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D3.4 REPORT ON LIAISONS ACTIVITIES - FINAL

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Abstract	This document reports the main liaisons and synergies created within the SNS JU context and beyond by establishing connections, exchanging know-how and organising common events, webinars, panel discussions, etc.
Keywords	liaison activity, synergies, collaborations

DISCLAIMER

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SEN	*Sensitive, limited under the conditions of the Grant Agreement*	
Classified R-UE/ EU-R	*EU RESTRICTED under the Commission Decision No2015/ 444*	
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* R: Document, report (excluding the periodic and final reports)
DEM: Demonstrator, pilot, prototype, plan designs
DEC: Websites, patents filing, press & media actions, videos, etc.
DATA: Data sets, microdata, etc.
DMP: Data management plan
ETHICS: Deliverables related to ethics issues.
SECURITY: Deliverables related to security issues
OTHER: Software, technical diagram, algorithms, models, etc.

EXECUTIVE SUMMARY

This report provides an overview of the key activities and achievements of the **6G4Society project** from January 2024 to December 2025. The activities led by Task 3.1, in close coordination with the other WP3 tasks and the project's WPs, aimed to strengthen strategic liaisons, foster synergies, and align the project's objectives and work plans with other **SNS Joint Undertaking (JU)** projects, spanning CSAs, RIAs, and broader European and global initiatives. Building on the consortium's diverse expertise and its active participation across the 6G-IA and SNS JU Working Groups / Task Forces activities, the project successfully implemented a coordinated engagement strategy. This included close collaboration with the **SNS JU Office**, the **Sustainability Task Force**, **SNS OPS, SNS ICE and SNS CO-OP**, multiple R&I projects, including the **Sustain-6G Flagship,** as well as other ongoing RIAs. From the outset, this multi-stakeholder approach ensured strong visibility of the work done by 6G4Society within the SNS JU ecosystem and beyond, extending to research and innovation Cloud, Edge, AI, and IoT communities, also thanks to direct engagement with our Expert Advisory Board.

Core Contributions of WP3

WP3 played a central role in strategically positioning the project within the rapidly evolving SNS JU landscape and helped trigger a "cultural" change and approach to 6G development, bringing social, environmental and economic sustainability as a core requirement to be addressed already at design time. This was done by:

1. **Driving consensus-building activities** to define a shared **Key Value Indicator (KVI)** framework suitable for adoption across SNS JU projects and standardisation bodies, helping overcome the existing fragmentation.
2. **Enhancing collaboration with external organisations active on 6G definition and development**, including **ETSI**, **NGMN**, **6G Flagship** and **one6G**, to promote global alignment on sustainability, ethics, and societal values as core driving requirements.
3. **Strengthening public engagement and awareness**, to ensure that the potential societal benefits, challenges, and sustainability considerations of 6G technologies are communicated and understood effectively.

Key Lessons Learned

1. **Limited resources constrain the impact of collaborations.** While many initiatives, both within and beyond the SNS JU context, play a critical role in advancing sustainable 6G, the scope and reach of collaborative efforts are inherently limited by available resources. Nevertheless, the 6G4Society project has successfully established important bridges and connections that can be further leveraged in the future by SNS JU working groups and related projects.
2. **Overcoming fragmentation requires active coordination across multiple levels.** Fragmentation and a lack of coordination remain the persistent challenges across initiatives. The SNS JU's strategy of embracing both Member State-level and international initiatives is crucial to overcoming such fragmentation. Within this context, 6G4Society has actively coordinated efforts with several initiatives, including emerging platforms such as ACM GoodIT and Sustainable Places, thereby contributing to a more integrated landscape.
3. **Complex organisational structures can sometimes make collaboration challenging, highlighting the value of proactive alignment.** The SNS JU's structure, particularly at the WG level, can occasionally lead to overlapping efforts or redundancies, which may reduce overall efficiency. Through active engagement across

multiple WGs, 6G4Society has contributed to fostering alignment, improving coordination, and supporting more integrated and coherent collaborative efforts.

4. **Multi-stakeholder, multi-disciplinary approaches are essential for socially and environmentally responsible 6G development**. Developing sovereign, trustworthy, and sustainable technologies requires broad engagement. The 6G4Society consortium has capitalised on a diverse, multi-disciplinary framework, actively engaging a wide range of stakeholders to ensure broader relevance, acceptance, and societal impact.

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ABBREVIATIONS

3GPP	3rd Generation Partnership Project
5G	Fifth generation mobile network
6G	Sixth generation mobile network
AI	Artificial Intelligence
AR	Augmented Reality
CEF2	Connecting Europe Facility 2 (Digital)
CEN	European Committee for Standardization
CENELEC	European Committee for Electrotechnical Standardization
CSA	Coordination and Support Action
CWA	CEN Workshop Agreement
DG CONNECT	Directorate General Content, Networks and Technology of the European Commission
DMP	Data Management Plan
DoA	Description of Action
EC-GA	European Commission Grant Agreement
ETSI	European Telecommunications Standards Institute
EUCNC	European Conference on Networks and Communications
FNS	Future Network Services
GDPR	General Data Protection Regulation (EU 2016/679)
ICT	Information and Communication Technologies
IEEE	Institute of Electrical and Electronics Engineers
IoT	Internet of Things
ITU	International Telecommunication Union
KPIs	Key Performance Indicators
KSIs	Key Sustainable Indicators
KVs	Key Values
KVIs	Key Value Indicators
M&E	Media & Entertainment
MS	Member States
NDT	Network Digital Twins
NGMN	Next Generation Mobile Networks Alliance
PPDR	Public Protection and Disaster Relief
R&D	Research and Development
R&I	Research and Innovation
RIA	Research and Innovation Action
SAT	Social Acceptance of Technology
SCOT	Social Construction of Technology
SERI	Swiss State Secretariat for Education, Research and Innovation
SME	Small and Medium-sized Enterprise

SNS-JU	Smart Network System - Joint Undertaking
SNVC	Societal Needs and Value Creation
SRG	States Representative Group
TAM	Technology Acceptance Model
TC	Technical Committee
TF	Task Force
TRL	Technology Readiness Level
UTAUT	Unified Theory of Acceptance and Use of Technology
UX	User Experience
WG	Working Group

1 INTRODUCTION

This document presents a comprehensive and systematic overview of the liaison activities conducted within the 6G4Society project. It is addressed to the SNS ecosystem and the wider research and innovation community; consequently, for external readers, this updated version is sufficient to be consulted, as it supersedes the interim liaison activities deliverable (D3.1). The report consolidates all relevant activities and outcomes over the full project period from 01.01.2024 to 31.12.2025, thereby ensuring complete coverage of the project's entire lifecycle. The document details the processes through which key stakeholders within the SNS JU framework were identified and engaged via a series of workshops, webinars, interviews, and surveys. These activities were designed to foster synergies and promote alignment of objectives across multiple initiatives, with a particular emphasis on highlighting the societal dimensions of technological development. In this context, the liaison efforts aimed to raise awareness among SNS projects of 6G4Society's work on Key Value Indicators (KVIs), standardisation, and a human-centric approach, thereby facilitating the integration of sustainability, ethical considerations, and societal acceptability as core design principles from conception onward.

Synergies with other projects are strategic as a groundwork for our activities where we are aiming at presenting the Social Acceptance and Technology framework (SAT), the KVI-KSI frameworks, engaging with them, obtaining feedback from stakeholders, or presenting communication material for non-experts. The primary beneficiaries of these synergies and related activities include both direct stakeholders, such as policymakers, technology developers, industrial players, and broader societal groups, including public administrations, academic institutions, and, of course, citizens. These groups stand to gain from the project's focus on creating a value-based and socially aligned framework for 6G adoption.

Furthermore, this activity contributes to the SNS JU objective of conceiving and developing a European value-based approach to 6G, emphasising alignment with global standards, such as those set by the ITU and 3GPP. European KVIs and KPIs integrate benchmarks that resonate with these global frameworks, ensuring a coherent and unified path in the international 6G standard-setting process.

The document sets the strategic and forward-looking roadmap for future activities by focusing on deepening cross-sectoral collaboration and outlining plans to integrate societal values and sustainability into the evolution of 6G technologies. By reporting on current achievements and mapping out future collaborations with both SNS projects and Member States, it also serves as both a record of progress and a guide for aligning research, innovation, and societal impact within the broader SNS JU ecosystem.

The rest of this deliverable is organised as follows:

- **Section 2: Stakeholder Mapping: The SNS JU context**

  This section provides a detailed mapping of the main stakeholders within the SNS JU framework. It outlines the range of collaborative activities which have been carried out (such as workshops, webinars, and circulation of the citizen survey, expert consultations, interviews, etc).

- **Section 3: Landscape Analysis and Stakeholder Research**

  This section describes our combined approach of desk research and direct engagement, which provided a robust foundation for identifying potential partners and shaping our collaboration strategy. We report on the main liaisons and collaboration activities such as desk search, surveys, info gathering, study and analysis, collaborations with selected SNS JU projects, interaction via existing 6G IA and SNS JU Working Groups and collaborative organisation of events (online and offline).

- **Section 4: Collaboration and Knowledge Exchange beyond the SNS JU**

  This section reports on the project's engagement in liaison activities designed to foster strategic alignment with relevant research, innovation, policy, and regulatory initiatives across Europe, as well as strategies to engage with Member States by mapping national initiatives and exploring how to align them with the project's broader objectives by emphasising the need to integrate societal and sustainability considerations into Europe's 6G development framework.

- **Section 5: Legacy of the 6G4Society project**

  This section presents the project's long-term legacy, adopting a forward-looking perspective on how its outcomes will continue to generate impact within the SNS community. It highlights the areas of continuity that will sustain long-term value creation and ensure strong strategic alignment in the years ahead. The section also outlines the strategic roadmap and engagement plan established with Sustain-6G, ensuring that future technical developments remain coherently aligned with societal needs, sustainability objectives, and the broader 6G vision.

2 LIAISONS AND COLLABORATIONS APPROACH

This mapping exercise was fundamental for identifying potential collaborations and liaisons to achieve project objectives and maximise its impact. Although the landscape of relevant players was constantly evolving, identifying key actors and initiatives was a prerequisite to establish lasting, effective synergies.

2.1 STAKEHOLDER MAPPING - THE SNS JU CONTEXT

Stakeholder mapping was central to 6G4Society's approach to 6G, informing its design, development, governance, and eventual adoption. The project prioritised alignment with EU strategic priorities and values, including sustainability, societal inclusion, trustworthiness (specifically privacy and data protection), and collaborative partnerships.

In this respect, the 6G4Society consortium collaborated with many of the ongoing Call 1, Call 2 projects and Call 3 projects from the SNS Stream B, C, and D.

- **Stream B – Research for Radical Technology Advancement**: Focuses on fundamental research and sustainability-driven innovation.
- **Stream C – Experimental Infrastructures and Platforms**: Supports testing and validation of emerging 6G technologies.
- **Stream D – Large-Scale Trials and Pilots with Verticals**: Demonstrates real-world applications in key sectors.

Figure 1: The SNS JU Evolution

OBSERVATIONS:

The SNS JU ecosystem is quite complex, with several SNS JU Working Groups and Sub Working Groups, and 6G-IA Working Groups that are only open to 6G-IA members.

6G4Society is a Phase 2 project. Therefore, when we started, only Phase 1 projects had already been active for about one year. All Phase 2 projects essentially started at the same time we did.

The direct formal engagement of Phase 2 projects within the SNS JU ecosystem, including participation in SNS JU Working Groups and Task Forces, was not possible until June 2024, because of the delay in the SNS JU Collaboration Agreement.

Given the different timelines and maturity of the work conducted by different projects, the kind of collaborations we established with them had to be adapted to the specific situation.

By engaging with Call 3 projects launching in **January 2025**, we aimed to ensure that new projects integrate sustainability principles from their inception, particularly with Sustain-6G Sustainability Flagship project.

2.1.1 KEY STAKEHOLDER GROUPS

6G4Society emphasises a holistic stakeholder engagement framework, ensuring that 6G technology is developed ethically, inclusively, and in alignment with societal values. By mapping key actors across the ecosystem, this framework fosters transparency, collaboration, and sustainable innovation in defining future network architectures and applications. The stakeholder mapping presented below illustrates the diverse ecosystem contributing to the design, development, deployment and standardisation of 6G.

Notice, this map has been created as an instrument of work for our consortium, based on the existing SNS JU ecosystem map produced by the SNS OPS project, but extending it and complementing it considering the specific ambition of 6G4Society - see Appendix 1.

1) **General Public, Experts, Influencers, and Media:** This group includes various stakeholders such as non-experts, researchers, policymakers, media representatives, each of them playing a vital role in knowledge sharing and ensuring broad engagement and shaping public perception about 6G development.
2) **Policy and Financing Bodies:** This category comprises EU institutions, governmental and international regulatory entities and funding bodies, which provide strategic oversight and provide financial support for 6G initiatives.
3) **Standardisation and Open-Source Organisations:** This group includes standardisation bodies and open-source platforms that collaborate to establish industry standards and foster innovation through collaboration.
4) **SNS User Ecosystem:** This category encompasses SNS JU projects and associated initiatives driving 6G research and development, emphasising collaboration, shared learnings and driving joint efforts within the SNS JU framework.
5) **5G/6G Industry, Research, and Verticals:** This category gathers key industrial players, academics, representatives from vertical sectors driving the commercialisation and application of 6G technologies across various industries, such as healthcare, energy, smart cities, mobility, etc.
6) **5G/6G Non-SNS Complementary National, European, and Global Organisations:** Comprises international collaborations and complementary domain-specific organisations to foster cross-border and essential interdisciplinary collaboration.
7) **Related Activities and Synergies:** Focuses on initiatives and collaborative efforts at both EU and global levels that create strategic synergies to support and expand the 6G ecosystem.

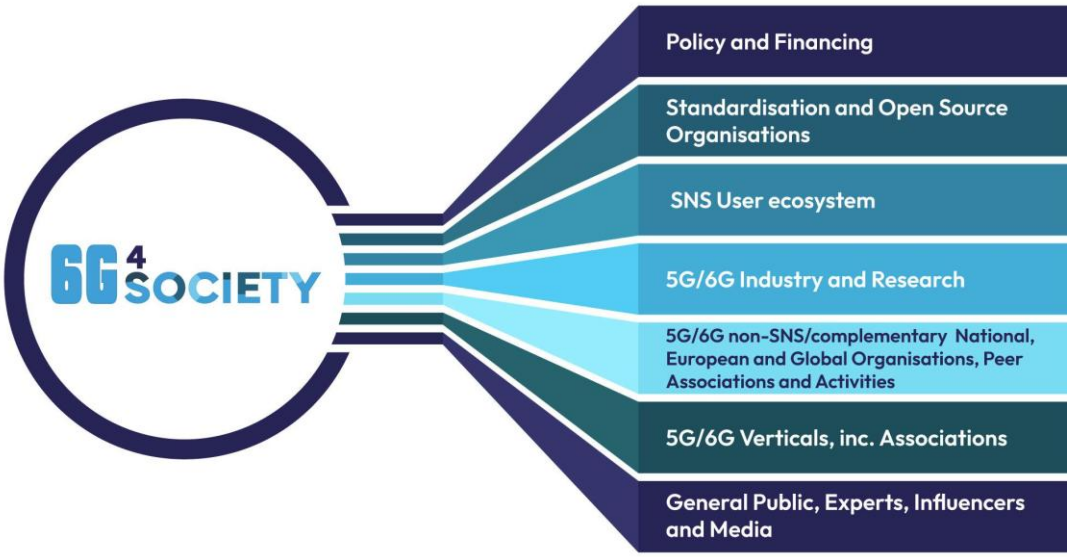

Figure 2: Key Stakeholder Groups

2.1.2 STAKEHOLDER ENGAGEMENT APPROACH

The 6G4Society project integrates stakeholder engagement through:

Public Awareness and Education: 6G4Society recognized the importance of informed public discourse surrounding 6G technology. We engaged in targeted outreach activities to educate non-expert audiences about both the potential benefits and the potential risks associated with 6G (see in particular several activities led by WP2). This includes simplifying complex technical information, addressing public concerns, and fostering a balanced understanding of 6G's societal implications. Examples of these activities included public forums, plain-language publications, and educational resources disseminated through various channels. This ensured that public perceptions and societal values are considered in the development and adoption of 6G.

Multidisciplinary Collaboration: Building a robust and responsible 6G ecosystem required diverse perspectives. 6G4Society fostered multidisciplinary collaboration by bringing together technical experts (engineers, researchers), legal professionals (experts in data privacy, regulation), social scientists (experts in human-computer interaction, societal impact), and economists (experts in market analysis, innovation). This collaborative approach ensured that the development of 6G is not solely driven by technological advancements but also considered the legal, social, and economic implications, leading to a more holistic and well-rounded approach. This collaboration occurred through workshops, joint research projects, and ongoing dialogue, but also via direct engagement with the external Expert Advisory Board (Task 5.1) representatives we have engaged in several ways.

Standardisation and Policy Input: 6G4Society actively contributed to the development of 6G governance frameworks by providing input on standardisation and policy. We highlighted that societal needs and ethical considerations, such as data privacy, trust, security, and accessibility, need to be embedded in the standards and regulations that will shape the future of 6G. 6G4Society informed, based on scientific evidence, relevant stakeholders from the European ecosystem (national and EU policymakers, EU agencies, DGs, etc.) and the broader public on the current and upcoming strengths, challenges, and opportunities supporting the relevant European ambitions delineated by the European Commission regarding 6G. This involved participating in standardisation bodies, contributing to White Papers with relevant policy, regulatory, and standards insights, and to policy discussions more generally, and providing research-based evidence and recommendations to policymakers. Our goal was to

influence the direction of 6G development so that it aligns with societal values and promotes responsible innovation. This included active engagement with key Working Groups under SNS JU and 6G-IA, like the Pre-Standardisation WG, to create liaisons and explore pathways to advocate for the early integration of value considerations into 6G standards. A significant result was the development of KVI Ontology, a structured framework that systematically captures the established key societal and sustainability indicators, with the target of positioning them as not just abstract concepts but traceable and interoperable elements within 6G standardisation. Communication with a major standardisation body, ETSI, was attempted, with views of contributing the Ontology work and potentially the KSI framework into a Technical Committee (TC). This communication channel faced challenges, because the TCs have rigorous procedures and mainly technical orientations. Moreover, our participation in events like the ITU-ETSI Symposium on ICT Sustainability facilitated discussions on embedding sustainability metrics in 6G governance. The Pre-Standardisation Roadmap identified key stakeholders and mechanisms, such as the CEN Workshop Agreement (CWA), to formalise the KVI ontology as a recognised pre-standardisation document. We refined the KVI Ontology based on establishment of a common set of KVIs, submitting the ontology for CWA endorsement, and continuing collaboration with certification and regulatory stakeholders to promote a human-centric and responsible 6G ecosystem.

Open Innovation and Open-Source Contributions: 6G4Society champions open innovation and open-source contributions as key drivers of technological advancement. We advocated that community-driven development fosters greater transparency, accelerates innovation, and ensures that the benefits of 6G are accessible to a wider range of stakeholders. We encouraged participation from researchers, developers, and other stakeholders through open-source projects, collaborative platforms, and public competitions. This collaborative approach fostered a dynamic and inclusive 6G ecosystem.

Sustainability and Societal Readiness: By recognising the critical importance of sustainability, 6G4Society aligned 6G development with KSIs and responsible research principles. We investigated the environmental impact of 6G technologies and promoted practices that minimise energy consumption, e-waste, and resource utilisation. Furthermore, we addressed broader societal readiness by considering the ethical, social, and economic implications of 6G, ensuring that the technology is developed and deployed in a responsible and sustainable manner. This included examining potential societal disruptions and developing strategies for mitigating negative impacts and maximising the positive contributions of 6G.

3 LIAISONS AND COLLABORATION ACTIVITIES

6G4Society championed sustainable, inclusive, and socially accepted 6G technology. By actively participating in SNS initiatives, workshops, and knowledge sharing, the project promoted a human-centric, ethical, and environmentally sound approach to 6G development. Future efforts focused on strengthening partnerships and using research to shape policy, standardisation, and the real-world implementation of sustainable 6G networks.

In the remainder of this section, we report on the main liaisons and collaboration activities run within the project lifecycle on various fronts:

- Desk search, surveys, information gathering, study and analysis.
- Liaisons and collaborations with selected SNS JU projects.
- Interaction via existing 6G IA and SNS JU Working Groups.
- Collaborative organisation of events (online and offline).

3.1 LANDSCAPE ANALYSIS AND STAKEHOLDER RESEARCH

Effective collaboration required a thorough understanding of the existing landscape. To lay the groundwork for impactful liaisons and collaborations, 6G4Society undertook a significant effort in its comprehensive information-gathering phase. This involved both desk and empirical research methods. Namely, we conducted extensive desk research, analysing publicly available documents, reports, and publications related to 6G technology, relevant initiatives, and stakeholder activities. Empirically, we engaged with key actors through surveys, interviews, and targeted information gathering exercises to gain direct insights into their perspectives, priorities, and ongoing work. This combined method of desk research and direct engagement provided a robust foundation for identifying potential partners and shaping our collaboration strategy.

This work consisted of:

1) **Identifying key project links** using the **SNS Vertical Engagement Tracker Tool** produced by the SNS ICE project, as well as examining public deliverables and project public activities, and via interactions within various WGs.
2) **Mapping** ongoing projects working on **KVIs** throughout publicly available SNS projects' deliverables, engagement in the various WGs, as well as one-on-one interactions with individual projects (e.g. online meetings, via EUCNC networking). Additional projects for engagement were identified via the 6G4Society workshop participation.
3) **Running surveys** to collect information from the ongoing SNS JU projects.
4) **Deepening collaborations** leading to tangible results, such as publications, webinars, conferences, surveys within the SNS JU ecosystem through continued engagement with working groups and task forces.
5) **Organising high-impact webinars, workshops, and knowledge-sharing sessions** to advance discussions on KVIs, sustainability, and social acceptance.
6) **Strengthening liaisons with Member States** to align national 6G initiatives with European strategic objectives.
7) Further **developing methodologies** for assessing KVIs and KSIs and integrating them into European and global 6G standardisation efforts.
8) **Expanding outreach** and advocacy efforts to promote a responsible and sustainable 6G transition.

As 6G research progresses, these planned activities ensured that the societal dimensions of technology remain a core focus, bridging the gap between technical advancements and real-world impact.

3.1.1 SNS SURVEYS TO CALL 1 AND 2 SNS JU PROJECTS

To create synergies within SNS JU and avoid duplication of efforts with other running activities, the consortium engaged with several relevant working groups and task forces, including the Societal Needs and Value Creation (SNVC) sub-Working Group as well as the Sustainability Task Force (TF). The exchanges highlighted knowledge gaps that needed to be addressed by 6G4Society to be able to work towards its objectives and mandate. These gaps included: addressing the social acceptance dimension, as well as sustainability beyond its environmental dimension (which itself is almost exclusively represented by energy efficiency only), including social sustainability, in SNS JU, and a lack of a cross-cutting analysis of the KVIs landscape across all SNS JU projects.

2024 Survey Round

A consistent part of 6G4Society's mandate was to contribute towards two main areas of work: Key Values (KVs) and KVIs, and Social Acceptance (SA). With the need to better understand SNS JU projects' approaches to these thematic areas, in August 2024, 6G4Society launched a blanket Survey to all running projects (Call 1 & 2). The objectives of the Survey were to:

- Capture current narratives on the impact of 6G on society, environment, and economies being actively sought in your project.
- How projects understood the public's fears/concerns related to 5G.
- Understand approaches taken by projects, if any, to social acceptance.
- Identify where the SNS JU project and 6G4Society had opportunities for future engagements on activities related to KVIs and SA.

The Survey was closed in September 2024, gathering a total of 22 eligible responses. The analysis of the results brought to light some key aspects that helped to inform the activity planning of 6G4Society. To exemplify, the survey provided further inputs into how SNS JU projects define their approach to social acceptance, their understanding of stakeholder interaction and their interaction with them (50% of the responders mentioned that they engage with final users, and more than 50% stated that their interaction is based on a co-design and co-creation approach). The Survey has been functional in supporting 6G4Society in tailoring targeted and well-defined activities with selected SNS JU projects. To accommodate the new projects starting in 2025, the survey was revised with plans for a second launch in Q1 of 2025.

2025 Survey Round

To accommodate the new projects starting in 2025 and to deepen the analysis, the survey was revised and relaunched in February-March 2025, primarily targeting Call 2 and Call 3 projects. Leveraging the results obtained in 2024 and with a better understanding of the approaches of projects from Call 1 & Call 2, the 2025 survey represented an opportunity to revisit the questions already answered and redefine them to ensure further insights. The section on Member States Initiatives was removed from the 2025 questionnaire for two main reasons: (i) projects had limited knowledge of 6G initiatives led at the Member States level, and (ii) SNS projects were receiving multiple requests for inputs, so 6G4Society decided to focus on sections that would most directly feed into the project's activities.

The 2025 Survey received 41 eligible responses, nearly doubling the response rate of 2024. Together, the two survey rounds gathered a total of 63 responses, achieving approximately 80% coverage of all SNS JU projects across Calls1-3.

Key Comparative Findings

The cross-analysis of the 2024 and 2025 Surveys revealed several important trends:

Perception of 6G Disruption: In 2024, around 70% of respondents believed 6G would be "somewhat disruptive", with 27.3% emphasising disruption from a business model perspective

and 22.7% from a technological standpoint. This shifted in the 2025 responses, where the majority (48.8%) expected disruption mainly from a technological point of view.

Social Acceptance Challenges: While in 2024, 86% of respondents did not anticipate public problems accepting 6G, the 2025 Survey revealed a more nuanced awareness of challenges. The top three frequently mentioned challenges in 2025 were: Security and Privacy concerns (19 projects), Health (10 projects), and Cost (9 projects).

Stakeholder Engagement: In 2024, researchers and technology providers were the stakeholders most engaged, with over 50% also engaging final users. In 2025, Technology Service Providers (40 mentions) led, followed by researchers (36). Engagement methods diversified, with Meetings/Workshops (18), Activities as part of the project (9), and Surveys/Interviews (7) being the most common.

5G Controversies Awareness: Projects were asked about their awareness of public concerns during 5G rollout. A significant number (16 projects in 2025) confirmed awareness, with concrete proactive measures being undertaken by projects including 6G-TWIN, XTRUST-6G, NexaSphere, TeraGreen, 6G-PATH, SUSTAIN-6G, and 6G-XCEL.

For a detailed analysis of the survey findings, see **Appendix 3: SNS Survey Report 2024-2025.**

3.1.2 TOWARDS A COMMON TECHNOLOGY ACCEPTANCE MODEL

Building on the survey results, 6G4Society identified a subset of projects which addressed the concept of “acceptance” in their project work, at different levels of definition and detail. Task 3.2 “Coordination with 6G initiatives towards a Technology Acceptance Model” was responsible for collecting evidence-based knowledge about the societal impact of 6G technologies through engagements with experts from running projects and other initiatives.

Project Interviews Conducted

In-depth interviews were conducted to deepen understanding of the systemic challenges linked to addressing social acceptance, sustainability, and responsible innovation within project’s practice. Over the course of 2025, twelve project members were engaged, representing nine SNS JU projects: VERGE, Hexa-X-II, TrialsNet, SUSTAIN-6G, FIDAL, 6G-PATH, FLECON-6G, NexaSphere, and AMBIENT-6G. These interviews were complemented by consultations with **two additional external experts**: a senior research officer in telecom industry and a social scientist specialised in public controversies on science and technology.

The interviews, tailored to each project, sought to understand how acceptance is conceptualised and operationalised in practice. The qualitative data gathered focused on identifying potential strengths, challenges, concerns, risks, opportunities, and threats within the nascent 6G ecosystem, particularly as they relate to societal impact concerns such as acceptability, inclusiveness, trust, security, safety, and sustainability.

Key Findings

The 2025 survey revealed that 21 projects are actively addressing social acceptance in their activities, spanning all three SNS Calls. Several projects demonstrated sophisticated engagement with existing acceptance frameworks and models, including references to established approaches such as the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), Responsible Research and Innovation (RRI), and the Social Construction of Technology (SCOT). This awareness indicates a growing recognition within the SNS JU community that social acceptance requires structured approaches, though the survey also revealed significant variation in how these frameworks are understood and operationalised in practice.

The interview analysis revealed several interconnected societal concerns that emerged consistently across the engaged projects. These include tensions around environmental

sustainability (particularly between energy efficiency goals and broader lifecycle impacts), privacy implications of advanced sensing capabilities, and questions of digital inclusion and equitable access. A detailed analysis of these findings, including the specific challenges and approaches identified across projects, is presented in **D3.2: 6G-IA Position Paper on Social Acceptance of 6G**.

The Social Acceptance of Technology (SAT) Framework

The SAT framework employed in 6G4Society builds upon previous work conducted by CyberEthics Lab., and now CyberSocial Lab., in the context of 5G SOLUTIONS and other responsible research and innovation projects funded by the EU. Drawing from these experiences and adapting to the specific context of 6G development, 6G4Society has developed a new iteration of the framework informed by the empirical reality investigated through the surveys, interviews, and collaborative activities conducted throughout the project.

The SAT framework starts from a simple premise: social acceptance is not simply public approval to be secured through better communication, nor a barrier to be overcome at the end of development. It is an ongoing, often contested process through which technologies become, or fail to become, legitimate in the eyes of diverse stakeholders, shaped by questions of values, governance, power, and trust that emerge throughout the innovation lifecycle, including how benefits, risks, and responsibilities are distributed.

Following the survey and interview activities, several projects expressed interest in exploring how the framework might apply to their work, and proposals for collaboration were developed accordingly. However, given the demanding workloads and timeline constraints faced by SNS JU projects, particularly those in advanced implementation phases, sustained engagement proved difficult to operationalise within the project period, itself an indication of how time and resource constraints shape whether and how social acceptance considerations can be integrated into ongoing 6G development.

3.1.3 CONSULTATION ACTIVITIES

In addition to broader discussions, workshops and webinars (described below), 6G4Society piloted collaborative engagement across a select sample of projects in **small group work** (~3 projects per topic) based on the KVs and KVI processes. The aim was to conduct **focused interactions on specific themes and have the projects provide proposals based on their project experiences on social sustainability values, objectives, guidance needed, and what would make good exemplar indicators**.

The goal of these groups was to:

- Establish a **common understanding** of key sustainability objectives within 6G projects. While the groups were small, the intention was to understand the places of disagreement and agreement, where projects were deriving their definitions from, and better understand their KVI processes.
- Explore how these values **relate to different project types** and their implications for **network design and policy development**, with the aim to better understand lower-TRL work, or the implications of use cases or different stakeholder interactions on the KVI thought process.
- Identify **best practices** and **challenges** in implementing social sustainability within the 6G ecosystem.

This initiative sought to provide a structured environment for deep diving into specific sustainability issues and ensuring alignment across projects and improve sharing across projects.

3.1.4 KVI AND SOCIAL ACCEPTANCE RELATED WEBINARS AND WORKSHOPS

Furthermore, one **webinar on social acceptance** was organised, targeting the SNS community, which took place in March 2025*: "Understanding and Addressing 6G Controversies: Learning from the Past, Building for the Future".*

This session aimed to establish a foundation for proactive engagement with societal concerns. We explored lessons from previous technology deployments, particularly the 5G rollout, to better understand and address potential controversies surrounding 6G. We also examined how trust dynamics develop and evolve in technological transitions, using a constructive, non-polarising approach to map and address concerns. Parallels with other sectors were made, where social acceptance has been problematic and crucial.

Objectives:

- Exploring lessons learned from 5G deployment.
- Understanding and addressing public concerns through evidence-based approaches.
- Developing strategies for constructive dialogue without increasing polarisation.
- Introducing a reflection on a framework to analyse social acceptance in the specific context of 6G.

6G4S workshop at the 2025 Spring PSCE conference (May 23, 2025, Goteborg, Sweden):

6G4S held a workshop on KVs and suggestions towards indicators (KVIs) for Next-Generation Public Safety Communication and Smart Network Services Technology. This event gathered nearly 40 PPDR practitioners, industry experts, and academics:

Purpose of the workshop: The goal of this activity was to identify and priorities which values (safety, resilience, trustworthiness, equity, quality of life) matter most in emergency contexts, understand how the values interrelate to PPDR goals and objectives, and translate them into what could be monitored (e.g. proto-KVIs) that can guide the design, the evaluation and the deployment of next-generation smart network services. The aim was also to trial a methodology for stakeholder engagement that could support future value-based or KVI alignment activities across the verticals or different use cases.

Activities Undertaken: To help explain what a KVI is, the workshop featured three project presentations in the form of video interviews (FIDAL, TrialsNet, 6G-PATH) showcasing real examples of value-driven innovation for PPDR use cases. Then, participants worked through realistic disaster scenarios, prioritised societal values in each context, and co-developed elements that could be monitored and evidence that could demonstrate whether those values were being delivered in practice. Particular attention was given to the interaction between technical capabilities and human, organisational and social factors.

Achievement: The workshop resulted in practitioner-grounded definitions of key societal values and an initial set of proto-KVIs linked to operational outcomes such as system availability, response coordination, situational awareness and support for community self-organisation. We can also summarise this workshop with three key insights:

1. Stakeholder perspective matters: PPDR practitioners understand these values uniquely based on their goals and operational contexts. This guide captures their perspective to help align innovation with real-world needs.
2. Context fundamentally changes what values mean: In a blackout, “quality of life” shifts from general well-being to keeping people alive. In wildfires, “trust” shifts from institutional trust to data reliability. Indicators must reflect these shifts.
3. Values are interconnected, not isolated: Working on Safety without Trust, or Resilience without Education, will be incomplete and less effective.

3.2 CROSS-SNS JU COLLABORATIVE EFFORTS

As a first public engagement debut, very soon after the 6G4Society project started, we worked in collaboration with the SNS JU office, but also with other players in the SNS JU ecosystem, to put together a special session proposal for the **EuCNC & 6G Summit 2024**. This session, which finally took place in June 2024, focused on presenting the main work of 6G4Society but also on discussing the main challenges and priorities to design a sustainable and socially accepted 6G. Engaging with experts on stage and various stakeholders attending this special session, has been a very concrete way to identify and connect with different stakeholders and projects actively engaged on sustainability matters. The outcomes of the session resulted in a white paper titled "Towards a Sustainable and Socially Accepted 6G for Society", launched in collaboration with SNS JU, as well as the FIDAL and BroadEU.Net projects. This short paper explores how 6G networks can address critical societal and environmental challenges by placing sustainability and social values at the core of future technological development. Key highlights from the white paper (available on the 6G4Society website) include:

- **Integrating sustainability and inclusivity:** Advocating for a proactive sustainability-by-design approach in 6G development, aligning technological advancements with urgent needs for environmental stewardship, social inclusion, and equity.
- **The role of KVIs:** Emphasising how KVIs can complement traditional KPIs to guide 6G technology design, development, and adoption. This ensures that networks not only meet technical benchmarks but also contribute positively to society and the environment.
- **Social acceptance vs acceptability**: Explaining that both social acceptance and acceptability are critical for the successful implementation of technologies like 6G, as they address both current societal attitudes and future ethical implications, ensuring that innovations are both embraced and ethically sound.
- **The importance of public engagement:** Highlighting the critical importance of public engagement and inclusive decision-making in building the trust necessary for the successful deployment of 6G technologies.

Furthering its commitment to sustainability advocacy, 6G4Society has actively contributed to **Special Sessions and Workshops on Sustainability at** EUCNC & 6G Summit 2025. These workshops, organised jointly with other **SNS JU projects** (SUSTAIN-6G, Hexa-X-II, CENTRIC, TrialsNet, Fidal, 6G-SAFE), focused on operational sustainability, social sustainability, and the practical application of KVIs in project implementation throughout the following sessions:

- **Operational Sustainability Workshop on "Technology Enablers for Sustainable 6G Design**" organised by Gigasys Solutions in collaboration with 17 SNS projects, the SNS Sustainability Task Force, and the 6G-IA Vision Working Group, covered key topics such as AI-driven energy efficiency, secure and sustainable network design, NTN and IoT for sustainability, and the role of observability and metering in green network operations. Discussions also focused on the latest insights from SNS JU-funded projects, including sustainability targets, trade-offs, and challenges. The event featured expert presentations, case studies, and a panel discussion to align research efforts, defined sustainability metrics, and drove industry-wide adoption of green 6G solutions. 6G4Society was invited to contribute to the forthcoming publication arising from this Workshop, scheduled for release in 2026 with sustainability insights holistically–i.e. also beyond the energy efficiency and such like environmental sustainability dimensions, and include the insights on socio-economic sustainability in 6G–as well as the KVI-related input.
- **Social Sustainability & KVI Special Session on "Societal Sustainability Driven by Values: Transforming 6G Through Key Value Indicators,"** aimed to explore how KVIs can bridge the gap between technological innovation and societal impact in 6G

development. Organised by experts from 6G4Society, SUSTAIN-6G, and other SNS JU projects, the workshop will define societal sustainability in the 6G context, showcase real-world applications of KVIs, and discuss methodologies for measuring societal impact. The session featured two interactive panels focusing on conceptualising societal sustainability KVIs and their practical implementation across different sectors. Key topics included aligning social values with technical performance, integrating societal impact into 6G research, and standardising KVIs for future networks. Through expert presentations, case studies, and discussions, the workshop identified gaps, proposed strategic solutions, and drove 6G development toward measurable societal benefits.

- **Special Session on "Social Acceptance as a Catalyst for Sustainable 6G: Bridging Technology, Society, and Policy"** aiming to bring together experts from SNS JU projects, industry leaders, policymakers, and researchers to discuss how social acceptance influences the design, adoption, and sustainability of 6G networks. Key topics included the integration of trust, transparency, and stakeholder engagement into technology development, lessons learned from 5G deployment, and the role of social and environmental KVIs in fostering public trust. The session featured a keynote speech, expert presentations, a panel discussion, and a Q&A segment, aiming to establish a unified approach to embedding social values in 6G innovation.

3.2.1 LIAISONS AND COLLABORATIONS WITH SNS JU RIAS

To foster dialogue and knowledge exchange, 6G4Society further organised and participated in several high-impact events aimed at advancing sustainability in 6G networks. Further liaisons and collaborations have also been established via the organisation of online and offline events of various nature that are summarised in the following.

Joint Workshop at Sustainable Places 2024 Conference (September 23-25, 2024, Luxembourg):

- **Collaborating with SNS projects:**
  - **6G-TWIN:** Focuses to enhance 6G performance and reliability by aiming to establish such an architecture by leveraging Network Digital Twins (NDT) for real-time control of complex network scenarios.
  - **BeGREEN:** Aims to integrate green energy solutions into next-generation mobile networks, by seeking to design evolving radio networks that accommodate increasing traffic and services without compromising power consumption.
  - **COALESCE:** Seeks to decrease the distance in European societies to scientific understanding and address issues concerning public distrust and policy responses to scientific crises. It will do so by building on and adding to existing forms of excellence in science communication, public engagement with sciences and co-creation practices.
  - **IN2CCAM:** Aims to accelerate the implementation of innovative (Cooperative, connected and automated mobility (CCAM) technologies and systems for passengers and goods, intends to develop, implement and demonstrate innovative services for connected and automated vehicles, infrastructures and users.
  - **CENTRIC:** Proposes to design the future 6G by creating the user-centric AI Air Interface. It will leverage AI techniques to provide a top-down modular approach to wireless connectivity that focuses on users' communication needs and environmental limitations.

- **6Green:** Envisions 5G and 6G networks and vertical applications cutting their carbon footprint by a factor of 10 or more. The project will make the most of cloud native technologies and service-based architecture introduced in 5G, to evolve and develop network capabilities focused on the new generation of services. 6Green also intends to improve the flexibility, scalability and sustainability of the global ecosystem.

- **Purpose of Collaboration:** To convene experts from various projects focus on sustainable 6G development, facilitating knowledge exchange and identifying synergies.
- **Activities Undertaken:** Organised a joint workshop during the Sustainable Places 2024 Conference, where each project presented their research findings and discussed collaborative opportunities on sustainability aspects.
- **Achievements:** We circulated an open letter on "*Towards Sustainable 6G: A Collaborative Call to Action for Addressing Environmental Challenges in (and thanks to) Future Mobile Networks"* summarising the key insights and action items identified during the session and to raise collectively voice the urgency of integrating environmental considerations into 6G development. We gathered endorsements from like-minded stakeholders and promoted the initiative through various channels. The letter has garnered significant support and is slated for publication in prominent industry journals.

Key Value Indicator (KVI) Workshop – 6G4Society & FIDAL Joint Event (October 25, 2024):

- **Collaborating with an SNS Project:** **FIDAL** focuses on developing advanced frameworks for evaluating 6G technologies, particularly in media and public protection and disaster relief sectors. FIDAL aims to establish KVIs that complement traditional performance metrics and help align 6G development with ethical and societal priorities.
- **Purpose of Collaboration:** To further establish the knowledge base, expertise, and needs towards defining a KVIs framework and methodologies that will guide the assessment of 6G technologies across SNS projects, ensuring that innovations align with societal expectations and sustainability goals.
- **Activities Undertaken:** The joint workshop primarily targeted SNS project partners, and also engaged industry leaders and researchers in interactive discussions about the hopes, fears and assumptions about KVIs and their role in shaping responsible 6G innovation. The workshop explored challenges, best practices, and strategies for implementing KVIs, emphasising the need for clear definitions and measurable impact.
- **Achievements:** A report has been created based on the workshop findings and widely circulated among the participants and stakeholders. The discussion identified key challenges, such as the difficulty in measuring KVIs within a project's lifecycle and the need for clearer connections between KVIs and traditional KPIs. This has been foundational input into the development of the KVI framework, necessary support structures, and strategic recommendations made.

6G4Society & Hexa-X-II Joint Webinar on Ensuring 6G Social Acceptance (November 6, 2024):

- **Collaborating with an SNS Project:** **Hexa-X-II** is a European flagship project focused on designing a sustainable, inclusive, and trustworthy 6G platform. The project aims to develop wireless technologies that address society's needs in the 2030s, with an emphasis on ethical, environmental, and societal considerations. Hexa-X-II seeks to define advanced use cases, services, and requirements that maximise value for

society. A key objective is delivering a 6G platform blueprint that enhances connectivity while realising the vision of "networks beyond communications.

- **Purpose of Collaboration:** To explore societal concerns and ensure the social acceptance of 6G technologies by integrating ethical, environmental, and inclusivity principles from the outset. The collaboration aims to align 6G development with public expectations and values, fostering trust and long-term sustainability.
- **Activities Undertaken:**
  - Engaged with stakeholders from SNS JU, who emphasised the importance of **KVIs** in measuring and promoting sustainability and societal acceptance.
  - Presented findings from 6G4Society and Hexa-X-II on **integrating social acceptance, ethics, and sustainability into 6G development**.
  - Offering insights into concerns such as privacy, security, and accessibility.
  - Conducted **real-time participant polls** on key social acceptance priorities for 6G, reinforcing the need for transparency, sustainability, and inclusivity.
- **Achievements:** The webinar successfully brought together diverse perspectives and generated actionable insights on embedding social values into 6G development. This provided input to refine the **SAT** model **for 6G**, incorporating lessons from public surveys, expert discussions, and Hexa-X-II's ethical research. Furthermore, we expanded th**e collaboration with civil society and industry players** to foster multi-stakeholder dialogue and create actionable guidelines for socially responsible 6G deployment.

6G4Society & TrialsNet Joint Webinar on Objective and Subjective Approaches to Key Value Indicators (February 6, 2025):

- **Collaborating with an SNS Project: TrialsNet** is a European project dedicated to deploying large-scale trials to implement a diverse set of innovative 6G applications. These applications leverage advanced technologies such as cobots, the metaverse, massive twinning, and the Internet of Senses, focusing on three key urban ecosystem domains.
- **Purpose of Collaboration:** To collaboratively explore and refine methodologies and evaluation tools for both objective and subjective measurement of KV and KVIs focusing specifically on the challenge of non-technical KVIs. This collaboration aims to ensure that those working to assess the societal and sustainable impact of 6G technologies have the tools and skills to engage in societal impact.
- **Activities Undertaken:** A Joint Workshop was organised that brought together experts from both projects, two additional SNS projects, as well as 4 external experts to share examples, and discuss methodological approaches towards defining and evaluating KVIs that focus on societal and sustainable impact.
- **Achievements** We developed a comprehensive report[1] on the webinars' main outcomes. This collaboration established key features needed for the elicitation and planning of KVIs for the evaluation practices to align with societal values and expectations. The insights have been folded into the proposals for how to elicit KVIs from KVs and for the proposal for what makes a good KVI.

1 https://6g4society.eu/wp-content/uploads/sites/118/2025/04/6g4society_KVI-WS-Feb_Report_V1.1.pdf

Sustainable Places 2025 Conference (October 08-10, 2024, Milan):

- **Collaborating with an SNS Project:** 6G4Society contributed alongside other R&I projects including 6G-TWIN, CENTRIC, 6Green, and others such as COALESCE and IN2CCAM — reflecting a multi-project collaborative environment.
- **Purpose of Collaboration:**
  - The collaboration was intended to integrate environmental, social, and ethical dimensions into the design and future of 6G — moving beyond purely technical or performance-oriented metrics.
  - 6G4Society aimed to bring forward frameworks like its KVIs, social-acceptance models, citizen engagement insights and sustainability-by-design principles to influence the broader network of SNS-JU and associated projects.
  - A core objective was to foster shared strategies across projects for greener network futures — including energy-efficient architectures, lifecycle assessment, renewable energy, sustainable hardware, and inclusion of societal values in 6G planning.
- **Activities Undertaken**
  - 6G4Society participated in the clustering workshop titled **"Towards Sustainable 6G – Part II: Progress and Perspectives from R&I Projects on Greener Network Futures"**, held during Sustainable Places 2025 in Milan.
  - In that session, key representatives (e.g., from 6G4Society) presented insights and arguments on embedding sustainability and value-based design into next-generation networks — spanning energy efficiency, lifecycle assessments, and citizen engagement (human-in-the-loop) approaches.
  - The event also included cross-project discussion exploring recent advancements across SNS-JU and Horizon-funded projects, sharing progress and perspectives on greener network infrastructures.
  - Additionally, 6G4Society contributed to sessions about how digital infrastructure (data centers, AI, digital twins) can support sustainability efforts, linking 6G networks to broader digital sustainability and decarbonisation goals
- **Achievements:**
  - 6G4Society reinforced the principle that 6G development must be socially and environmentally grounded, not just technically driven. Their contribution helped re-frame 6G as a tool for inclusive, sustainable digital transformation, aligned with European climate and social goals.
  - By presenting its frameworks (KVIs, social-acceptance models, sustainability-by-design) in a multi-project forum, 6G4Society strengthened cross-project alignment: positioning sustainability and ethical considerations as shared priorities across the SNS JU ecosystem.
  - The event contributed to raising awareness and building momentum for energy-efficient and environmentally responsible 6G network architectures - advocating renewable energy, lifecycle assessments, and sustainable hardware as essential components of next-gen connectivity.
  - 6G4Society's engagement helped bridge sectors, research, policy, industry, and civil society, underscoring the need for multi-stakeholder collaboration in shaping 6G futures that deliver societal value, trust, inclusivity, and environmental sustainability.

Final event (December 15, 2025)

- **Collaborating with an SNS Project:** The final event of 6G4Society (took place 15 December 2025, online) brings together, among others, representatives from SNS CO-OP and Sustain-6G within the broader ecosystem of SNS JU projects. This collaboration reflects 6G4Society's intent to embed its sustainability- and value-oriented outputs into the broader SNS community
- **Purpose of Collaboration:** The collaboration aims to:
  - Demonstrate how the development of 6G networks can align technical trajectories with sustainability, social values, and public needs.
  - Highlight the importance of interdisciplinarity and societal considerations in designing socially relevant 6G use cases, an objective aligned with the perspectives of SNS CO-OP, Sustain-6G, and the broader SNS JU ecosystem.
  - Share and promote the tools and frameworks developed by 6G4Society (e.g. KVI/KSI framework, value-based design ontology, citizen acceptance questionnaire) so that they can be adopted or considered by other SNS projects for future R&I, deployment, or policy processes.
- **Activities Undertaken:** During the event, 6G4Society organised:
  - Following the SNS-JU keynote on putting sustainability as a strategic priority within next SNS Programming, we held sessions presenting the project's work on social sustainability, practical implementation of the SAT framework alongside other project outputs to the broader SNS JU community, a dedicated session on how societal impact, sustainability, and key-value indicators (KVIs / KSIs) can guide value-driven network design - including practical implementation of a "KVI ontology." and the development of a value-based framework for 6G, citizens survey results with speakers from within the consortium.
  - A panel discussion bringing together actors from industry, research, and standardisation (including representatives from Sustain-6G and SNS CO-OP) to discuss the interconnections among social, environmental, and economic dimensions of sustainability in 6G. This session addressed challenges, trade-offs, and holistic approaches across these pillars.
  - A policy-oriented panel to derive lessons learnt, recommendations, and policy directions for future SNS JU initiatives - providing a platform to embed the outputs of 6G4Society into future 6G strategy, standardisation, and deployment processes
- **Achievements:** As a result of the collaboration and the final event:
  - 6G4Society's core tools and frameworks - including the SAT model, the KVI Framework, the KVI Ontology, and the Citizen Questionnaire - were formally presented to the SNS community, offering concrete instruments for measuring and steering value-based 6G design.
  - The event reinforced the role of social sustainability and citizen-centric values as central components of future 6G development rather than peripheral add-ons, strengthening the strategic alignment between technical innovation, societal values, and European policy priorities.
  - Through the participation of SNS CO-OP, Sustain-6G and other stakeholders, the event helped bridge the gap between research-focused, value-driven frameworks and more deployment- or industry-oriented projects promoting a shared vision of sustainable, inclusive 6G.
  - Concrete recommendations for short- and long-term actions were produced, intended to support the SNS JU community in embedding sustainability,

inclusiveness, and social acceptance into forthcoming 6G use cases and standardisation efforts.

3.2.2 LIAISONS AND COLLABORATION WITH SNS JU CSAS

To strengthen synergies and coordination especially in support of the various SNS JU projects, 6G4Society established connections with the other three CSAs, namely the SNS Operations (SNS OPS), and SNS Innovation and Communication Ecosystem (SNS ICE) and the SNS Collaborative Operations and Output Optimisation (SNS CO-OP). While in the first 6 months, ad hoc collaborations were ensured via the participation of Martel in SNS OPS as a partner, more formal consortium-to-consortium discussions have been organised from August 2024 on.

Key Contributions and Collaborative Efforts:

1. **A short input and recommendation paper** was put together and provided as input to the finalisation of the SNS JU Work Programme 2025. This document was sent to the SNS JU Office, SNS OPS and SNS ICE representatives, emphasising the critical need to align on overlapping and complementary activities to embed societal and environmental sustainability into 6G development. The paper highlighted that existing plans were predominantly centered on performance and energy efficiency, identifying key gaps in sustainability considerations and proposing consequent actionable steps.
2. **Reformulating the Vision Section of the SNS OPS Questionnaire:** Revised and contributed to the Vision section of the SNS Questionnaire, specifically targeting projects under **Call 3**. This effort aimed to refine questions to better capture aspects of sustainability and societal impact, ensuring that new projects align with these core values.
3. **Promotion of the SNS-ICE Vertical Engagement Tracker:** Advocated for the utilisation of the **Vertical Engagement Tracker**, an online tool made available via the 6G SNS web site to systematically map and monitor use cases across various vertical industry domains. This platform aids in aligning 6G research and innovation projects with industry needs, providing a structured framework for engagement and ensuring that technological developments are relevant and beneficial to diverse sectors.
4. **Verification of National Initiatives through SNS-ICE Member States Engagement:** Cross-checked identified national initiatives via the related SNS-ICE report on Member States engagement, as detailed in **Deliverable D2.1: Identification of European 6G R&I Stakeholders and Trends**. This process ensured a comprehensive understanding of ongoing efforts and facilitated the integration of diverse national activities into a cohesive mapping exercise.
5. **Integration of SNS stakeholder mapping produced by SNS OPS into the 6G4Society's stakeholder mapping:** The outcomes of the produced report, including recommendations on new organisations, new categories and sub-categories, as well as the removal of existing organisations, have been incorporated into our stakeholder mapping exercise.
6. **Thematic Meetings for Alignment and Collaboration:** Organised and participated in thematic meetings with SNS-OPS and SNS-ICE to synchronise efforts and foster collaboration on critical topics, including:
7. **JU Metrics and Methodologies:** Engaged in discussions to relate these metrics to the TAM , KVIs, and KSIs for 6G, particularly concerning SNS-OPS Deliverables D1.1 and D1.2.
8. **Input to SNS Work Programme 2025 and 2026:** Provided insights and recommendations to shape the Work Programme, advocating for the integration of sustainability and societal considerations.

9. **Alignment on SNS Roadmapping and Vision Activities:** Collaborated to ensure that long-term planning and vision-setting activities reflect a balanced emphasis on technological advancement and sustainability goals.
10. **Advocated for a more structured approach to inter-group coordination in alignment with SNS CO-OP** which facilitates strategic coordination, leveraging insights from SNS OPS and SNS ICE to unify activities across 6G SNS stakeholders. A key challenge within the SNS ecosystem is ensuring effective alignment across working groups and sub-working groups, particularly where thematic overlaps exist. One recurring concern has been the limited synchronisation between the SNVC, Pre-Standardisation, Security, and 5G/6G CAM groups, especially on topics related to KVIs. 6G4Society actively contributed to identifying synergies to avoid duplication of efforts and emphasised the need for improved transparency and collaboration to enhance efficiency and reduce redundancy. As part of this effort, we mapped the current landscape of WG priorities, revealing gaps in how these priorities align with broader sustainability frameworks. While technical methodologies—such as KVIs and energy-efficiency metrics—receive strong attention, other essential dimensions of sustainability, including social values and ethical considerations, remain underrepresented. 6G4Society has worked towards embedding a more holistic sustainability perspective within the Sustainability TF session mechanisms, advocating for balanced consideration of all three pillars of sustainability (economic, environmental, and social).

3.3 SYNERGIES THROUGH SNS JU TFS AND WGS

6G4Society aimed to foster strong engagement in SNS JU Task Forces and Working Groups, ensuring that sustainability, inclusiveness, and social acceptance are at the forefront of 6G development. Additionally, all six partners in the consortium are members of the 6G-IA, enabling them to leverage ongoing research efforts and active participation in discussions and participation also in related 6G-IA working groups, ensuring coordination and structured handover of relevant findings.

6G4Society participated in and actively contributed to various SNS JU Task force activities:

- SNS JU/Sustainability Task Force.
- SNS JU/Communication Task Force.
- SNS JU/Vertical Engagement Task Force.

6G4Society is also involved in multiple SNS Working Groups to maximise impact:

SNS Project Working Groups (originating from SNS JU projects):

- SNS JU WG/6G Architecture WP.
- SNS JU WG/Test, Measurement, and KPIs Validation WG.

SNS Industry Working Groups (organised by 6G IA):

- SNS 6G-AI WG/Vision WG/Social and Value Creation Working Sub-Group.
- SNS 6G-AI WG/Vision WG/Member States Initiative Working Sub-Group.
- SNS 6G-AI WG/Pre-Standardisation Working Group.

Furthermore, 6G4Society is engaged in the activities of **NetWorld Europe WG** (SME WG managed by SNS OPS project).

3.3.1 SNS JU COMMUNICATION TASK FORCE

Activities between June 2024–December 2025:

- Regularly participated in monthly meetings to provide updates on 6G4Society's progress.
- Supported and helped for promoting presence of SNS JU projects at MWC 2024 - in collaboration with SNS OPS and the SNS JU Office.
- Supported and helped for promotion of the EUCNC and 6G Summit 2024 event.
- Coordinated communication and dissemination efforts, including newsletters, events, and publications, in collaboration with other SNS JU projects.
- Active involvement in Task Force meetings to share developments and synchronise dissemination strategies.
- Explored opportunities for joint activities and collaborative dissemination efforts to maximise outreach and impact.

3.3.2 SNS JU SUSTAINABILITY TASK FORCE

Activities between June 2024–December 2025:

- Participated in Task Force calls, contributing information and insights to support sustainability initiatives.
- Collaborated in organising the Sustainability Task Force session at the SNS Technical Board meeting in Castelldefels in October 2024.
- TF Chair Ali Razaki (Nokia) conducted interviews with 6G4Society in December 2024 to gather comprehensive sustainability data.
- Volunteered to analyse the data and co-author a paper based on findings from the sustainability questionnaire and interviews collected from SNS projects, with the goal of disseminating key insights to a broader audience.
- Collaborated to provide updates on 6G4Society activities for the Sustainability Task Force session at the SNS Technical Board meeting in Krisna in February 2025.
- Active involvement at TF meetings to maximise the impact of sustainability efforts across the 6G community.
- Co-authored the publication entitled ‘Towards new Key Concepts, Challenges, and Building Blocks’ that synthesised data analysis from questionnaires and interviews collected from SNS projects with the goal of launching a white paper at EUCNC in June 2025-Assessing societal issues raised by 6G4Society and engaging relevant project partners.

3.3.3 SNS JU VERTICAL ENGAGEMENT TASK FORCE

Past and Ongoing Activities (March–December 2025):

- Identified PPDR vertical stakeholders to further populate the citizen survey and to engage in value-based workshop to ensure diverse perspectives are considered and establish the case for the importance of stakeholder engagement.

3.3.4 6G IA VISION WG/SOCIAL AND VALUE CREATION WORKING SUB-GROUP

Activities between June 2024–December 2025:

- Contributed to defining activities, roles, and responsibilities between the Social and Value Creation (SNVC) group and 6G4Society.
- Led thematic discussions on topics such as trust, gathering practical examples of KVIs in application.
- Organised a series of project presentations showcasing KVI development and evaluation, exploring variations and alternatives to the SNVC KVI methodology.
- Facilitated the exchange of best practices and challenges in applying KVIs across different contexts.
- Worked on increasing project engagement in Working Group meetings, ensuring broader participation and collaboration, with regular contributions from PSCE and CSL.

Past and Ongoing Activities (March–December 2025):

- Developed interview questions for SNS projects to understand how KVs and KVIs were designed, created, and operationalised, with the aim of informing methodologies and strategic choices for the SNVC's upcoming white paper, which will revisit, critique, and update the previously proposed KVI framework.
- The WG was in charge of developing a White Paper that provides concrete examples on simplifying and applying the KVI methodology. We have been supporting in defining the content and goals of this paper in relation to 6G4Society activities, as well as developing a project interview guide for the WG, based on our knowledge and experience. 6G4Society's research is also expected to form the background chapter of the white paper.
- Refined best practices and disseminating them via the WG to guide projects in effectively implementing KVIs.
- Engaged projects in Working Group meetings to present case studies and share real-world applications of the KVI methodology.
- Supported the development of new methodologies or refinements to the existing KVI framework based on feedback and practical applications.
- Coordinated with stakeholders for the successful execution of the KVI workshop at EUCNC.
- Strengthened collaboration between SNVC, 6G4Society, and other relevant initiatives to foster innovation in value-driven network development.

3.3.5 6G-IA PRE-STANDARDISATION WG

Activities between June 2024–December 2025:

- Mapped standardisation contributions from SNS projects to inform the development of the 6G4Society standardisation plan.
- Disseminated the survey as a part of the preparation of a structured 6G KVI/KSI ontology to establish a shared vocabulary among 6G-IA member projects to serve as a foundational tool for 6G-IA contributions to the 2026 standardisation phase.
- Strengthened collaboration within Pre-Standardisation WG meetings, contributing to discussions on value-driven 6G development and the positioning of societal and sustainability considerations in future standardisation work.
- Engaged WG participants in recurrent discussions on how to translate societal and sustainability values into actionable technical design requirements, exposing the

current gap between abstract principles and engineering practice. Highlighted misalignments where 6G technical development proceeds without meaningful linkage to real end-user needs or societal impact, reinforcing the need for value-driven requirements early in design cycles.

- Discussed the integration of KVI policies as first-class elements in future 6G architectures. Gathered expert feedback confirming industry uncertainty about how KVIs should be operationalised, what data would be required to measure them and whether existing network metrics are sufficient for value evaluation.
- Presented of the KVI Ontology conceptual model under development to WG members, explaining its purpose, scope, and potential role as a harmonising semantic asset supporting future standardisation efforts.
- Communicated of the fragmentation in KVI reporting across SNS to the WG to highlight the need for a unified value vocabulary and shared indicator structure.
- Contributed to discussions on terminology alignment, offering elements of the ontology's KV, KVI, stakeholder and sustainability structures as candidates for future harmonisation work under emerging pre-standards.
- Monitored of standardisation trends and gaps, with input provided back into the WG on the absence of mechanisms to formally integrate societal values into 6G technical specifications, supporting the WG's strategic agenda.
- Communicated of the goal of creating a CEN Workshop Agreement (CWA) to position the KVI Ontology as a candidate semantic backbone for future methodological guidance, and consultation with WG participants.
- Advocated for a synchronised approach across working groups, even after the rejection of a cross-WG task force, by initiating follow-up discussions with WG leads to align ongoing KVI activities.

3.3.6 SNS JU 6G ARCHITECTURE WG

Activities between June 2024–December 2025:

- Disseminated 6G4Society's objectives, ongoing and future activities and expected impacts, including the upcoming workshops and webinars.
- Contributed to the introductory section of the sustainability chapter in the 6G Architecture White Paper entitled 'Towards 6G Architecture: Key Concept, Challenges, and Building Blocks'.
- Circulated the KVI and Social Acceptance' Survey by 6G4Society for SNS projects (Call 2 & 3 Projects) in order to identify how Phase 2 & Phase 3 projects within SNS Phase are approaching KV and KVIs and how are they applying them into their technology design and development, and understanding projects' approaches (where applicable) to social acceptance of 6G, including the possible implementation of specific technology acceptance models or frameworks.
- Disseminated of the standardisation survey contributing to the preparation of a structured 6G KVI/KSI ontology.
- Peer-reviewed and co-authoring the entire sustainability chapter in the 6G Architecture White Paper.

3.3.7 SNS JU WG/TEST, MEASUREMENT AND KPI VALIDATION WG (SUBWG ON KVI)

Activities between June 2024–December 2025:

- Contributed to the White Paper by integrating the ontology work of 6G4Society into KVI definitions, ensuring alignment between conceptual frameworks and practical applications.
- Supported the further development of the ontology by leveraging data gathered from various projects, refining its structure and applicability.
- Acted as an informal liaison between TMV and SNVC sub-Working Groups to facilitate collaboration and ensure coherence in methodology and objectives.
- Coordinated efforts for the KVI workshop submission to EUCNC, aligning it with broader project goals and strategic priorities.

3.3.8 COLLABORATION IN NETWORLD EUROPE WG (SME WG)

Activities between June 2024–December 2025:

- Presented 6G4Society's activities and objectives to the working group, highlighting the project's focus on integrating societal values into 6G development.
- Promoted the 6G4Society Citizen Survey to gather public insights on 6G technology, aiming to inform development with user-centric perspectives.
- Volunteered to contribute to the upcoming SME position paper for 2025, specifically authoring or co-authoring sub-sections on Ethics and Regulatory Framework Compliance, Social Values and Acceptance, and Responsible and Trustworthy Innovation in Section 2 of the paper; and on Sustainability and Trustworthiness in Section3.

3.3.9 SNS TECHNICAL BOARD VERTICAL WHITE PAPER

Activities between June 2024–December 2025: Contributed to SNS Technical's Board Vertical White Paper entitled 6G for Media and Entertainment (M&E) with a chapter on regulatory, ethical, and societal considerations. The White Paper was released at the NEM Summit. This section drew primarily on the experience of 6G4Society, while also incorporating relevant insights from other SNS-JU initiatives focused on regulatory, policy, and socio-ethical issues. Indeed, since 2024, 6G4Society has investigated how emerging connectivity technologies such as 6G were shaped not only by technical performance but also by wider societal dynamics. Here, this question was addressed specifically in relation to M&E from regulatory, ethical, and societal viewpoints. The aim was to link the practical policy and regulatory environment, including funding mechanisms, EU law, ethical standards, regulatory obligations, content governance, and EU strategies for virtual worlds—with an analytical framework for immersive technologies and values (including M&E) to assess how M&E align with, and are shaped by, the EU policy landscape guiding the evolution of 6G.

4 LIAISONS ACTIVITIES BEYOND THE SNS JU ECOSYSTEM

Collaboration and knowledge exchange beyond the SNS JU context were essential for making sure the planned work and outcomes of the 6G4Society project can effectively contribute to align efforts that aim at the development of a sustainable 6G. This section focuses on the project's engagements in liaison activities designed to foster strategic alignment with relevant research, innovation, policy, and regulatory initiatives across Europe.

Our liaison activities have been diverse, encompassing participation in key events and working groups, engaging with external Advisory Experts, exchanging and promoting relevant efforts, and delivering structured input via the SNS JU Office to the State Representative Group (SRG) composed of representatives of each Member State and Associated Country. By actively engaging stakeholders outside the SNS JU ecosystem and initiatives/representatives of various Member States (MS), 6G4Society seeks to contribute to a shared understanding of the challenges and priorities surrounding the development of a 6G that, by design, is sustainable at a pan-European level.

4.1 ESTABLISHED EXTERNAL LIAISONS OVERVIEW

With the expression “external liaison”, within the context of this document, we refer to a liaison established with initiatives and/or stakeholders external to the SNS JU ecosystem. Some of these have a more European-focused span of influence and action, while others have a more global scope/range of motion. In the following, we summarise the main external liaisons we established during the entire project’s lifecycle.

The SHIFT project

The liaison has been established by inviting Hugues Ferreboeuf as a member of the 6G4Society External Advisory Board.

The SHIFT Project (https://theshiftproject.org) is a French think tank that advocates for a carbon-neutral economy. They focus on conducting research and proposing solutions to accelerate the transition towards a sustainable society. Their work covers various sectors, including energy, transportation, finance, and digital technology. The Shift Project aims to raise awareness about the urgency of climate action and promote policies and initiatives that support decarbonisation. They engage with businesses, policymakers, and the public to foster collaboration and drive change, and their work provides valuable insights for decision-makers and stakeholders involved in the transition to a sustainable future. Among others, one of their key areas of focus is **digital sufficiency**, advocating for responsible and sustainable use of digital technologies.

In this respect, by collaborating, SHIFT and 6G4Society amplified their impact and contribute to a more cohesive approach to the sustainable development of 6G. For instance, SHIFT's research and work on digital sufficiency (several documents were shared by Hugues Ferreboeuuf with our consortium) have informed some of the 6G4Society's activities. Conversely, 6G4Society's insights on the potential of 6G to enable sustainable solutions supported SHIFT's broader advocacy for a carbon-neutral economy.

In both France and globally, the digital sector accounted for approximately 10% of total electricity consumption in 2022 (The SHIFT Project, 2021, 2023). In a context of intense electrification of uses (mobility, building, industry, etc.), it is clear that digital technologies are also at the heart of planning issues for the transformation of our systems and the prioritisation of access to now-strained resources, including electricity.

The work conducted within The SHIFT Project’s last report “Energy & Climate: Lean networks for resilient connected uses10” has highlighted the significant impact of collective choices on the dimensioning of mobile networks regarding the development of new services and methods

of access (geographical, temporal) to these services. One of its recommendations is to create a **space for consultation** (citizens' and companies' conventions, expert interviews, institutional assignments and/or other modalities).[2]

ACM GoodIT

Prof Johann Marquez-Barja is a member of the 6G4Society External Advisory Board and as an engaged representative of IMEC (Belgium), he is directly involved in the ACM GoodIT initiative, which is an ACM yearly conference (typically about 100-120 people) focused on promoting ethical and responsible computing practices. It aims to raise awareness about the societal impact of technology and encourage the development of computing solutions that benefit humanity. ACM GoodIT focuses on several areas:

- **Ethical Considerations:** Examining the ethical implications of computing technologies and developing guidelines for responsible design and deployment.
- **Social Impact:** Analysing the impact of technology on society and promoting the use of computing for social good.
- **Sustainability:** Encouraging the development of sustainable computing solutions that minimise environmental impact.
- **Education and Awareness:** Raising awareness about ethical and responsible computing practices among students, professionals, and the public.

Both ACM GoodIT and 6G4Society recognized that technological advancements, particularly in the realm of 6G, must be guided by ethical considerations and a commitment to social good. 6G4Society benefited from ACM GoodIT's resources and expertise in ethical frameworks and responsible innovation. In turn, 6G4Society provided ACM GoodIT with valuable insights into the specific ethical considerations related to 6G, contributing to the development of more targeted guidelines and recommendations.

For the ACM GoodIT 2025 edition, which took place between the 3rd and 5th of September 2025 in Antwerp), 6G4Society's coordinator provided a keynote in which, among others, 6G4Society's key outcomes were presented using it as an example of how projects can embed environmental and societal considerations into the early stages of 6G design. This was a great opportunity to promote not only the 6G4Society work and results, but also to present the SNS JU initiative.

6G Flagship

Dr Marja Matinmikko-Blue Research Director of Infotech Oulu and Director of the Sustainability and Regulation of 6G Flagship at the University of Oulu is a member of the 6G4Society External Advisory Board.

The 6G Flagship is a pioneering research program based in Finland that conducts cutting-edge research across a wide range of 6G technologies, exploring, among others, the societal implications of 6G such as its impact on healthcare, education, and industry. Sustainability is also a key focus area for the 6G Flagship initiative which incorporates sustainability in their research and innovation efforts in various ways:

Energy Efficiency: They are exploring technologies and architectures that can significantly reduce the energy consumption of 6G networks. This includes research on energy-efficient hardware, software, and network management techniques.

[2] *The Shift Project - Lean ICT: towards digital sobriety (2019) 19 The Shift Project - Energy & Climate: Lean networks for resilient connected uses (2024). The Shift Project answer to public consultation on the European Commission White Paper "How to master Europe's digital infrastructure needs?"*

Resource Optimisation: They are investigating ways to optimise the use of resources, such as spectrum and infrastructure, to minimise the environmental footprint of 6G deployments.

Circular Economy: They are promoting the principles of the circular economy in the design and manufacturing of 6G equipment, encouraging the use of recycled materials and the development of devices with longer lifespans.

Environmental Monitoring: They are exploring the potential of 6G technology to enable environmental monitoring and sustainable resource management, such as smart agriculture and smart grids.

The 6G Flagship excels in cutting-edge technological research and ecosystem building, fostering collaboration between academia, industry, and government agencies. 6G4Society brought strong expertise in societal aspects of 6G, including sustainability, ethical considerations, and social acceptance.

one6G - participation to the one6G Summit 2024

one6G is a non-profit association focused on shaping the future of 6G technology in Europe. They aim to create a collaborative platform for stakeholders across the 6G ecosystem, including industry, academia, research institutions, and policymakers. one6G's activities include organising events and workshops, publishing reports and white papers, and participating in standardisation efforts. They aim to serve as a central hub for information and collaboration, facilitating the exchange of ideas and best practices within the European 6G community.

In September 2024, the 6G4Society project was invited to take part in discussions taking place at the one6G Summit 2024 on *"Global 6G Development" addressing the crucial question: how can we harness 6G for society and the environment?*

Both the one6G initiative and the 6G4Society project recognized the transformative potential of 6G technology and its impact on various aspects of society. They both emphasized the importance of human-centricity, sustainability, and ethical considerations in 6G development. By collaborating, they reinforced these shared values and promote a responsible and inclusive approach to 6G.

ETSI - European Telecommunications Standards Institute

The European Telecommunications Standards Institute (ETSI) plays a crucial role in shaping the future of mobile communications by developing globally recognised standards for next-generation networks. As an influential player in the 6G landscape, ETSI fosters collaboration among industry leaders, research institutions, and policymakers to define the technological and regulatory framework for future wireless communications. Through its working groups and pre-standardisation efforts, ETSI provides a platform for bringing together diverse perspectives and ensuring that 6G development aligns with the needs of society and industry.

The 6G4Society project was actively pursuing ETSI-driven endorsement to ensure that societal and sustainability perspectives are proactively integrated into emerging 6G standards, as part of a broader strategy to bridge the gap between technical standardisation and non-technical considerations. The project has made significant strides in pre-standardisation discussions, particularly through the development of the KVI Ontology, a structured framework that captures KVIs and KSIs relevant to 6G standardisation. This ontology serves as a reference to embed social and environmental concerns into the technical standardisation process, providing the structure and operational relationships between them.
During the project, preliminary exchanges were initiated between partners and ETSI contacts regarding the potential alignment of the KVI ontology with ETSI activities, especially the Smart Applications REFerence (SAREF) ontology framework maintained by the smartM2M Technical

Committee. Awareness of ETSI developments was also maintained through the SNS Pre-Standardisation Working Group, where ongoing standardisation trends and gaps were regularly discussed. While these discussions confirmed conceptual interest in the topic, the timeline and maturity levels of the respective efforts were not aligned. ETSI activities in the relevant working groups were either concluding their current cycles or had roadmaps not suited to the ontology's development schedule. As a result, no formal integration pathway could be pursued within the duration of 6G4Society.

Nevertheless, the project's investigation demonstrated the relevance of semantic modelling for embedding societal and sustainability values into future 6G-related standards, and the KVI ontology remains positioned as a candidate for future alignment initiatives beyond the project horizon. The groundwork established, the conceptual structuring, terminology harmonisation, and value-indicator modelling have been done and can inform standardisation dialogues in the future. This ensures that the 6G4Society contribution is prepared for follow-up by projects or working groups wishing to continue the effort.

CEN-CENELEC

CEN–CENELEC is the European body responsible for developing standards across a wide range of industrial and societal domains, representing an important pathway for early influence on emerging frameworks relevant to 6G. It is a standardisation body that offers mechanisms that align closely with the mission of 6G4Society. For this reason, the project explored this body as the main route for embedding value-driven and sustainability-aware perspectives into the broader 6G ecosystem, consistent with the strategic motivations described in the KVI ontology objectives.

A particularly relevant mechanism within CEN–CENELEC is the CEN Workshop Agreement (CWA), which provides a fast-track, consensus-driven route for producing pre-standardisation deliverables. CWAs are intentionally lighter and more agile than formal European Standards, making them well suited to fast-moving domains where shared terminology, methodological guidance, and interoperable semantic models are needed ahead of full standardisation cycles. This aligns closely with the emerging needs around 6G KVs, KVIs, and sustainability-oriented assessment frameworks. In this context, 6G4Society engaged with the drafting of a developing CWA focused on establishing a methodology and ontology for structuring KVs and KVIs in next-generation network research. contributed conceptual insights and early structuring elements drawn from the KVI/KSI ontology, including its harmonised vocabulary, conceptual hierarchy, and representation of relationships between values, indicators, impacts, and sustainability features. These inputs support the CWA's objective of creating an initial, interoperable framework that can guide stakeholders in assessing societal and environmental impacts in early 6G research and development activities, while providing a foundation for more formal standardisation efforts in the future.

6G4Society has actively pursued in discussion with CEN representatives seeking endorsement from the following Technical Committees:

- CEN SS S29 – Social Responsibility,
- CEN/TC 391 – Societal and Citizen Security,
- CEN/TC 465 – Sustainable Urban & Community Development,

The agility of the CWA process and its focus on consensus made it an appropriate venue for disseminating the project's conceptual advancements. The ontology's structured model ensures that subsequent CEN–CENELEC activities and standardisation experts can build on a unified semantic foundation, accelerating the integration of societal and sustainability considerations into pre-standardisation work.

4.2 ALIGNMENT WITH MEMBER STATES INITIATIVES

It is vital at this early stage of development that all Member States are aware of each other's 6G developments to ensure convergence and integration at a pan-European level, not to duplicate efforts and align on the societal and sustainability aspects that must go hand in hand with technical development. In Lithuania, for example, the first 6G pilot tests is expected to be starting in 2026. In Slovakia, no roadmap has been defined yet. The ambition is to make sure that technology developments are driven by societal, environmental and economic needs - and not the other way around. This requires a market/society-pull approach rather than a technology push one. To do so, engaging with citizens and end users, private and public institutions, as well as policy makers and industrial players across Europe, is essential. A clear focus on KVIs[3] is therefore inseparable from successful 6G implementation across Europe.

Therefore, this section outlines our conducted activities for engaging with Member States within the evolving 6G ecosystem. It captures the progress made for mapping and fostering synergies among national initiatives, particularly in the realms of societal impact and sustainability in liaisons with initiatives at the MS level.

SNS JU stressed the importance of the involvement of Member States from the Kick-off Meeting onwards (January 2024). The SNS JU recommended to get through on the national initiatives, also to have a broader impact and collaborate with those Member States having societal aspects and sustainability on the agenda. Therefore, our approach focused on pinpointing the most active Member States through multiple channels: engaging National Contact Points, collaborating with SNS JU Governing Body States Representative Group (SRG), all of which are central to our data collection process.

4.2.1 6G4Society alignment with MS

To create a comprehensive mapping of existing initiatives and projects at the Member States level, our approach began with a continuous desk search designed to identify and align with relevant European and international initiatives. We reviewed materials, including the 2022 report on 5G/B5G/6G Member States initiatives, released in March 2023. This report highlights the various activities promoted by Member States, Associated Countries, and Candidate Countries, which are relevant for the deployment of 5G communications networks and their evolution “Beyond 5G” towards “6G” networks. In close coordination with the SNS ICE project, we reviewed the D2.1 Identification of European 6G R&I stakeholders and trends. This report gives an overview of the different activities that SNS ICE has done in 2023 to foster collaboration and exchange of information between different 6G initiatives in Europe, and recommendations for possible collaboration actions. We were cross-checking the list of national initiatives, which focuses on mapping European 6G research and innovation stakeholders. To support this work, we maintained and continually updated a comprehensive stakeholder database, integrating input from projects in the SNS ecosystem, representatives engaged via National Contact Points, and with the 6G4Society Advisory Board members.

Within the framework of EUCNC 2025, on June 3rd, a Sustainability workshop addressing the SRG was organised in the context of the SNS JU’s commitment to strengthening Europe’s technological leadership in next-generation networks and accelerating both the digital and green transitions. Within this framework, 6G4Society presented its core scope, objectives, and methodological contributions. The project introduced its multidisciplinary approach, which expands beyond technology-push analysis to integrate ethical, societal, and governance considerations into 6G development. Central themes included the role of Social Acceptance in 6G, lessons drawn from the deployment of 5G, and the importance of embedding sustainability

[3] *In the 6G-IA White Paper “What societal values will 6G address? – Societal Key Values and Key Value Indicators analysed through 6G use cases” it is stressed that KVIs are used for monitoring and validating the impact on key societal values, and vice versa, for studying how societal Key Values can be enabled by steering technology developments in certain directions.*

and societal values into network architecture and design processes. This included an overview of the SAT framework, the development of KSI (as part of the KVI methodology), and their relevance for responsible innovation.

The presentation also highlighted the project's extensive public engagement activities, summarising findings from the citizens' survey and co-creation workshops, as well as reflections on how such participatory approaches could be scaled at the Member State level. Additional insights were shared regarding 6G4Society's contributions to pre-standardisation and policy, particularly around interoperable sustainability metrics, societal indicators, and policy recommendations.

Finally, the project outlined how 6G4Society supported SRG and the Member States, including:

- the provision of multilingual information materials and a citizens' survey available in nine languages;
- support for national-level citizens' engagement workshops;
- dissemination of policy briefs and white papers;
- participation in future SRG webinars or workshops as needed.

Through these contributions, the workshop aimed to equip SRG members with the knowledge and tools required to engage strategically in Europe's 6G agenda, while reinforcing sustainability -environmental and societal - as a defining element of Europe's future network leadership.

The SRG has been an adequate platform for our outreach activities as it is composed of representatives from each Member State and Associated Country, and it is mandated to advise on research and innovation under Horizon Europe and deployment initiatives under CEF2 Digital and other EU programmes.

4.3 MEMBER STATES COLLABORATION THROUGHOUT WEBINARS AND WORKSHOPS

4.3.1 Workshop on the role of KVIs and SAT in 6G ecosystems, with Future Network Services (FNS) Ethics Board

On 25 September 2025, 6G4Society hosted the webinar titled "A Conversation with the Dutch FNS 6G Ethics Board." The session featured insights from Aaron van Diepen (TU Delft, FNS Ethics Board) and Katrina Petersen (Senior Research Consultant, Societal Value at Public Safety Communication Europe (PSCE), 6G4Society Project), who explored how the concept of KVIs can guide the ethical development of 6G.

6G4Society aimed to co-create a sustainable 6G ecosystem by aligning technical innovation with societal values. This objective was central to the conversation, which examined how KVIs can bridge the current gap between engineering priorities and public expectations. As a new complement to traditional KPIs, KVIs introduce value-driven criteria into network development, emphasising goals such as privacy, sustainability, transparency, and community-level impact.

Exploring the Role of KVIs in 6G Development

The motivation behind KVIs was presented. While the technical community is well-versed in KPIs, metrics that track speed, latency, or bandwidth, KVIs shift the conversation toward values that matter to society.

Dutch Future Network Services (FNS) Ethics Board way of working was presented as a main objective to embed ethical considerations into the architectural and policy frameworks for 6G. He noted that security, privacy, and sustainability cannot be afterthoughts; they must be built into the technical design process.

There was a strong emphasis for the need for KVIs to capture real-world public concerns, such as protecting personal data, encouraging open-source innovation, and supporting technologies that enhance, rather than replace, human interaction, especially at the neighbourhood or community level. She also discussed the importance of energy efficiency, particularly as 6G infrastructure expands and the number of connected devices increases.

From Policy to Practice: Harmonising KVIs Across Use Cases

A key part of the conversation focused on the challenge of harmonising KVIs across a wide range of use cases and sectors. With different projects working on everything from IoT applications to AI integration, there's no one-size-fits-all approach. However, both speakers stressed the importance of common procedures and shared understanding to ensure that KVIs remain consistent and meaningful throughout the 6G ecosystem.

It was discussed how KVIs are derived from KVs, themselves shaped by high-level policy goals and ethical standards. By translating these into measurable design principles, 6G developers and decision-makers can assess whether the technology being built truly reflects the values it claims to support.

Bridging the Five-Year Gap to 2030

With 6G expected to be operational by 2030, the next five years represent a critical opportunity. The webinar emphasised that KVIs can serve as a bridge between the rapid pace of technical innovation and the longer-term societal impact of 6G.

Rather than waiting until after deployment to evaluate public acceptance, the speakers argued for proactive co-creation. This includes engaging with citizens early, incorporating their perspectives into pilot projects, and building trust through transparency, openness, and responsiveness.

The webinar made one thing clear: value-driven design is no longer optional. As networks become smarter and more embedded in our lives, ethical considerations must be integrated from the very beginning. KVIs offer a promising pathway for aligning 6G development with societal needs and expectations, not just in theory, but in practice.

4.3.2 On 5G and 6G Societal Dimensions, with citizens and Future Network Services (FNS) experts, with Waag Society in Amsterdam

This workshop organised on September 25th, 2025, focused on the 6G SAT Framework, specifically designed in the 6G4Society project as a way to navigate these issues. We proposed a comprehensive model to explore and evaluate technology acceptance within Research and Development (R&D) and Research and Innovation (R&I) contexts: the SAT framework, a multi-level approach to acceptance and acceptability able to comprehensively assess the complex dynamics proper of the 6G context. The workshop emphasised that 6G is not merely a faster network, but a foundational technology that could underpin the next generation of public infrastructure.

Where 5G integrates the Internet of Things (IoT), connecting devices, 6G integrates Artificial Intelligence (AI), enabling the network itself to become semi-autonomous. This shift will influence how societies operate, from transport and energy systems to governance and public services.

Participants agreed that the narratives surrounding 6G must therefore evolve. Rather than focusing on industrial use cases or isolated technical milestones, the message to citizens, policymakers, and businesses should highlight that we are building the "railways and

roadways" of the 21st century, critical infrastructures that enable economic growth, democratic resilience, and strategic autonomy.

Shaping the Narrative: From Industry to Society

A key takeaway from the workshop was the need to involve broader stakeholder groups in shaping and communicating the story of 6G.

While industrial actors have traditionally led discussions around next-generation networks, participants stressed that policymakers, educators, civil society organisations, and citizens must all have a seat at the table. Only through shared ownership of the narrative can Europe ensure that 6G reflects public values and contributes to societal wellbeing.

This societal framing also supports the European Commission's vision of bringing 80% of intelligent processing to the edge, thereby reducing dependence on global hyperscale and enhancing Europe's strategic digital autonomy.

Embedding Values through Key Value Indicators

Another central point of discussion was the importance of KVIs as a practical framework for embedding values into 6G development.

Participants agreed that KVIs are not optional, but essential for building use cases that are both technically robust and socially meaningful.

KVIs are derived from KVs, translating abstract principles, such as sustainability, privacy, or inclusion, into measurable indicators. By mapping these values to technological enablers, KVIs can help ensure that future networks are energy efficient, trustworthy, and aligned with public expectations.

A Call for Broader Engagement

The Amsterdam workshop made one thing clear: the future of connectivity cannot be determined by engineers alone.

To ensure that 6G serves as a public good, we need an inclusive, sustained dialogue that bridges technical innovation with societal reflection. As discussions at Waag Society showed, the next generation of networks will not only connect devices and data; it will connect values, people, and purpose.

By grounding 6G development in public dialogue and measurable values, Europe could build a network that is not just faster, but fairer, more resilient, and more human.

4.3.3 Webinar with Dutch and Finnish 6G Communities

On 29 September 2025, 6G4Society organised the webinar *"The 6G4Society Project and 6G Next Generation Networks: What Does It Take to Build a Successful Ecosystem?"* The session convened leading voices from the Dutch and Finnish 6G communities to examine how robust national ecosystems are created, sustained, and scaled over time. Contributions from Paul Wijngaard (Dutch Future Network Services), Otto Vaino, and Pekka Rantala (6G Bridge Programme, Finland) offered concrete insights from ongoing national initiatives and reflected on how technical advancement can be aligned with societal, industrial, and strategic objectives.

The discussion reinforced the idea that 6G4Society's vision of a sustainable and inclusive 6G future depends not only on technological innovation, but also on the strength of the ecosystems that enable it. By drawing on the experiences of Finland and the Netherlands, the webinar explored how highly interconnected, multi-stakeholder environments can be cultivated—and what lessons can be transferred to other contexts.

Core Elements of a Thriving 6G Ecosystem

Opening the session, TNO highlighted the importance of understanding what motivates each actor within the ecosystem, from semiconductor manufacturers and network providers to public authorities. Identifying these drivers and integrating them into a shared narrative transforms collaboration from simple coordination into genuine co-creation.

The process to developing a "virtual twin" of the ecosystem was endorsed: by mapping relationships and interdependencies, new synergies can emerge naturally. Today, the Dutch 6G ecosystem brings together more than 500 stakeholders across government, industry, and research, all operating with a shared strategic direction.

Three fundamental drivers shaping the Dutch approach to 6G were identified:

- **Economic Value Creation** – A credible business rationale is essential. Although 6G technologies are still under development, insights can already be drawn from 5G deployments and the growing integration of AI into network architectures. Opportunities extend beyond end-user applications to include core network innovation and influence over future standards.

- **Digital Sovereignty and Strategic Resilience** – As 6G enables cloud capabilities to move closer to the network edge, Europe's digital autonomy becomes a central concern. With up to 80% of data expected to be processed at the edge, this transition represents not only a technical evolution, but a strategic priority.

- **Sustainability by Design** – Energy efficiency must be embedded as a foundational principle. Rather than increasing energy demand, 6G networks are expected to reduce overall consumption, making sustainability a baseline requirement for long-term infrastructure investment.

The Finnish Approach: Aligning Strategy and Implementation

The Finnish ecosystem follows a complementary yet distinct path. Finland's model combines grassroots innovation with strong alignment to national, European, and multilateral funding frameworks. Core capabilities are developed early through targeted support and then scaled via applied research, pilots, and collaborative projects.

It was explained that this approach allows supply and demand, research and deployment, to converge in a structured but flexible manner. The result is an ecosystem that balances stability with adaptability, capable of addressing immediate needs while advancing long-term strategic goals.

It was also emphasized that a set of practical principles for effective ecosystem building, applicable at both national and international levels:

- Identify committed points of contact among key customers and stakeholders.
- Prioritise regular in-person meetings to deepen trust and collaboration.
- Ensure that leading organisations have sufficient operational resources to coordinate and drive activities.
- Actively communicate strategic roadmaps (such as SRIA or SRDA) through both formal and informal channels.
- Take calculated risks by initiating experimental or untested collaborations.
- Remain open and responsive—embracing new opportunities often leads to unexpected value.

These principles highlight the often-invisible work that underpins successful ecosystems. Once an enabling environment is created, others naturally step in—sometimes overlooking the sustained effort required to establish those foundations.

Ecosystem Development as Strategic Work

The webinar concluded with a key insight: building a successful 6G ecosystem is as much a strategic endeavour as it is a technical one. Mapping stakeholder landscapes, aligning incentives, and translating national strengths into shared missions are all essential steps that shape the trajectory of technological development.

The Dutch and Finnish experiences provide two compelling examples of how this can be achieved in practice. Whether through the Netherlands' narrative-driven collaboration or Finland's systematic alignment of funding, piloting, and standardisation, both demonstrate that early coordination, long-term vision, and values-driven leadership are critical for navigating technological uncertainty.

As 6G continues to evolve, it will ultimately be the quality and resilience of these ecosystems, not technology alone, that determine how inclusive, impactful, and sustainable the next generation of connectivity will be.

5 LIAISONS PERTAINING TO THE LEGACY OF THE 6G4SOCIETY PROJECT

5.1 A LEGACY ALIGNED WITH THE FUTURE 6G

As 6G4Society approached its conclusion, its legacy stands as an essential enabler for the next phase of European 6G research and innovation. The SNS JU welcomed the initiative that the project's methodologies, particularly those supporting social sustainability, value-driven design, and technology acceptance, be partially carried forward into Sustain-6G in line with its scope and description of actions. This continuity is not envisioned as additional work but as a strategic approach that enriches ongoing activities within Sustain-6G and ensures alignment between past insights and future technological development. 6G4Society's results therefore, persist not merely as outputs but as a structured knowledge framework capable of guiding Sustain-6G through its methodological, technical, and societal challenges.

5.2 STRENGTHENING SOCIAL SUSTAINABILITY IN 6G DEVELOPMENT

One of the most enduring contributions of 6G4Society concerns the conceptualisation of **social sustainability**. The partners identified early on that the notion of social sustainability was insufficiently defined and operationalised within the 6G context. 6G4Society took the first steps to filling this gap by offering a clear analytical foundation to support the community in defining the concept, prioritising elements of it within smart networks, and addressing identified gaps in existing SNS approaches.

This was achieved through the development of a structured toolkit that supports the transition of social sustainability from a high-level aspiration to measurable KVIs as well as draw the direct connection between social sustainability and social acceptance. The toolkit serves as a blueprint for projects and external stakeholders to move beyond connectivity-for -connectivity's sake, ensuring that assessment of social impact and considerations of the social context in which 6G is entering into are embedded into the initial design phase rather than treated as a retrospective consideration. By breaking down social sustainability into actionable components, 6G4Society has sought to provide the 6G ecosystem with a common language, or at least the basis from which to debate a common language, priorities, and success factors. Through this work, 6G4Society enables other projects to treat social sustainability as a core component of technological development rather than an external, conceptual add-on, or conflate it with user experience.

5.3 KEY VALUES AND KEY VALUE INDICATORS: A FRAMEWORK FOR VALUE-DRIVEN INNOVATION

One of the most enduring legacies of 6G4Society lies in its guiding work on **KVs** and **KVIs**, which fundamentally reshaped how societal and sustainability considerations are integrated into 6G research and innovation. While this concept was already in action within the 6G ecosystem, 6G4Society introduced collaborative processes, definitions, and proposed methodologies to support harmonisation of KVIs; it identified key challenges faced in the practical application of the concept; and it provided strategic guidance towards a roadmap to developing common indicators across the projects.

Through its contribution to the SNS community (e.g. via 6G-IA Working Groups, via collaborative project-driven activities) and being handed over to Sustain-6G and the SNVC working group, the project proposed a robust methodological foundation for the derivation, definition, and evaluation of KVIs. Central to this effort was the development of the guidance document ***"What is a Good KVI"***, which provides a shared reference point for the community. This guidance clarifies the concept of KVIs and distinguishes them from KPIs, user experience (UX) metrics, and high-level principles, addressing a long-standing ambiguity in how value is operationalised in technology projects. It further outlines principles for robust KVI design, practical examples of KVIs in use, and a step-by-step approach to building meaningful indicators that are decision-relevant rather than purely descriptive. The preparation of this guidance was a collaborative process, involving contributions and reviews from representatives of 14 SNS projects and incorporating advice from external experts. As such, it represents not only a methodological output but also a consensus-building exercise that helped establish a shared language and vision around values, sustainability, and impact, while openly acknowledging unresolved challenges and areas for future work.

Beyond conceptual clarification, 6G4Society advanced a concrete, practice-oriented approach via a **stakeholder value mapping methodology**. This process guides projects to work with external stakeholders from different verticals (e.g. those who would use and be impacted by 6G) to work through real-world scenarios, problems, and goals in order to identify, define and prioritise key values. The aim of it is to co-create common KV definitions, transparently articulate the objectives within for the stakeholders, and generate proto-KVIs grounded in operational reality without creating a burden for the external stakeholders and by promoting relatively contained activities. By engaging PPDR stakeholders directly to test this process, the project ensured that value definitions reflect practitioner perspectives and contextual constraints, rather than abstract assumptions. The resulting insights support a deeper understanding of how values manifest differently across use cases and stakeholder groups.

A further cornerstone of the legacy is the development of **Social Sustainability Value Sheets** *(see D3.3-Apprendix 3)* covering inclusivity, trust, well-being, safety, and building knowledge and skills. These sheets, contributed to by representatives from eight projects and reviewed within the SNS community, provide structured definitions and illustrative KVI exemplars. They are explicitly designed to harmonise value interpretations across projects, enable cross-project learning, and stimulate necessary debates about priorities and trade-offs, acknowledging that distinctions between "key values" and "objectives" are often deeply intertwined.

To bridge the gap between abstract values and actionable assessment, 6G4Society also introduced a **structured value template** *(see D3.3)*. This template supports projects in systematically moving from value definitions to measurable indicators by identifying stakeholders and pain points, linking values to technology choices, use cases or policy decisions, mapping impacts and trade-offs, and formulating KVIs that inform concrete design and governance decisions. This approach reinforces the idea that KVIs are not standalone metrics, but tools embedded within decision pathways.

Importantly, 6G4Society did not treat KVIs as static or purely evaluative instruments. Its work emphasised principles for sustainability-oriented KVIs that are holistic, transparent about boundaries and trade-offs, oriented towards long-term resilience, and grounded in both stakeholder engagement and theory. Illustrative examples demonstrated how social, economic, and environmental dimensions can be intertwined within KVI design, making explicit the tensions between access, affordability, environmental impact, and economic viability.

The project's legacy also includes early practical application: Some of the Sustain-6G use-case scenarios were mapped for KVI derivation as a way to test and finesse the process as not only a way to structure definitions but to see if it could also be a process to ensure continuity from conceptual development to implementation.

Finally, the continuation of this work is ensured through its handover to the 6G AI Societal Needs and Value Creation sub-group (SNVC). The background research, KVI concepts, ontology, and methodological elements developed by 6G4Society will be carried forward and embedded into the broader SNS methodological framework. In doing so, 6G4Society leaves behind not only tools and documents, but a durable shift in how the European 6G community understands success: as a balance between technical excellence and the societal values that 6G is ultimately meant to serve.

5.4 ADVANCING THE UNDERSTANDING OF SOCIAL ACCEPTANCE OF TECHNOLOGY

Beyond its contributions to values-based and sustainability-oriented 6G design, **6G4Society leaves a substantive methodological legacy to Sustain-6G through the operationalisation of SAT**. In this framework, acceptance is no longer treated as a proxy for individual user satisfaction or adoption intent but is reconceptualised as a **multi-level socio-technical condition** that shapes whether technologies can be legitimately deployed and sustained at scale. Significantly, SAT distinguishes between acceptance (the empirical reality of how technologies are received) and acceptability (the normative question of whether deployment is ethically justified), both of which require systematic attention.

SAT, as developed and applied within 6G4Society, explicitly addresses the gap repeatedly identified in Sustain-6G analyses: the discrepancy between **technical readiness and real-world deployment**. Rather than attributing this gap to performance limitations, the SAT framework demonstrates that many barriers are rooted in **economic, institutional, governance, and social acceptance conditions** including trust, legitimacy, fairness, inclusion, and transparency. This reframing enables Sustain-6G to better diagnose why technically mature solutions (e.g., in agriculture, smart grids, or e-health) fail to scale, despite meeting functional requirements.

Crucially, the 6G4Society SAT methodology expands the analytical scope of acceptance beyond active stakeholders and market actors. By systematically identifying and incorporating **passive stakeholders** - those indirectly affected by technological infrastructures but typically excluded from consultation processes - it broadens the understanding of societal impact and governance responsibility. This perspective is particularly relevant for networked infrastructures such as 6G, where opting out is not a realistic option and legitimacy must be collectively established rather than individually negotiated.

Methodologically, 6G4Society provides Sustain-6G and other SNS JU projects with a **five-step SAT assessment process**, covering: (1) definition of the object and level of acceptance, (2) stakeholder identification, (3) elicitation of concerns and values, (4) analysis of acceptance conditions and drivers/barriers, and (5) translation into measurable indicators. The final step is especially significant for legacy uptake, as it directly links SAT to the **KVI methodology** and enables social acceptance to be monitored alongside environmental and economic dimensions within the Sustainability Management Plane.

Through this contribution, 6G4Society hopes to equip Sustain-6G with **practical tools for anticipating societal controversy, identifying value conflicts, uncovering governance bottlenecks, and addressing second-order effects** of technology deployment. In doing so, it strengthens the capacity of SUSTAIN-6G (and other SNS JU projects as relevant) to support responsible innovation pathways, enhance institutional trust, and ensure that future 6G systems are not only technically and environmentally sustainable, but also socially legitimate and publicly accountable.

5.5 SUMMARY

In essence, 6G4Society's legacy is a bridge-connecting the social science-driven understanding of technology's societal role with the technical ambitions of Sustain-6G. Its frameworks and methodologies provide depth, clarity, and purpose to the next phase of 6G development. They ensure continuity across the SNS programme and reinforce the vision of a 6G ecosystem that delivers societal value alongside technological excellence.

Through its legacy, 6G4Society remains an integral contributor to Europe's 6G journey, guiding Sustain-6G toward a future where networks are not only powerful and efficient but also aligned with the values, needs, and aspirations of European society.

6 CONCLUSIONS AND TAKEAWAYS

Over the course of its two years, **6G4Society** has positioned itself as a cornerstone project within the SNS JU ecosystem, advancing a value-driven, sustainability-oriented, and socially grounded vision for the evolution of a sustainable 6G. Through extensive liaison activities, strategic collaborations, and continuous knowledge exchange, the project has contributed significantly to shaping the discourse on supporting and promoting the integration of societal, environmental, and economic values in 6G, ensuring its design, development, and adoption contribute to a sustainable future while fostering social acceptance.

A central achievement of the project has been its ability to **connect technical research with societal expectations**, ensuring that the development of 6G is informed not only by performance-driven ambitions but also by European values, ethical principles, as well as sustainability goals. The broad engagement across CSAs, RIAs, SNS Task Forces, Working Groups, standardisation bodies, and external initiatives has generated a multi-layered network of synergies that will continue to produce impact well beyond the project's timeline.

Through surveys, interviews, workshops, webinars, and ad-hoc cross-project collaborations, 6G4Society has clarified the fragmented landscape of **KVs**, **KVIs**, and **SAT** approaches across the SNS community. These activities have made visible the gaps, opportunities, and conceptual challenges shared across projects and have laid the foundation for common methodologies that can be adopted at ecosystem level. Our work on KVI methodologies, the SAT, the emerging KVI ontology, and the citizen survey instruments represent concrete, actionable tools that other projects can directly apply to future research, policymaking, and standardisation processes.

A key lesson learned is the **critical importance of early, structured engagement**, between technical experts, social scientists, policymakers, standardisation bodies, and citizens. This collaborative approach has not only enabled knowledge exchange but has also facilitated alignment across different streams of SNS work, reducing duplication and increasing the coherence of sustainability and societal impact efforts. As demonstrated through collaborations with SNS CO-OP, SNS OPS, SNS ICE, Sustain-6G, Hexa-X-II, and numerous R&I projects, 6G4Society has contributed to **a shared understanding of the sustainability dimensions of next-generation networks** and a collective readiness to address them. Another substantial outcome is the contribution to **shaping the future direction of the SNS JU**. By providing targeted inputs to the SNS Work Programme, participating in technical and vertical white papers' development, and supporting strategic initiatives also outside of the SNS JU context, 6G4Society has helped embed societal values and sustainability considerations into the future roadmap for European 6G development efforts. External liaisons with entities such as ETSI, 6G Flagship, ACM GoodIT, one6G and The Shift Project- further reinforced the project's influence beyond the SNS ecosystem, promoting alignment with global trends, regulatory practices, and broader societal debates. The project's final event and sustained collaboration with the **Sustain-6G** Flagship project confirmed the project's long-term vision and enduring relevance. Many of its output frameworks, guidelines, surveys, methodologies, and analytical insights-are explicitly designed to be carried forward, further refined, and adopted at scale within the next wave of SNS JU projects. In this sense, 6G4Society's legacy is not merely a collection of deliverables but a **strategic foundation** upon which the SNS community can continue building a human-centric, trustworthy, inclusive, and sustainable 6G ecosystem.

In conclusion, 6G4Society has successfully fulfilled its mandate by **bridging technological advancement with societal needs**, enhancing collaboration within and beyond SNS JU, and laying down a coherent, value-based vision for the networks of the future. Its contributions will play a significant role in shaping how Europe collectively imagines, develops, and evaluates 6G ensuring that innovation not only serves markets but also supports society, the environment, and democratic values.

APPENDIX 1 - 6G4SOCIETY STAKEHOLDER MAPPING

1. General Public, Experts, Influencers, and Media:

General Public: Includes non-experts, end-users, consumers, NGOs, and civil society organisations. Engagement with this group ensures transparency and inclusivity in 6G development.

Experts: Comprises academia, researchers, policy experts, businesses, and enterprises, Industry Associations and Trade Organisations, Tech Conferences (EuCNC and 6G Summit), Membership/Community Organisations (ETNO, ECTA, IEEE, Digital Europe, NetWorld, and NGMN). These actors drive knowledge creation, innovation, and policy frameworks.

Influencers: Academics and high-level policy experts in the 5G/6G field and those interested in the progressive deployment of 5G and 6G technologies

Media: Technology and business media outlets and journalists (e.g., TechCrunch Europe, The Next Web, Telecoms.com, Wired, Techradar.com) play a critical role in disseminating information and shaping public perception.

2. Policy Makers:

EU-level Institutions:

- Directorate-General for Communications Networks, Content, and Technology (DG CONNECT).
- European Union Agency for Cybersecurity (ENISA).
- European High Performance Computing Joint Undertaking (EuroHPC JU).
- European Data Protection Board (EDPB).

European Bodies:

- European Telecommunications Standards Institute (ETSI).
- Body of European Regulators for Electronic Communications (BEREC).

Other International & Cross-Sector Entities:

- 3GPP.
- International Telecommunication Union (ITU).
- Department of Environment, Climate Change and Communications (DECC).
- European Conference of Postal and Telecommunications Administrations (CEPT).
- Radio Spectrum Policy Group (RSPG).
- United Nations (UN).
- Media, Think tanks, and NGOs.

3. Financing Bodies:

European, Regional, and National Funding Agencies & Financial Institutions:

- European Investment Bank (EIB).
- European Investment Fund (EIF).
- European Bank for Reconstruction and Development (EBRD).
- European Research Council (ERC).
- European Space Agency (ESA).

Innovation, Research, and Strategic Initiatives:

- Horizon Europe.
- Digital Europe Fund.
- Connecting Europe Facility.
- Climate-KIC.
- Built4People.
- New European Bauhaus Initiative.

Interregional and Societal Impact Programs:

- Interreg Europe – Sustainable Growth and Resource Efficiency.
- ESF+ (European Social Fund Plus).
- Social Impact Accelerator (SIA).

4. Standardisation and Open Source Organisations:

Standardisation Bodies: 3GPP, ETSI, ITU, IETF, IEEE, O-RAN Alliance, GSMA, MCX, MulteFire, MEF, TM Forum Open API, TCCA, ONF, TIA, APCO, UNECE WP29, IET, IDSA, GUTMA, ISO, ASTM, CEN/CENELEC, IEC, TI, MPEG, JPEG, EASA, UIC, National Standards Authority of Ireland (NSAI), Linux Foundation, LF Networking, Apache Software Foundation, Big Data Value Association, GlobalPlatform, Optical Internetworking Forum (OIF), Web Assembly Community Group, and World Wide Web Consortium (W3C).

Open Source Initiatives: Cloud Native Computing Foundation, Cloudify, e.DO, OCCI, ONAP, ONF, ONOS, OpenBaton, OpenDayLight, OpenRoadM Multi-Source Agreement, OpenStack, OpenvSwitch, OPNFV, Eclipse, CAMARA, OpenAirInterface (OAI), O-RAN, Open-Source MANO, ETSI TeraFlow SDN OSG, Open5GCore, EDRi (European Digital Rights), OKF (Open Knowledge Foundation), OEDP (Open Environmental Data Project), EOSC (European Open Science Cloud), OMEC, Open-Source Circular Economy Days, Open-Source Wireless Router Project (OSWRP), Linux Foundation Edge, Linux Kernel, eBPF Foundation, O-RAN Software Community, Kubernetes Apps Special Interest Group (K8), Open Compute Project (OCP), Next Generation Mobile Networks (NGMN) Alliance, Telecom Infra Project (TIP), ETSI SDG TeraFlowSDN, ETSI SDG OpenSlice, ETSI SDG OpenCAPIF, ETSI SDG Open-Source MANO, OpenNetLab, Open DataHub, WAYRA, Hyperledge Foundation, and Openrail.

5. SNS User Ecosystem:

SNS Projects and their members via the SNS working groups, The SNS JU Office and the SNS JU Governing Board, the 6G Smart Networks and Services Industry Association (6G-IA), including linkages and lessons learned from the 5G PPP ecosystem:

SNS projects in Call 1, Call 2, and Call 3: CSAs (SNS OPS, SNS ICE), Hexa-X-II, 6G-SANDBOX, FIDAL, 5G-STARDUST, 6G-NTN, 6GTandem, CENTRIC, ETHER, FLEX-SCALE, TIMES, 6G-SHINE, SUPERIOT, IMAGINE-B5G, TARGET-X, TrialsNet, BeGREEN, NANCY, VERGE, ADROIT6G, HORSE, PRIVATEER, 6G-XR, ACROSS, CONFIDENTIAL6G, DESIRE6G, DETERMINISTIC6G, PREDICT-6G, RIGOROUS, 6G-BRICKS, 6Green, SEASON, TERA6G, TERRAMETA. 6G-DISAC, 6G-GOALS, 6G-MUSICAL, 6G-SENSES, INSTINCT, EXIGENCE, iSEE-6G, 6G-REFERENCE, FirstTo6G, TeraGreen, 6G-XCEL, SUNRISE-6G, 6G-PATH, ENVELOPE, 6G-TWIN, ORIGAMI, PROTEUS-6G, Opti-6G, ROBUST-6G, 6G-CLOUD, 6G-INTENSE, NATWORK, ELASTIC, 6G-EWOC, SAFE-6G, ECO-eNET, and iTRUST6G**. Unity-6G, Rigorous, 6G-Leader, Flecon-6G, Sustain-6G, 6G-Versus, OPTI-6G, MARE, NEXA-Sphere, Multi-X, Ambient-6G, Amazing-6G, XTRUS-6G, 6G_MIRAI, 6GARROX, 6G-DALI, X-TREME 6G, SNS CO-OP.**

Projects at work on KVI Linkages and social sustainability aspects: Ongoing projects from Call 1, Call 2 and Call 3 such as HEXA-X-II, Target-X, Origami, Privateer, BeGreen, G6reen, TrialsNET, FIDAL, 6G-SANDBOX, CENTRIC, IMAGINE-B5G, ORIGAMI, SAFE-6G,

Deterministic6G, 6G-SHINE, 6G-INTENSE, 6G-BRICKS, COALESCENCE, TeraGreen, **Unity-6G, Rigorous, 6G-Leader, Flecon-6G, Sustain-6G, 6G-Versus, OPTI-6G, MARE, NEXA-Sphere, Multi-X, Ambient-6G** drive research and development in alignment with Key KVIs and/or social sustainability aspects.

Call 3 projects joining in Jan 2025: Among the 16 new projects, SUSTAIN-6G as sustainability lighthouse project is specifically considered as a key stakeholder.

6. 5G/6G Industry, Research, and Verticals:

Industry Stakeholders & Commercialisation: Telecommunication operators, SMEs, startups, and large tech firms play a crucial role in the development and commercialisation of 6G solutions.

Research & Innovation: Universities, innovation labs, and European projects provide critical insights into the scientific and technical foundations of 6G.

Vertical Industries & Societal Impact: The integration of 6G with key sectors—such as healthcare, smart cities, energy, agriculture, and mobility—enhances technological advancements and societal benefits.

Industry Associations & Representation: Organisations like GSMA, ETNO, AIOTI, NGMN Alliance, NetworldEurope, ESA, ECSO, FSAN, GSOA, Wireless World Research Forum (WWRF), Fira, Small Cell Forum, 5G Infrastructure Association (5G IA), 6G Infrastructure Association (6G-IA), European Satellite Operators Association (ESOA), European Photonics Industry Consortium (EPIC), Broadband Forum, 6G Platform Germany (DE), 6G Flagship (FI), one6G, 6G Forum, GeSI, Digital with Purpose, O-RAN Alliance, 5G PPP, TM-forum, Telecom Infra Project (TIP), AT - Mission Critical, EU policing bodies, GCHQ, AI RAN Alliance, IOWN (Innovative Optical and Wireless Network), Restart (IT), PEPR (FR), FNS (NL), CONNECT (IE), National 6G Initiative (SE) represent the interests of industry stakeholders, facilitating collaboration and shaping the future of 6G development.

7. 5G/6G Non-SNS Complementary National, European, and Global Organisations:

International Cooperation: Partnerships with 5G Americas, 5G Brasil, 6G Forum Korea, XGMF Japan, ENCQOR (Canada), IMT-2020 & IMT-2030 China, TSDSI (India), Beyond 5G Japan, Next G Alliance (North America), Trade and Technology Council (EU-US), ITRI Taiwan, Sparklink Alliance, NICT Japan, Open RAN Policy Coalition (North America), ARIB (Japan), One6G, 6G FORUM, Bharat 6G Alliance (India), O-RAN, Telecom Infra Project (TIP), TIP from USA NSF (Directorate for Technology, Innovation and Partnerships), NTIA (National Telecommunications and Information Administration), and other global entities foster international collaboration.

Complementary Domain associations: IoT (AIOTI, EUCloudEdgeIoT), Big Data (DAIRO, BDVA), Software (NESSI), Photonics (Photonics21), Microelectronics (AENEAS), Robotics (euRobotics), Aviation (SESAR JUs), Space (GSOA, ESA. ETP4HPC, Transcontinum Initiative), and cybersecurity initiatives provide essential interdisciplinary inputs to the 6G ecosystem.

8. Related Activities and Synergies:

EU and Global Initiatives: The European Green Deal Coalition, Industry and SMEs (Innovation), Peer European Partnerships, Peer associations and international associations related to vertical sectors, European 6G initiatives, Member State Initiatives at the national and

regional levels, Non-SNS projects to access vertical stakeholders/value drivers and peer association collaboration contribute to strategic planning.

Telecom and Network Entities: SA, ECSO, ETNO, FSAN, GSMA, NGMN Alliance, GSOA, NetworldEurope, WWRF, AIOTI, Fira, Small Cell Forum, and other telecom-focused organisations provide technical expertise and operational guidance.

APPENDIX 2 - KVIS & SOCIAL ACCEPTANCE SURVEY QUESTIONS

Timeline: August – September 2024
Target: Call 1 & Call 2 projects
Total N/ Responders: 22 (eligible answers)

Section 1: Disruption of 6G

- *How do you deem the disruption potential of 6G, as compared to previous network technology? (By disruptive we mean a technology that does not follow incremental innovation, but that it is based on new technological concepts, opening the way to new market dynamics and business models).*
- *From the technological perspective, under which aspects and to which extent 6G will be disruptive compared to 5G? [we would like to identify technological aspects that are expected to undergo major conceptual developments or discontinuity changes].*
- *Do you foresee a significant change in infrastructure compared to previous generations of wireless technology (i.e. 5G or 4G)?*
- *What are the main differences that you expect to see in 6G infrastructure compared to previous generations of wireless technology (e.g. the shape that infrastructure will probably take; visual impact on landscape and territories)?*
- *In your opinion, which of the following verticals/sectors will be most impacted on, or disrupted, with the advent of 6G technology?*
- *6G will enable multiple use-cases across a number of verticals/sectors, with relative applications. What do you think will be the impact of such applications on digital divide (i.e. the fact that the access to, and the use of, some applications is more difficult or hindered for some more fragile categories of persons, such as elderly, low income, low education)?*
- *Do you think the public will have problems accepting 6G?*

Section 2: Social Acceptance

- *What approach are you taking to assess social acceptance of technology?*
- *What themes, aspects or approaches around acceptance are you looking at or addressing in your work?*
- *Are you aware of the existence of approaches and models aimed at measuring users' acceptance of technology (e.g. TAM, UTAUT...)?*
- *To which extent, in your SNS 6G project, do you plan to use or experiment with a model for technology acceptance, or any similar framework to evaluate user acceptance and interactions?*
- *Regarding TAM / acceptance related activities, if you are applying it in your project, which framework are you using?*
- *Which type of stakeholders are you interacting with or plan to interact with to develop your technology?*
- *What methods are you using to work with stakeholders?*
- *In contemporary discourse, societal apprehensions surrounding 5G technology, particularly regarding electromagnetic fields, have been notable. As we look ahead to the advent of 6G, the discourse on potential impacts escalates. Through this survey, we aim to capture sentiments regarding such concerns, shedding light on societal perceptions and expectations of emerging technologies, including their potential implications on health and well-being. Are you taking any action during the development and implementation of your technological solutions, in order to anticipate, avoid or proactively address these concerns, and facilitate users' acceptance?*
- *What actions are you taking?*

- *Imagine that you are approached by a non-technical person who is relatively familiar with the topic of wireless technology and particularly 6G technology. They have concerns about the potential impact of the electromagnetic fields to health and the environment. What would you say to provide a clear counter-narrative and explanations to address and alleviate public fears related to electromagnetic exposure?*

Section 3: Key Values and Key Values Indicators (KVIs)

- *Is your project working on KVIs or KSIs (Key Sustainable Indicators)?*
- *What do you think is the key objective of integrating KVIs approaches into the technology design and development?*
- *When you are talking about 'value' for KVIs, what do you mean by 'value'?*
- *What challenges are you facing in identifying KVIs to use in your project?*
- *What challenges are you experiencing in applying KVIs to your project?*
- *How are KVIs influencing the technology development processes?*
- *Based on your experience, do you have any suggestions or best practices for improving the integration and effectiveness of KVIs in 6G technology projects?*

Section 4: Member States Initiatives

- *Can you list any ongoing or planned national initiatives that integrate 6G technology to promote sustainability?*
- *Please list the national initiatives you are aware of and describe their goals and current status.*
- *Are there any collaborations between government, industry, non-profit, the scientific community, and academia in your country that aim to leverage 6G technology for sustainability? Please list the collaborations on 6G technology for sustainability and describe their goals and current status.*

KVI and Social Acceptance Responses - Key Highlights

DISRUPTION OF 6G

(Q1) Around 70% of the respondents believe that 6G will be somewhat disruptive.

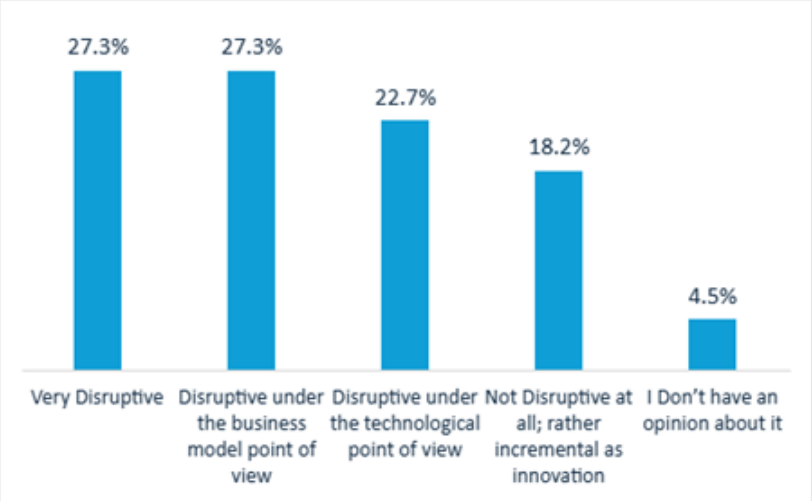

Figure 3: 2024 SURVEY - IMPACT OF 6G

(Q4) In terms of impact on infrastructure, there is a mixed response with the majority of responders mentioning no major impacts on infrastructure. Where impacts are mentioned, there is a higher consideration for changes in the rural areas. Some respondents did not

answer the question directly but rather highlighted how 6G will bring positive impacts with increased energy efficiency and create positive environmental impacts.

(Q5) Most Impacted verticals: Safety and Security, Transportation, Entertainment.

(Q6) The majority of projects (60%) tends to believe that 6G will have a positive impact on Digital Divide by increasing accessibility (demographically and geographically).

SOCIAL ACCEPTANCE

(Q7) 86% of the respondents don't think that the public will have problems accepting 6G.

(Q9): Themes, aspects or approaches addressed by projects:

Top 3: User Experience, User Needs, Accessibility.

Bottom 3: Adoption propensity or adoption rate, Attitude (towards using), Match with "my values" or social norms.

(Q10, 11, 12): Seven projects declared awareness of the existence of dedicated technology acceptance models and frameworks. Of these seven:

- One mentioned the intention to use a specific TA framework, mentioning the original TAM.
- 2 have a task dedicated for TA.
- 3 said they discuss models or frameworks of Technology Acceptance in their work. (which ones?).
- 2 said they do not address TA.

(Q13) Top responses mention researchers and technology providers. However, over 50% mentions engagement with final users of the application and almost a 1/3 engage with policymakers.

(Q14) For the methods used, more than 50% of the projects selected the use of co-design/co-creation and user validation.

KEY VALUES AND KEY VALUES INDICATORS

(Q18) 17 projects working on KVIs.

(Q21) KVI Challenges:

- Top 3: Defining quantitative measures, working with qualitative data, validating KVIs.
- Bottom 3: Working with stakeholders, identifying which policy matters, assigning responsibility for implementation.

(Q22) KVIs challenges highlighted:

- Identifying KVIs for low TRL projects.
- Accessibility to stakeholders.
- Availability of baseline data.
- Comparable KVIs across Use Cases.
- Measurement and Assessment of KVIs.

MEMBER STATES INITIATIVES

(Q26) Known collaborations on 6G technology for sustainability:

- UNICO projects.
- The German 6G initiative.
- EU's Horizon Europe and SNS Joint Undertaking.
- Finland's 6G Flagship Program.
- United States' Next G Alliance.
- China's 6G Research and Innovation Program.
- South Korea's 6G R&D Initiative.

(Q27) Knowledge of collaborations between government, industry, non-profit, the scientific community, and academia:

NO: 13.

ES: 6.

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6G4SOCIETY

SNS SURVEY REPORT 2024 - 2025

Revision: v.0.9

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EXECUTIVE SUMMARY

The 6G4Society project conducted two survey rounds in 2024 and 2025 to understand how SNS JU projects are integrating societal considerations into 6G development. With 63 responses across three project calls, these surveys examined how projects approach Key Value Indicators (KVIs) and Social Acceptance, providing essential groundwork for the project's ongoing activities.

Deepening Social Acceptance

The surveys revealed important insights into how projects approach social acceptance. While projects are effectively addressing adoption barriers, there is an opportunity to expand their focus toward broader "acceptability", ensuring technology aligns with societal values like fairness, trust, and institutional legitimacy. When addressing public concerns about issues like electromagnetic fields, projects typically rely on technical explanations and scientific evidence. While this demonstrates strong empirical knowledge, it may benefit from complementary approaches that acknowledge the trust and legitimacy dimensions underlying public concerns. Projects are engaging appropriate stakeholders through established methods like meetings and workshops, though more diverse and rich interaction formats could strengthen dialogue, particularly with end-users, broader stakeholders, and policymakers.

Advancing Key Value Indicators

Most SNS JU projects are actively working with KVIs to align innovation with societal, economic, and environmental goals. As they define indicators, measures and validation approaches, projects are starting to learn to navigate the difference between KVIs and technical Key Performance Indicators. A key insight so far is that KVIs cover a wide variety of values, have a range of different goals, and projects face many challenges in identifying, defining, prioritizing, and defining measures for them. There is also much learning still to be done because almost no projects had started assessing indicators by the time of the survey. Projects are also encountering tensions between technical performance and cost considerations versus values like privacy, security, and inclusivity. These trade-offs point to the need for policy-driven frameworks that can support projects in making balanced decisions when competing priorities arise.

Moving Forward

These lessons are informing 6G4Society's core activities: developing frameworks and practical tools to help projects define and harmonize KVIs; operationalizing a more nuanced Social Acceptance for Technology model through direct collaboration; and engaging with selected projects through interviews and working groups to build deeper understanding and support better integration of societal considerations into 6G innovation.

Co-funded by the European Union

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1 INTRODUCTION

The Coordination and Support Action (CSA) 6G4Society has been mandated since its inception in January 2024 to contribute to shaping the next generation of wireless communication, namely Beyond 5G (B5G) and 6G, by supporting the integration of societal needs beyond just faster connectivity. The vision of the project specifically emphasizes the design and development of innovative solutions that are conceived with the idea of creating a more inclusive, sustainable, and human-centric digital future. 6G4Society focuses on addressing critical societal challenges by supporting the embedding of ethical, social, and environmental considerations into the design and deployment of 6G infrastructure from the outset. The project is doing so by focusing on two main streams of work:

1.1 KEY VALUES AND KEY VALUES INDICATORS (KVI)

This work supports the efforts of the SNS JU in incorporating key values within the development of 6G technologies by exploring how KVIs are being used across 6G innovation projects to generate positive short and long-term impacts on societal, environmental, and economic sustainability.

1.2 SOCIAL ACCEPTANCE (SA) OF 6G TECHNOLOGY

This part of the work focused on better understanding the relationship between the new generation of wireless technology, the public views on technology development, and the consideration of these aspects and relationships across the projects within the Smart Networks and Services Joint Undertakings (SNS JU). In doing so, attention was given not only to how projects interpret acceptance and values in terms of perceptions or concerns, but attention was also given to questions of acceptability. 6G4Society recognizes that social acceptance is not limited to whether people will adopt or resist new technologies, but also involves questions of acceptability, that is, whether technological trajectories, including design choices and purposes, align with societal values such as fairness, trust, inclusivity, and sustainability.

As 6G4Society primarily operates within the system of the SNS JU, the first step was to better understand the existing landscape, dynamics as well as approaches of SNS JU projects in addressing the work on KVIs and Social Acceptance. After a stakeholder mapping exercise, in Q2 of 2024 6G4Society developed a set of questions around four main topics, to gather data across the existing SNS JU projects and better understand the current status quo of the projects with the goal also better support the definition of the key activities of 6G4Society. The four sections addressed within the questionnaire included: potential of 6G; KV and KVIs; Social acceptance of 6G; knowledge of Member States' Initiatives. In addition to informing our understanding of acceptance and KVIs, the materials generated by the surveys are utilized through the SAT and KVI frameworks being developed by the project to assess acceptability and sustainability, particularly where answers address values, trade-offs, and broader social impacts.

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2 METHODOLOGY

A first questionnaire round was launched in 2024 for Call 1 and Call 2 projects. As the SNS JU welcomed an additional number of projects from Call 3 in 2025, 6G4Society deemed it necessary to gather baseline data from the new projects as well. To this end, a second questionnaire was launched at the beginning of 2025. Leveraging on the first results obtained in 2024 and with a better understanding of the approaches of projects from Call 1 & Call 2, the 2025 survey represented an opportunity to revisit the questions already answered and redefine them to ensure that they provided further insights and more specific questions to the topics as mentioned earlier.

2024 Survey

- **Topics addressed:** Impact of 6G; KV and KVIs; Social acceptance of 6G; Knowledge of Member States Initiatives.
- **Target Group:** Call 1 & Call 2 Projects
- **Responses Received:** 22 projects
- **Period of activity of the Survey:** August - September 2024

2025 Survey

- **Topics addressed:** Impact of 6G; KV and KVIs; Social acceptance of 6G.
- **Target Group:** Call 2 & Call 3 Projects
- **Responses Received:** 41 projects
- **Period of activity of the Survey:** February - March 2025

It is important to note that while the second Survey was mainly targeting Call 2 & Call 3 projects, 6G4Society also did receive answers from Call 1 projects that did not have the opportunity to complete the questionnaire in 2024. All eligible answers received were considered in the Survey analysis.

A decision was made to discard the section on Member States Initiatives in the 2025 questionnaire for two main reasons: i) projects had a limited knowledge of 6G initiatives led at Member States level, ii) at the time when the Survey was launched, it became evident that SNS projects were receiving multiple requests for inputs. Therefore, 6G4Society decided to limit the questionnaire to the three sections that would more directly feed into the project's activities, redefining or revising the questions asked based on needs.

The same communication strategy was put in place for both questionnaires. 6G4Society identified key mailing lists and groups where the surveys could be circulated through. This included:

- The SNS Communication Task Force
- The SNVC Working Group
- The 6G-IA point of contact for communication
- Steering Board and Technical Board mailing list

While the response rate was relatively low for the 2024 survey (22 responses), numbers almost doubled in the 2025 Survey with 41 eligible answers received.

3 THE 2025 SURVEY REVISION

Before its launch, the 2025 Survey underwent a revision that was informed by:

- The latest understanding of the SNS JU landscape by 6G4Society
- The results obtained from the 2024 SNS Survey, assessing how to improve the quality and clarity of responses
- The prioritization needs in the 6G4S activities
- The identified needs of the SNS JU projects

Below are the changes that were proposed in the 2025 Survey, presented by section:

Impact of 6G

Question 5. Regarding the most impacted verticals/sectors projects, they were asked to select the top THREE rather than keeping the question open

Social Acceptance

Question 8. This question looked at projects' understanding of what is meant by acceptance which was not asked in 2024 Survey

Question 9 & 10. These newly introduced questions looked at technologies introduced by projects that might require SA and the stakeholders that were believed as having to accept these new technologies

Question 11. We requested projects to dig deeper in the social and practical implication of the introduced technological changes

Question 15 & 16. Newly added questions looking into how SA is operationalized in the projects' activities and if these are aligned to any existing SA frameworks

Question 19. Newly introduced question on controversies

Question 20. New question concerning proactive measures undertaken by projects to address societal concerns expressed by members of the public during the rollout of 5G.

Key Values Indicators (KVI)

Question 24. The question was rephrased from 2024 to directly ask projects about the values that they are addressing

Question 28. A newly introduced question that looked at the type of trade-offs being considered by the projects

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4 RESULTS

In this section, we present some key results that have emerged from the two Surveys, comparing where possible the results from 2024 and 2025. The results are reported by topic

4.1 HIGHLIGHTS: IMPACT OF 6G

In 2024, around 70% (17) of the respondents believe that 6G will be somewhat disruptive with 27.3% (6) mentioning its disruptiveness under the business model point of view and 22.7% (5) under the technological point of view (Fig 1). Also, when filtering the result by stream it also appeared that Stream D projects were more likely to select “Not Disruptive at All” or “Disruptive under the business model point of view”. The situation shifted with responses from Call 2 & 3 projects in the 2025 Survey, where the majority of responders (20, 48.8%) believe that most of the disruption will be mainly related to the technological perspective (Fig. 2). This suggests there are different narratives circulating about the impact 6G will have on the market. Suggested future work would involve tracking these narratives in order to understand a) from where they are derived and b) how they are informing the various conceptions of value being engaged by the projects. The aim would be to harmonise the relationship between understood impact, disruption, and value for society.

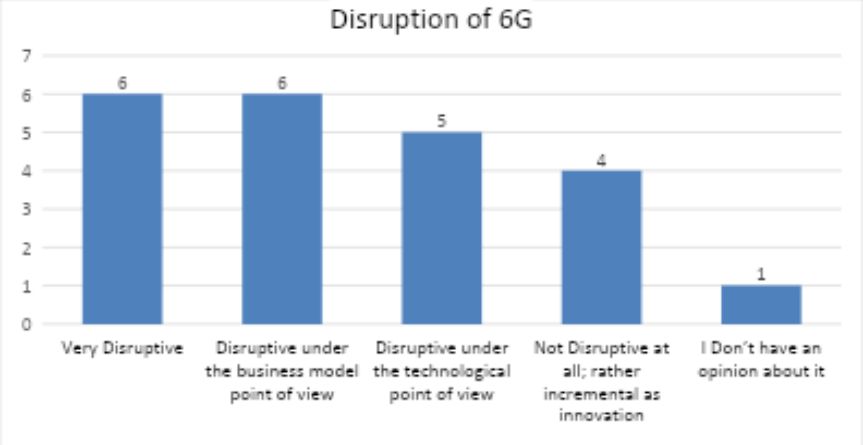

FIGURE 1 2024 SURVEY - IMPACT OF 6G

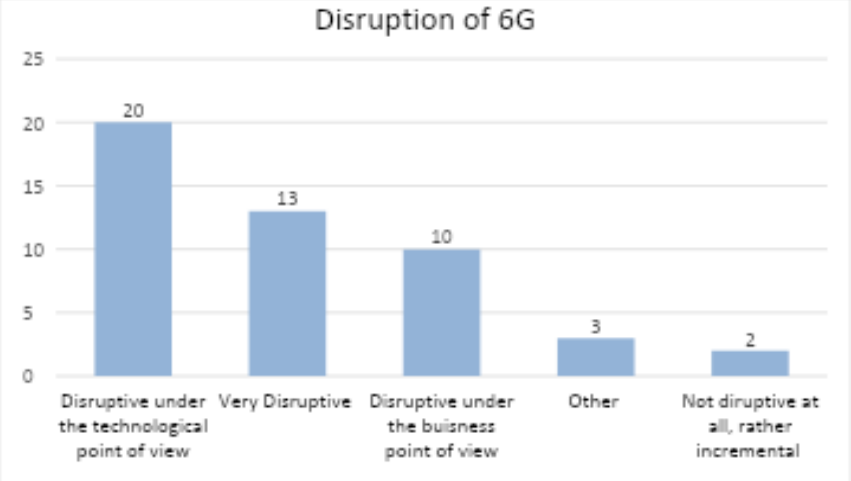

FIGURE 2 2025 SURVEY - IMPACT OF 6G

In terms of **impact on infrastructure**, in 2024 there is a mixed response on this with the majority of responders mentioning no major impacts on infrastructure. Where impacts are mentioned, there is a higher consideration for changes in the rural areas. Some respondents did not answer the question directly but rather highlighted how 6G will bring positive impacts with increased energy efficiency, and create positive environmental impacts, but without further details as to what those environmental impacts are expected to be. In 2025, the number of projects that mentioned foreseeing major changes in the infrastructure has shifted the ratios with ¾ agreeing with the statement that major impacts are foreseen on infrastructure (31). Again, changes mentioned were either positive (21) or neutral (10). Across the surveys, there was a trend in what projects thought were the three most impacted verticals.

In 2024 (Fig 3)

- Top 3 answers: i) Safety and security, ii) Transportation, iii) Entertainment
- Bottom 3 answers: i) Agriculture, ii) Energy, iii) Education

In 2025 (Fig 4)

- Top 3 answers: i) Healthcare, ii) Transportation, iii) Communication
- Bottom 3: i) Agriculture, ii) Education, iii) Energy

Energy Efficiency (EE) is a recurrent topic in SNS JU projects. However, when looking at the answers at both surveys, it seems that EE is not considered as the most impacted vertical. A comparison with the results of the SNS OPS questionnaire released in Q2 2025, highlights that perhaps EE is a **means** to support other verticals, and might not be considered by the projects as a focus vertical per se. It also suggests the end of that means could be something other than improved environment (e.g. increased battery life, decreased cost).

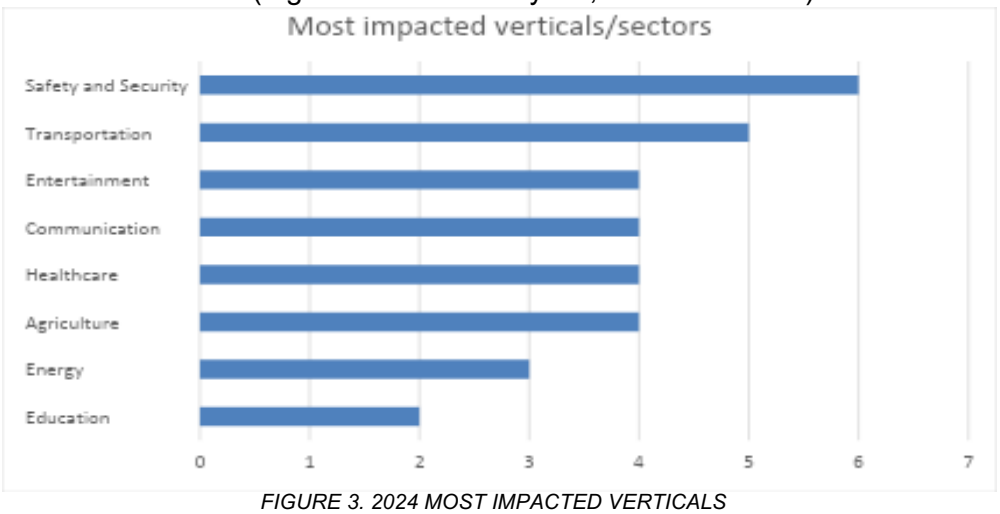

FIGURE 3. 2024 MOST IMPACTED VERTICALS

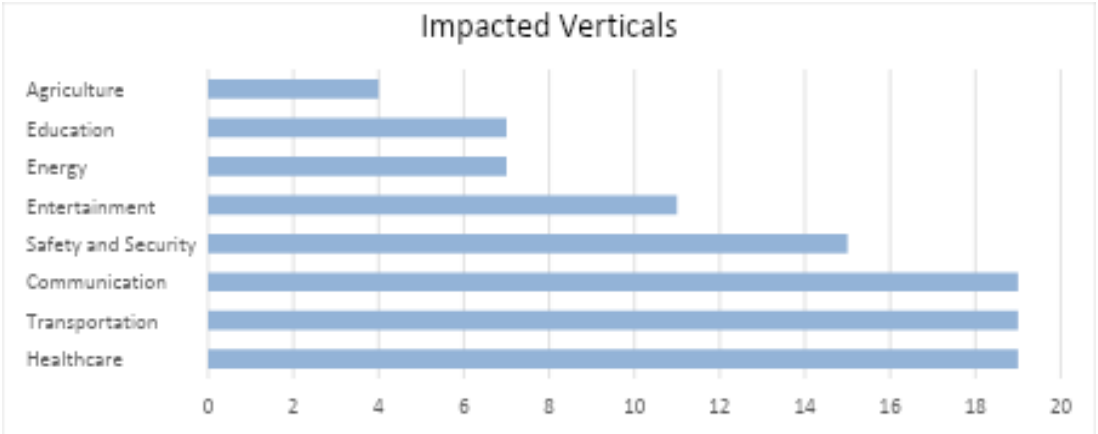

FIGURE 4. 2025 MOST IMPACTED VERTICAL

Finally, regarding **digital divide**, the 2024 question asked for open-ended responses about impacts on digital divide. This resulted in the majority of the projects (60%) identifying rather positive impacts such as lowered digital divide and increased accessibility.

The 2025 Survey was revised to request projects highlight positive and negative impacts as concerns the digital divide issue. In this case as well, the positive impacts seemed to outweigh the number of the negative ones (Table 1). It would be good to assess in the future how many projects are actively addressing these desired impacts, where there might be gaps, and how these relate to different communities' and verticals' understanding of what is needed to bridge the digital divide.

POSITIVE IMPACTS	NEGATIVE IMPACTS
• Facilitating access • More Democratic Networks • (In general) Positive Impacts • < costs and + accessibility (also to vulnerable groups) • Improved access and quality • More accessibility= > coverage • < DD through universal connectivity • Potentially simpler user interface • Enhanced connectivity • Data-driven personalization • Limited impact or decreased DD • Improvement of society's efficiency • Job market opportunities • Institutional efficiency • User-friendly and transparent applications	• Digital literacy • Costs • Accessibility Issues • Affordability • Infrastructure Challenges • Disparity Rural vs Urban • Complexity of technology

TABLE 1. 2025 SURVEY: DIGITAL DIVIDE IMPACTS

4.2 HIGHLIGHTS: SOCIAL ACCEPTANCE

The survey responses shed light on how projects understand acceptance, in terms of adoption, perceptions, and concerns. These descriptive findings and insights will inform the upcoming Deliverable 3.2, dedicated to the Social Acceptance of Technology (SAT) framework. The SAT framework (described in D1.1) will aim to investigate also the acceptability dimension, looking

at how societal values are embedded in 6G development, and will draw directly from answers that touch on values, trade-offs, and broader social impacts.

In 2024, 86% of the respondents did not think that the public would have problems accepting 6G. Amongst the projects that, to some extent, mentioned addressing social acceptance in their activities, projects rated the typology of themes and approaches they are dealing with (Table 2):

Top 3: i) User Experience, ii) User Needs, iii) Accessibility

Bottom 3: i) Adoption propensity or adoption rate, ii) Attitude (towards using), iii) Match with "my values" or social norms

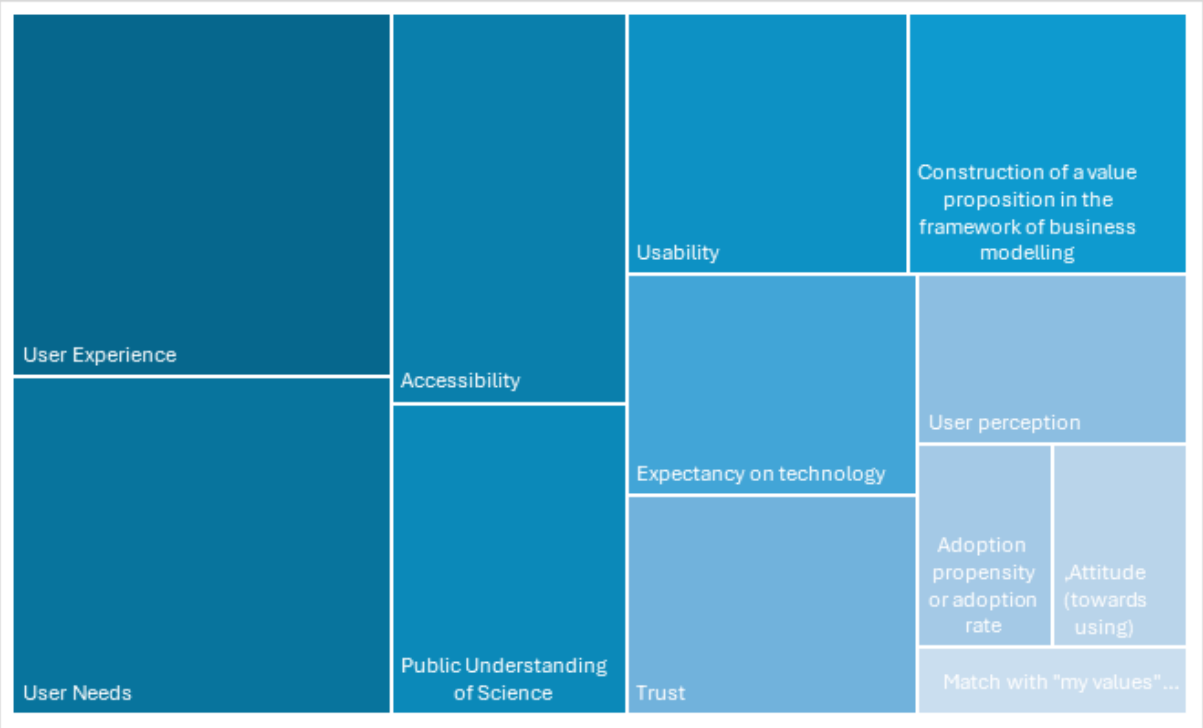

TABLE 2. SURVEY 2024, SNS JU PROJECTS THEMES, ASPECTS, APPROACHES ON SOCIAL ACCEPTANCE

However, it is interesting to observe that while all projects did select one or multiple approaches in the related multiple-choice question, when asked about facilitating users' acceptance by addressing their concerns (Q15), more than 50% of the responders answered that they do not take any actions. Projects that claimed to be proactive, mentioned action that revolved around: Privacy and Security, Trust, Energy Efficiency, Environmental Impact, Health. (Q16). This highlights that "acceptance" is often interpreted narrowly, more as the removal of obstacles to adoption, whereas addressing "acceptability" would require a broader engagement to investigate how such obstacles reflect and are the result of underlying societal values.

This information goes hand in hand with the responses obtained in 2025 relative to the challenges foreseen in addressing Social Acceptance (Q7). In fact, the top three frequently mentioned challenges were:

- Security and Privacy concerns: 19 projects
- Health: 10 projects
- Cost: 9 projects

The cross-analysis of the 2024 and 2025 Survey also highlighted similarities and differences with regards to the **engagement/interaction with stakeholders:**

In 2024, researchers and technology providers resulted being the type of stakeholders that Call 1 & Call 2 projects engaged with or planned to engage with the most, with over 50% (13) mentioning also engagement with final users of the application and almost a 1/3 of the projects that responded (6) referring to interactions with policymakers (Fig. 5). In addition, when asked about the methods used to work with these stakeholders, more than 50% of the projects (13) selected the use of co-design/co-creation and user validation.

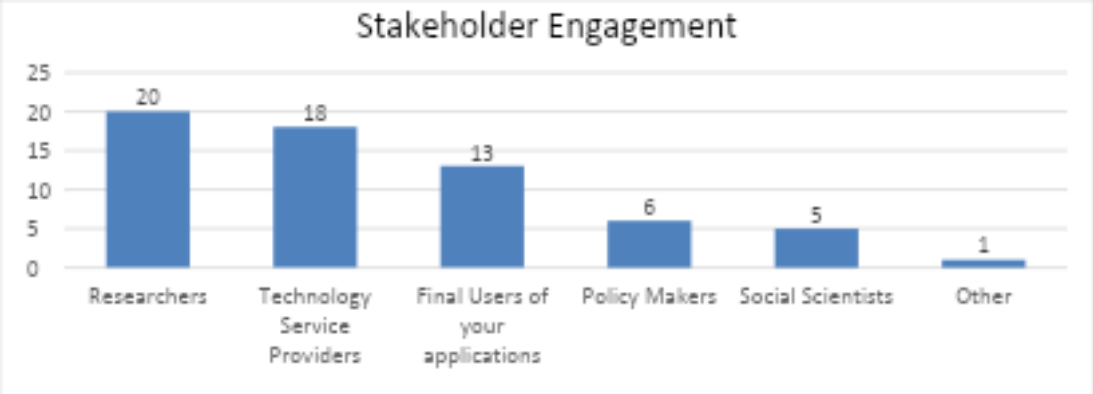

FIGURE 5. SURVEY 2024 STAKEHOLDER ENGAGEMENT

The results seemed consistent with responses from the 2025 Survey (Fig 6), with the exception that the first mentioned type of stakeholder were the Technology Service Provider (40) followed by Researchers (36). In both surveys, a high number of projects also indicated Final Users of Applications and Policymakers in the top four stakeholder types.

With regards to the methods used, projects reported on different methods (Fig. 7) with the most mentioned being: Meeting/Workshops (18), Activities as part of the project (9), Surveys/interviews (7). While engagement activities appear relatively widespread, they tend to emphasize established formats such as workshops or surveys.

According to the current understanding that 6G4Society has of these projects, results from both surveys show the need for a better reflection and shared understanding on the specific actors that is relevant to involve as stakeholders, as well as of the most appropriate engagement modality to use in relation to objective and stage of the project. An appropriate consideration of *acceptance* and of *values* requires the involvement of actors (e.g. users, community members, consumers, public, policymakers) beyond B2B relationships (e.g. service providers). Indeed, in lack of a more varied exploration of social needs and values, if no resistance is raised in business environments (e.g. meetings with service providers), a project might record “acceptance”; this result, however, is not indicative neither of the social acceptance, nor of the acceptability of the solution - where with *acceptability* refers to the extent to which a solution not only complies with legal requirements or norms, but also reflects values and priorities considered priority and just in society (e.g. inclusivity, fairness, trust). In order to guarantee acceptability and social acceptance, the voices of users and communities, not just providers, shall be listened to.

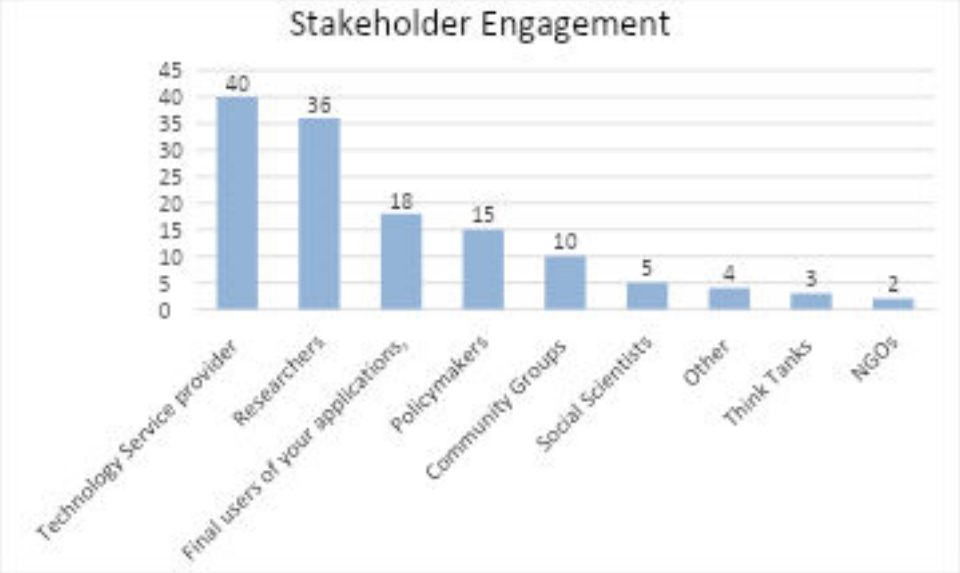

FIGURE 6. SURVEY 2025 STAKEHOLDER ENGAGEMENT

FIGURE 7. SURVEY 2025 STAKEHOLDER ENGAGEMENT METHODS

A final open question was asked to projects in both Surveys to assess how these would respond to a non-technical person raising concerns regarding the linkages between 6G and electromagnetic fields (EMF). In 2024, the largest group of responders tended to promote the idea that the knowledge in physics of technical people should constitute a sufficient argument to pushback any concerns regarding the health impact of 6G. In 2025, 21 projects mentioned that they would refer to evidence/trusted scientific sources, and 16 projects (in line with the 2024 answers) mentioned the application of their personal scientific or technical knowledge.

Such answers indicate significant opportunities and needs for strengthening how projects attribute meaning and address controversial or value-laden public concerns. A notable case is the persistent public anxiety over electromagnetic fields (EMF), which continues to feature prominently in national and local debates surrounding wireless infrastructure. As observed in

both survey rounds, many respondents appear to frame public concern over EMF in terms of misinformation or scientific illiteracy, with answers often relying on technical reassurance or individual knowledge in physics. However, this framing may overlook the broader context.

As emphasized in Deliverable D1.1, **concerns about EMF exposure are not always reducible to knowledge deficits.** The widespread international circulation of the 5G Appeal – signed by hundreds of scientists and acknowledged by public officials, including mayors and local governments across Europe – shows that this topic is also deeply tied to issues of **trust, institutional legitimacy, and conflicting interpretations of scientific evidence**. What was observed in the surveys is that many projects tend to assume that technical expertise (e.g., a background in physics) is sufficient to respond to public concerns. This indicates that **projects often frame disagreements as a matter of ignorance or lack of knowledge,** rather than as legitimate value-laden critiques. In the wider public debate, such framings also risk conflating genuine concerns with fringe conspiracies, such as those linking 5G to COVID-19, without engaging with more grounded critiques.

From an acceptability perspective, these concerns highlight where technological visions may come into tension with societal values such as precaution, accountability, and transparency. The SAT framework developed by 6G4Society urges a different response: to treat such controversies not as anomalies to be corrected, but as signals of where societal values and technological visions may be misaligned. This perspective moves beyond what is known in science communication theory as the 'deficit model', and toward a trust-oriented, value-sensitive vision for 6G development, one that acknowledges, rather than dismisses, societal concerns.

4.3 HIGHLIGHTS: KEY VALUE INDICATORS

In both Surveys, a high number of projects confirmed that they are working on KVIs:

2024: 17 out of 22 projects

2025: 34 out of 41 projects

Regarding the projects' understanding of the role of KVIs, among both the 2024 and 2025 responses, there was a general agreement that KVIs are seen as tools that support the consideration of the societal implication in technology design and development as well as to align innovation with societal, economic, and environmental goals as well as means to ensure that technologies respond to societal needs.

The 2025 Survey asked more specifically about **the objectives of integrating KVI approaches in technology development**. From those responses, projects appear to be using KVIs as a means to attain several goals, with the relationship between values, indicator, and end-goals being handled in different ways across projects (Fig.8). Some of the goals listed by projects for KVIs include fostering trust, measuring real impact, promoting the adoption of use cases or business aspects, promoting social acceptance or other ethical goals, and overall as a means for creating value. In other cases, the objectives are about ensuring accuracy and data rates. In other cases, the objectives of KVIs are intended to meet values like fairness and digital inclusion. In line with what was found in D1.1, the responses from the survey help explain the variations and diversity of KVIs as well as challenges faced by the projects in understanding how to define and implement KVIs in both theoretical and practical terms.

If KVIs are considered to serve this variety of goals, this, in turn, leads to a higher degree of complexity in harmonizing indicators across projects, since each goal could require a different style of indicator. Hence, aligning the objectives of the KVIs across the projects is needed to be able to define a common set of indicators for all projects. 6G4Society has proposed a framework of action towards this. But it also indicates that more purposeful and coordinated guidance is needed to define which values matter and why, particularly from actors with influence over 6G trajectories and desired outcomes, including industry, policy, vertical and community stakeholders.

FIGURE 8. SURVEY 2025, KVI'S INTEGRATION OBJECTIVES

All projects were also asked questions about the challenges encountered with KVIs, including in how they tried to identify KVIS as relevant to their projects and how they aimed to apply KVIs in their work.

Regarding the **identification of KVIs**, in 2024 (Fig. 9) the top 3 challenges mentioned were: i) Defining quantitative measures, ii) Working with qualitative data, iii) Validating KVIs. Similarly, in 2025 (Fig. 10) the top 3 answers mentioned were: i) Defining indicators that can be measured in the project's lifetime, ii) Defining quantitative measures, iii) Validating KVIs. The answers show a consistent pattern of respondents seeing quantification and measurement as key issues related to their successful use of KVIs. Approaches to assessing KVIs that are less similar to quantitative KPIs need to be further developed and projects need support in developing or including such expertise in order to do so.

This pattern was confirmed when projects were more specifically asked to **identify challenges related to their application of KVIs**, where the most recurrent challenges mentioned across the two surveys were:

- Defining KVIs
- Identification of values
- Data collection and validation
- The relationship with KVIs for low TRL projects
- Assessing values that are too early to estimate within the lifespan of a project

Much of what this suggests is that there is a trend to see KVIs as thresholds or targets, similar to KPIs, where societal values are something that can be met, achieved, or cleanly validated through demonstration. This also suggests that projects are still seeking guidance as to how to know what values matter to their projects and how to translate the values into relevant and valid indicators. This stands in contrast to how values are often understood in the social sciences, where they are seen not as fixed or universal truths, but as context-dependent tools for decision-making and evaluation of a societal ideal or goals. While not all social science perspectives align completely, many emphasize that what counts as “good” or “bad” is shaped by cultural, historical, and situational factors, rather than as fixed or universally applicable rules.

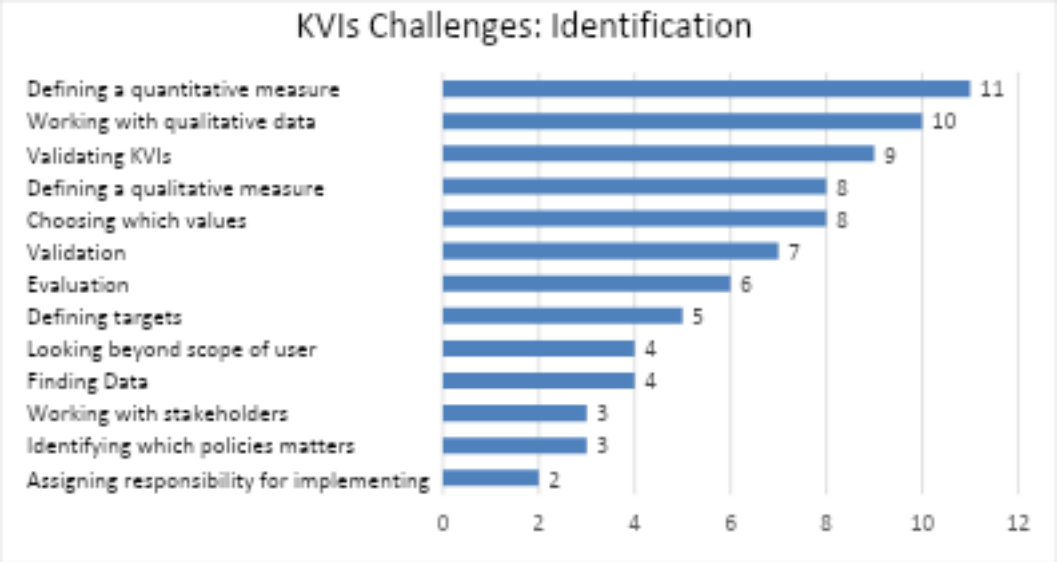

FIGURE 9. 2024 SURVEY, IDENTIFICATION OF KVIS

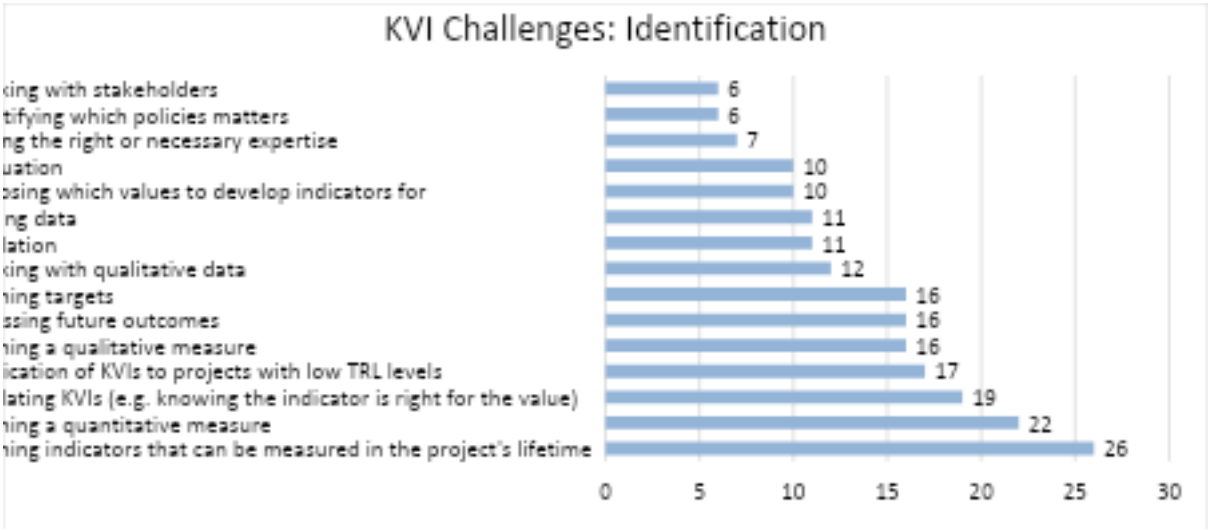

FIGURE 10. 2025 SURVEY, IDENTIFICATION OF KVIS

It is interesting to note is that in the responses to both surveys, working with stakeholders and identifying which policies matter were the challenges least frequently mentioned. Yet, further development of both these areas could help address some of the challenges listed from the previous questions. Policy analysis can provide critical insights into which values matter to impacted communities, while meaningful stakeholder engagement helps validate whether chosen indicators align with stated objectives and real-world implementation needs. This suggests that greater attention to stakeholder engagement and policy alignment during initial project phases could help projects address some of the technical and methodological challenges they currently face.

With the current knowledge that 6G4Society has of SNS JU project activities and dynamics, further questions emerged from these results which warrant future investigation such as: is the policy landscape clear enough for projects to consider what values matter? What do projects mean by stakeholders? What kind of interactions with stakeholders are possible within projects? Are KVIs like KPIs with thresholds and targets or do they more orient research in directions but are not lines to cross? What other kinds of expertise is needed on projects to support addressing these challenges?

To further understand how projects are considering KVIs, in 2025 two additional open-ended questions were added that did not appear in the 2024 Survey:

What values are projects addressing in their KVI approach?

What kind of trade-offs are being considered in your project around KVIs and why?

When looking at **the values more frequently mentioned** by the responders in 2025 (Fig. 11), the top three answers are:

Energy Efficiency (15)

Safety, Security, Privacy (14)

Economic Sustainability (10)

With trust, social sustainability, and digital divide coming tied in fourth place.

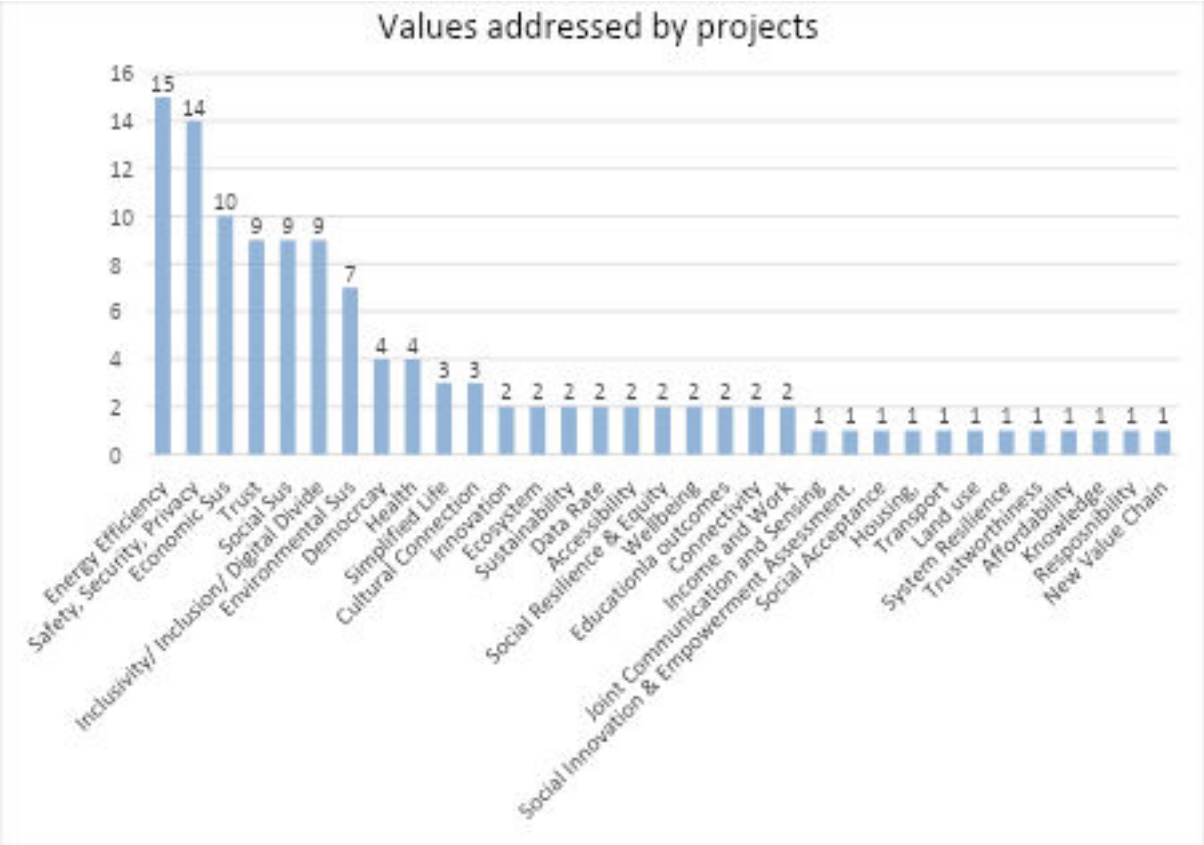

FIGURE 11. 2025 SURVEY. PROJECTS' VALUES

These results validate the information that 6G4Society had been collecting from projects over time regarding the type, granularity, and variety of values that are addressed and discussed within SNS JU projects. The values being addressed by projects span a considerable spectrum, from abstract principles like democracy to specific challenges like the digital divide,

and from broad categories such as economic sustainability to targeted domains that if improved could help make life better for communities, like transport, housing, or system resilience. In other cases, the projects frame their values around the things that projects want to directly make better such as educational outcomes. This diversity reflects the varied contexts and priorities across different initiatives, but it also reveals the need for greater clarity in how values are defined and categorized.

Without more consistent approaches to value classification, projects may struggle to learn from each other's experiences, compare effectiveness across similar contexts, or build upon existing measurement frameworks. It is also not possible to define a set of indicators relevant across 6G or even across a vertical. Developing more harmonized ways of articulating and organizing these values could strengthen the overall value measurement process by helping projects better understand what values are, see how values translate to indicators, clarify how their work connects with that of others, and to identify proven measurement approaches for similar areas of research.

Trade-offs in 6G projects are complex, and each project manages them in different ways, but some clear patterns appear. Performance and related technical features dominate the landscape (e.g. a value vs a performance feature). But the most frequently mentioned features on one side of a trade-off include: Privacy, Cost, Performance features (like latency, accuracy, or AI functions), Security, Energy, and Inclusivity, which suggests these features are the ones driving 6G design and development decisions as well as an important message for communication by the projects. Privacy and Performance are the most frequently traded off elements, and not just with each other. Cost considerations appear widespread, considering they are traded off against nearly every other value mentioned, and are a potential constraint on work towards societal goals. Energy considerations also permeate many 6G decisions and a key sustainability feature considered, but it is also currently understood to be in tension with elements like security and inclusivity. Figure 12 below charts the various trade-off relationships provided. In addition, three trade-offs with unique elements were mentioned but not included in the figure: EMF exposure vs wireless power transfer efficiency, sustainability vs infrastructure scalability, and centralised vs distributed architecture.

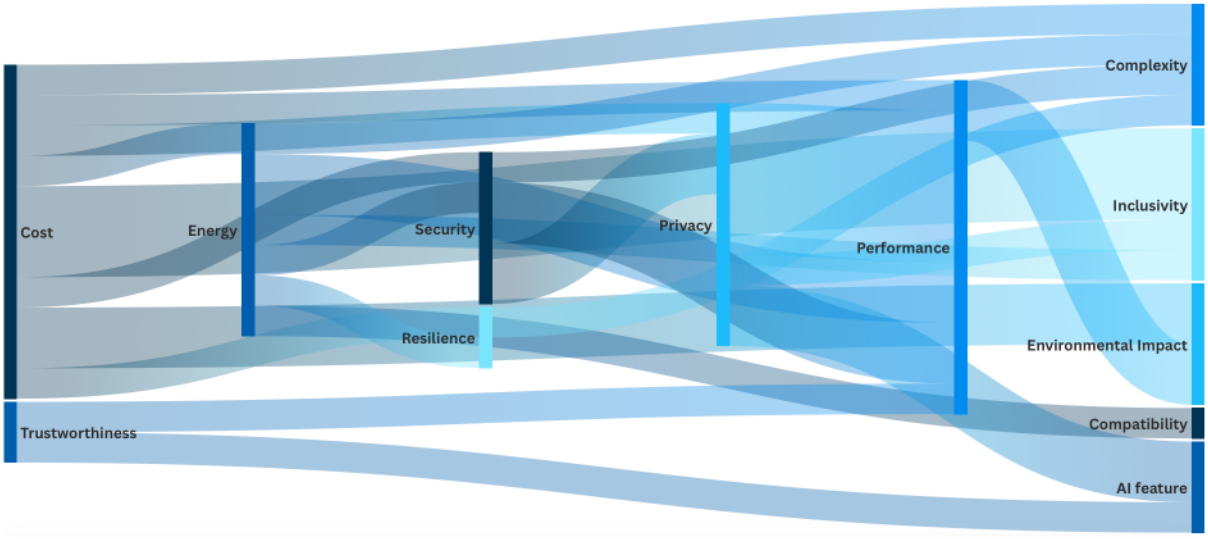

FIGURE 12. 2025 SURVEY. PROJECTS' TRADE-OFFS

However, the diversity and range of tensions presented suggest that a policy- or strategy-driven framework to support decision-making in relation to the values would benefit the projects since otherwise cost and performance often seem to be the foundational drivers. It is worth following up with the projects to understand more how they weighed the trade-offs, what decisions they took towards them in the end, and how they might be able to see - if at all - the relationships as mutually reinforcing rather than one versus the other.

5 SECTION: SURVEY FOLLOW-UP

The responses received from the two Surveys have provided key insights on the status quo of the SNS JU projects regarding the understanding of the topics of KVIs and Social Acceptance, and even further, how projects are addressing perceptions and concerns from the general public regarding the roll out of Beyond 5G and 6G technologies. The data collected with the total of 63 responses received across Call 1, 2 & 3 projects have not only drawn a better picture of the landscape within which 6G4Society is operating, but it also provided the necessary insight to: a) better define the core activities of 6G4Society and b) identify a selected number of projects to be engaged with directly to deepen the knowledge acquired. More specifically:

For the **KVI Work**, 6G4Society has led and organized Workshops on KVI challenges and opportunities as well as how to define and measure values, built exemplar definitions based on existing project work that will support future articulation of KV and KVIs, organized a vertical-specific workshop with Public Protection and Disaster Response stakeholders to understand how values matter from their perspective, and it is currently producing a framework that will be able to better guide and inform SNS JU projects around KVIs and Sustainability. The results are also feeding the ongoing work on 'KVI Thematic Sheets' to further develop some of the value definitions and objectives within to support improved and harmonised indicator derivation. Selected projects have been approached and asked to split across five groups (Trust/trustworthiness, Safety, Build Knowledge & Skills, Inclusivity, Quality of Life) which will work on:

- Clarifying terminologies for values
- Better understanding 6G objectives within the values identified
- Draw a better understanding of the stakeholders they need to engage with and the impact
- Build exemplar KVIs

For the **Social Acceptance work**, the project has led and organized a webinar on controversies, identified and interviewed external experts, initiated a close collaboration with two projects to operationalize the Social Acceptance for Technology (SAT) model and produce material readily accessible and readable for the SNS JU community and beyond. In addition to this work, the 2025 Survey was also leveraged to identify additional projects that could be engaged in one-to-one interviews to understand the current approaches to social acceptance. To date, a total of nine projects have been approached and interviewed with the objective to assess the potential of the adoption and operationalization of SAT within project activities by collecting, through the interviews, evidence from real-world project experiences.

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