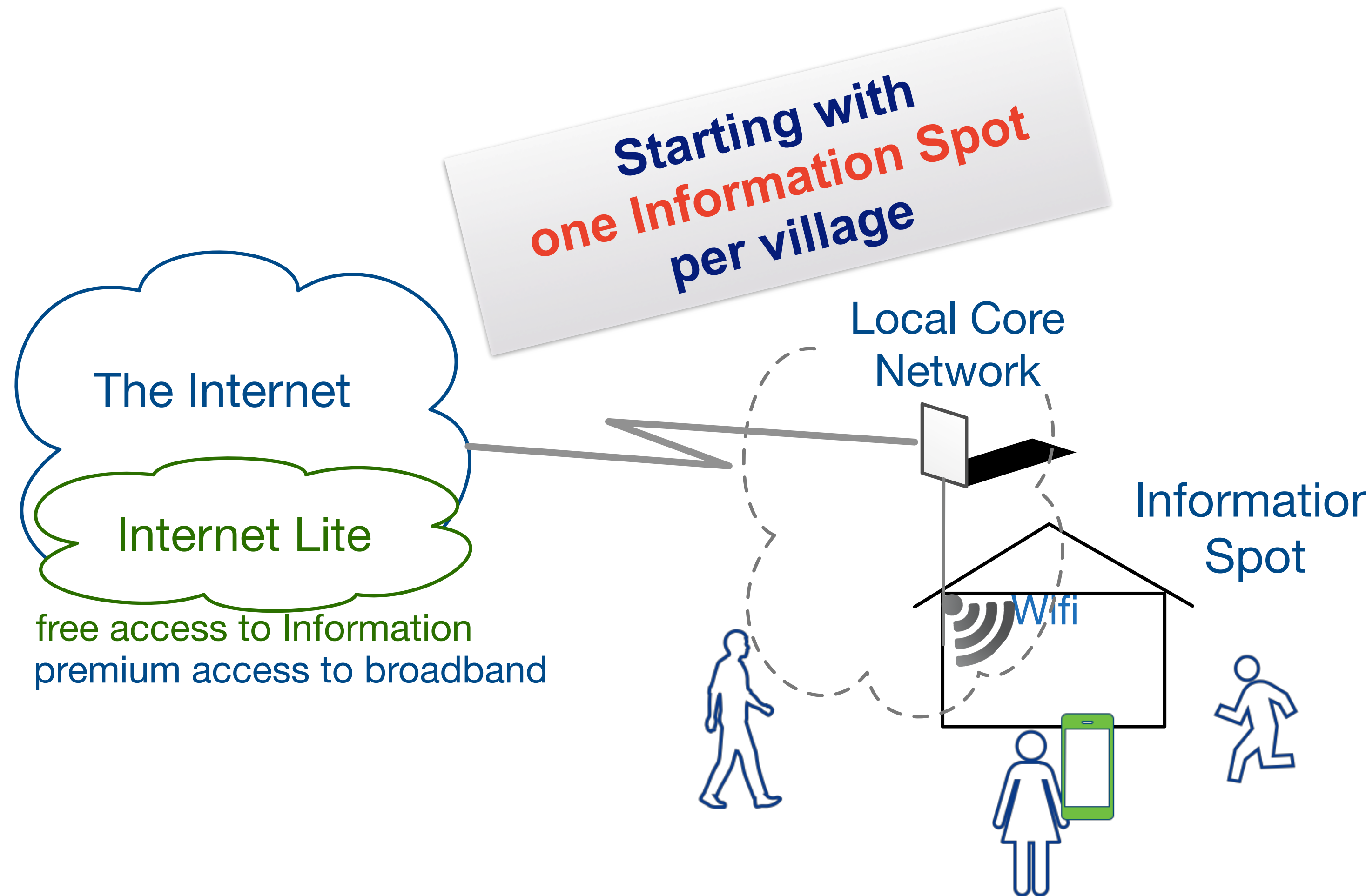
12x2

4.6 km

# “Internet Lite for All”

## the walk on the Internet

- **Freemium** model for access
  - ➔ Free: text, pictures & local video
  - ➔ Premium: broadband services
- Ensure **Network Neutrality**
  - ➔ Content type filtering
- **1 premium** pays for **300 free**
  - ➔ “**10 months** of Information, or **10 min** of video”?





# Internet lite for all *the catalyst for the goals*



# Empowering people for the **Innovative Society**



# Izazi



Antenna

Village office

Installation time: 1,5 h  
catching the signal from the Vodacom  
tower in Migoli (~10km away)

# Migoli (Nyerere High School)



1271 pupils, 34 full-time teachers  
9 m pole (above trees) base to connect  
- Migoli health station  
- Migoli village office



# Mbaash (Selela)



# Societal Trust - Discussion

- Digital Inclusion
  - ➔ Catalyst for the SDGs
  - ➔ Innovative Society
- Mobile evolution
  - ➔ from technology
  - ➔ to services
  - ➔ to societal empowerment
- Internet Lite for All
  - ➔ free access to information



Ved å bygge internett for alle, og ved å skape relevante og uunnværlige digitale tjenester, kan vi bidra til en bedre verden, skriver Sigve Brekke.  
FOTO: Heiko Junge, NTB scanpix

**IKT er den nye oljen! | Sigve Brekke**

[Source: [aftenposten.no](http://aftenposten.no)]

# THE PRICE OF INEQUALITY

JOSEPH E. STIGLITZ

WINNER OF THE NOBEL PRIZE IN ECONOMICS

**Norway's wealth:  
Oil, now data, for  
societal empowerment  
and wealthy society**

# 6G

**6G WIRELESS SUMMIT**  
Levi • Lapland • Finland  
24-26 March 2019

<http://www.6gsummit.com>

