



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

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# **Livsmestring i en teknologiverden som raser fordi oss**

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## Hva forventer vi

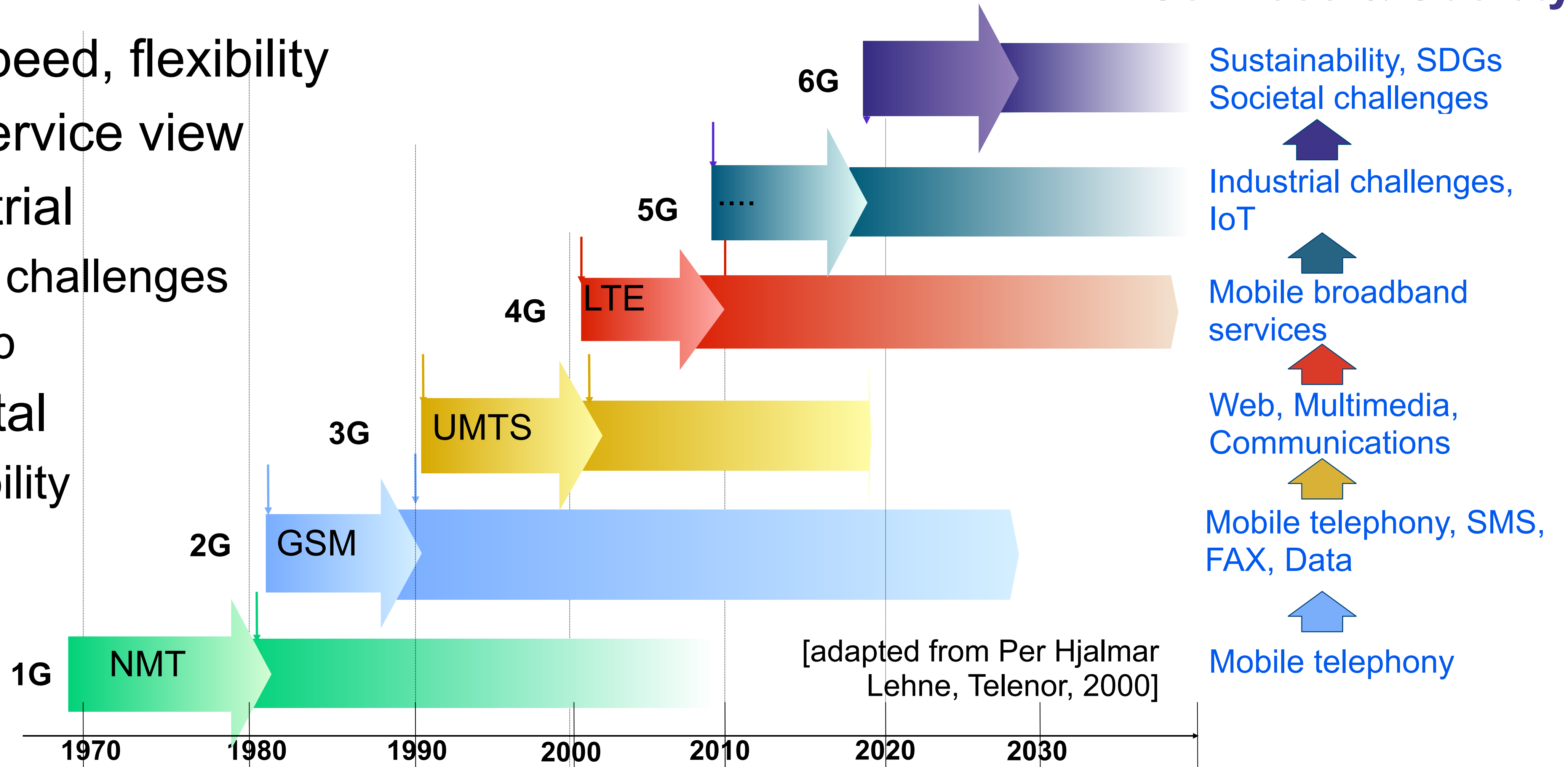
*“The last time I was connected by wire was at birth”*

- Mobil utviklingen
- Tingenes internett (Internet of Things - IoT)
- Framtidens bedrift
- Trygghet for oss som mennesker



## 6G: Digitisation of the Society

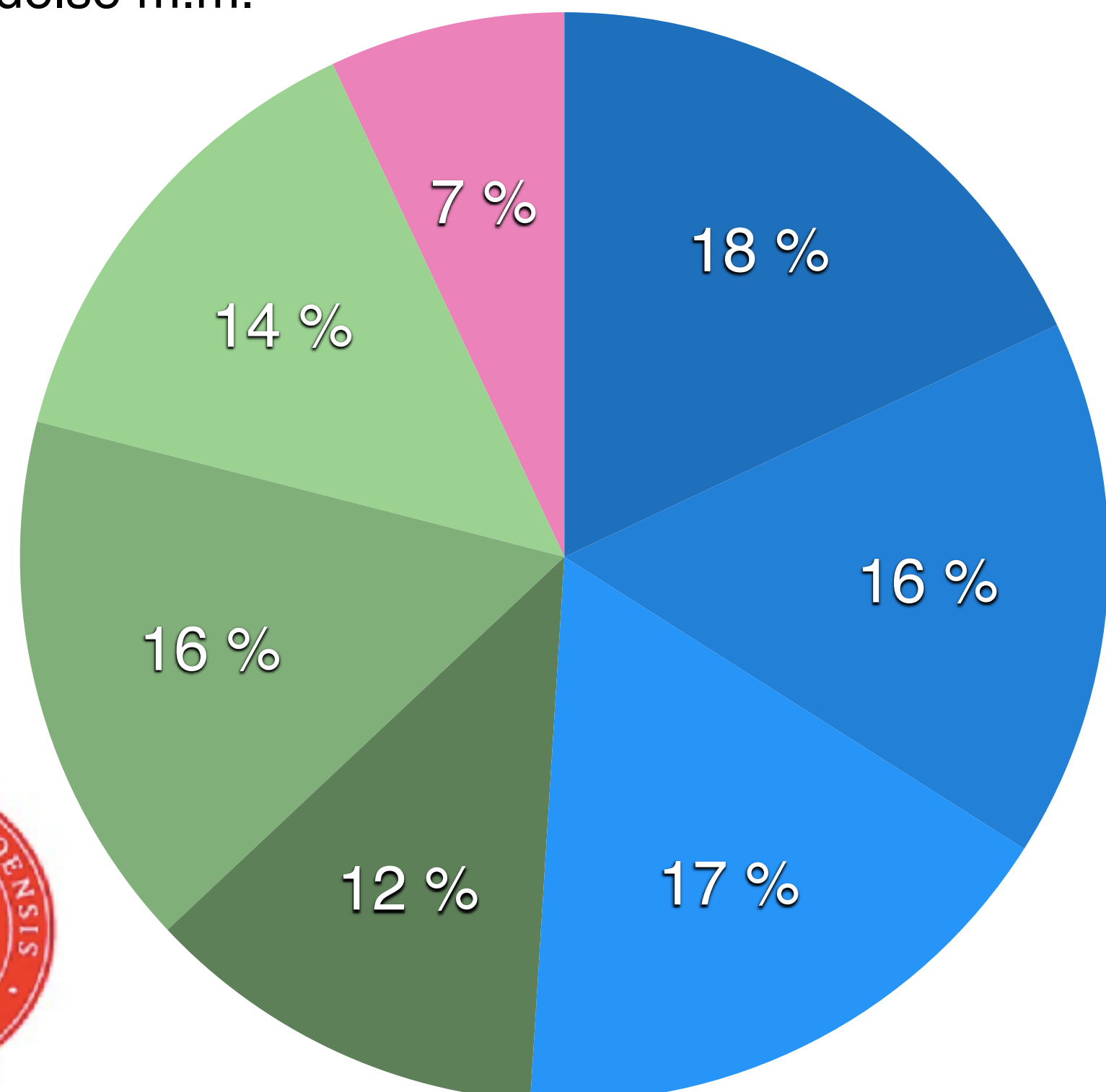
- 1G-3G: Speed, flexibility
- 3G-4G: Service view
- 5G: Industrial
  - Business challenges
  - ownership
- 6G: Societal
  - sustainability



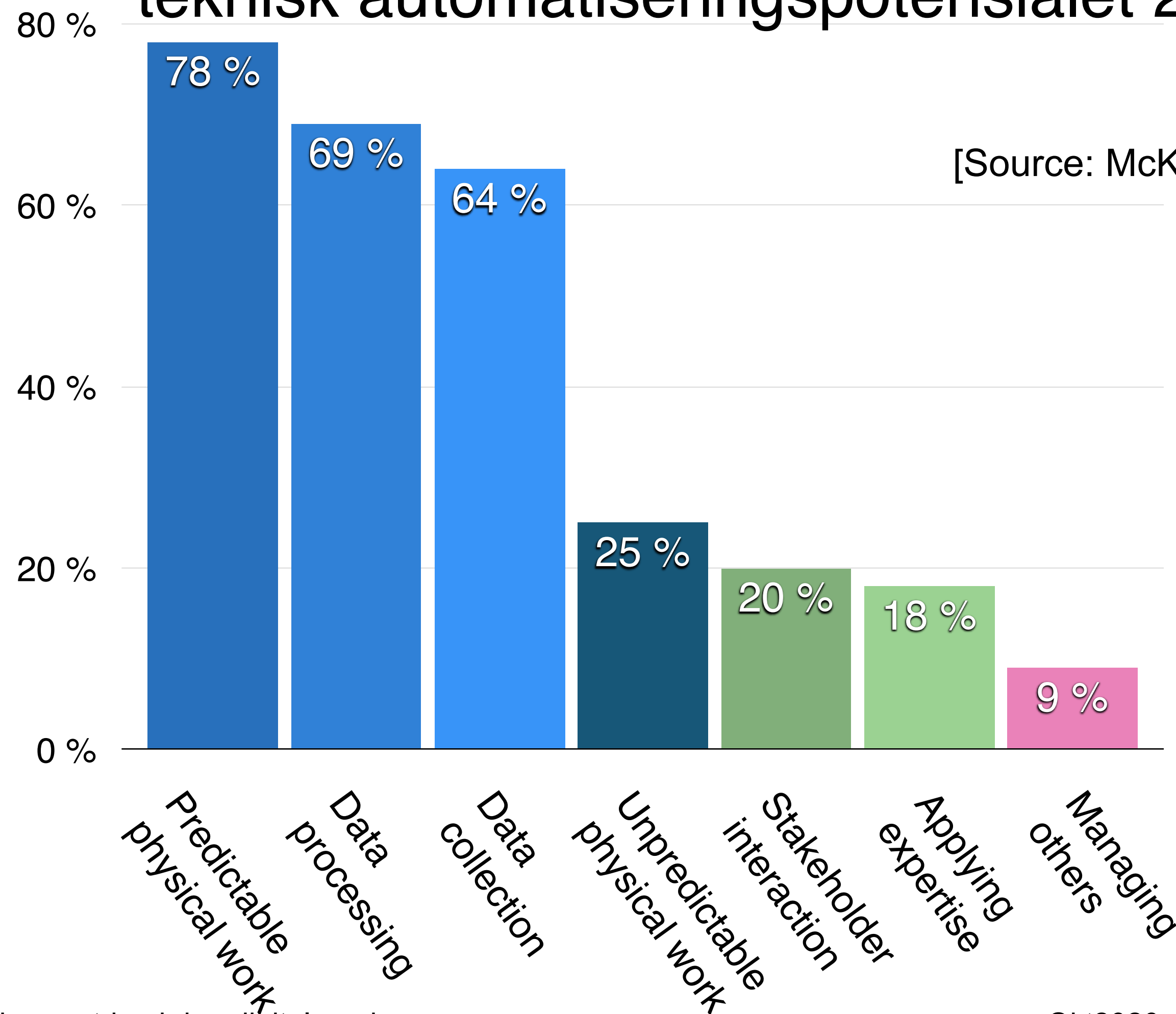
## Utfordringen med automatisering

### USA brukt tid [%]

- predikterbart fysisk arbeid
- data innsamling
- interaksjon med andre
- ledelse m.m.
- data prosessering
- ikke predikterbart arbeid
- anvendelse av kunnskap



### teknisk automatiseringspotensialet 2016 [%]

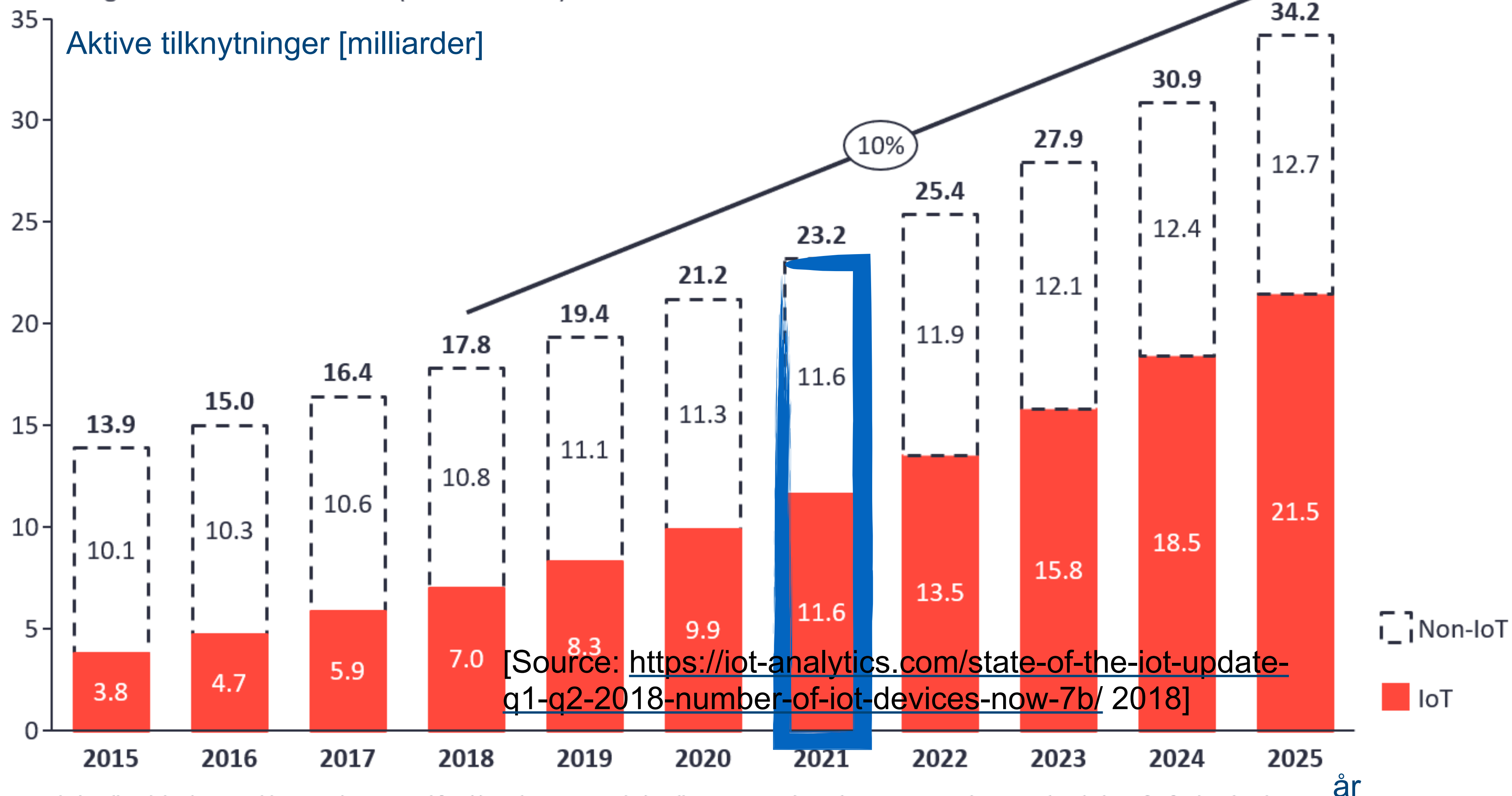


[Source: McKinsey, 2016]



# Total number of active device connections worldwide

Number of global active Connections (installed base) in Bn



[Source: <https://iot-analytics.com/state-of-the-iot-update-q1-q2-2018-number-of-iot-devices-now-7b/> 2018]

Note: Non-IoT includes all mobile phones, tablets, PCs, laptops, and fixed line phones. IoT includes all consumer and B2B devices connected – see IoT break-down for further details  
Source: IoT Analytics Research 2018



# Tingenes internett (IoT)

- IoT =
  - ➔ dingser +
  - ➔ internett +
  - ➔ semantikk
- tingene som snakker
  - ➔ med tingene
  - ➔ som forstår hva det dreier seg om, og
  - ➔ som tar beslutninger

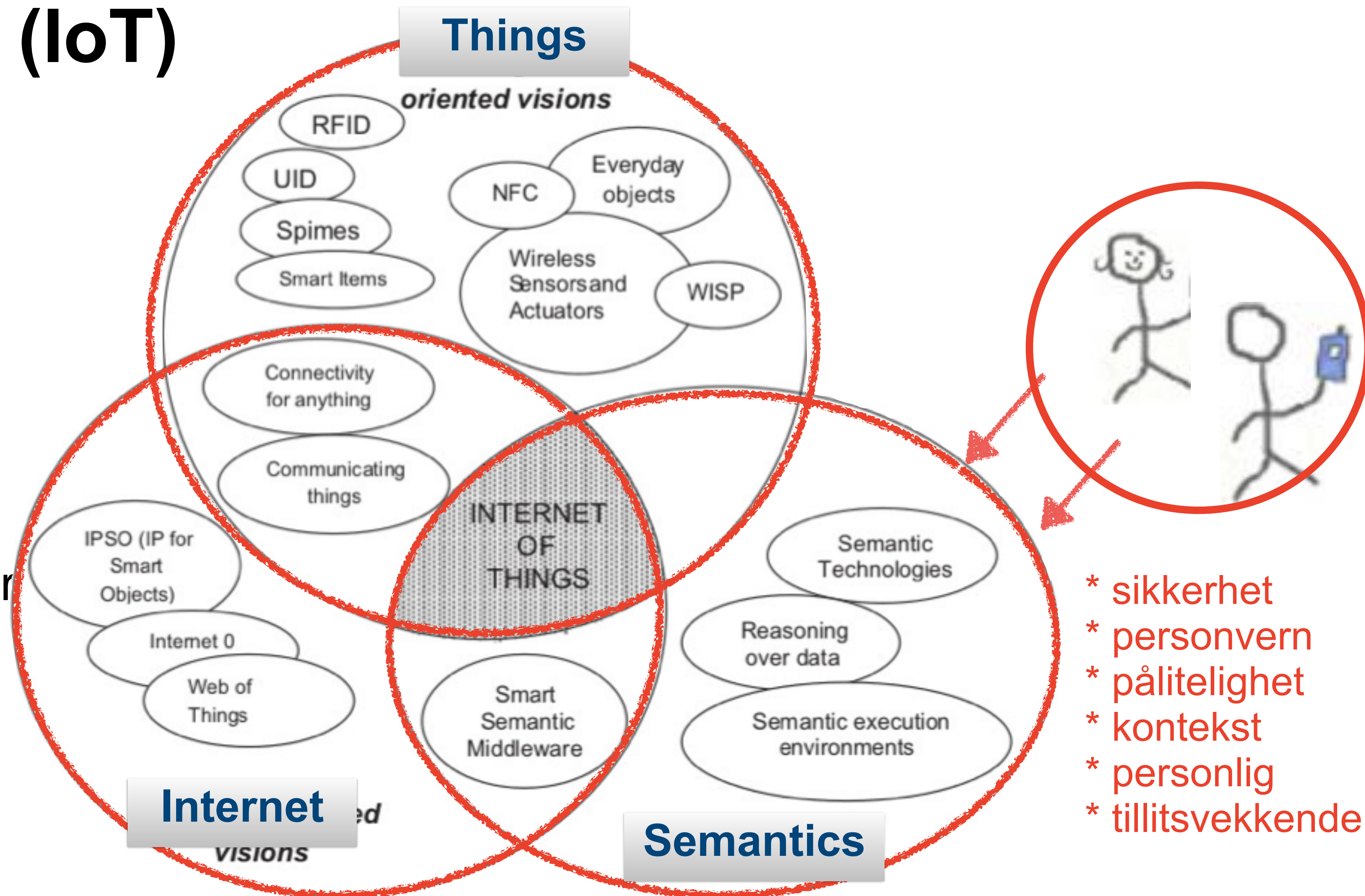
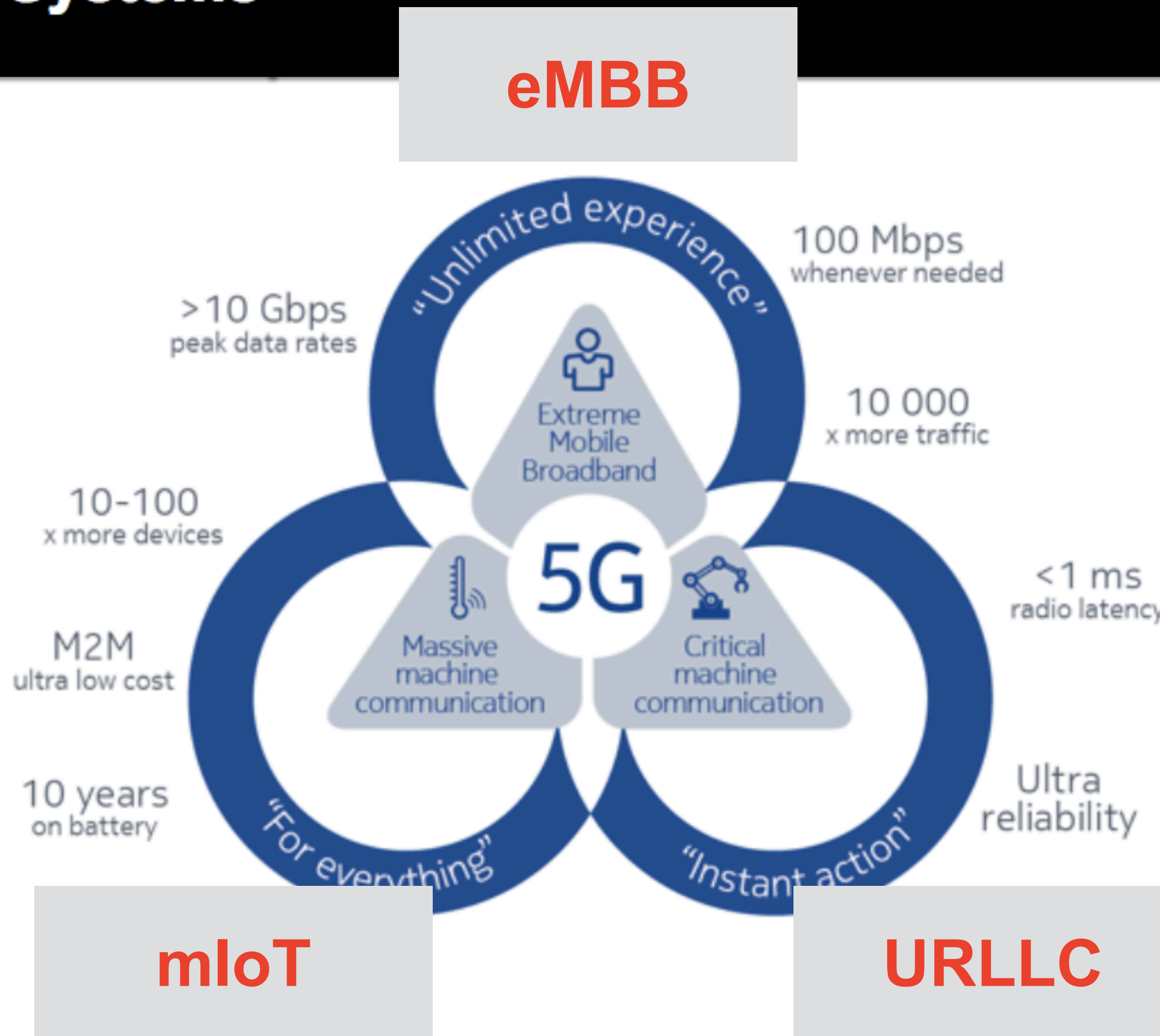


Fig. 1. "Internet of Things" paradigm as a result of the convergence of different visions.



## 5G målsetninger

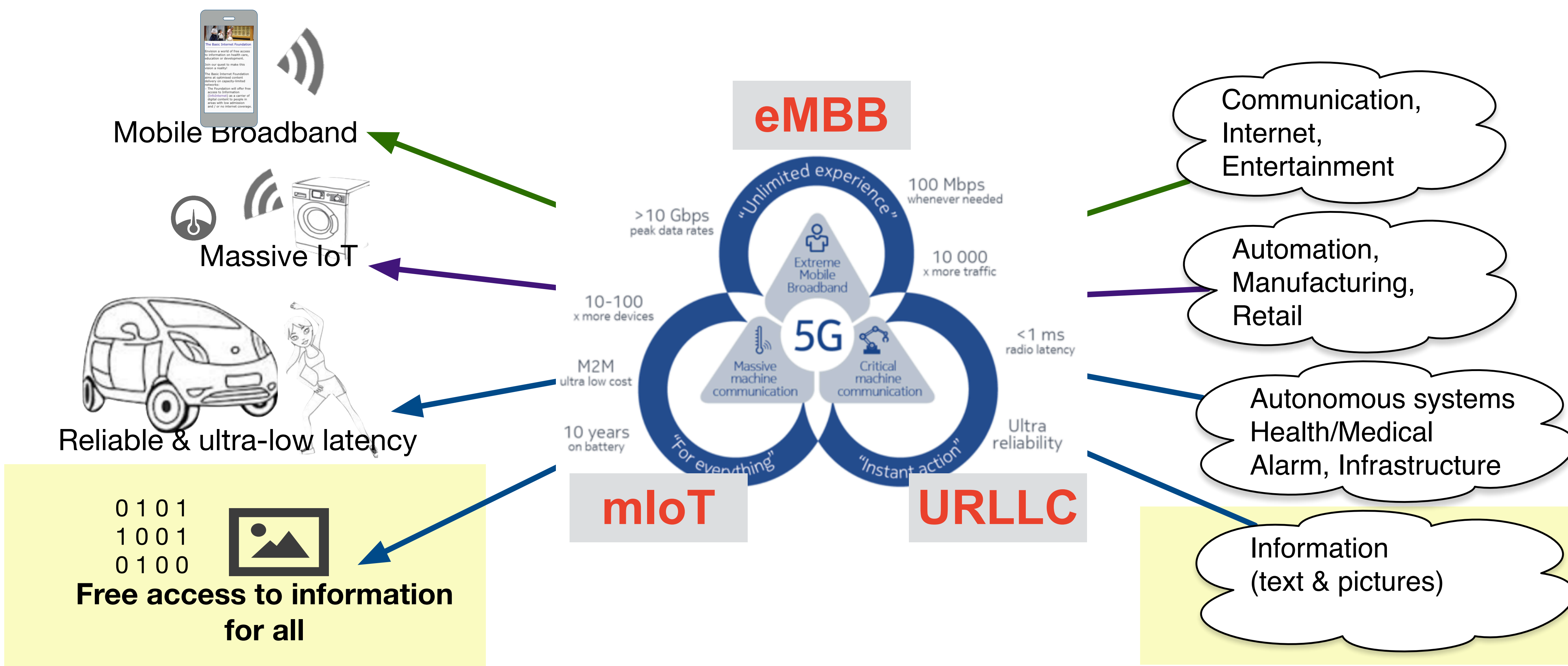
- utvidet mobilt bredbånd
  - 100 Mbit/s til mobiler/dingser
- massiv IoT
  - tilknyttete og smarte dingser
- ytterst pålitelig, lav forsinkelse kommunikasjon
  - forsinkelse <1 ms
  - pålitelighet >99.999%



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



# 5G mangler en ting .... fri tilgang til informasjon for alle





# Nye forretningsmodeller

- **Bilindustri: Ansvar for selvkjørende biler**
- **Energi: Nettkostnader vs Pålitelig strømforsyning**



# Volvo to 'accept full liability' for crashes with its driverless cars

But decide on rules so we can make the dang vehicles



13 Oct 2015 at 06:04, OUT-LAW.COM



68



22



78

Volvo will "accept full liability" for collisions involving its autonomous vehicles, the company has confirmed.



## Utfordringer med IoT

- **Sikkerhet: distribuert angrep (DDoS), utpressingsskadevare (“ransomware”)**
- **Personvern: Alle data til platform firmaer? Verdiskapning i landet?**
- **Digital inkludering: Tillit, transparens og digital deltagelse**



## Sikkerhetsangrep fra dingser

### IoT basert angrep (video, kamera)

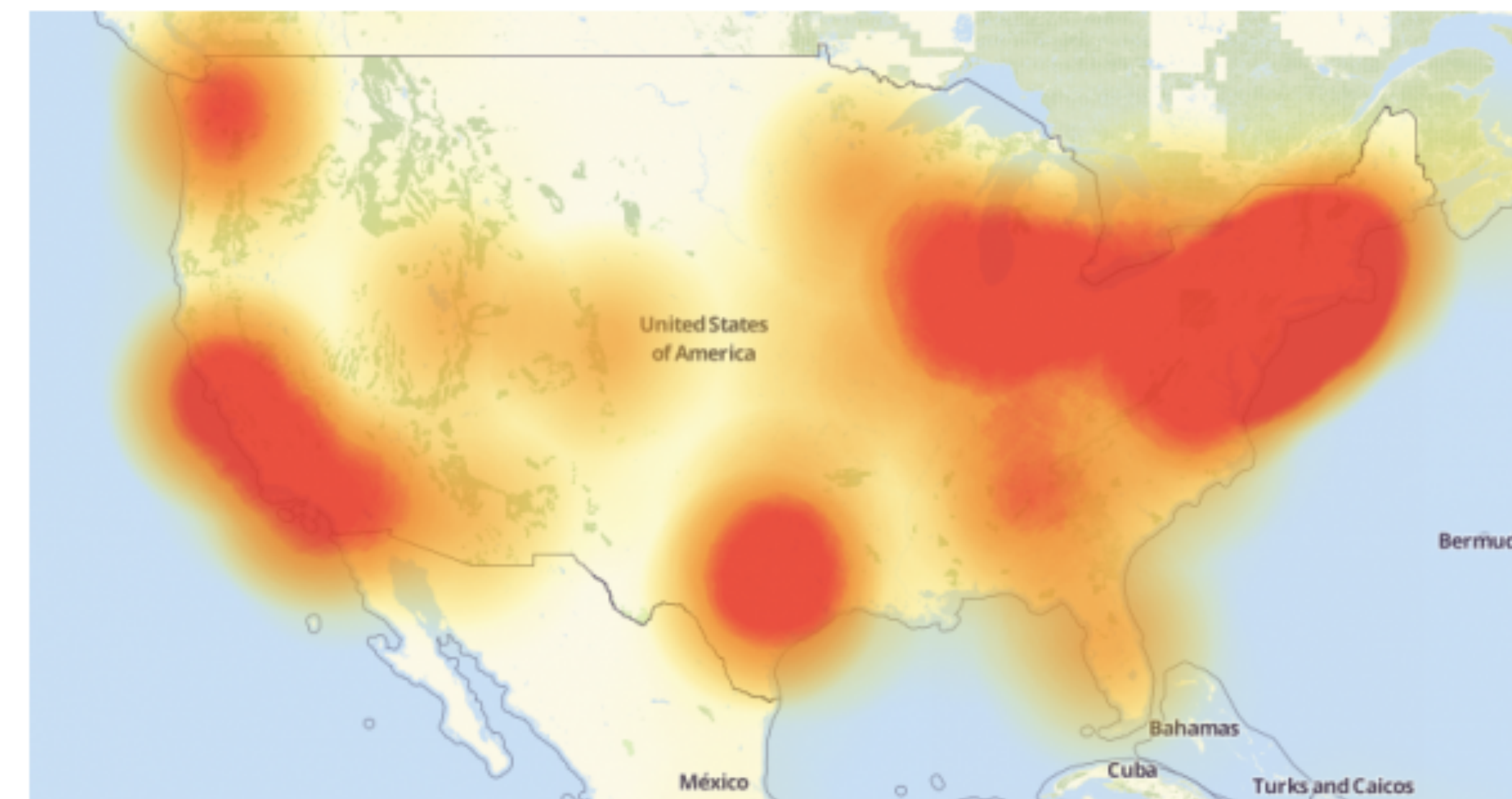
- Mirai angrep
  - “security by obscurity” -
    - ▶ “root - root”, “admin - 1234”
  - fritt tilgjengelig tilgjengelig
- “it is just the beginning”
  - 4x økning av kapasitet bare i 2018



### 21 Hacked Cameras, DVRs Powered Today's OCT 16 Massive Internet Outage 16Oct2016

A massive and sustained Internet attack that has caused outages and network congestion today for a large number of Web sites was launched with the help of hacked “Internet of Things” (IoT) devices, such as CCTV video cameras and digital video recorders, new data suggests.

Earlier today cyber criminals began training their attack cannons on **Dyn**, an Internet infrastructure company that provides critical technology services to some of the Internet's top destinations. The attack began creating problems for Internet users reaching an array of sites, including Twitter, Amazon, Tumblr, Reddit, Spotify and Netflix.



[Source: <https://krebsonsecurity.com/2016/10/hacked-cameras-dvrs-powered-todays-massive-internet-outage/>]

## Sikkerhet og tillit

[Source: <https://www.nrk.no/norge/xl/norske-offiserer-og-soldater-avslort-av-mobilen-1.14890424>  
NRK 18Mai2020]



IoT:  
våre dingser hjemme

SW oppdatering

1 garanti  
1 Gbit/s Wifi



tilgang



monitorering





**tillit:  
hvordan kan vi få våre sensorer  
til å snakke Norsk?**



## Utdannelse: Fra kunnskap til livsmestring

- Kognitive ferdigheter
  - ➔ lese- og skriveferdigheter
  - ➔ kritisk tenkning og problemløsning
- Sosiale og emosjonelle ferdigheter
  - ➔ empati & samarbeid
  - ➔ ledelse og kulturell bevissthet
  - ➔ broderskap og sosialt vennskap
- Globale utfordringer
  - Klima, bærekraft (SDGs)

