



SNS-OPS Survey Results on Technical, Vision and Market aspects of Phase 2 SNS Projects

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27th June 2024

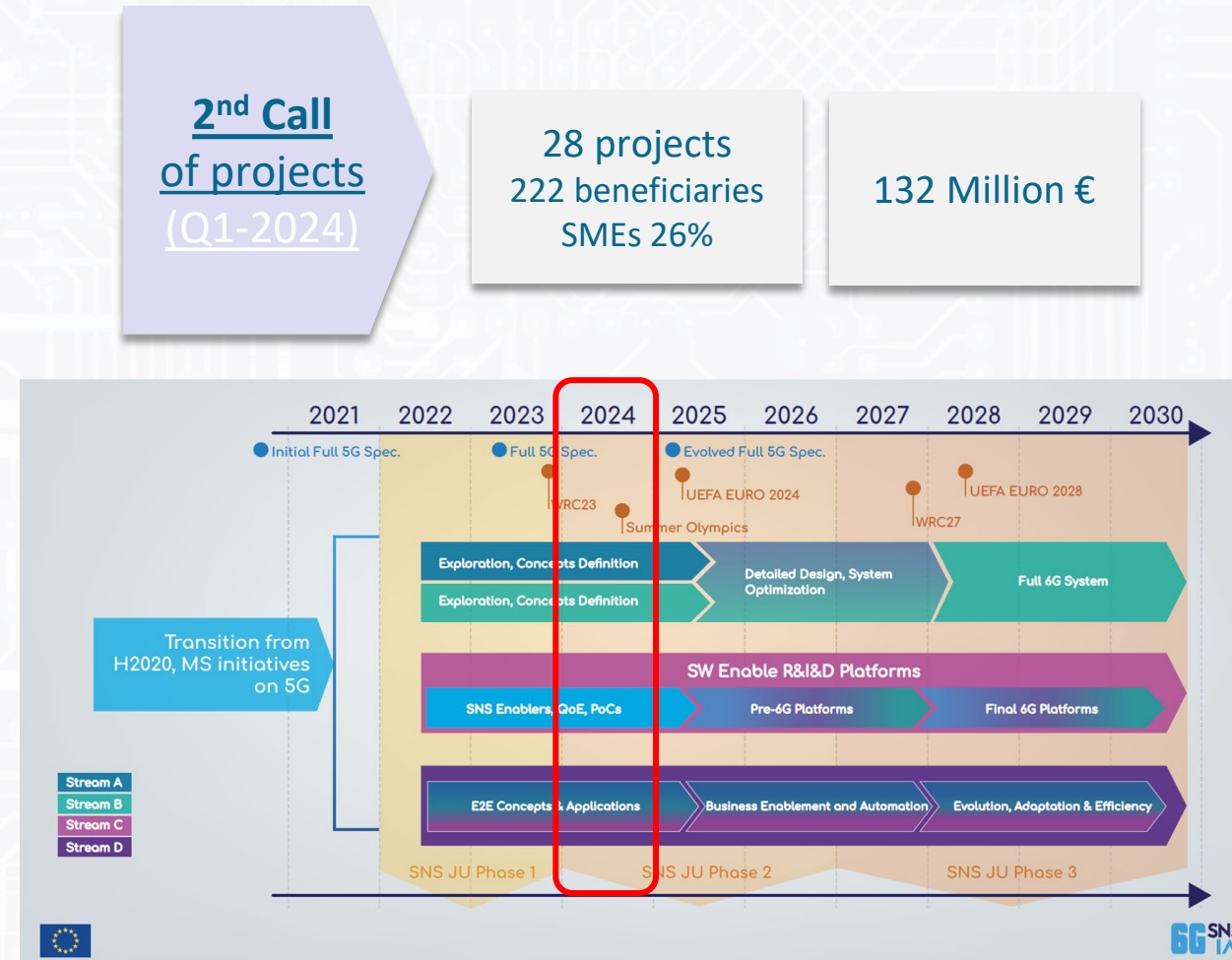




INTRODUCTION

Welcome

- **Welcome** to the SNS OPS Webinar on the **Technical, Vision & Market aspects of Call 2 SNS Projects**
- After the kick-off of the SNS journey with 35 projects in Q1 2023 another **28 projects commenced in Q1 2024** within the context of Phase 2 (Call 2) of the SNS-JU
- All projects addressing the challenges & topics mentioned in the **SNS Work Programme 2023**
- Important to get a more **comprehensive view of their work & goals**, after they have had a chance to consolidate their approach.



- A questionnaire was created by SNS OPS project and addressed to the 28 SNS R&I call 2 projects, as part of the **SNS Monitoring & Analysis Framework** (*SNS OPS Deliverables D1.1, D1.2*)
- The goal of the questionnaire is to get a better understanding of the work planned to be performed in each of the projects, the challenges being addressed and the expected outcomes.
- The questionnaire consists of three sections, i) **Technical** section (11 questions), ii) **Vision** section (6 questions) and iii) **Market** section (9 questions).
- All 28 projects provided their answers in the period February-April 2024
- The key insights extracted from the project answers are provided here.
 - Cross-comparison with Call 1 (2023 edition) results & aggregate view (Call 1 + Call 2) also provided
- The questionnaire will be re-issued on an annual basis addressing all active SNS JU projects.
- **Additional Questionnaire issued to Call 1 projects** to document their accomplishments / achievements during 2023
 - 15 questions attempting to quantify the impact achieved by SNS projects
- **Q&A:** please ask your questions in the chat-box, identifying the question and speaker addressed



TECHNICAL SECTION

Technical Section



Key Performance Indicators (KPIs)

B5G/6G Technological Enablers

Network Aspects Addressed

Verticals

Use Cases & Applications

Use of AI/ML

Standardisation Targets

Validation Methodologies

End User Equipment

Trials & Pilots (Planning)

Open Source Solutions

Technical, T1:

Please indicate which of the following Specific Objectives (SO), as defined in ANNEX II of the 2023 SNS Work Programme, will be addressed as a Primary or Secondary objective from your project?



- Projects' input was matched to the Specific Objectives (SO) of each stream (as defined in the SNS JU R&I WP 2023)
- The SNS projects' technology contributions towards the SOs was categorized into **Primary** & **Secondary**
- Results indicate:
 - **Good coverage** of all SOs of SNS JU WP 2023
 - **Good distribution** between Primary & Secondary objectives in Stream B

Stream B

Stream C

Stream D

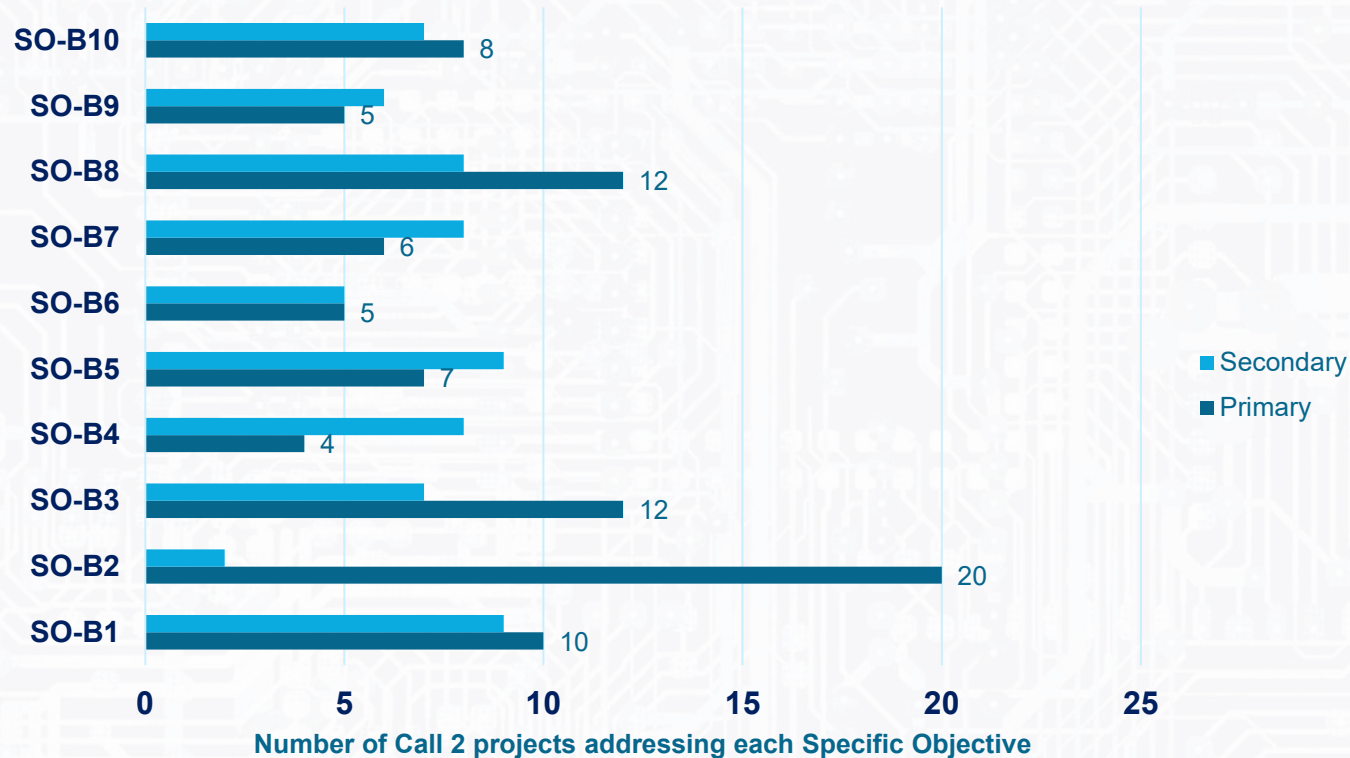
Technical, T1:

Please indicate which of the following Specific Objectives (SO), as defined in ANNEX II of the 2023 SNS Work Programme, will be addressed as a Primary or Secondary objective from your project?



Stream B – Specific Objectives

Specific Objectives (SO) - Stream B



Stream B : 25 call 2 projects

SO-B1: Technologies for validation/feasibility of globally accepted KVI's & KPI's

SO-B2: Key technologies/architectures with high potential for 6G standardisation

SO-B3: Optimised architecture, beyond the 5G Service Based Architecture (SBA)

SO-B4: Zero-touch open end-to-end resource management system

SO-B5: E2E Trustworthy & energy-efficient device, network, and service infrastructures, to deliver critical services in a sustainable manner

SO-B6: Dynamic end-to-end distributed security for connectivity, devices and service infrastructures extending the current set of patchy technologies

SO-B7: Managed spectrum and dynamic spectrum sharing across multiple frequency bands, opening new application scenarios

SO-B8: Foster European capabilities in key technologies and notably AI/ML, software and security enablers, advanced signal processing and microelectronics

SO-B9: Longer-term re-examination of fundamental system features/ functions

SO-B10: International cooperation / consensus on critical technologies

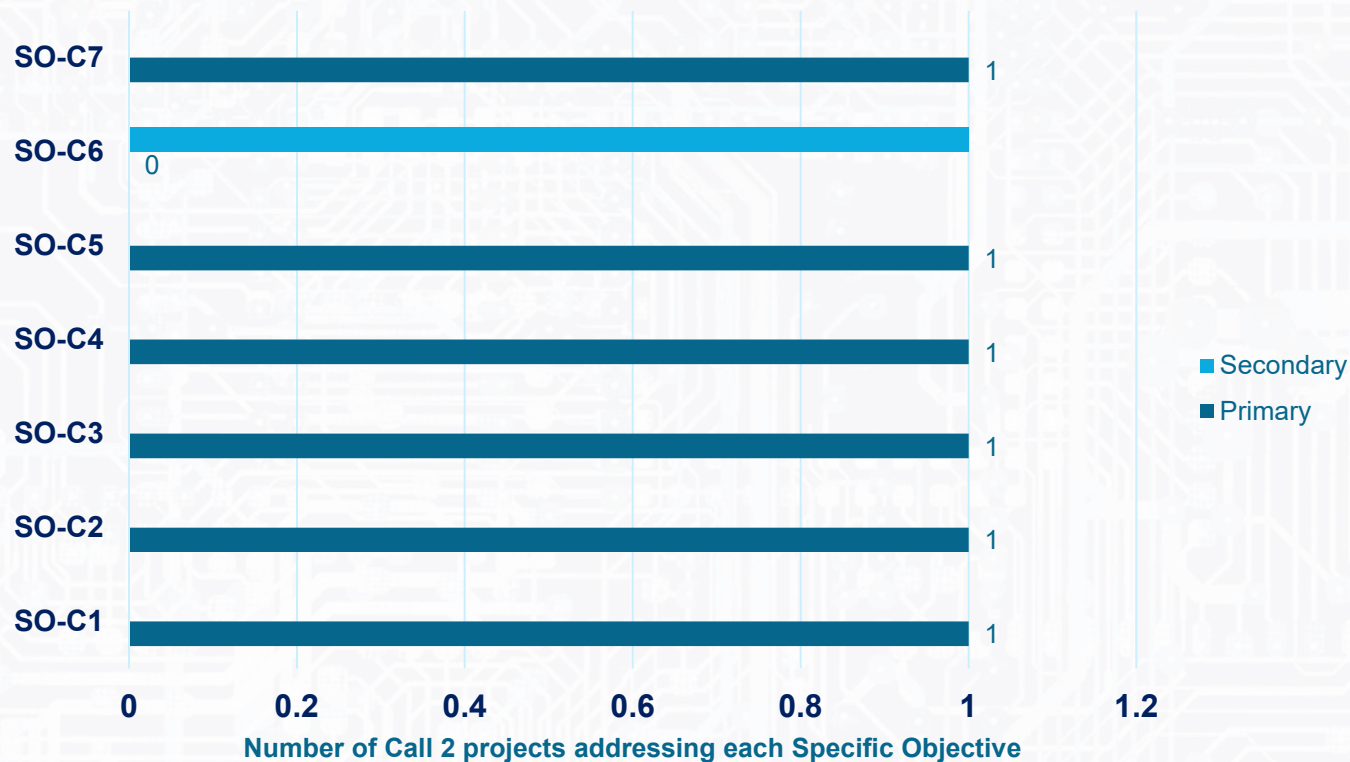
Technical, T1:

Please indicate which of the following Specific Objectives (SO), as defined in ANNEX II of the 2023 SNS Work Programme, will be addressed as a Primary or Secondary objective from your project?



Stream C – Specific Objectives

Specific Objectives (SO) - Stream C



SO-C1: Development of EU wide experimentation platforms that can incorporate various candidate 6G technologies for their further validation

SO-C2: Extend experimentation platforms towards a federated approach

SO-C3: Reusability and evolvability of the experimental platforms over the lifetime of the SNS programme

SO-C4: Accessibility / Openness: Use of the platform in subsequent phases of the SNS by consortium modular implementation methodology and, open-source solutions

SO-C5: Directionality and optimisation of previous and related investments in Europe: 6G experimental platforms piggybacking on previous investments in Europe

SO-C6: Disruption friendly: Experimental facilities capable of hosting upcoming unplanned 6G disruption and hence guarantee their future-proofness

SO-C7: End-to-end: The target experimental facility should be capable of demonstrating E2E service capabilities and include a full value chain

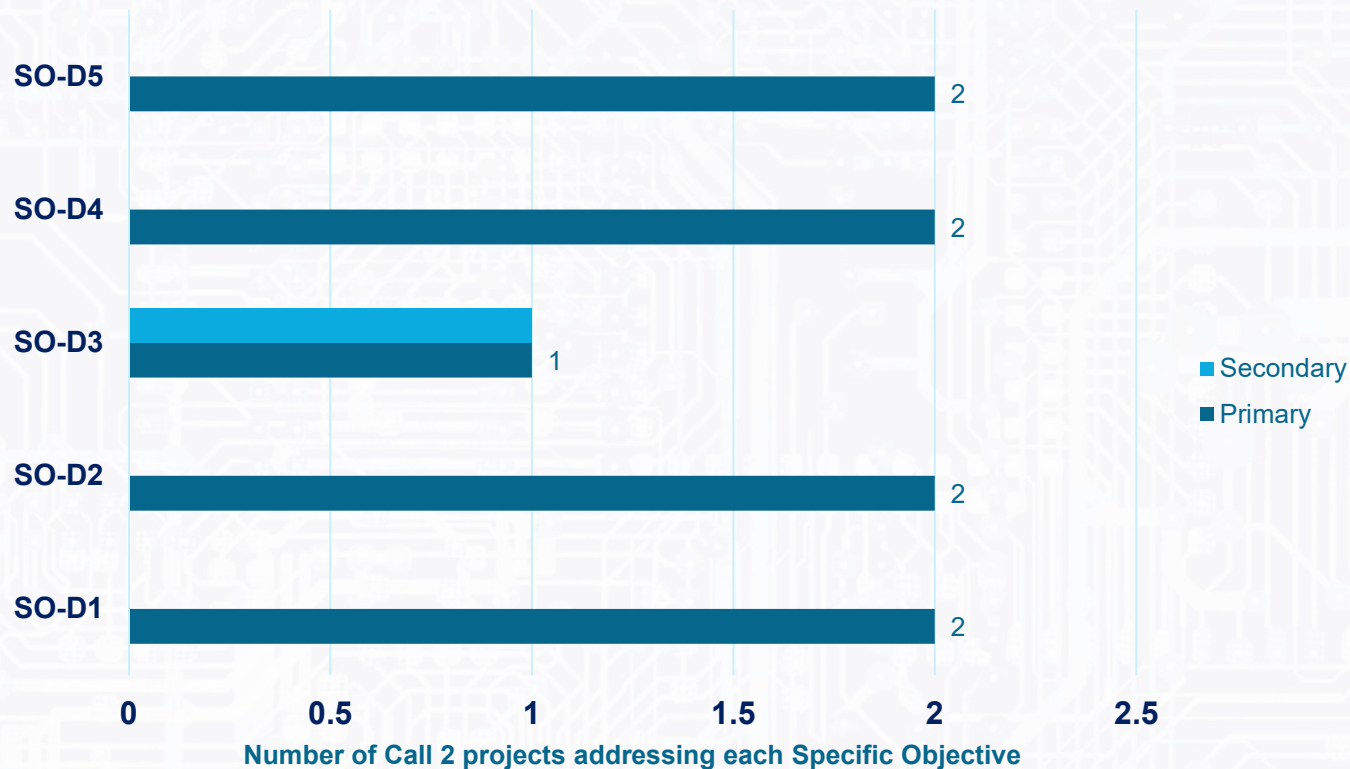
Stream C : 1 call 2 project

Technical, T1:

Please indicate which of the following Specific Objectives (SO), as defined in ANNEX II of the 2023 SNS Work Programme, will be addressed as a Primary or Secondary objective from your project?



Specific Objectives (SO) - Stream D



Stream D: 2 call 2 projects

Stream D – Specific Objectives

SO-D1: Validation of SNS KVIs and KPIs in the context of very advanced digital use cases implemented through Large-Scale Trials and Pilots (LST&P)

SO-D2: Identification of use case specific KVIs and KPIs and how they may be matched by SNS platform KVIs and KPIs

SO-D3: Structured feedback loop from vertical users towards SNS stakeholders, in view of ensuring the best match between 5G Advanced / 6G systems capabilities and users

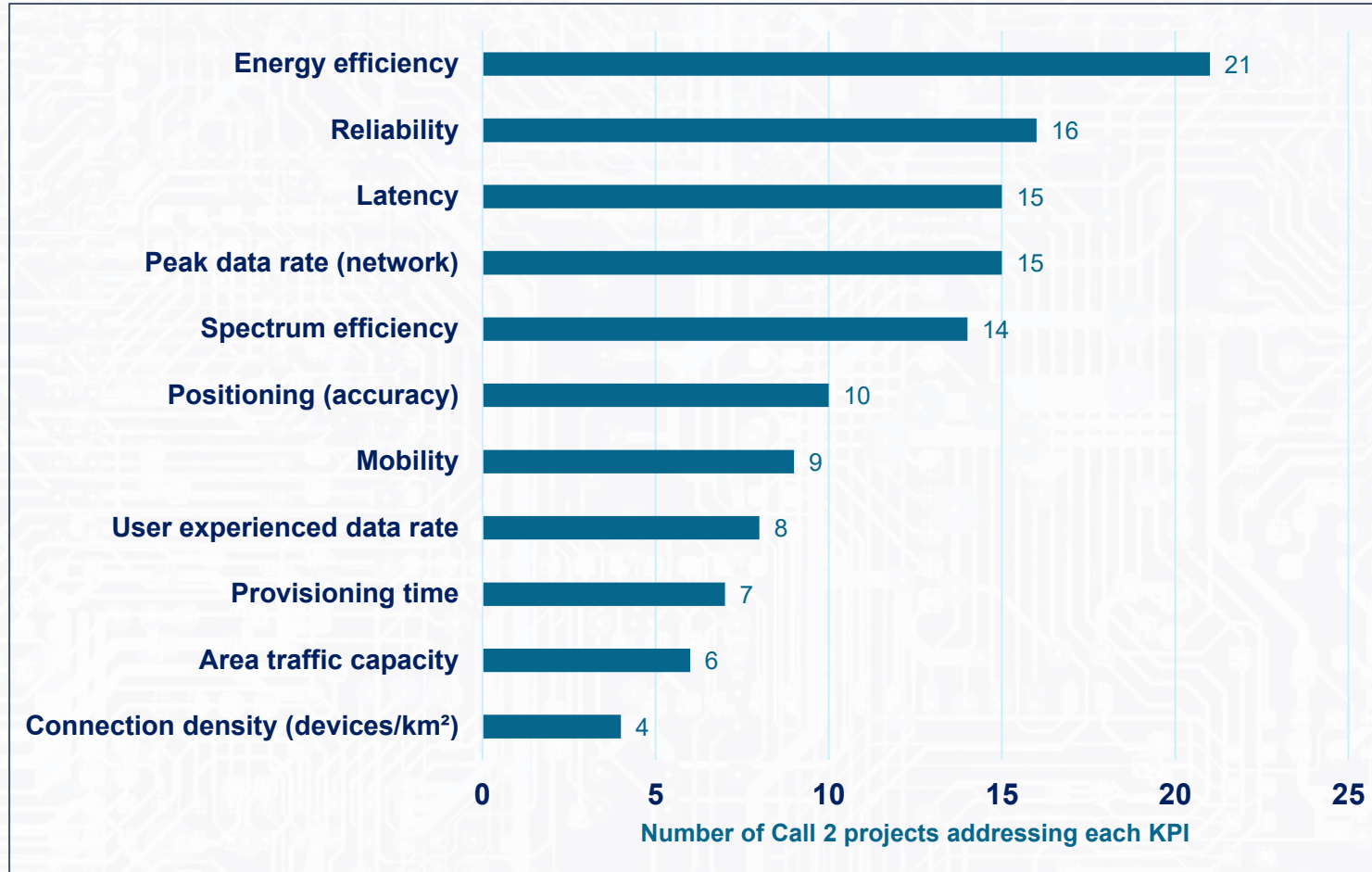
SO-D4: Integrated validation approach, from 6G platform to use cases, leveraging existing (open) platforms (e.g., developed under Stream C)

SO-D5: Accessibility and openness: The required targeted adaptations of the Stream C infrastructures/platforms as required to support specific Stream D use cases

Technical, T2: Which of the following main KPIs will your project address?



Call 2 (28 projects)

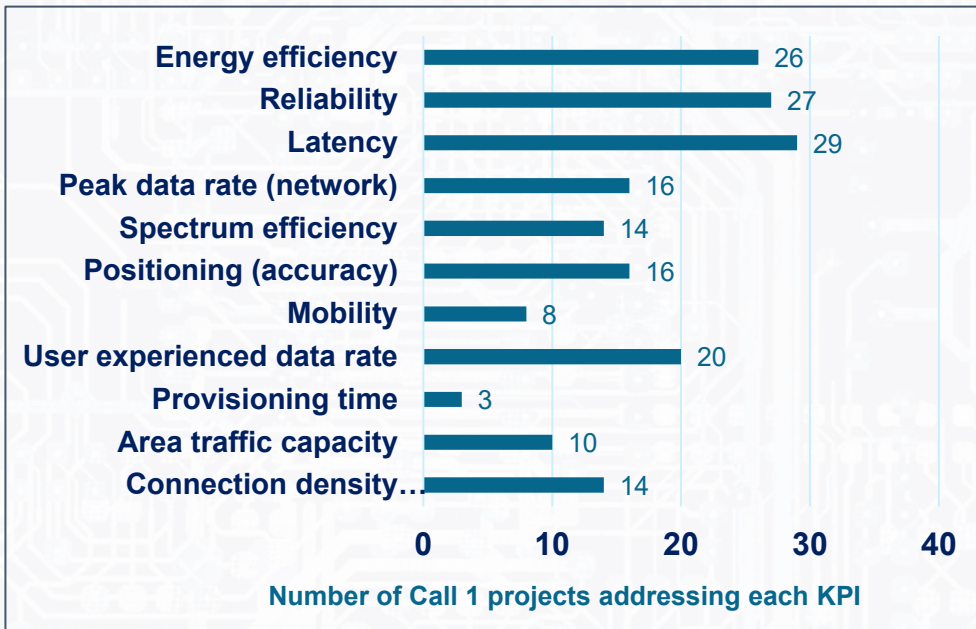
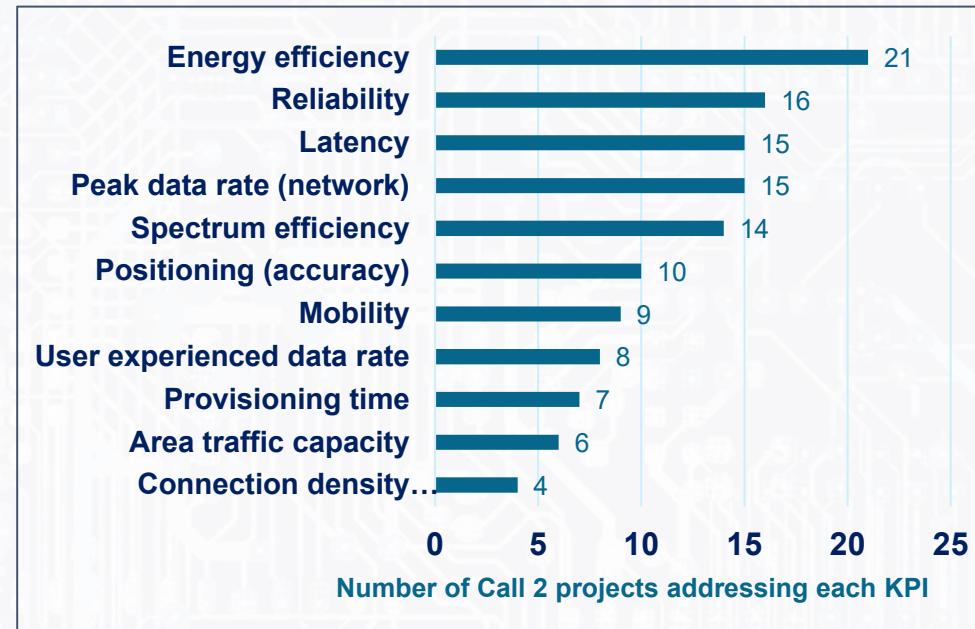


Key Insights

- Good coverage of all main KPIs
- Energy Efficiency is by far the most popular KPI
- URLLC KPIs are once again very popular

Technical, T2:

Which of the following main KPIs will your project address (Call 1 vs Call2)?

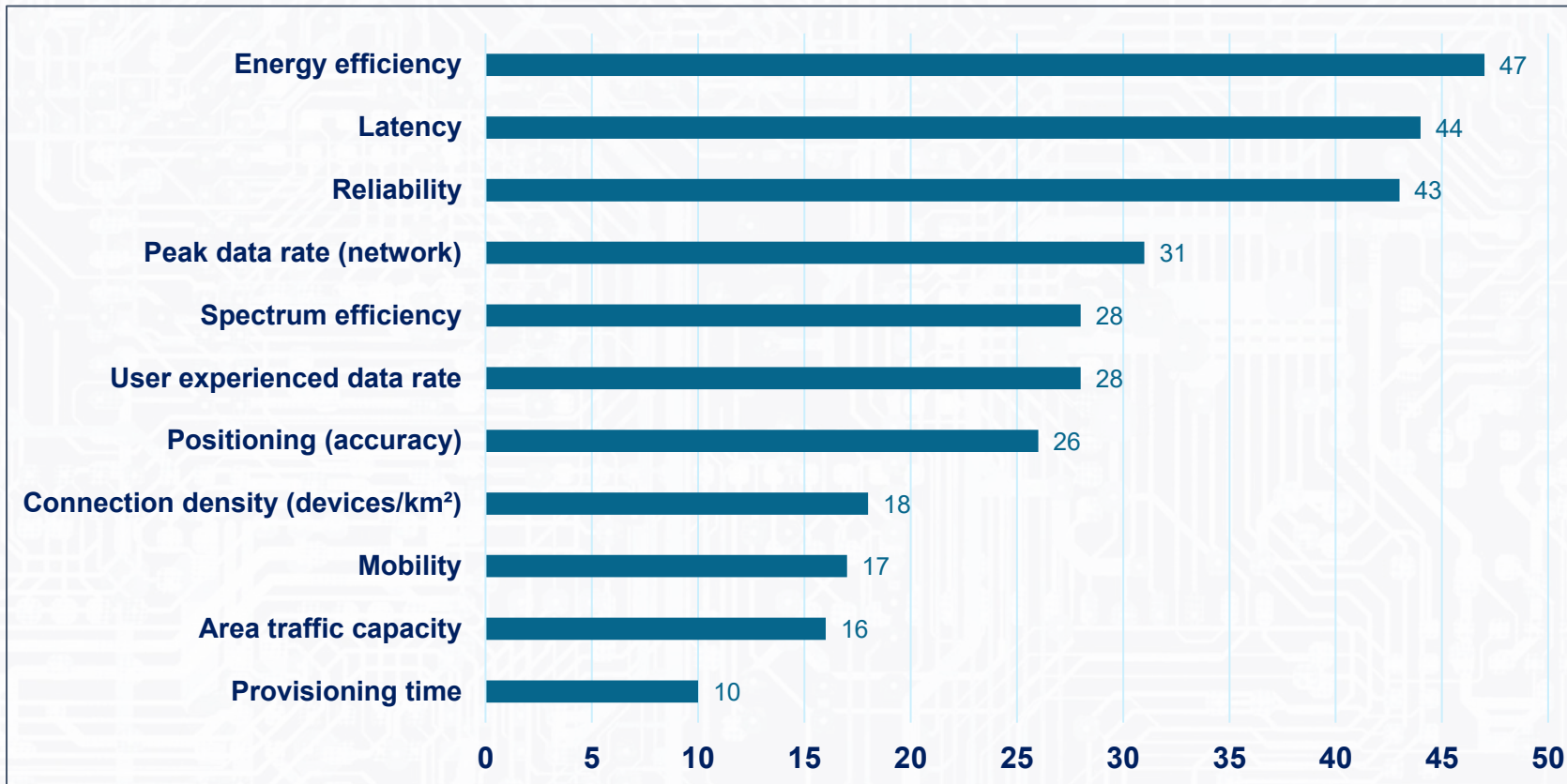
**Call 1 (2023)****Call 2 (2024)****Key Insights**

- Energy Efficiency, Latency & Reliability (URLLC) are the most popular KPIs for both Calls
- Peak Data Rate & spectrum efficiency follow in both calls
- Positioning, mobility, User data rate & Connection Density a bit more popular in Call 1 projects

Technical, T2: Main KPIs across all active SNS projects (Call 1 + Call 2)



Call 1+ Call 2 – KPIs



Key Insights

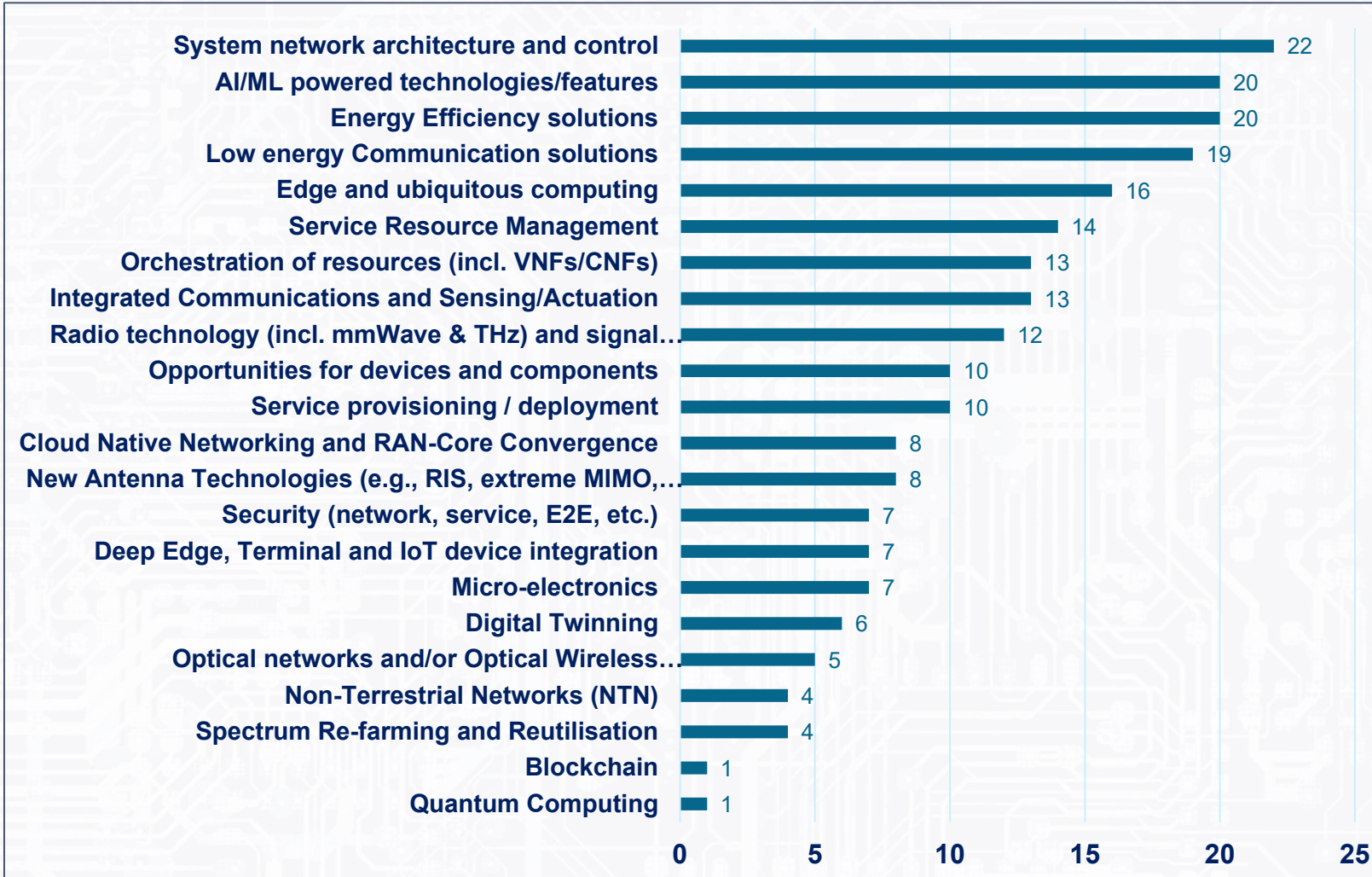
- A total of 63 projects are currently active in SNS JU
- 3 main “priority” tiers can be observed
 - 1s Tier: Energy Efficiency, Reliability, Latency
 - 2nd Tier: Peak data rate, User data rate, Spectrum efficiency, Positioning
 - 3rd Tier: Connection Density, Mobility, Area traffic capacity, provisioning time

Technical, T3:

Which of the following technological issues/aspects will your project address?



Call 2 (28 projects)



Key Insights

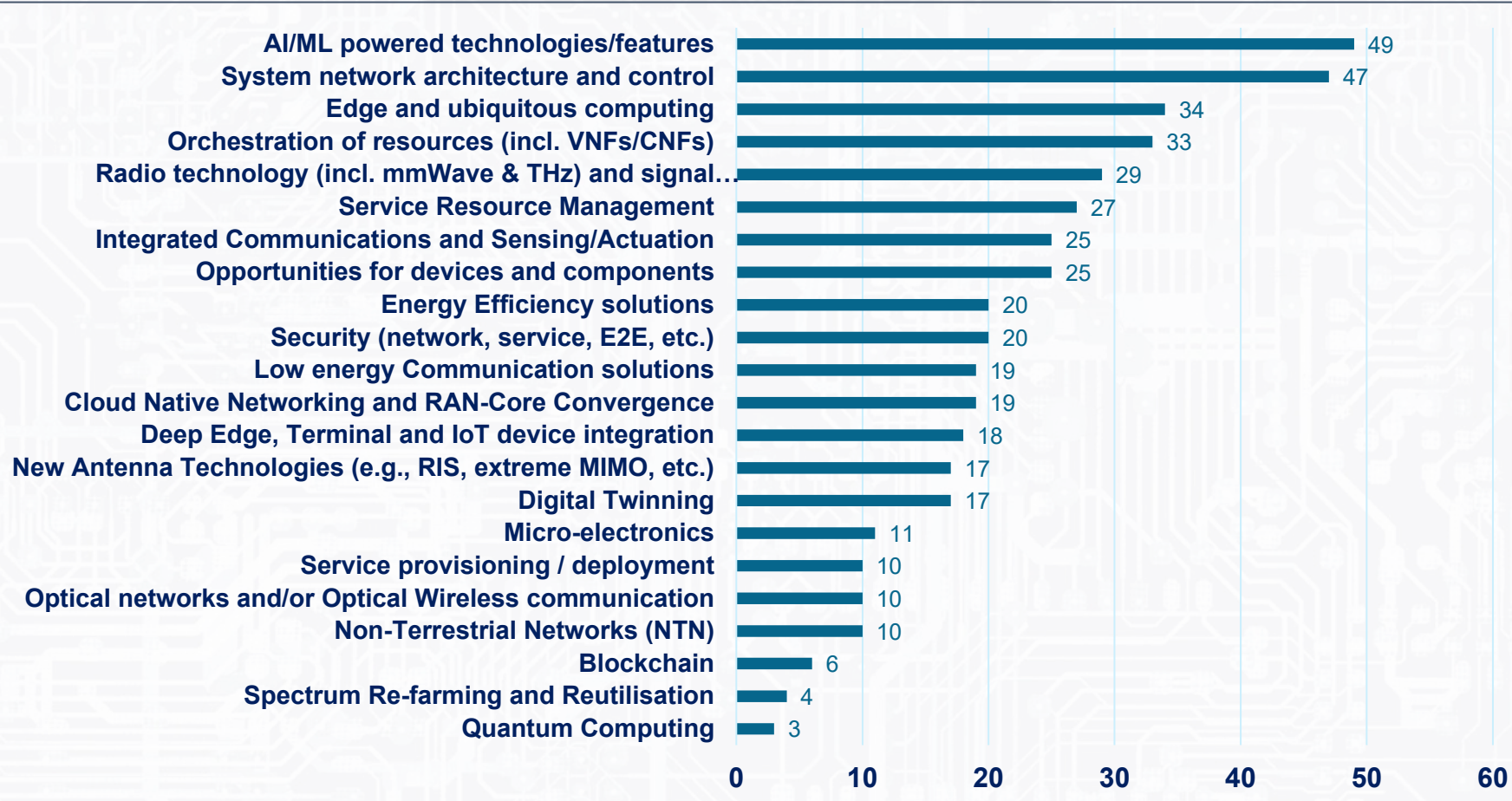
- Broad range of technologies / solutions / enablers researched by Call 2 projects
- Call specific technologies have been boosted (e.g., Low energy communications, JCAS, Micro-electronics, etc.)
- System Network Architecture, AI/ML functionality & EE solutions are the top researched topics for Call 2 projects

Technical, T3:

Which of the following technological issues/aspects will your project address?
(Call 1 + Call 2)



Call 1+ Call 2 – Technologies

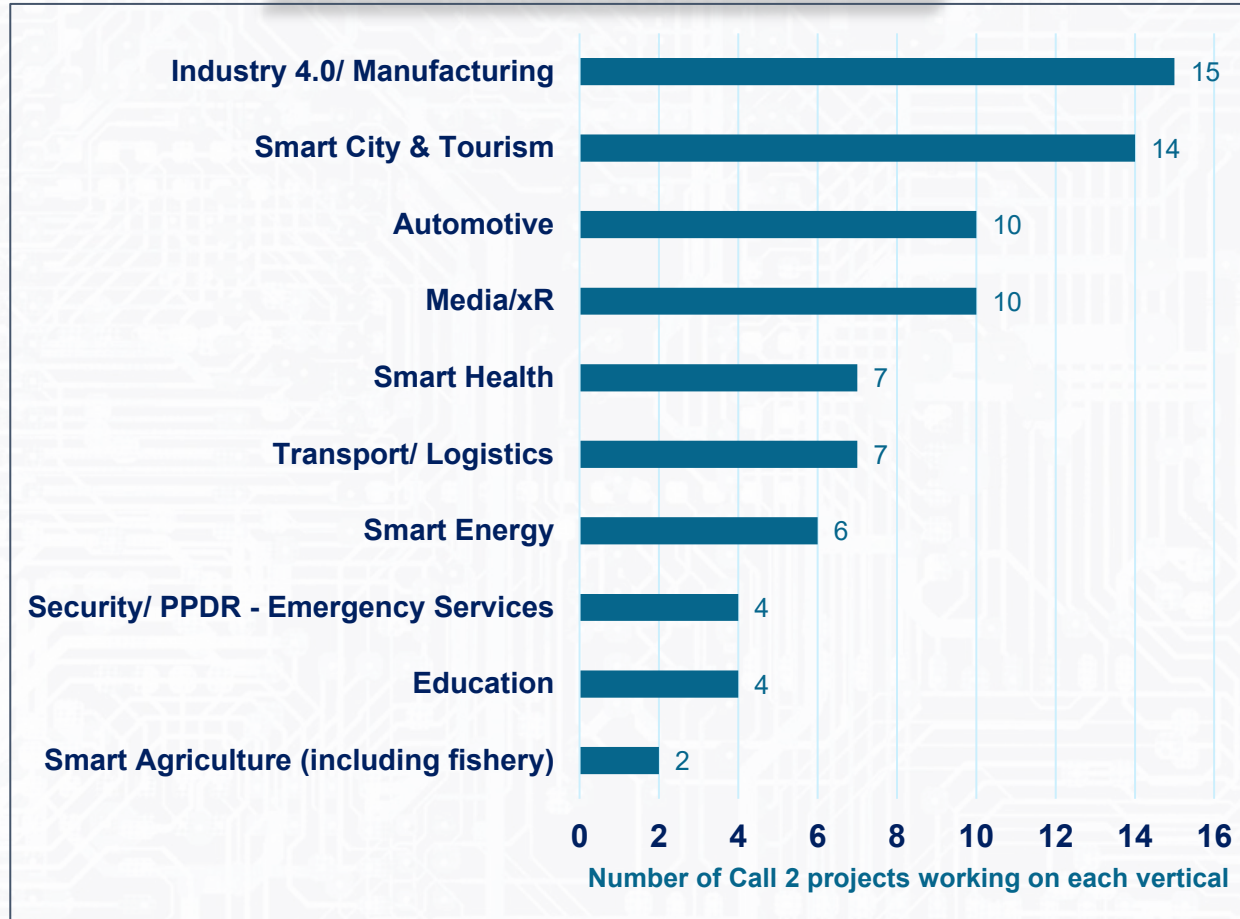


Key Insights

- A total of 63 projects are currently active in SNS JU
- AI/ML functionality & System Network Architecture are by far the most investigated issues among SNS projects
- A very broad range of technologies/issues (22+) are investigated by SNS projects
- Cross-comparison of results will assist the validation of the outcomes and extraction of common insights.

Technical, T4:

Which of the following Vertical sectors and use cases/applications will your project support??

Call 2 (2024) - Verticals**Key Insights**

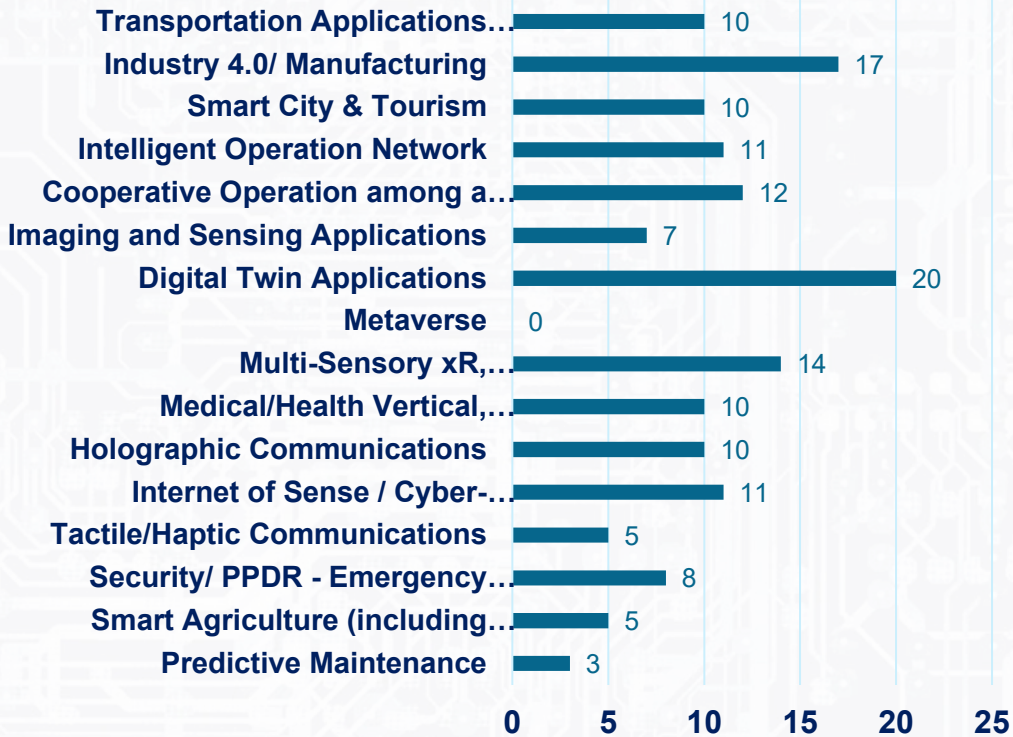
- Broad coverage of vertical sectors following the Call 2 targeted Work Programme
- 4.0 & Smart City / Tourism verticals are the most popular between Call 2 projects
- Automotive significantly increased interest in Call 2 projects

Technical, T4:

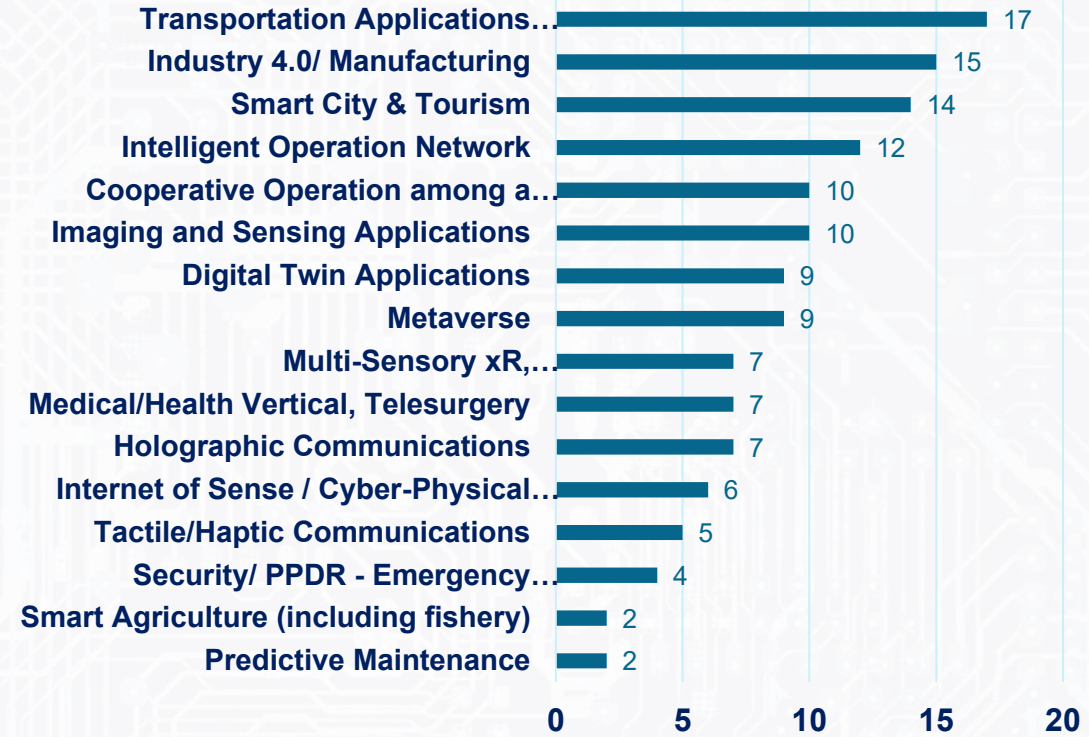
Which of the following Vertical sectors and use cases/applications will your project support??



Call 1 (2023) – Apps / UCs



Call 2 (2024) – Apps / UCs



Key Insights

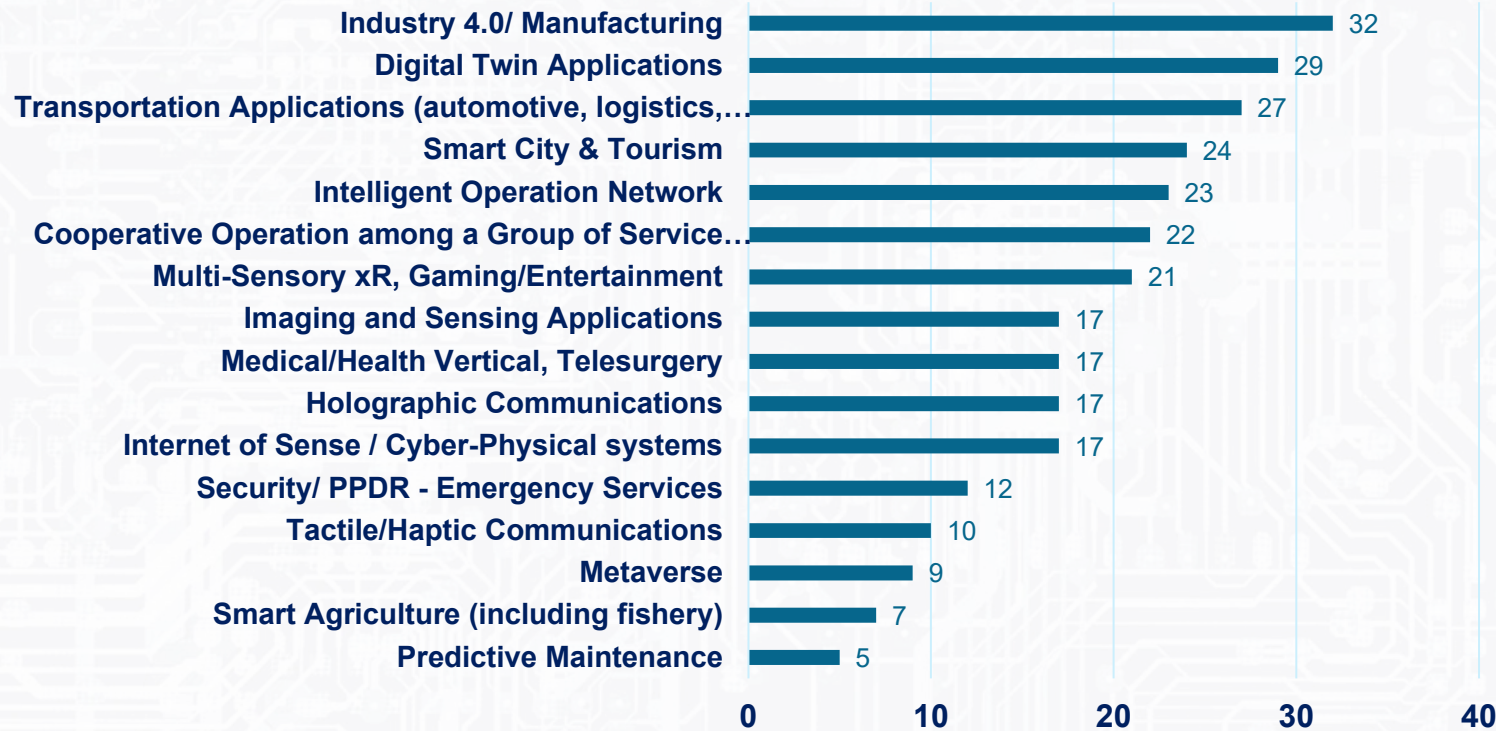
- A total of 63 projects are currently active in SNS JU
- I4.0 & Smart City / Tourism have retained their momentum in Call 2
- Metaverse introduced in Call 2
- Transport Apps increased in Call 2

Technical, T4:

Which of the following Vertical sectors and use cases/applications will your project support??

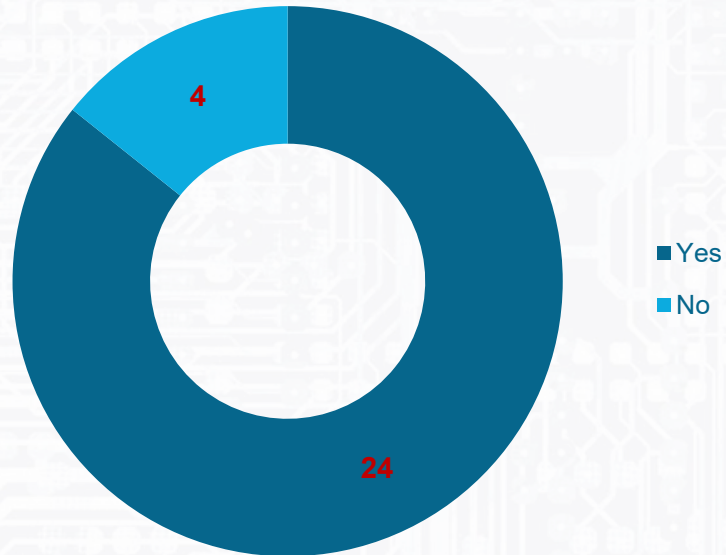
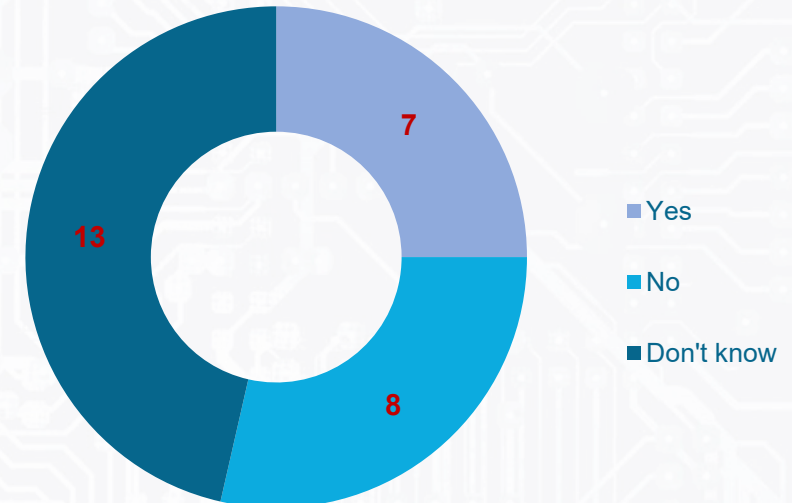


Call 1+ Call 2 – Apps / UCs



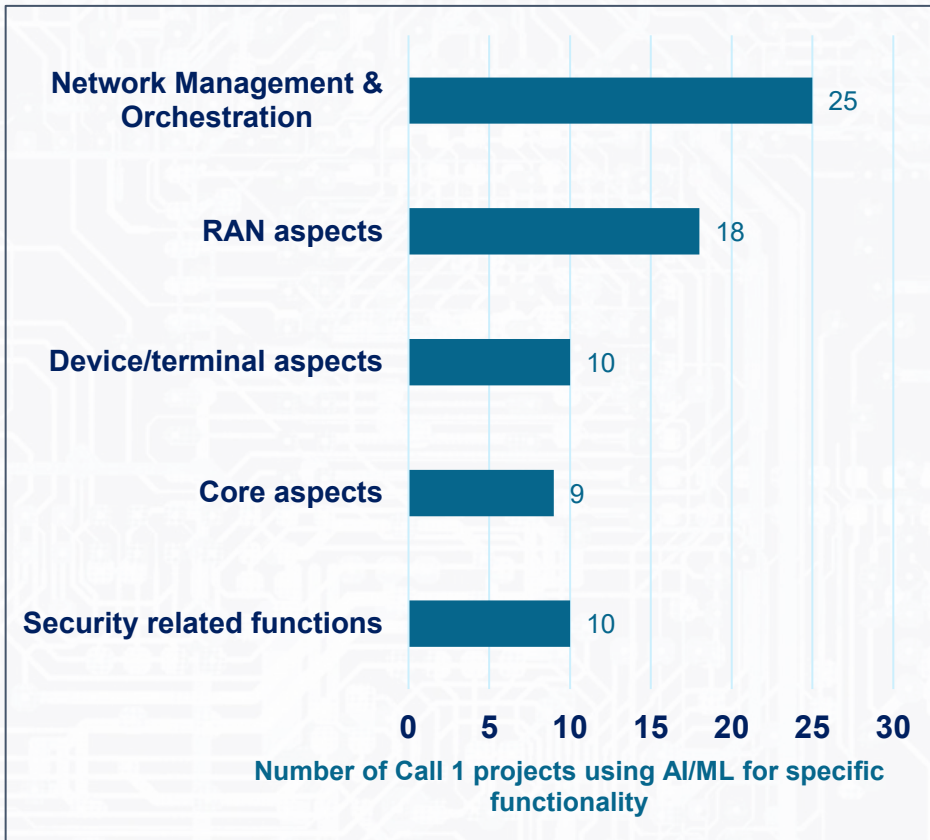
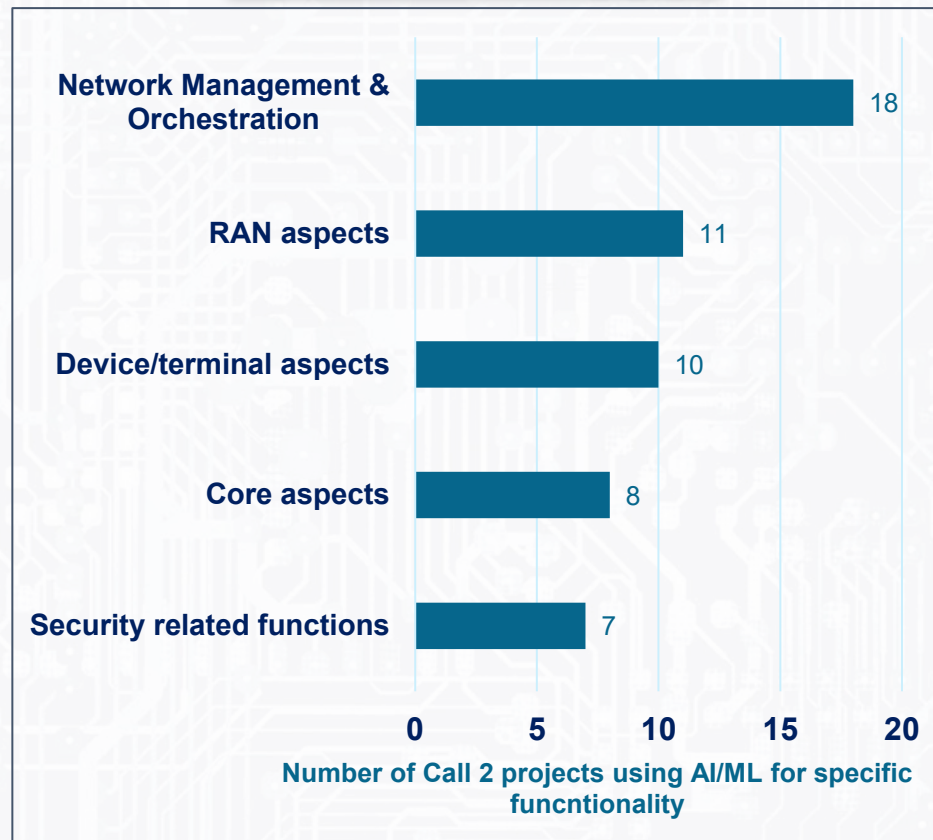
Key Insights

- Broad coverage of vertical sectors across Call 1 & Call 2 projects (more than 16 UCs/Apps addressed)
- I4.0, Digital Twinning & Transportation Use Cases are the most popular among SNS projects
- Very good overlap among Use Cases to be used for validation of results & extraction of communal insights
- New UCs added as the SNS JU programme moves forward

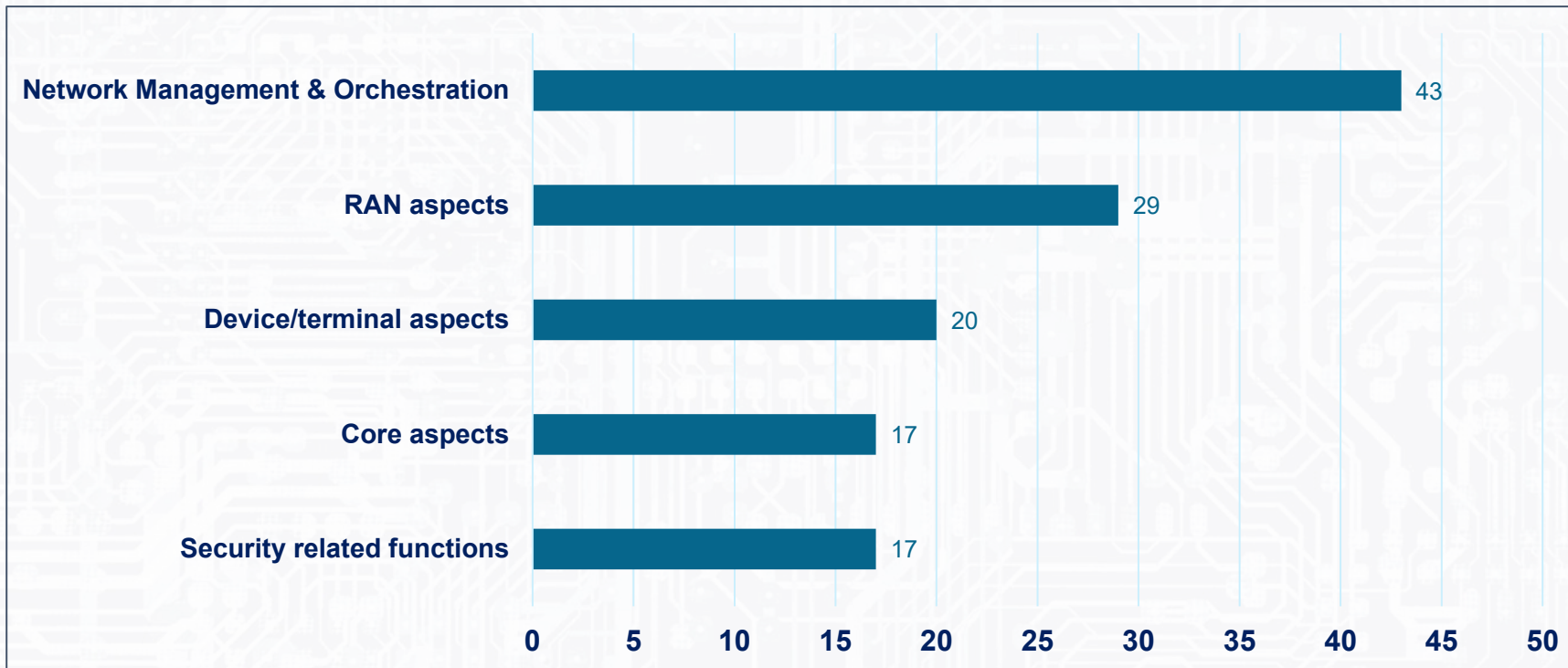
Technical, T5:**Will your project make use of AI/ML?****Do you plan to deliver/provide access to your AI training data sets?****Will your project make use of AI/ML?****Do you plan to deliver/provide access to your AI training data sets?**

Technical, T5:

For which of the below items do you plan to use AI/ML functionality?

**Call 1 (2023)****Call 2 (2024)****Key Insights**

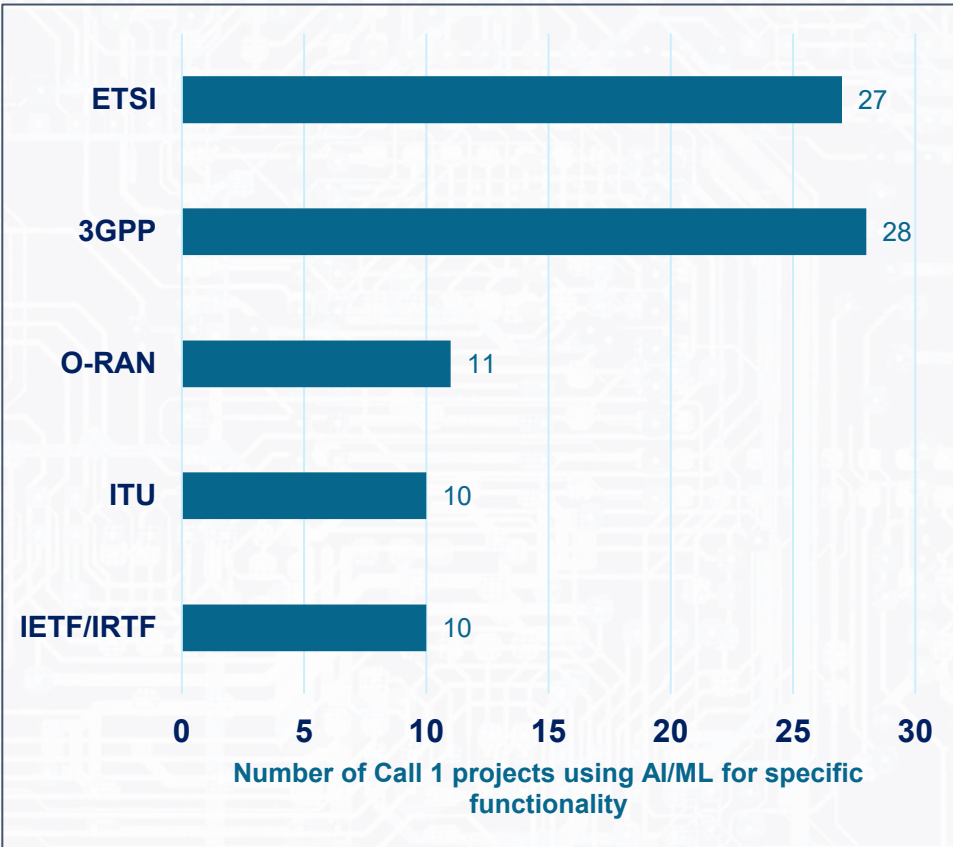
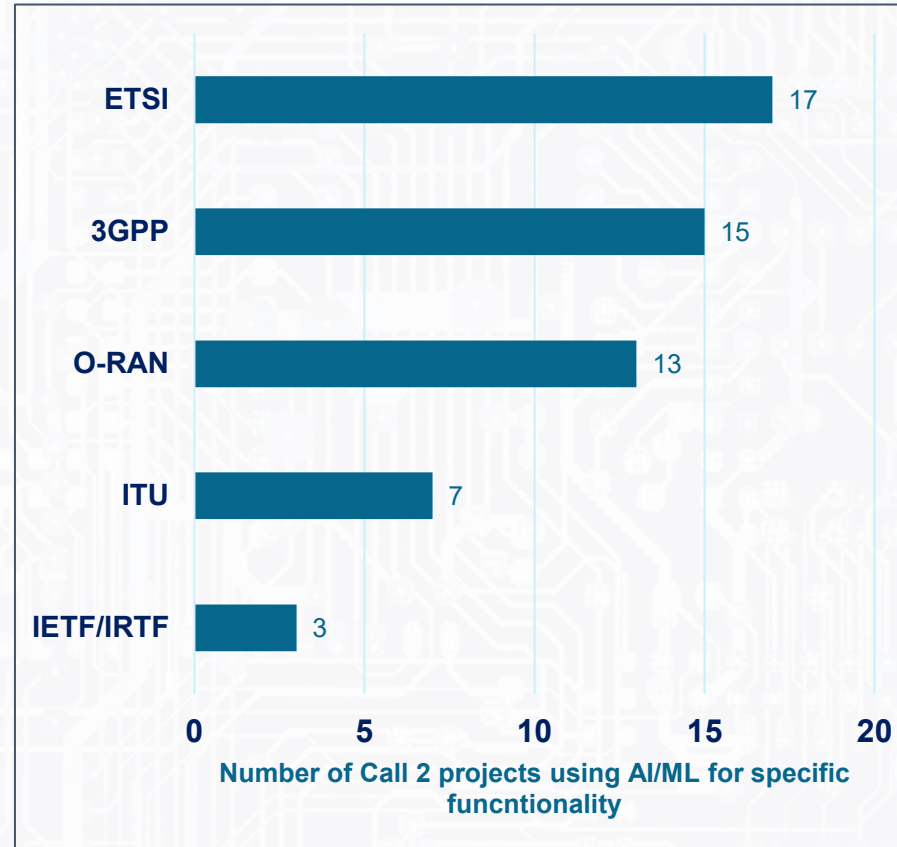
- Network Management & Orchestration remains the most popular field of AI/ML application
- The interests of the projects remain more or less the same across the 2 phases.

Technical, T5:**For which of the below items do you plan to use AI/ML functionality?****Call 1+ Call 2 – AI/ML Functionality****Key Insights**

- A total of 63 projects are currently active in SNS JU
- Network Management & Orchestration is the most popular field of AI/ML application followed by RAN
- AI/ML is well integrated in all network & device levels

Technical, T6:

Which standardization/specification bodies will your projects target for contributions?

**Call 1 (2023)****Call 2 (2024)****Key Insights**

- ETSI and 3GPP are steadily the most popular SDOs
- O-RAN seems to be in the focus of Call 2 projects
- IETF/IRTF on the other hand has attracted the interest of less Call 2 projects
- Overall balanced contributions targeted

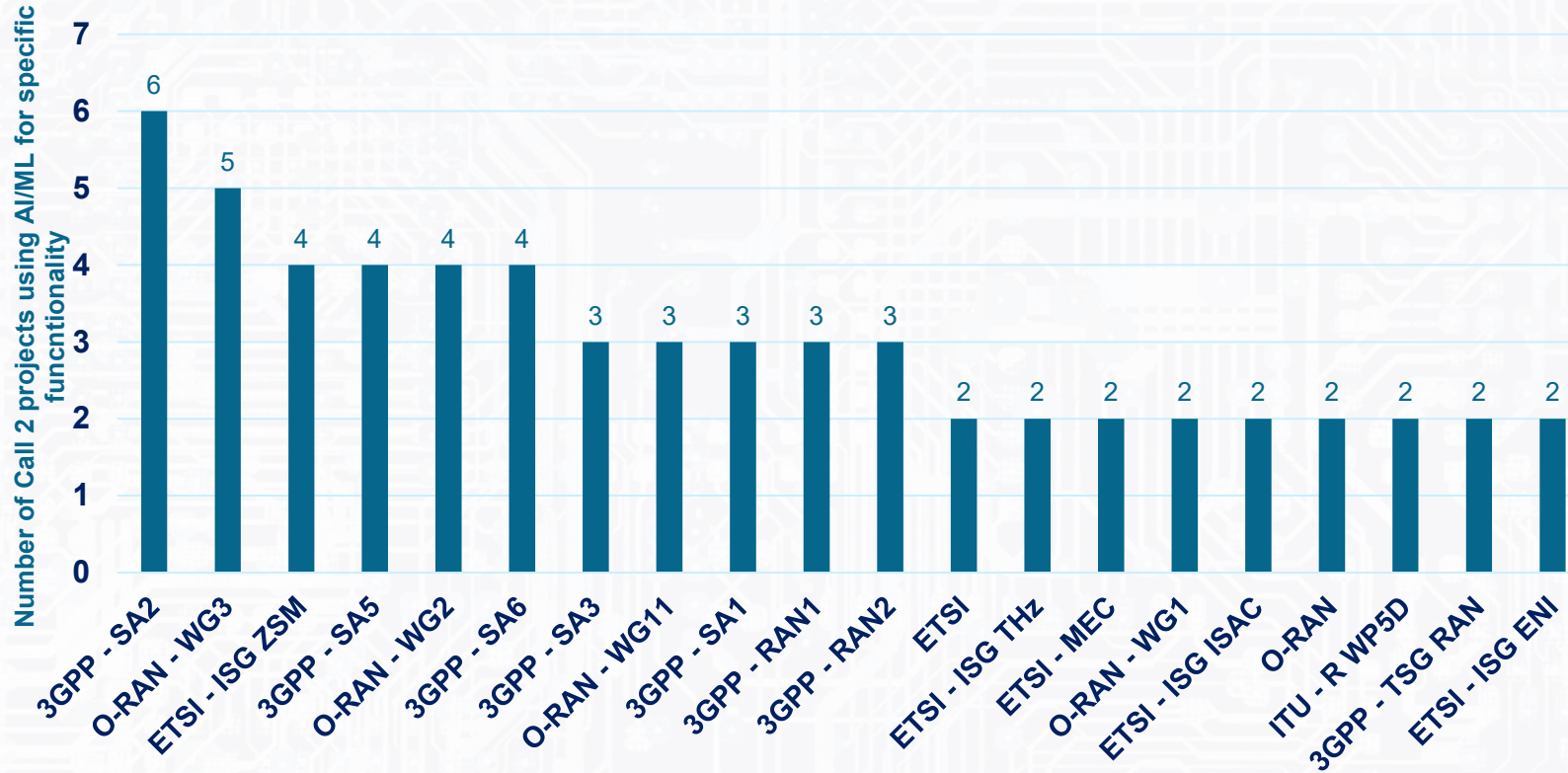
Technical, T6:

Which standardization/specification bodies will your projects target for contributions?



Call 2 (28 projects)

Standardization / Specification Groups Targets



Key Insights

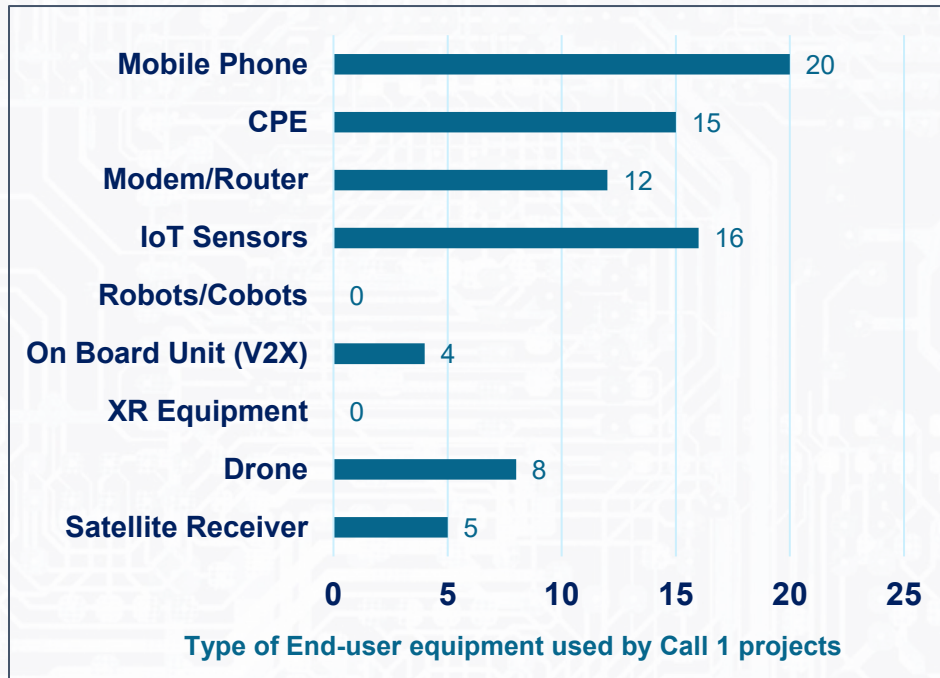
- Good distribution across multiple SG/WG/ISGs
- An additional 67 SG/WG/ISGs (under 'Other' category) are mentioned by the Call 2 projects, each with a single project targeting it.

Technical, T7:

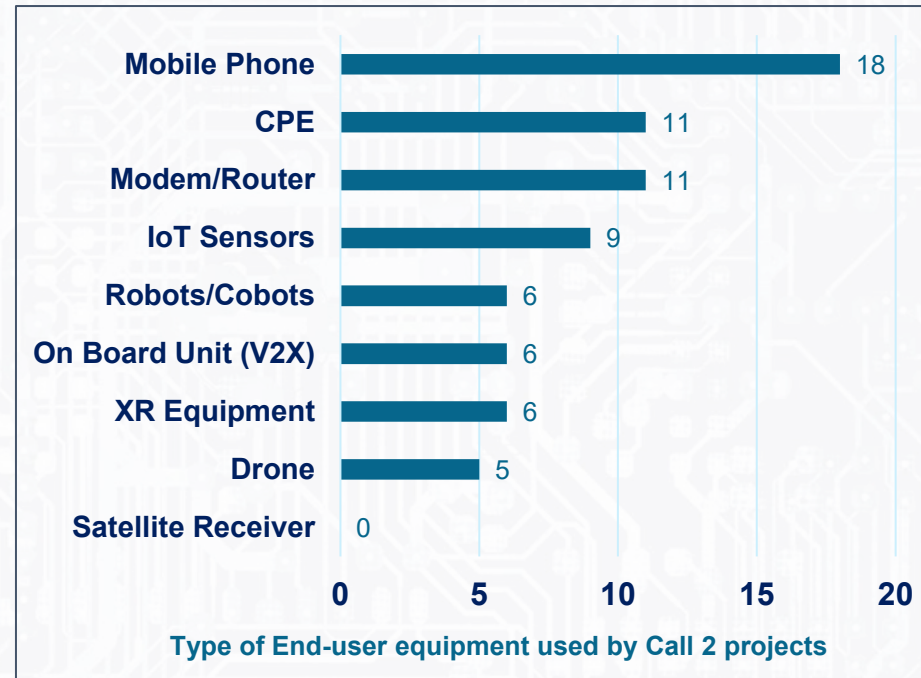
What type of (End User) Equipment will be used for testing/trialling in your project?



Call 1 (2023) – Types of UEs



Call 2 (2024) – Types of UEs

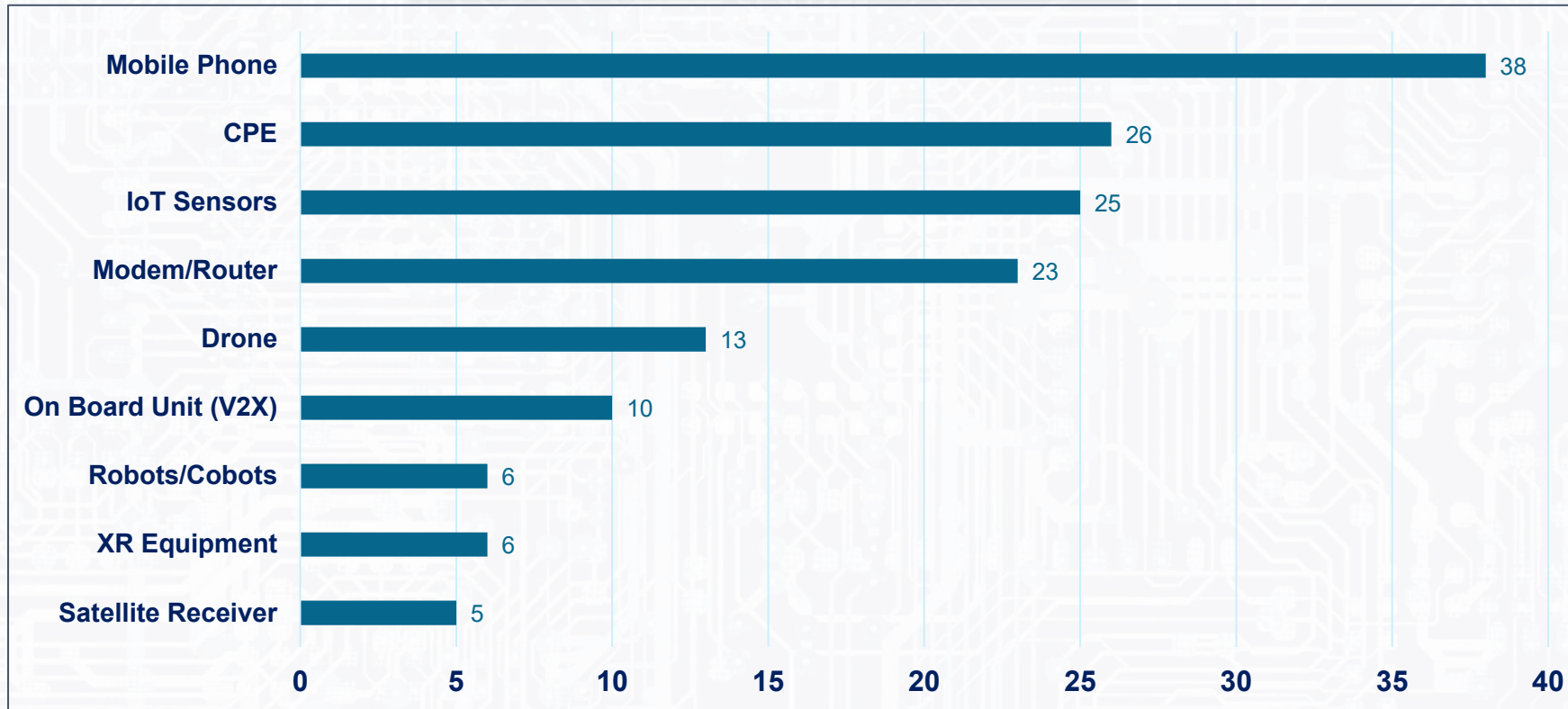


Key Insights

- Mobile phones are the most popular UE for projects of both calls
- Relatively steady trends across the 2 calls
- No satellite / NTN UEs in call 2 projects
- No Robots/Cobots & xR in Call 1 projects

Technical, T7:

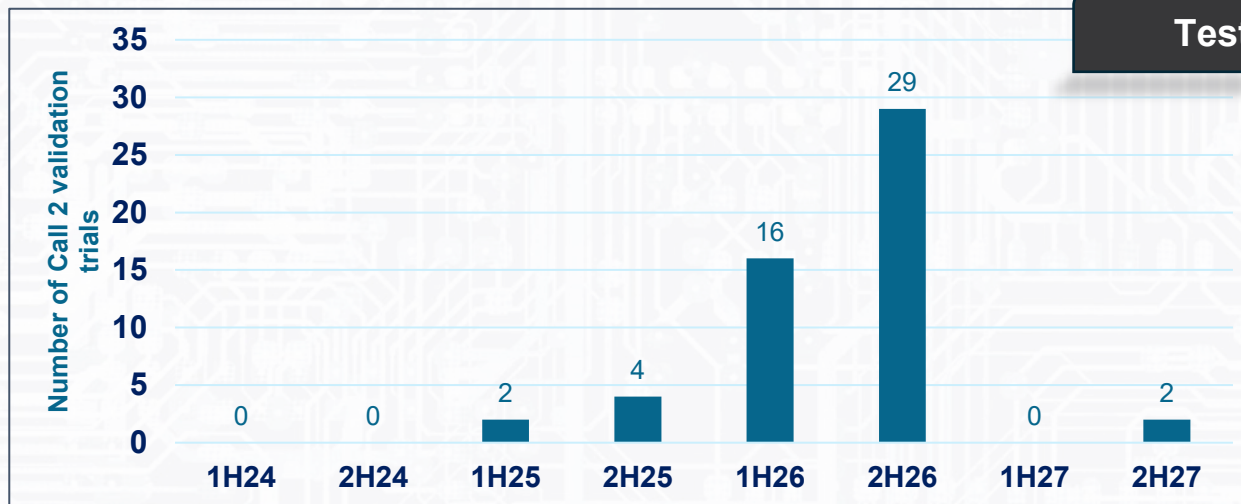
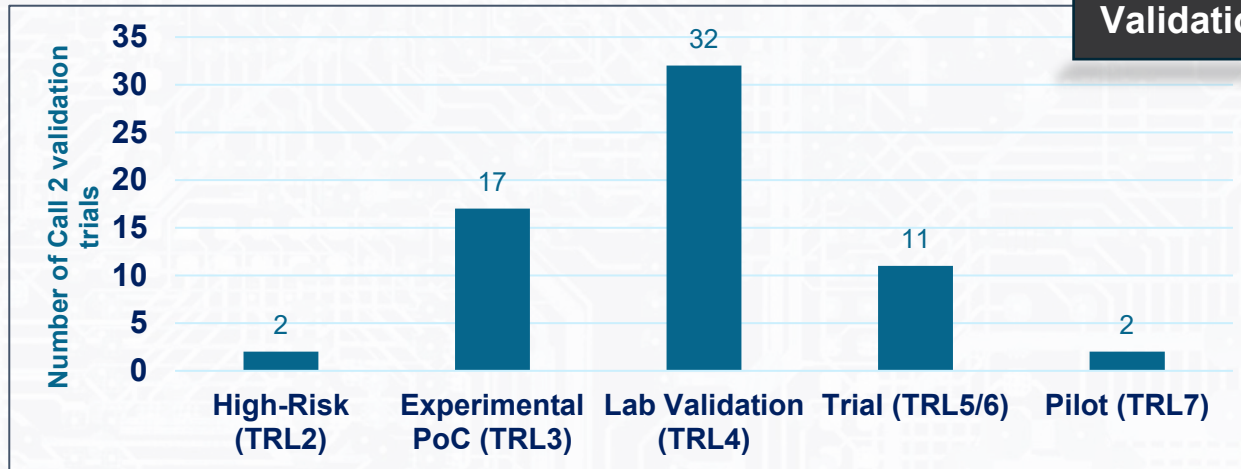
What type of (End User) Equipment will be used for testing/trialling in your project?

Call 1+ Call 2 – Types of UEs**Key Insights**

- Mobile phones are the most popular UE by far
- Good coverage of multiple types of UEs across the SNS projects
- CPEs, IoT sensors and Modem/Routers are also very popular among SNS projects
- More specialized UEs only used by projects with specific targeted UCs

Technical, T8:

Which methods will your project use to validate the technologies developed?

**Key Insights**

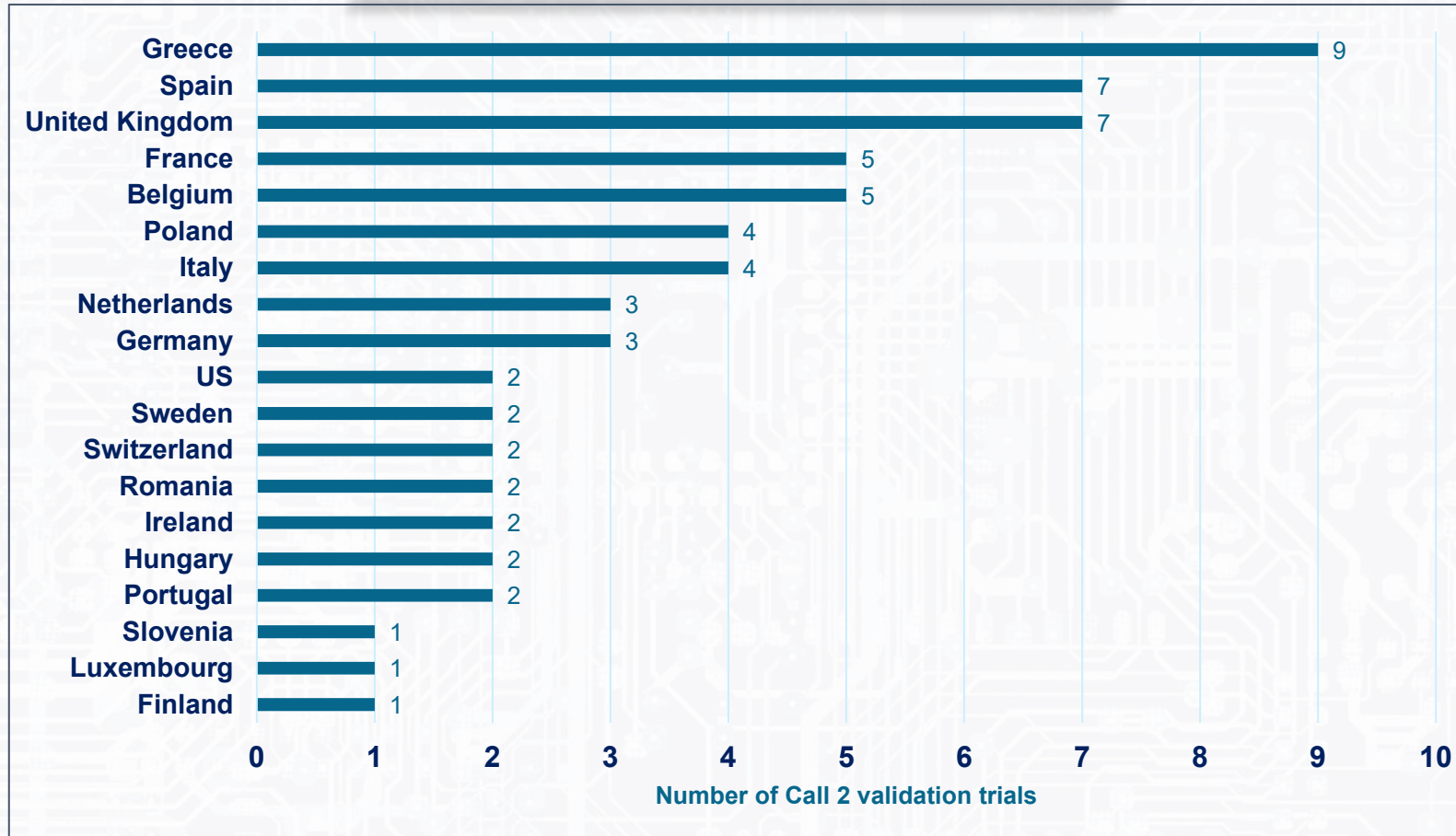
- Validation in the lab (TRL4) is the most popular validation method among Call 2 projects
- TRL3 PoCs and TRL5/6 & 7 (more advanced trials) are also well covered within Call 2 projects
- Limited 'high-risk' experiments also to take place within Call 2 projects
- Projects still need more time to prepare their experiments/trials (most are planned for 2H26)
- Early experimentation set to begin by early 2025

Technical, T8:

Which methods will your project use to validate the technologies developed?



Test/Trials per country



Call 2 (28 projects)

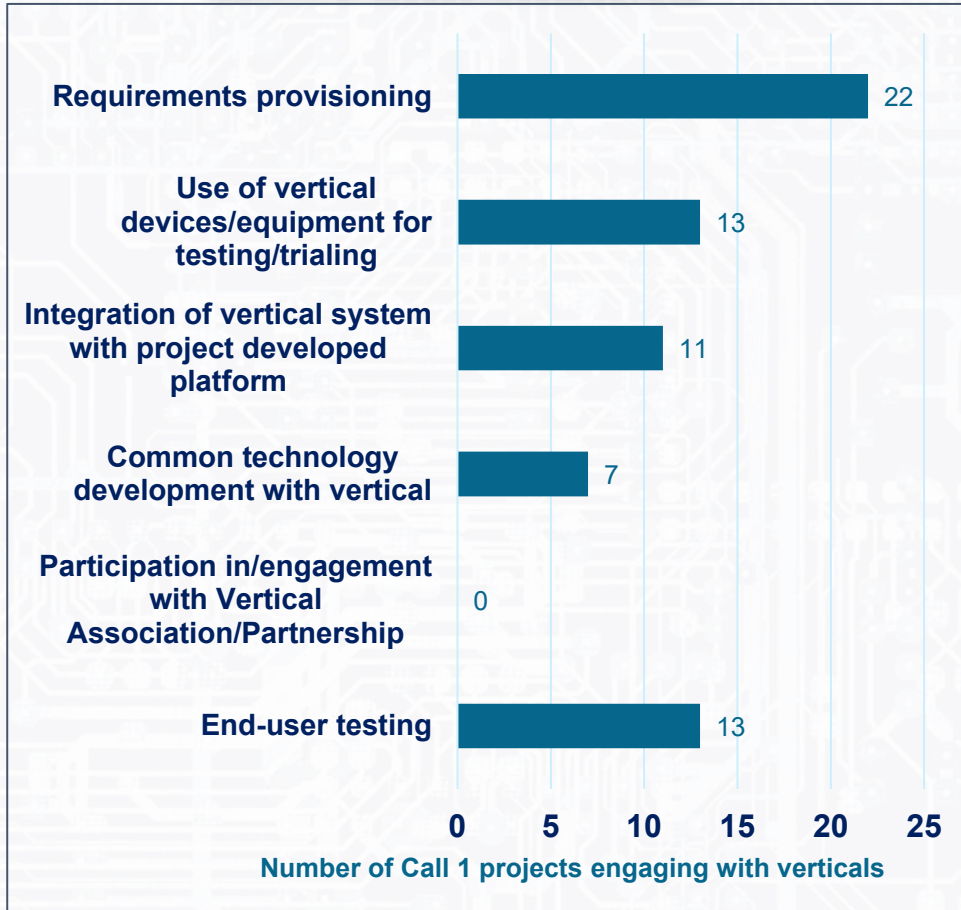
Key Insights

- Good spread of test/trial sites across Europe detected for call 2 projects
 - Experiments/trials to take place in 19 EU countries
- Greece, Spain and UK among the top locations for experimentation
- Additional insights expected from the Vertical Engagement Tracker

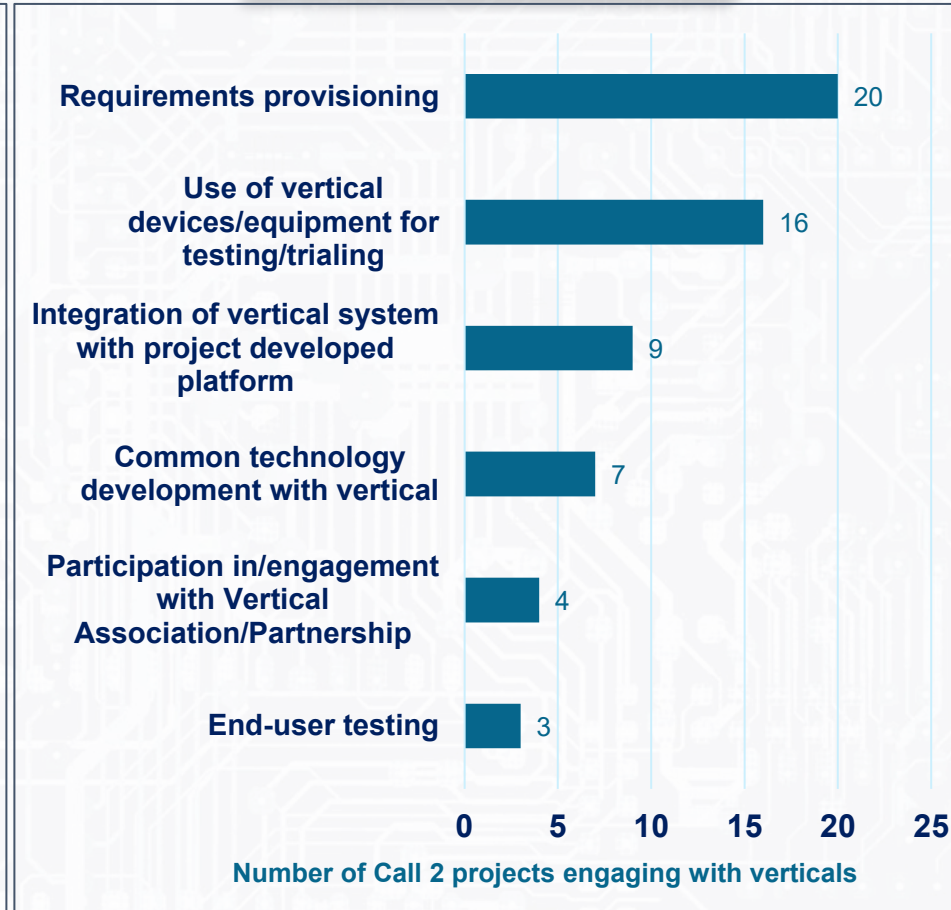
Technical, T9: How do you engage verticals in your project?



Call 1 (2023)



Call 2 (2024)



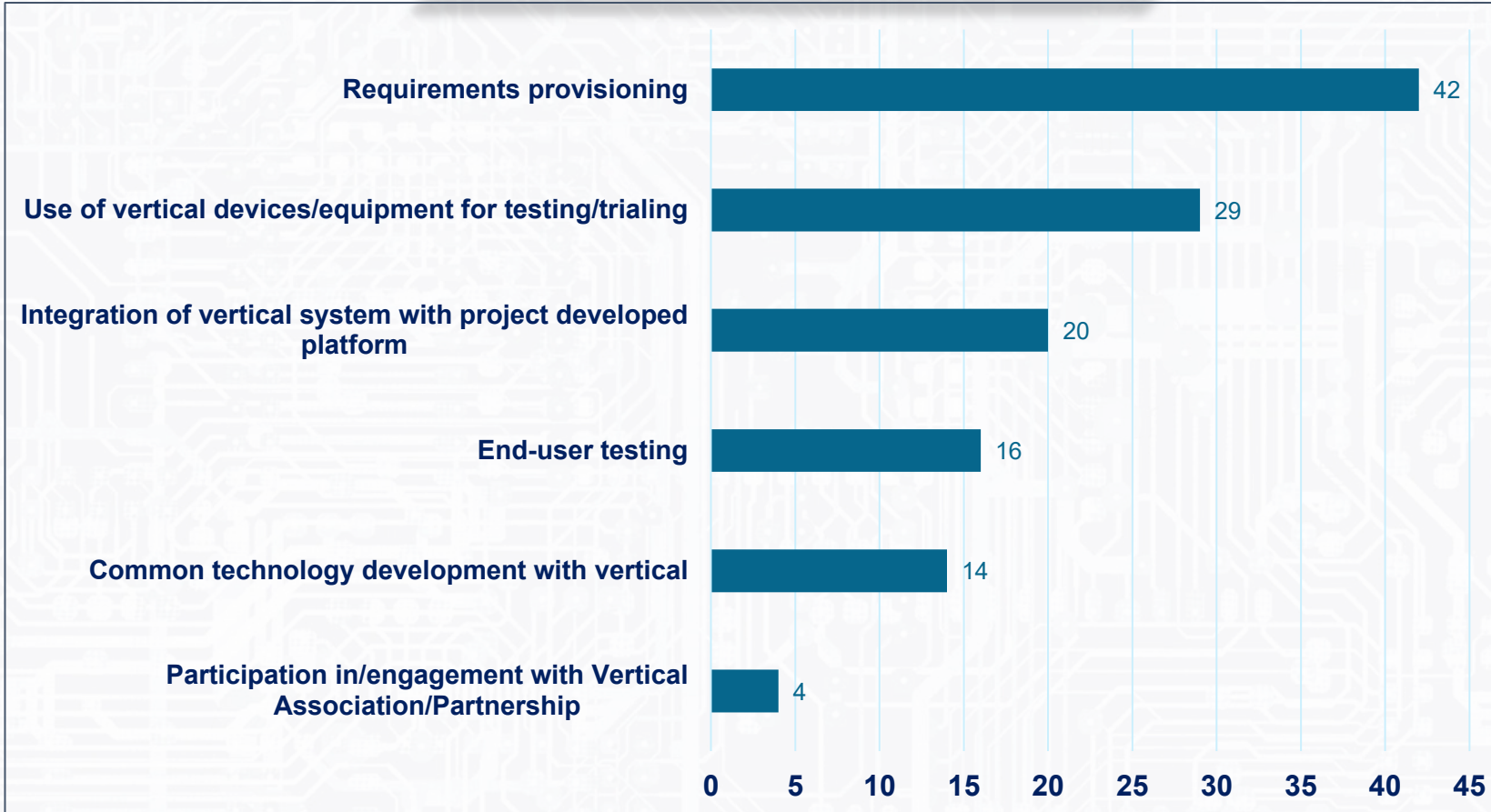
Key Insights

- Requirements provision is the most prominent way of interaction for projects from both Calls
- End-user testing receives a lot more attention in Call 1 projects
- Participation / Engagement with associations added as a new category in 2024.

Technical, T9: How do you engage verticals in your project?



Call 1+ Call 2 – Vertical Engagement



Key Insights

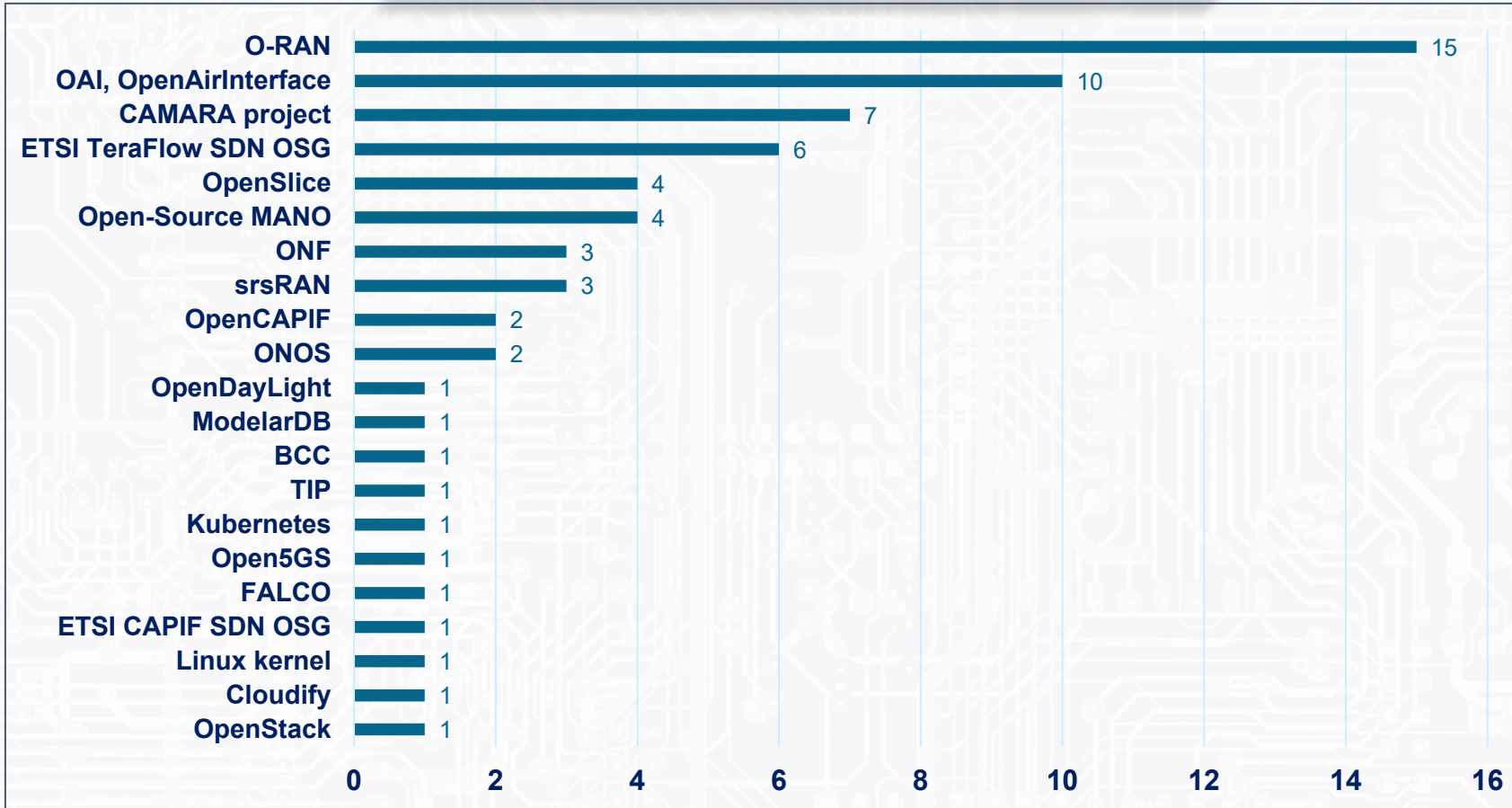
- A total of 63 projects are currently active in SNS JU
- Requirements provision is the most prominent way of interaction with vertical stakeholders for SNS JU projects
- Overall great integration of vertical stakeholders in multiple stages of the projects

Technical, T11:

To which Open Source organisations does your project contribute?



Call 2 (2024) – Open Source Contributions



Key Insights

- Broad range of Open Source Organizations covered by the projects (21 organizations)
- O-RAN is by far the most popular
- OAI, CAMARA & ETSI Teraflow SDN are also quite popular among projects

6G SNS OPS

THANK YOU FOR YOUR ATTENTION



in



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