ISAC from a telecom operator point of view

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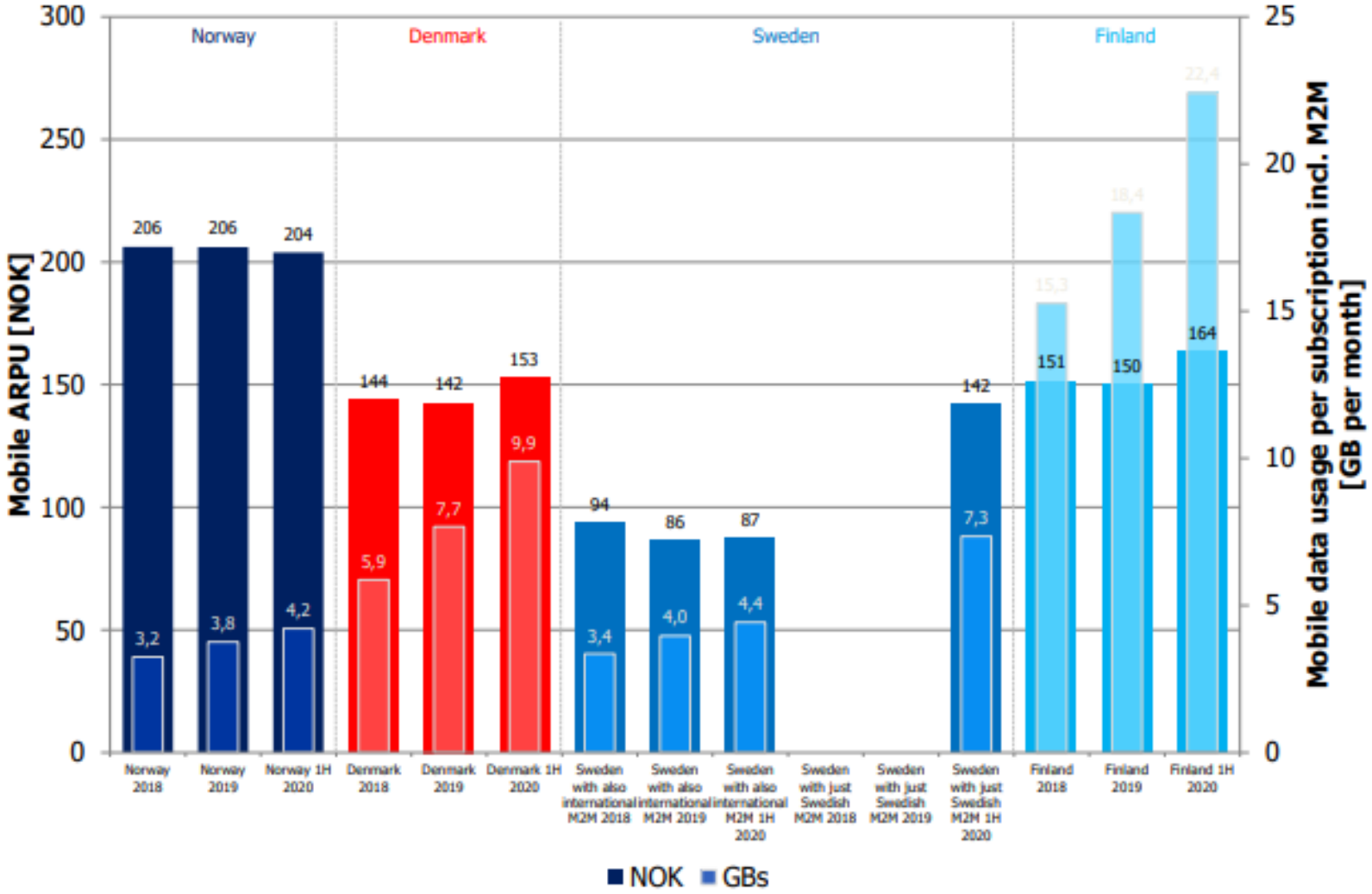
Motivation

- Data usage increases => new network investments are needed
- There is not a corresponding increase in the mobile ARPU.
- The number of subscribers do not increase much in mature markets
- Mobile operators need new “beyond connectivity” services.



Source: tefficient, “Assessment of Norwegian mobile revenues in a Nordic context”, Analysis prepared for Kommunal- og moderniseringsdepartementet

Benefits of ISAC

- Using the same network for both communication and sensing represents an efficient way to use resources:
  - Socio-economically efficient
  - Efficient use of the spectrum resources
- ISAC is an enabling technology for 6G, both for new services and network enhancements
- An important step towards fully cognitive radios

Joseph Mitola:

"… a full cognitive radio can be defined as a radio that is aware of its surroundings and adapts intelligently."

Identifying viable business cases

- One of the main selling points of ISAC is the ubiquitous availability of mobile networks, however:
  - The wide area coverage is on lower frequencies only (sub-6GHz spectrum)
  - High accuracy, high resolution ISAC services require the use of higher frequencies (mm-wave or above). But the coverage on such frequencies will be very spotty.
  - Better knowledge of what can be achieved with ISAC on lower frequency bands is needed.
- A viable business case must offer a favorable trade-off:
  - Required investments in ISAC functionalities vs. potential revenues/savings from the services
- Cooperation within the ecosystem will be required

Example use case – traffic control in rural areas

- Traffic lights are too expensive
- The wide area coverage of the mobile network might enable a cost-efficient ISAC based solution
- A viable business case requires use of sub-6GHz spectrum

Example use case - ISAC on demand

- ISAC services might be required in specific locations for a certain period rather than ubiquitous and anytime.
- Examples can e.g. be found within the public protection and disaster relief (PPDR) and agriculture sectors.
- High accuracy positioning is often an important service for these use cases.

Storage of radio sensing data

Incident from January 17th 2022

Source: www.youtube.com

- There are several use cases where the need for radio sensing data is not known in advance
- Storage of radio sensing data enables services that can be of great value for the society and have a large commercial potential
- Storing large amounts of radio sensing data enabling object detection and localization is a big challenge
  - The topic deserves more attention in the research community

Summary and conclusions

- Operators need new “beyond connectivity” services to improve return on invested capital
- ISAC represents a way for mobile operators to exploit their networks more efficiently
- ISAC services cannot be offered “over-the-top”, which reduces risks for mobile operators
- ISAC services using sub-6GHz spectrum would be very interesting from a business point of view
  - More research is needed to determine what can be achieved on lower frequencies
- Efficient ways to store radio sensing data would enable use cases with high commercial potential and great value for the society
  - More research is needed

Thank You!