NCORS Open Data Ecosystem: beyond open data!

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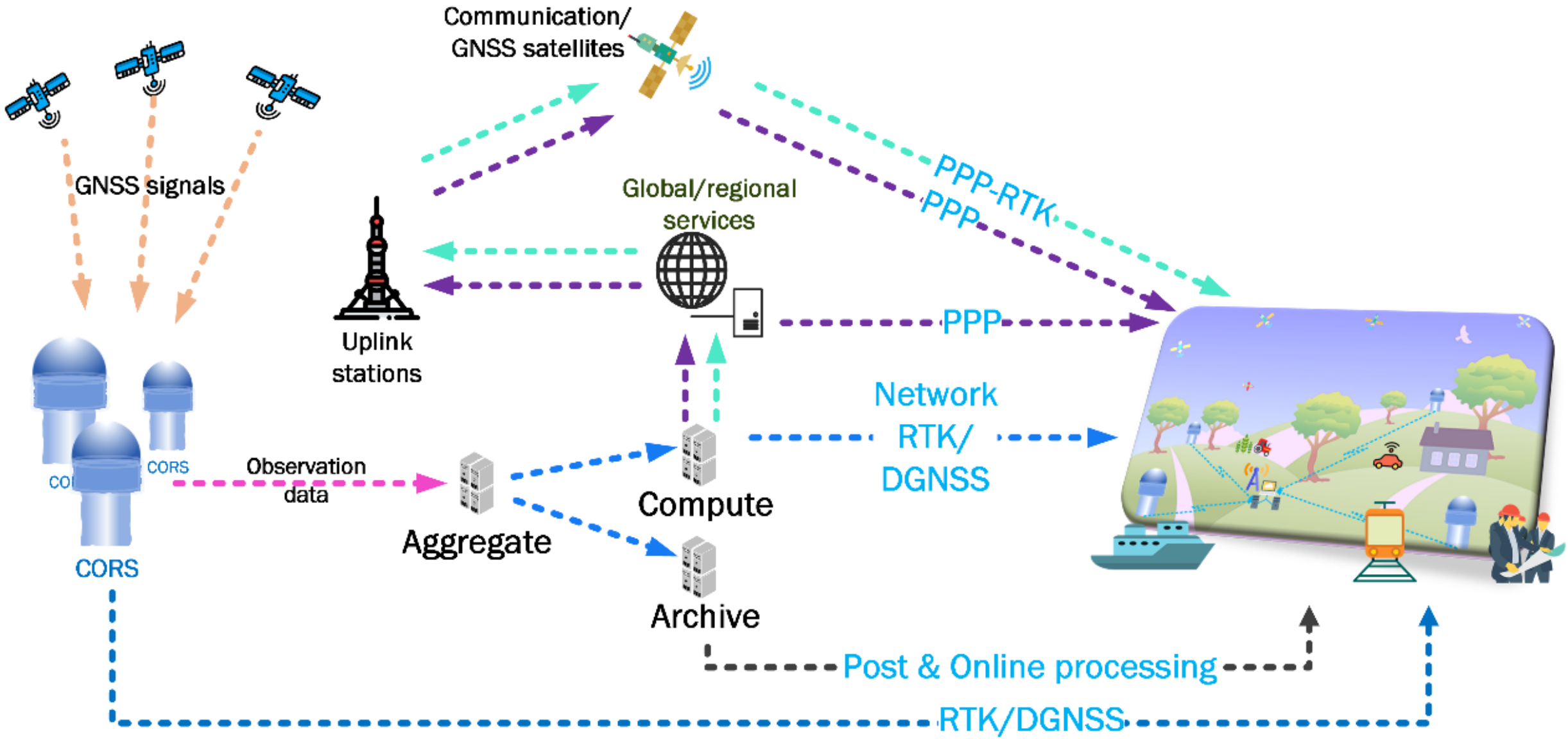
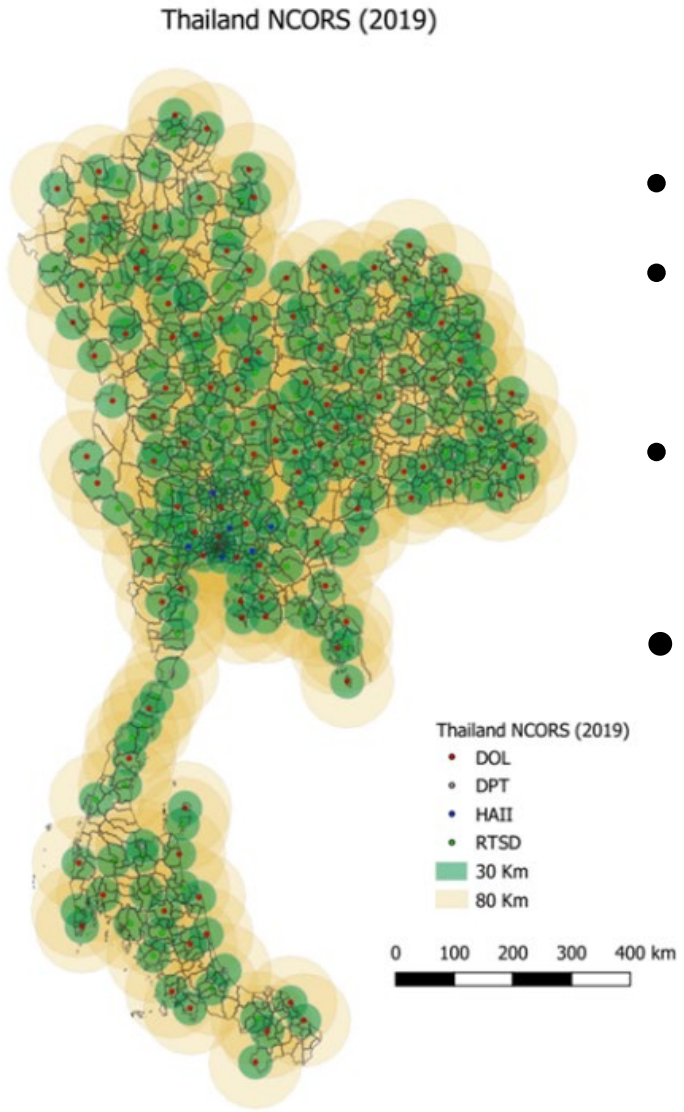
National Continuously Operating Reference Station: NCORS

NCORS data


Communication/
GNSS satellites
GNSS signals
Global/regional
services
PPP-RTK
PPP
Uplink
stations
PPP
Network
RTK/
DGNSS
CORS
Observation
data
Compute
Aggregate
Archive
Post & Online processing
RTK/DGNSS

NCORS in Thailand

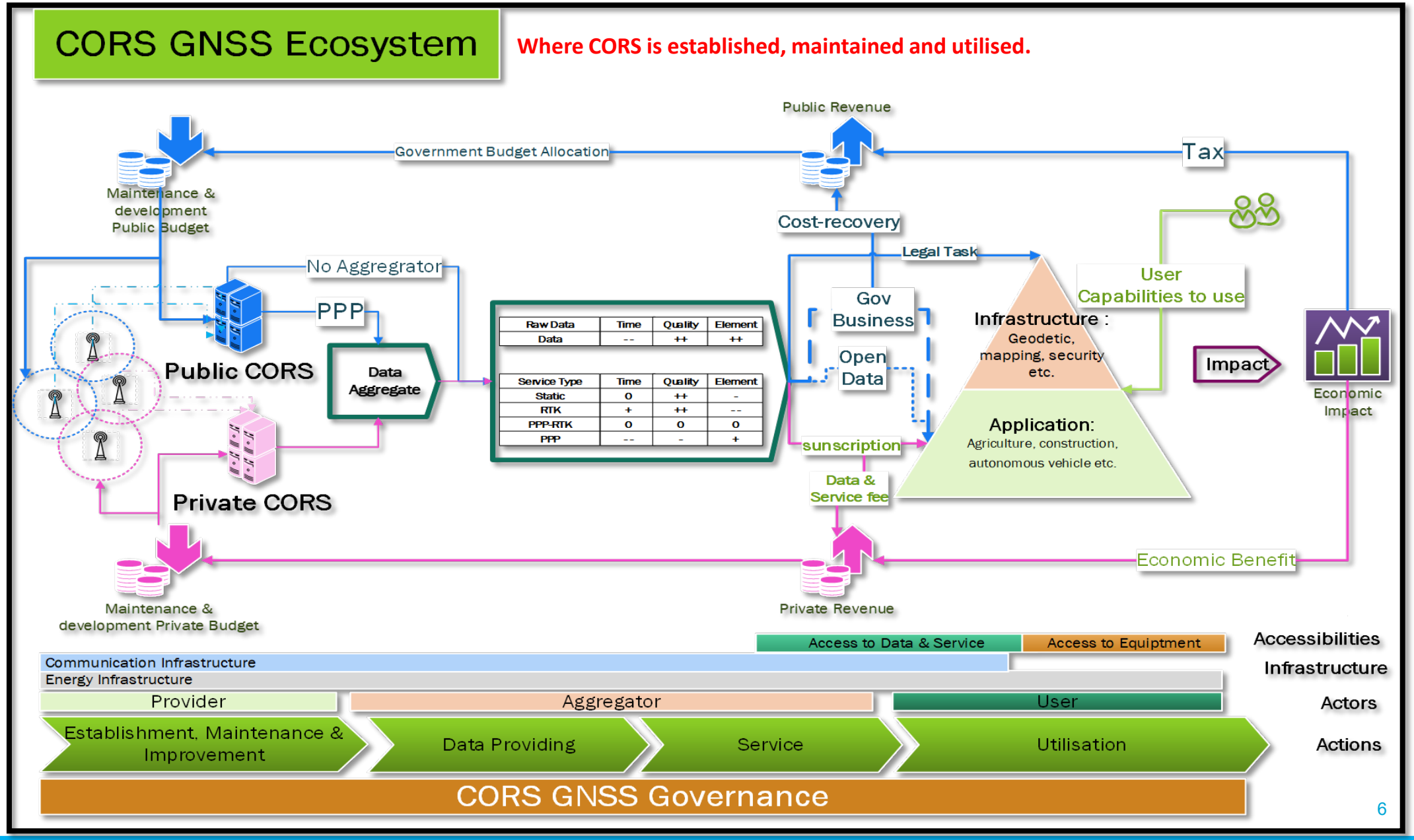


- Thailand's NCORS faces a challenge in NCORS data use.
- A free-of-charge policy (Open Data: OD) has been applied to encourage the use.
- The use has been among government agencies, not many other potential sectors.
- **How to optimise NCORS data use?**

This research

1. Formulate a conceptual framework
2. Identify & Investigate the problems
3. Examine policies

Original view of an NCORS data ecosystem

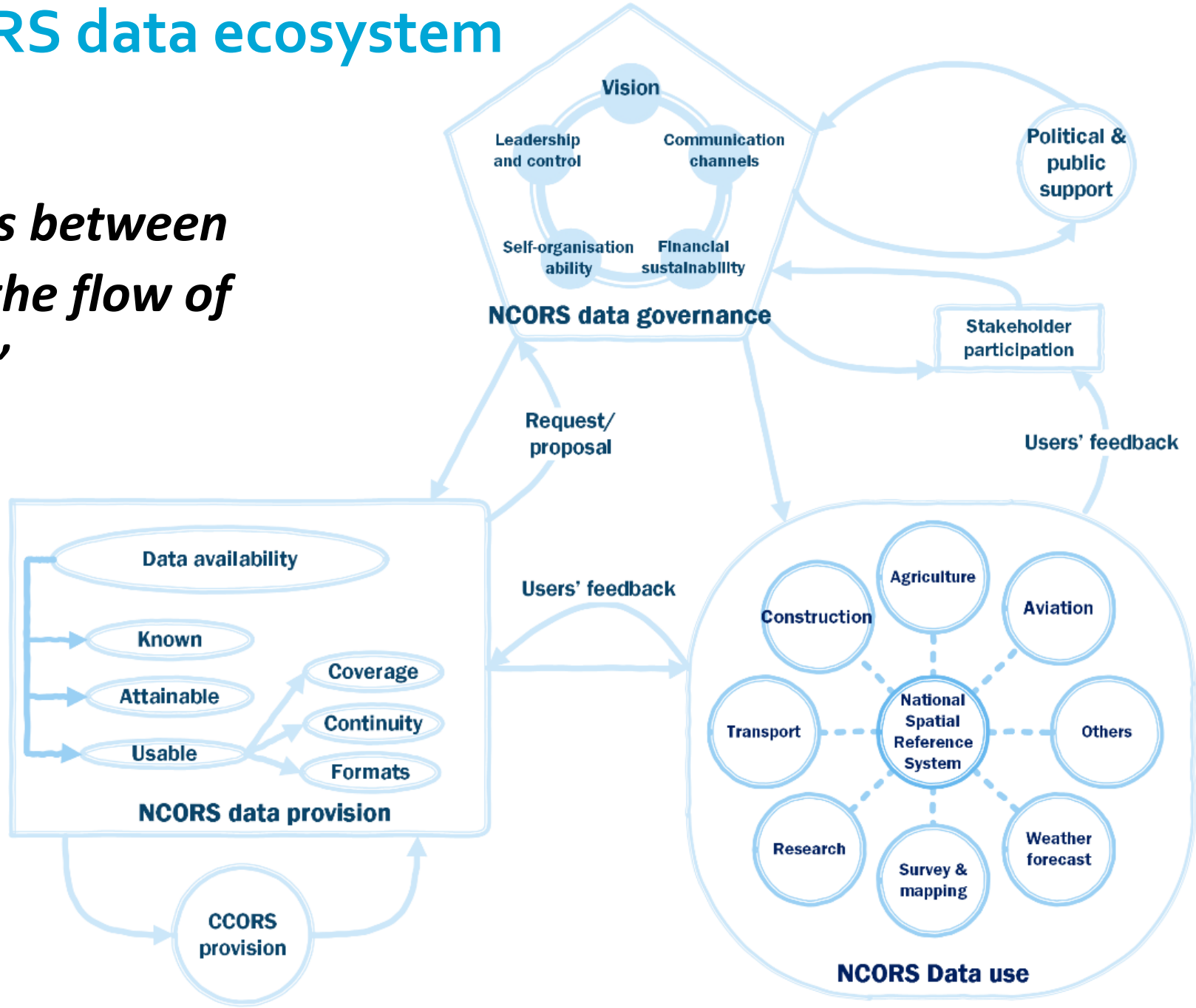


What is an NCORS data ecosystem?

*"a system where **technical and institutional elements** at the national level **coexist and interact** to collectively facilitate the flow of different NCORS data forms from providers to users"*

Mechanisms in an NCORS data ecosystem

"Collective interactions between elements to facilitate the flow of NCORS data"



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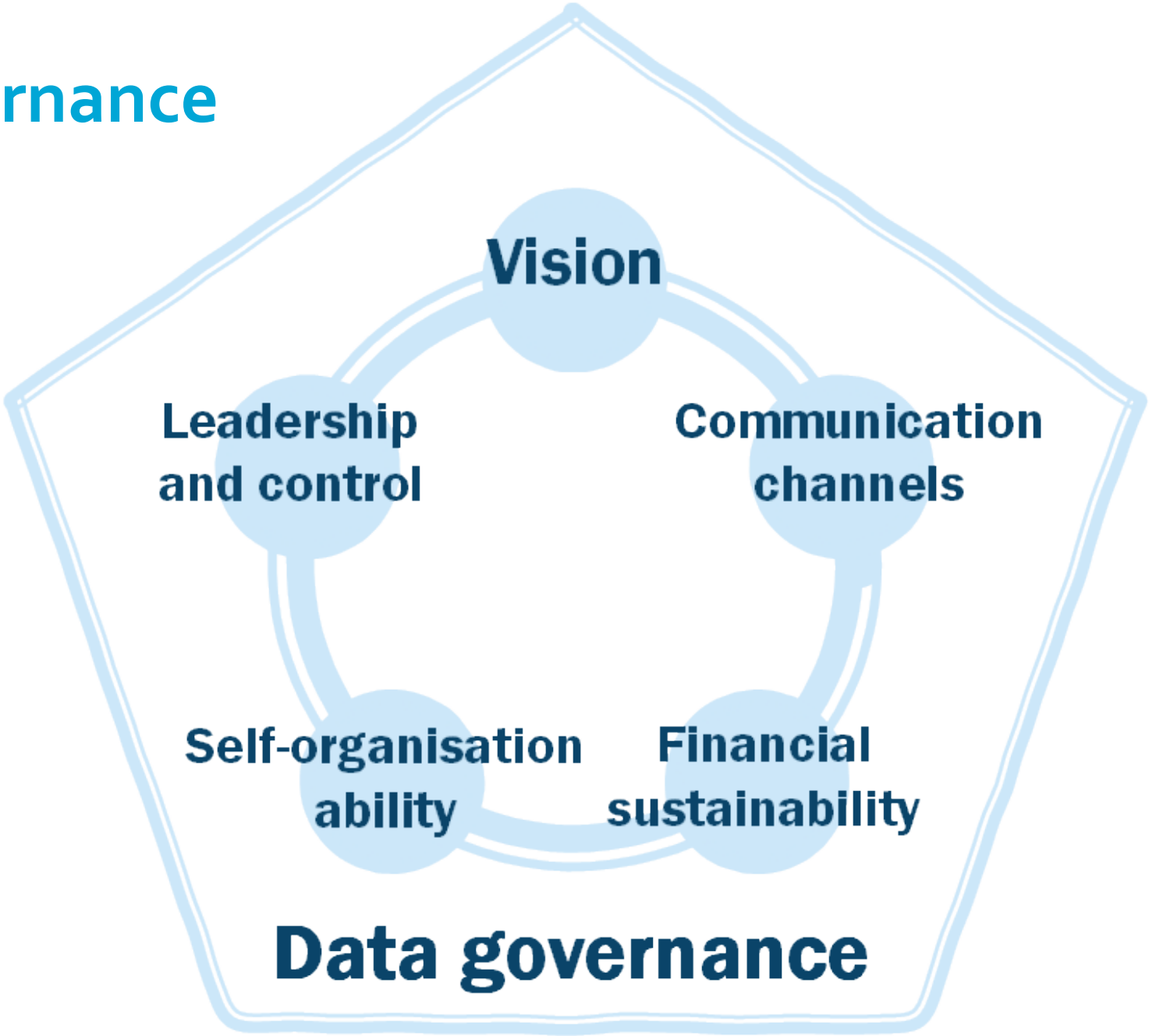
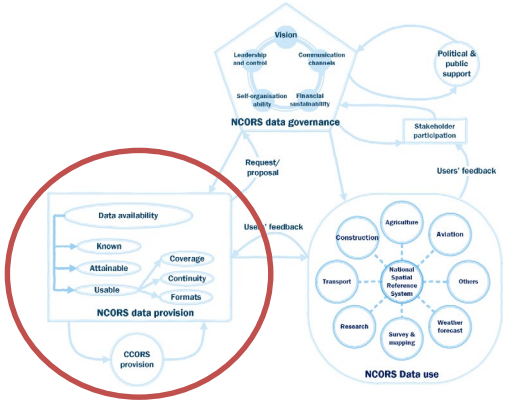
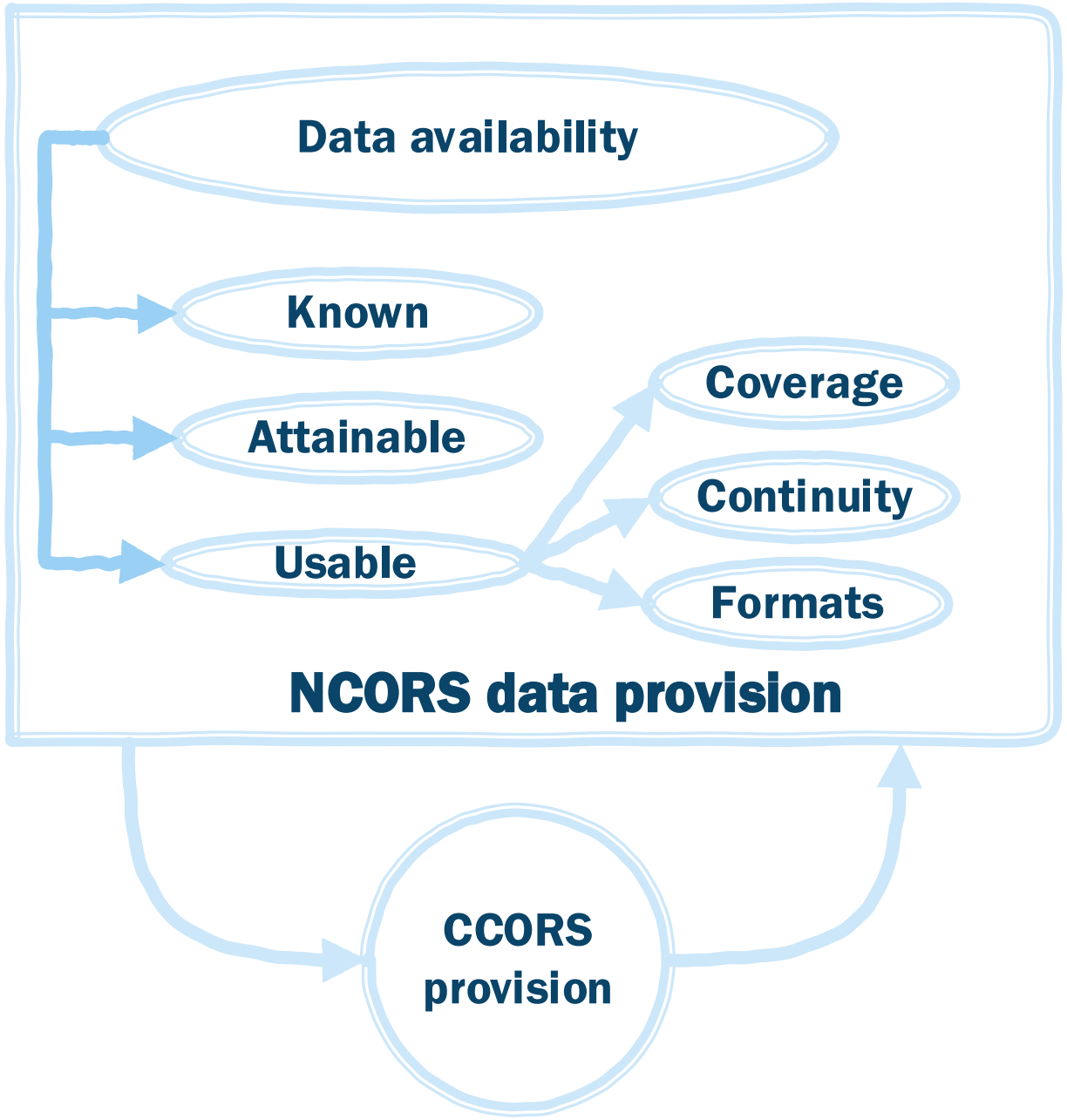
NCORS data governance

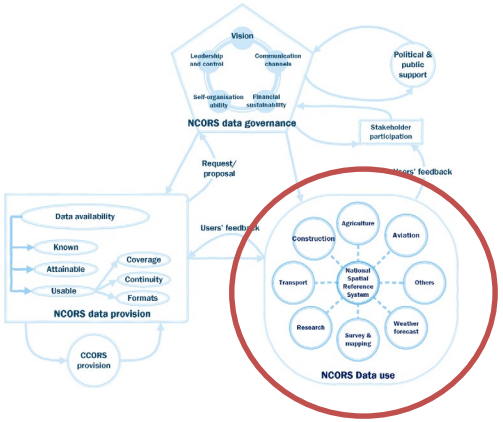


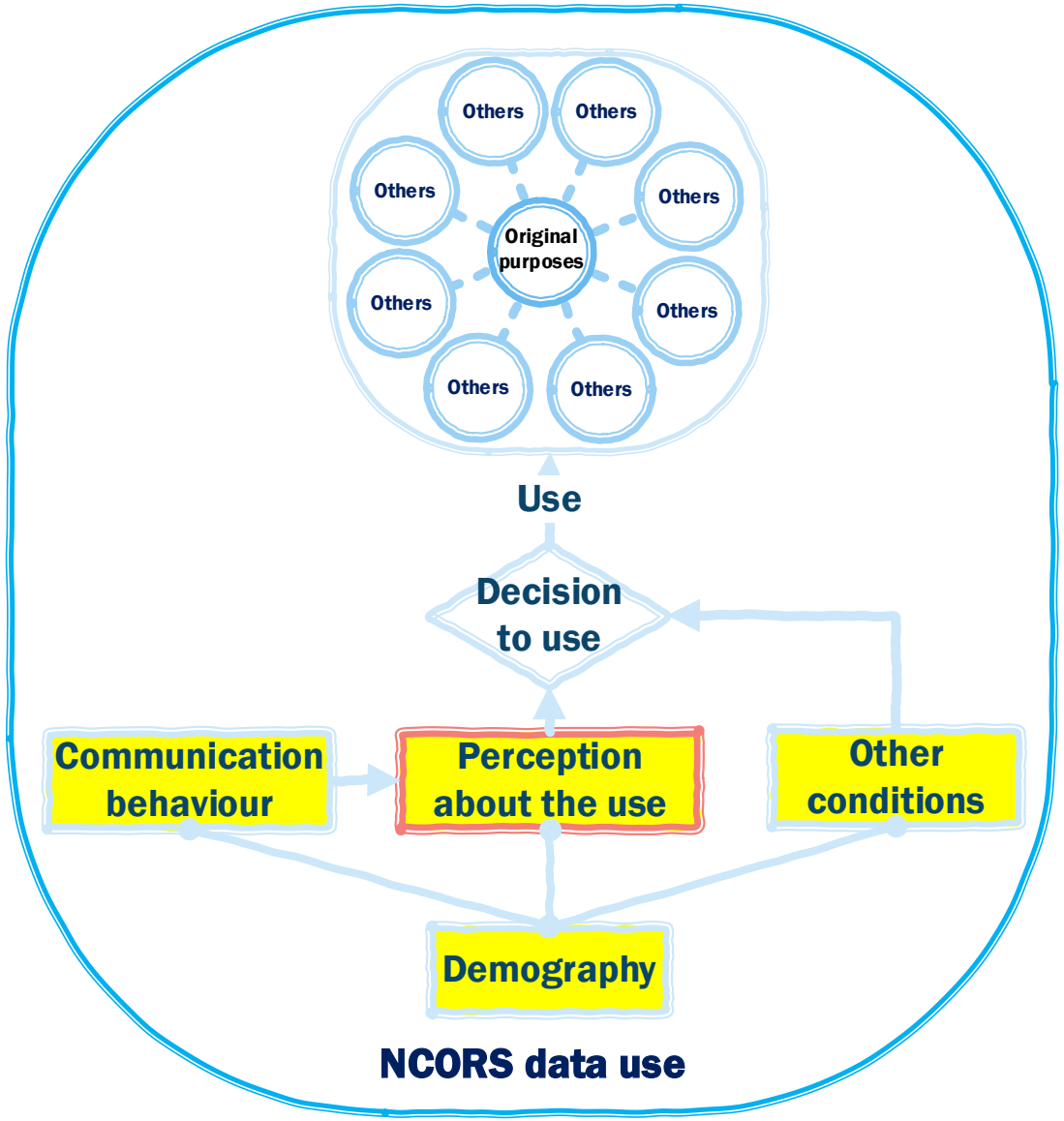
NCORS data provision





NCORS data use





User characteristics

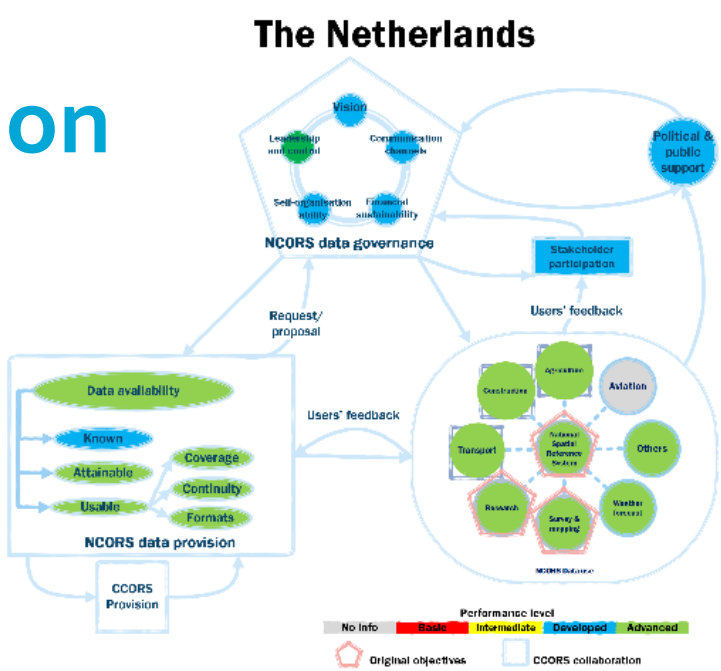
TAM

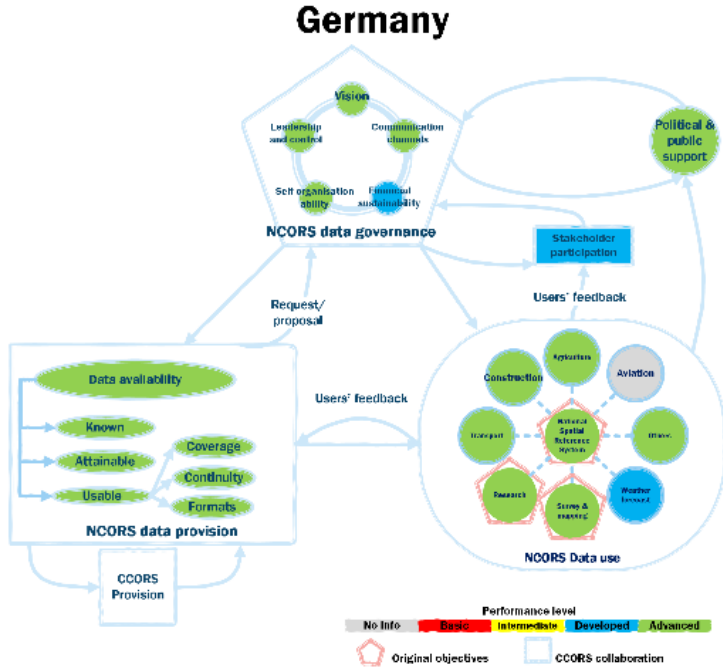
Overall data use mechanism

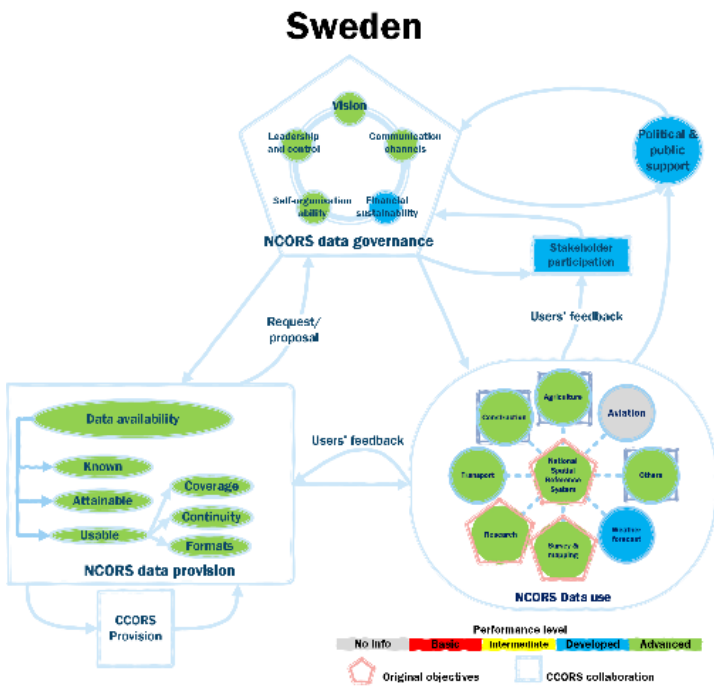
National CORS exploration

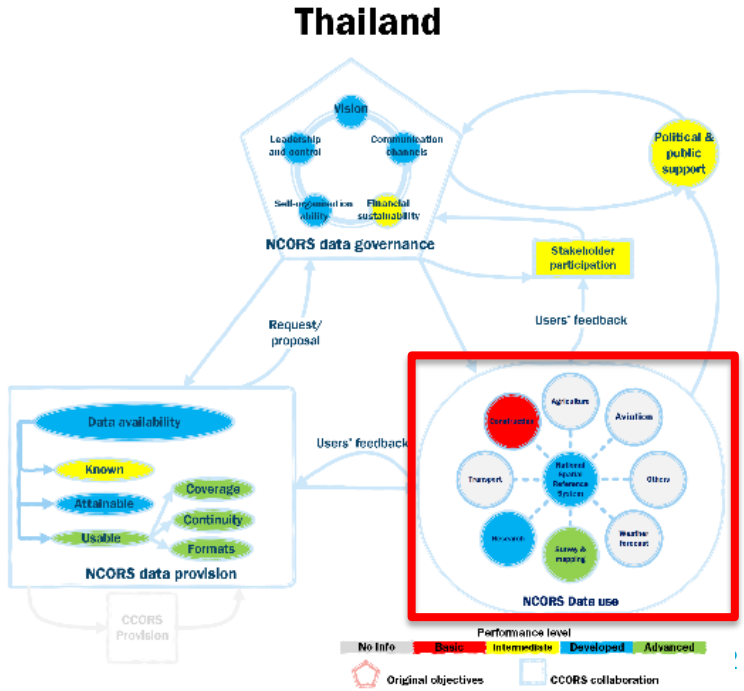
- **The availability of open NCORS data does not assure optimal use.**

- Users are the key actors in the NCORS data use.
  - for Thailand, user characteristics should be further investigated.









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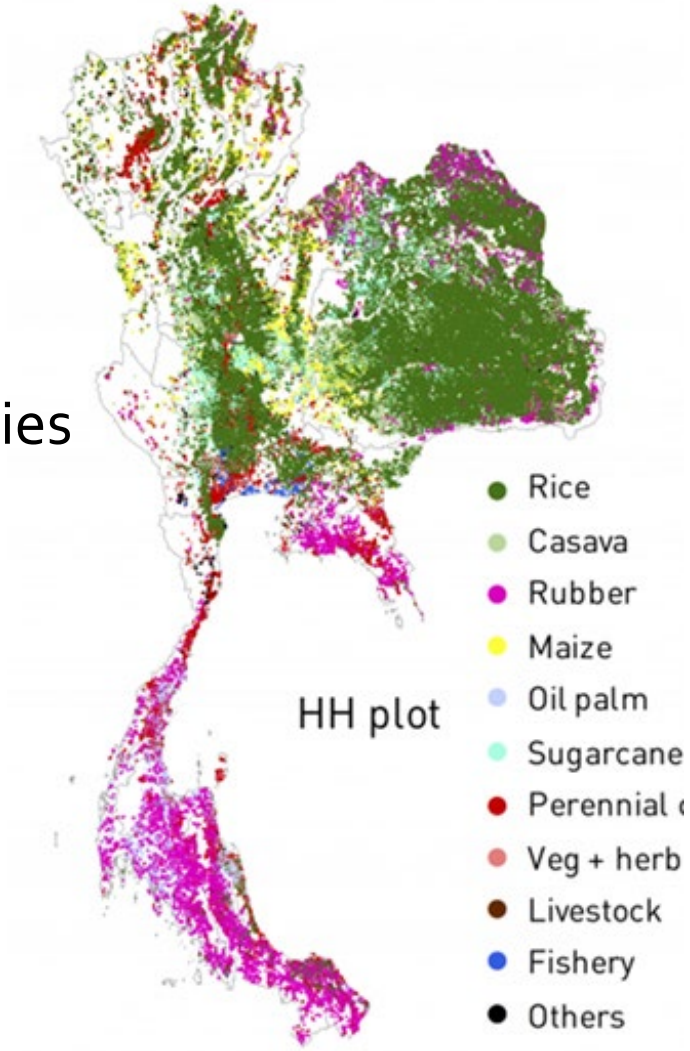
User and NCORS data use: Thailand's rice farming

- Rice farming
  - A significant socio-economic role in Thailand
  - challenges in labour shortage and ageing farmers
  - NCORS technology has been the solution in many countries
  - **But not Thailand, why?**
- User & Stakeholder investigation
  - Farmers (Survey & Interview)
  - Machine companies (Survey & Interview)



Traditional rice farming

Relying on human labours
Low productivity!

NCORS data use in rice farming

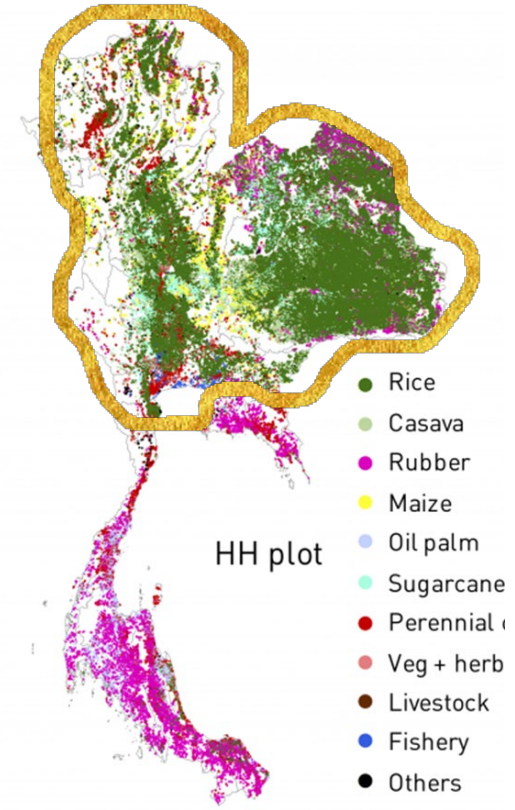
(Srisangdao)

Autonomous/ semi-autonomous / precise

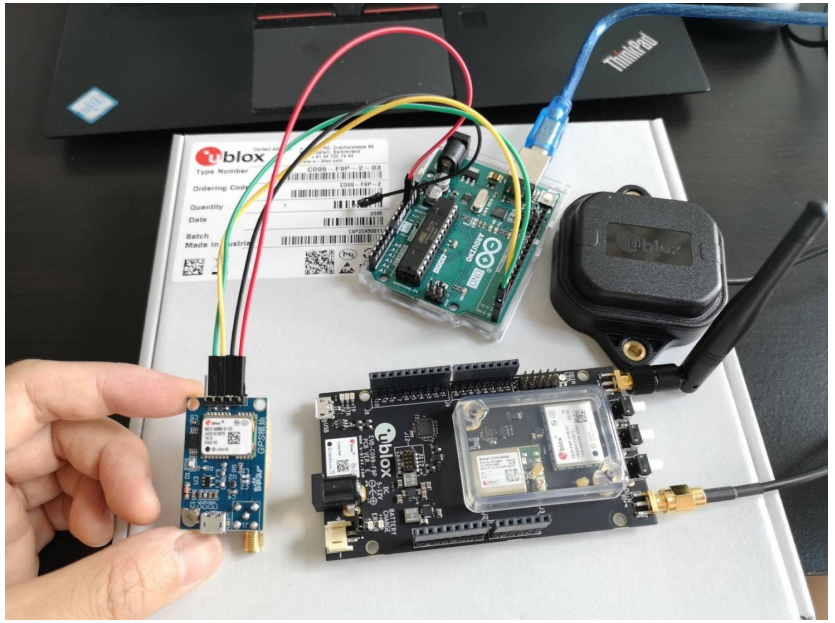
- **Rice seeding, harvesting,**
- **Farm management (levelling, mapping)**

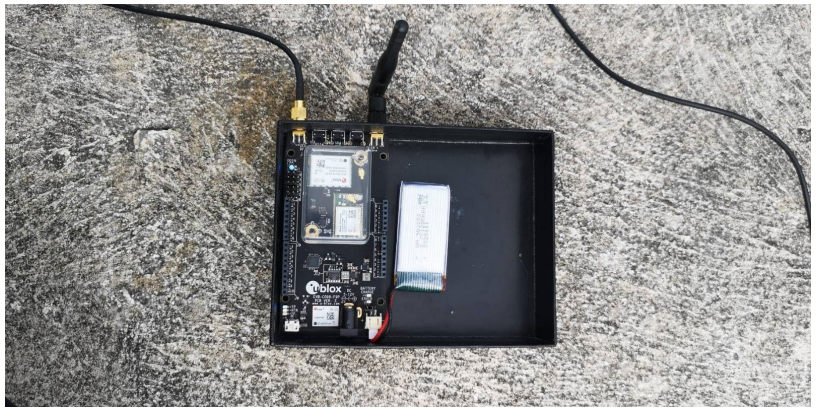
Understanding farmers as users: user survey

- 50% of 600 online forms were completed
- 80% of 95 paper forms were completed
- April – May 2021
- Total 421
  - 192 co-farm leaders
  - 229 individual farmers

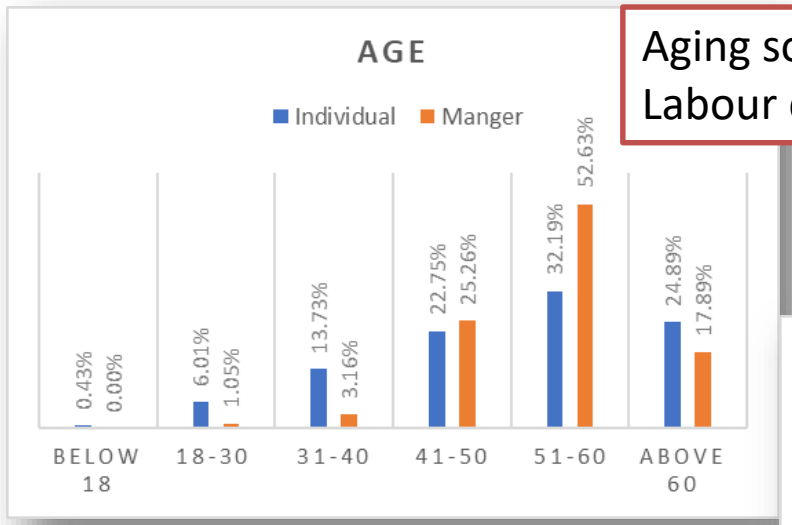


Field observation

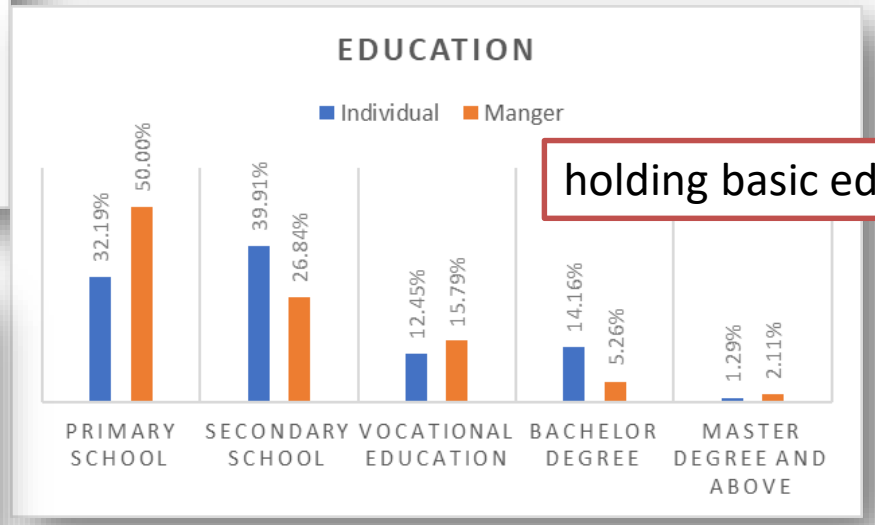




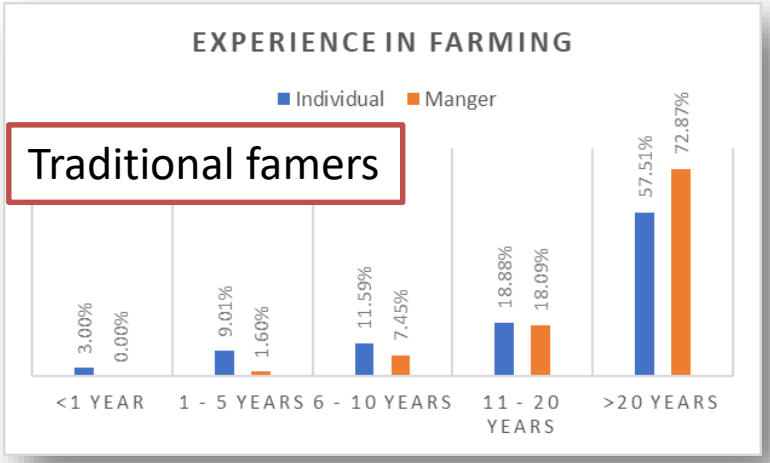
Farmers' demography



Aging society
Labour demand

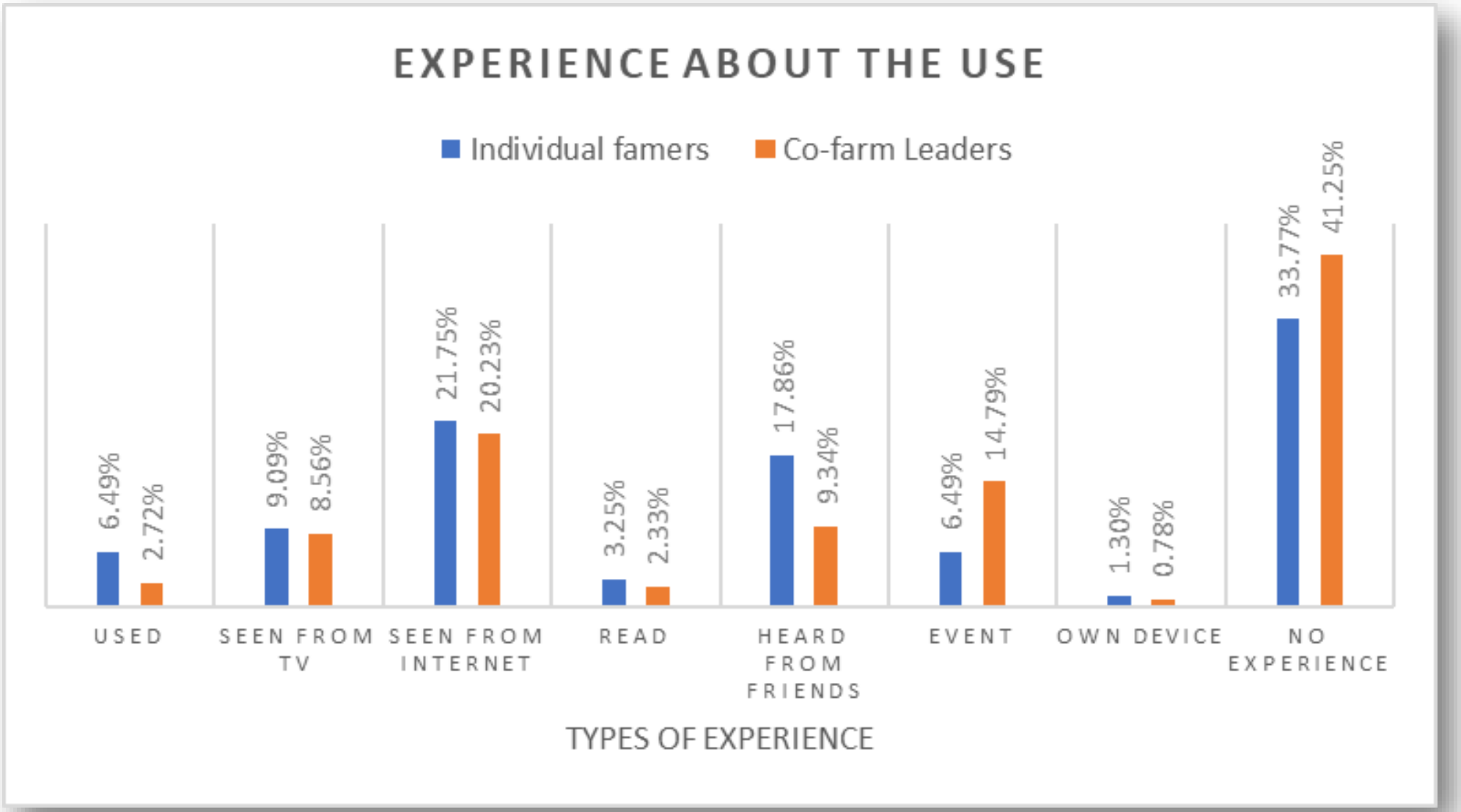


holding basic education



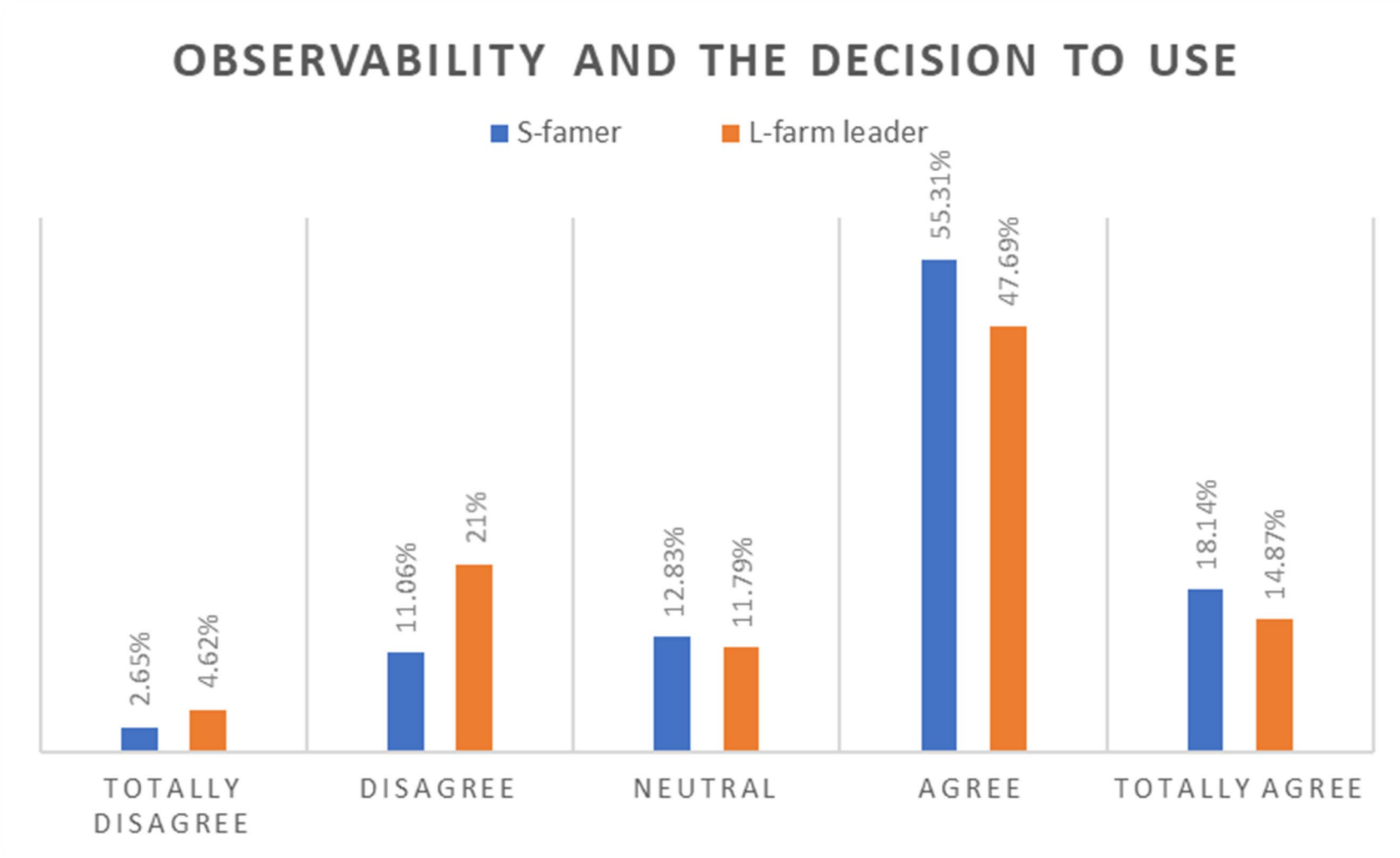
Traditional famers

They need the autonomous/precise positioning technology from NCORS

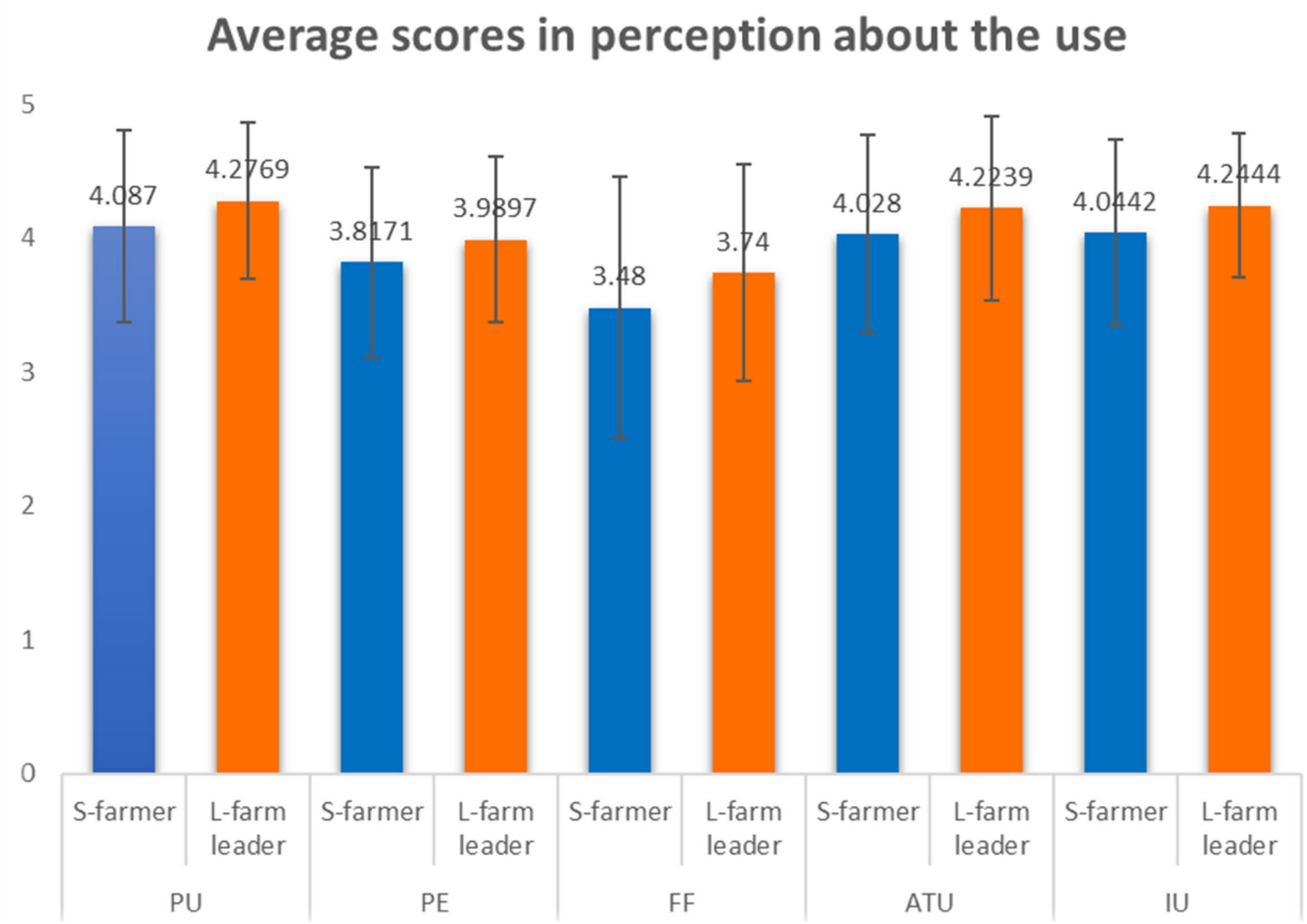


- Most farmers had no experience about the NCORS technology
- **Knowledge must be promoted**

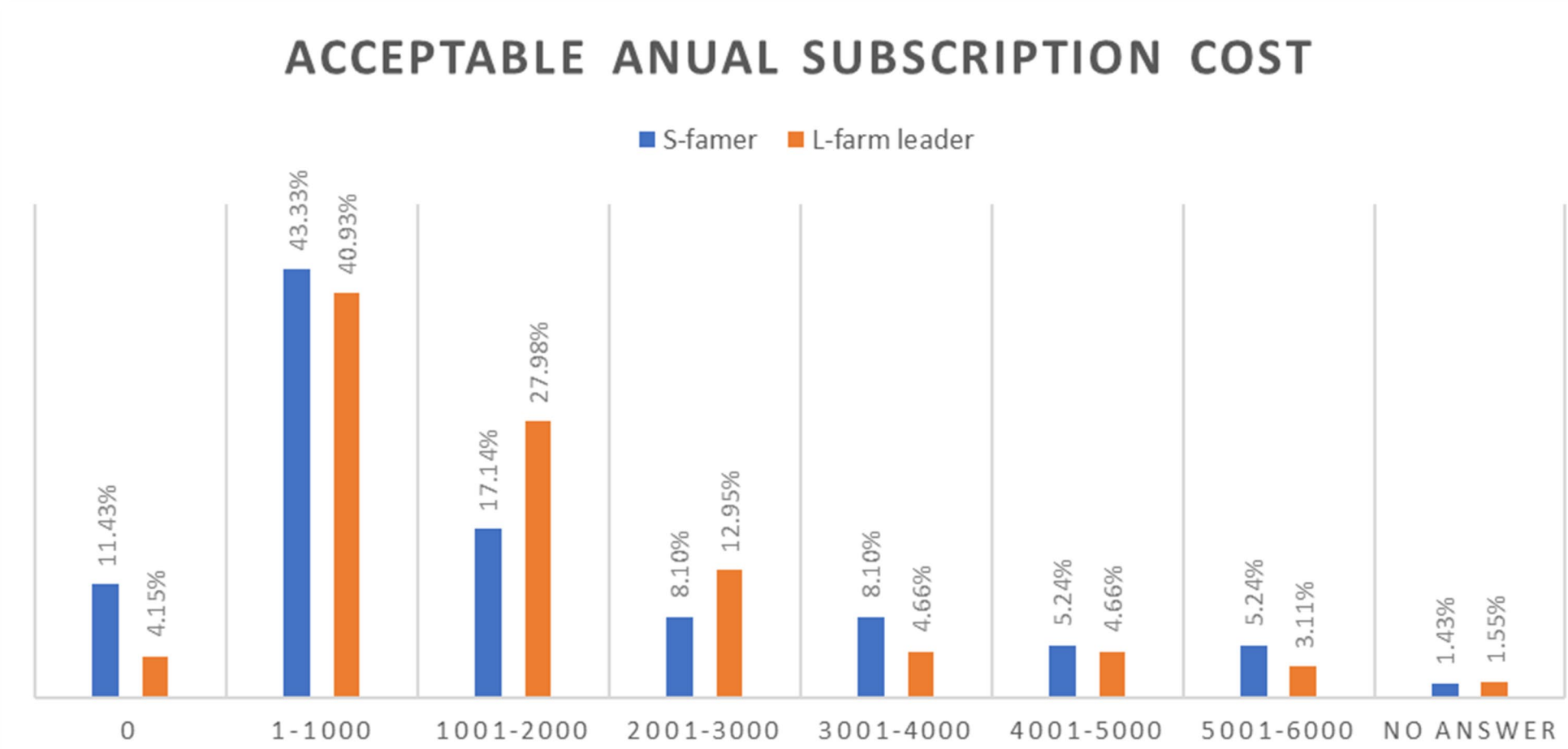
- Most farmers require to see the actual NCORS use to make decisions
- **Observability is necessary**



- They want to use NCORS technology
- **But cannot find the technology in the market**



- Most farmers can pay the NCORS data cost
- **But Open Data is preferred**



Why is the technology not available?

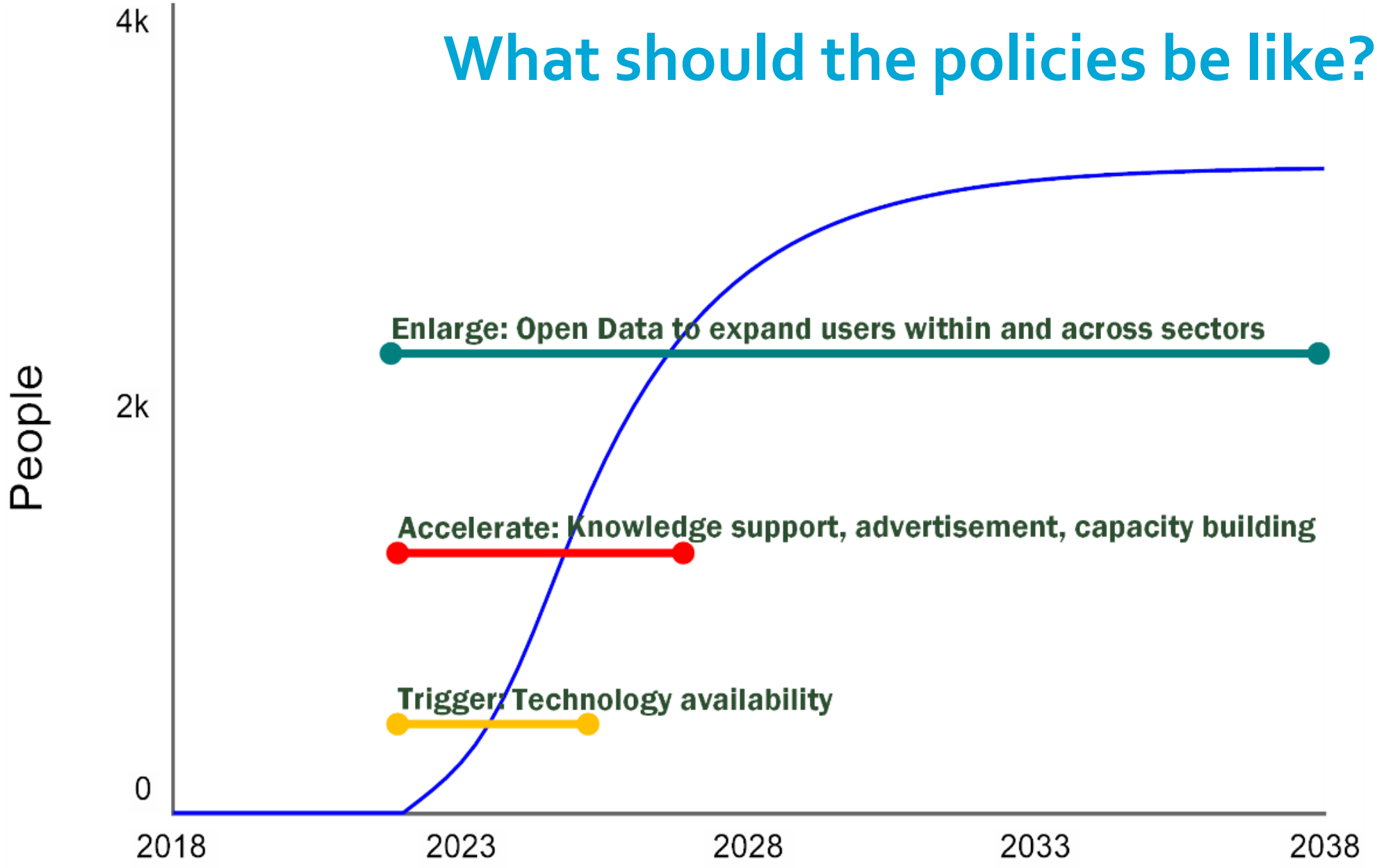
Agriculture machine companies (technology providers)

- reluctant to introduce the technology to the market
  - doubt in the NCORS data service reliability
  - unsured the farmers' intention to use
  - insufficient knowledge and human resources to service

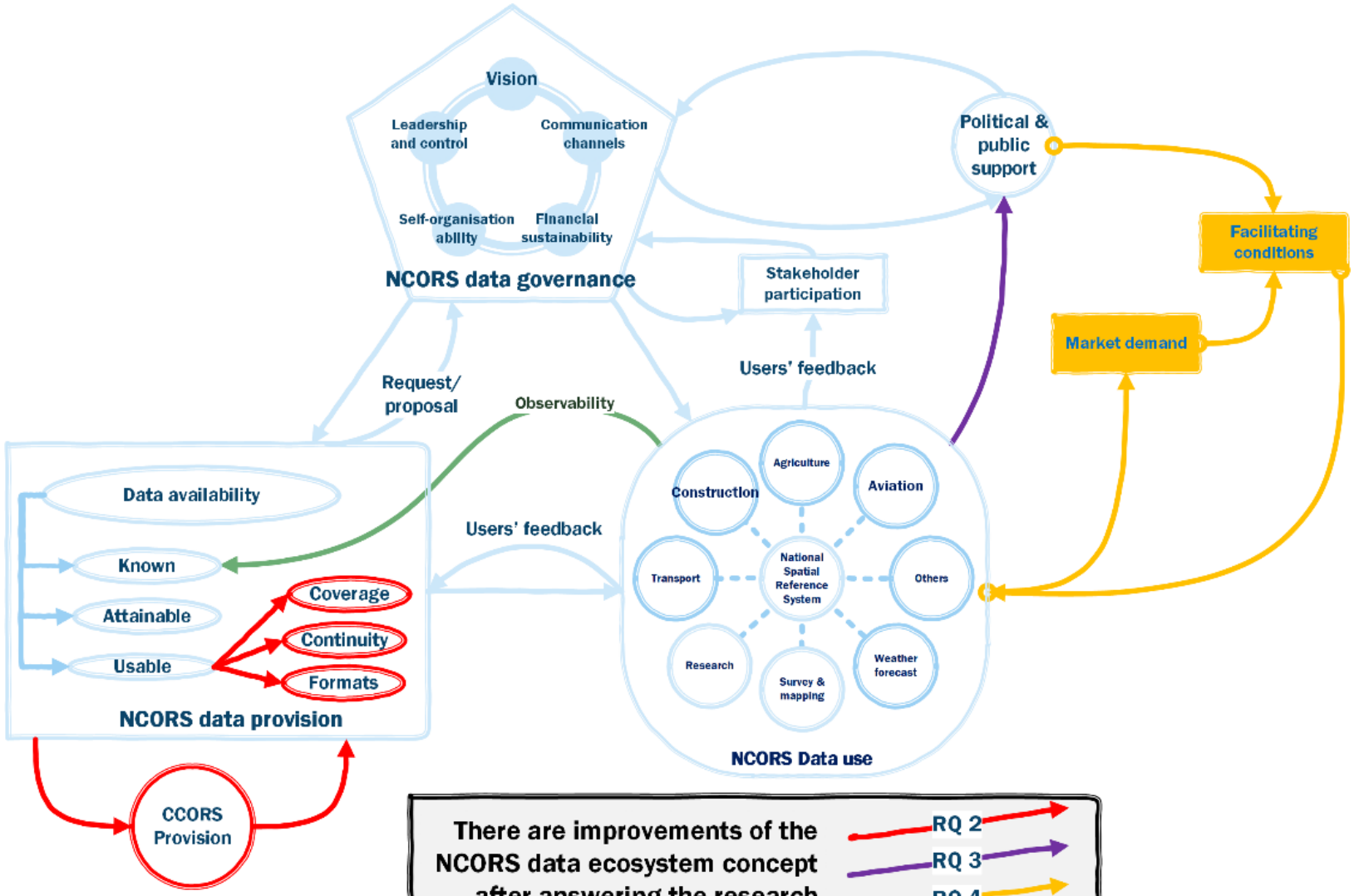
From the investigation

- Farmers are ready to use NCORS relevant technology**, but cannot find the equipment in the market**
- **Areas for improvement**
  - **NCORS technology availability in the mass market**
  - **NCORS technology knowledge for potential users**
  - **NCORS data cost**

What should the policies be like?



It is beyond an Open Data NCORS ecosystem!



Practical relevancies of the performed research

1. Not only making data available, but **empowering users** to use NCORS data
2. Strategic actions must be built
   - **Active role**: machine company engagement
   - **Groundswell of support**: raising political and public awareness
3. All these aspects must be with the awareness that all policies and efforts **take time** to achieve their goals

Future research directions

- To apply the NCORS data ecosystem concept to investigate other NCORSs or adapted to different data types
- For NCORS in Thailand, additional research to better understand and improve the supporting conditions to guarantee the success of NCORS data use

Thank you for your attention,
questions are welcome

NCORS Open Data Ecosystem: beyond open data!

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