Grant Agreement No.: 101139070 (SNS JU)

Key Values and Key Values Indicators: How can SNS Projects Drive Sustainable Change?

AN INTERACTIVE WORKSHOP

REPORT ON ACTIVITIES AND INSIGHTS

Jointly Organised by 6G4Society and FIDAL

25th October 2025

6G4SOCIETY project has received funding from the Smart Networks and Services Joint Undertaking (SNS JU) under the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101139070. This work has received funding from the Swiss State Secretariat for Education, Research and Innovation (SERI).

INTRODUCTION

On 25th October, **6G4Society and FIDAL Project joined forces to organize an interactive workshop on Embracing Key Values and Key Values Indicators: How can SNS projects drive sustainable change?** The format of the workshop was designed to target four objectives:

- Gather current approaches to identify relevant KVIs and better understand how and why different projects approach value prioritization
- Collect challenges in defining and implementing KVIs to assess further support needs
- Share what works well in projects working with KVIs to collect best practices
- Clarify the expected impacts of KVI use.

The main goal of this workshop was designed around two sets of activities. These explored:

- How SNS projects are working with Key Value Indicators (KVIs) to address positive impacts of 6G innovation on society, including their hopes and fears in this process
- Challenges and best practices in defining and implementing KVIs in ways that show impact

After a set of presentations to set the scene, participants were engaged via interactive dialogues and encouraged to actively contribute to guided activities on a MIRO Board.

This report presents the results of the activities, highlighting insights and trends that emerged from participant observations. The findings are organized by thematic session, summarizing the discussions and inputs from all breakout groups. The goal is to identify synergies and disconnects that suggest actions for the SNS community moving forward. At the end of the report, proposed next steps are outlined.

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WORKSHOP SUMMARY

From its promotional launch, the KVI workshop attracted significant interest from SNS projects, gathering 62 active participants from both Call 1 and Call 2 projects. Prior to the event, a select number of Call 1 projects—identified as working with KVIs and having defined Use Cases—were approached to gather information on the stakeholders they are working with, as well as the challenges and best practices related to KVI implementation. This preliminary exercise helped shape the interactive activities for the workshop.

The session began with three key presentations: the KVI work within the FIDAL project, an overview of the KVI methodology from the paper *Key Value Indicators: A Framework for Values-Driven Next-Generation ICT Solutions*, presented by SNVC sub-working group lead Marja Matinmikko-Blue, and an introduction to the work of the Coordination and Support Action project 6G4Society in this field within the SNS ecosystem.

Participants were then split into breakout rooms, where discussions were guided through two distinct activities. The first explored how SNS projects are approaching KVIs, focusing on their hopes, fears, assumptions, and questions. The second activity examined how projects would define a KVI and its impact, identifying challenges and best practices in the process.

The first exercise revealed several key insights. Hopes were centered around using KVIs as tools to foster responsible, ethical innovation by aligning technological progress with societal needs, improving public acceptance of 6G, and guiding developers to focus on societal impacts. Participants expressed a desire for a practical, unified KVI framework with actionable steps to evaluate high-impact projects. However, fears centered on significant obstacles, including challenges in measuring KVIs, especially for projects with lower technology readiness levels (TRLs), and mapping KVIs to Key Performance Indicators (KPIs). Some participants found KVIs to be too theoretical, raising concerns about their effectiveness. Several assumptions also emerged, such as the belief that KVIs should be quantifiable—though challenging to measure—and that they assess impacts that may only materialize after a project's completion. Overall, the workshop emphasized the need for actionable, context-specific KVI frameworks to bridge the gap between theoretical aspirations and practical application.

The second activity highlighted the challenges many participants faced in linking a KVI to a project's impact on societal values, particularly in defining the scale and scope of this impact. There was consensus that clarity is needed in the definitions and objectives involved, which requires engaging a broad range of stakeholders—including project partners, external stakeholders, and the public—to ensure societal values are interpreted meaningfully.

The discussions during the workshop provided critical input for 6G4Society to better understand the needs of SNS projects regarding the definition, implementation, and assessment of KVIs. Based on the outcomes of the event, which are detailed further in this report, we have outlined a roadmap of activities designed to address project concerns and aspirations around Key Values and KVIs.

Recognizing that the development of KVIs requires consensus on the definition of Values and Key Values, 6G4Society will dedicate the first quarter of 2025 to drafting a proposal on social sustainability and Key Values. This will include workshops and webinars to engage projects and reach consensus on the priority Key Values for the community. The second quarter of 2025 will focus on developing proposed indicators adaptable to projects' TRL levels, incorporating input from external experts. Finally, the consensus-building and validation efforts will culminate in a draft Key Sustainability Indicator (KSI) framework, which will further refine a

subset of KVIs essential for assessing sustainability in 6G. A final White Paper will provide a detailed overview of the KSI Framework, offering practical guidance for its application and integration into project activities.

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BREAKOUT SESSION 1: HOPES, FEARS, ASSUMPTIONS, QUESTIONS

HOPES

The "Hopes" section explored the intended outcomes of KVIs and the expectations behind their implementation. Participants were asked what they hope KVIs will accomplish. Asking this question has helped clarify how the SNS JU community understands KVIs and their objectives. It also revealed differing perspectives and applications of KVIs across projects, which, while creating some uncertainty, also offer a range of approaches that could be suited to different contexts. Understanding these hopes will help establish a baseline set of guidelines for KVIs, clarify their intended scope, objectives, and impact, and improve alignment across projects when defining and harmonizing indicators.

The overall hope is that KVIs will offer a new pathway for aligning innovation with societal expectations, particularly by promoting a more value-driven approach to ICT development. This approach aims to support progress at higher levels, such as within SNS or the EU Commission. ‘’Hopes’’ highlighted various outcomes that projects foresee though the application of KVIs in technology design and development:

Foster (Foreseen) Positive Impacts on Community and Environment, Leading to Long-term Sustainability:

- Guide the design of 6G technologies in a sustainable way and help the SNS community anticipate potential issues by integrating sustainable design from the outset.
- Enhance innovation's capacity to address previously overlooked areas.
- Build public acceptance of 6G.
- Enable the ability to provide evidence that an expected outcomes was realised (e.g., benefits like increased safety, improved responsiveness, and operational efficiency across stakeholder groups).
- Prioritize people and the environment in SNS innovation.
- Balance technical and market requirements with broader societal goals and values.
- Shift how use cases are defined and approached in design.

Prioritize Real-World Problem-Solving:

- Encourage responsible and ethical innovation.
- Support technology developers in focusing on aspects beyond just technical performance—such as societal needs, long-term benefits, and economic growth within and outside of 6G industry.
- Strengthen collaboration between the SNS community and global stakeholders.

Align Technology Development with Societal Needs and Expectations:

- Address the needs and desires of people and the environment.
- Meet societal expectations and contribute to long-term value.
- Consider economic perspectives and align with European priorities.
- Facilitate the replicability of beneficial impact in different contexts.

Increase Stakeholder Engagement and Broaden the Diversity of Perspectives Included in Design:

- Boost global stakeholder engagement and alignment.
- Integrate more social scientists into project teams.
- Engage directly with society through interactive processes.
- Foster a shared understanding of core value drivers, even though the articulation of these values may vary by region or demographic.
- Increase the likelihood of acceptance of developed solutions by considering diverse perspectives.

To achieve these outcomes, the hope is that a common KVI framework can be established, one that:

- **Promotes Knowledge Sharing:** Encourages projects to share not just indicators and assessments, but also the processes used for identifying, prioritizing, analysing, and evaluating KVIs.
- **Supports Flexible and Scalable Indicators:** Identifies meaningful KVIs that are adaptable across different TRLs (Technology Readiness Levels). For example, in lower TRLs, KVIs might focus on technological enablers that are embedded into the project's design rather than specific targets.
- **Balances Use Case-Specific and General Indicators:** Ensures KVIs are both specific to individual use cases and broad enough to apply across diverse contexts.
- **Identifies Points of Alignment:** Facilitates the identification of areas where different goals align, such as where energy efficiency intersects with performance optimization, leading to benefits like reduced energy consumption and cost savings for both industry and consumers.

Some participants have expressed the hope that KVIs will lead to a strategic evaluation framework, helping to more effectively identify projects and activities with strong potential impacts. This suggests a feedback loop where impact informs design, as opposed to using KVIs solely as a way to demonstrate technological excellence.

There is also an expectation that large industry players will integrate KVIs into specifications and guidelines, aiding technology developers in applying them effectively.

Some hopes for KVIs reflect different priorities. For instance, some participants expect KVIs that are directly tied to technology design, while others envision KVIs that focus on the broader societal effects of technology. These approaches can coexist, but they represent different types of indicators, with distinct collaborators, evidence requirements, and expected outcomes. Similarly, some see KVIs as tools to guide technology developers, while others want them to influence industry and policy decision-makers, as well as public perceptions.

Ultimately, the hope is that a unified KVI framework can be developed, offering clear, step-by-step guidance on how to select and apply existing KVIs, and practical advice for developing new, project-relevant indicators. This framework should be flexible enough to accommodate different TRLs, project types, structures, and goals.

FEARS

A central concern shared across workshop participants is the **difficulty of measuring KVIs**, particularly within the timeframe of a project. **There is significant uncertainty around how to define, apply, quantify, or qualify KVIs.** Many projects are unclear whether KVIs should be measured during the project, after completion, or if they are focused on real-world impact. Additionally, questions remain about whether KVIs can be effectively measured in lower TRL

projects. Another challenge is the difficulty in mapping KVIs to KPIs, with fears that such mapping may not be meaningful or easily validated. This uncertainty stems from the fact that KVIs are often too abstract for technology developers, leaving discussions theoretical rather than actionable.

Across the board, there is a recognition that **mapping current activities to long-term societal outcomes is inherently difficult.** The challenge of linking enablers like network coding to long-term societal value is significant, and predicting direct impact on customers remains speculative, particularly at lower TRLs, where technologies are still in development and their position within the ecosystem is not clearly defined.

Many workshop participants also fear that they **lack the necessary expertise to define KVIs properly**. There is concern about the absence of engagement with key experts and researchers with the required knowledge and skills. This is partly due to the difficulty in quantifying KVI targets in the same way KPIs are measured, pointing to the need for a different approach and skill set. Additionally, even if meaningful indicators are identified, projects may not have access to sufficient data to measure them effectively, limiting their ability to evaluate the impact of KVIs.

For many, **KVIs feel intangible and beyond a project's control—particularly when they move into the subjective or qualitative realm**. A related fear is that there may be **no reliable way to objectively evaluate whether a technology element meets a KVI**. Values, by their nature, cannot always be quantified or justified with hard numbers or statistics. Some participants expressed concerns that if KVIs cannot be measured with a degree of confidence, it would be impossible to determine whether a project has met its goals. This raises two critical questions:

- **Are KVIs evidence of change, enablers of change, or predefined targets to be achieved?**
- **Should projects approach KVIs the same way they approach performance features?**

A related concern is that the **gap between the ambitions of KVIs and what can actually be achieved is too wide**. Some feel that KVIs are too ambitious to realistically be achieved, echoing the wide-ranging hopes expressed earlier.

Participants fear that **KVIs, on their own, will not be effective unless they are tied to concrete actions**. Some participants believe KVIs need to be proactive—linked to real-world, actionable outcomes—rather than just reactive or theoretical goals. This concern is linked to the fear that there is a blurred distinction between KVIs, KPIs, and KVs (Key Values) as drivers of innovation. Are KVIs justifications for KPIs? Are they a way to prioritize KPIs, or should they be treated as something entirely different? Some participants also raised the point that, in some instances, the effects of technology might take years to materialize. For example, the societal impact of the smartphone on children was not clear when it was being developed, and job growth at TRL7 cannot be accurately predicted.

These concerns lead to a more profound fear, **circling around trade-offs: that there is a misalignment of incentives between technological objectives and sustainability goals**, which could result in sustainability being sacrificed for practical or financial considerations. Many worry that decision-makers, such as telecom operators, may prioritize market viability and cost over sustainability, ultimately ignoring the results of KVIs. While KVIs aim to set sustainability guidelines for 6G, there are fears that **KVIs lack the authority or influence to ensure they are applied in practice**. Industry decisions, driven by KPIs, determine what comes to market and influence testbed development, leaving little room for sustainability objectives to shape the final product. There is also concern that **values like privacy or**

security might conflict with other goals, such as energy efficiency, creating tensions that KVIs cannot address. This misalignment of values raises questions about the real-world relevance of KVIs—something that neither industry nor consumers may be willing to compromise on.

Another fear is that **sustainability and societal values are too complex to be reduced to measurable features**. Identifying key societal values, mapping them to indicators, and aligning these with technological enablers is a complicated process. Some participants worry that the effort to address this complexity will be sidelined or discarded. If values and their associated metrics become too subjective, complex, or difficult to manage, there is a risk they will fall out of use within just a few years.

There is a worry that **KVIs could become a tool for greenwashing**—used more as a marketing or reporting strategy or to justify existing KPI targets than as a genuine measure of impact or proactive source of change. As part of this, some worry that **claims made during project proposals may be disconnected from the actual work being done**. Instead of addressing sustainability as a whole, some projects may focus on individual aspects, such as energy efficiency of components, without considering the broader impact on the entire system. This could lead to a situation where **solutions fail to live up to their sustainability promises.**

ASSUMPTIONS

A variety of assumptions about KVIs have emerged, shaping both the hopes and fears discussed earlier, and driving the diversity of approaches and challenges within the projects. These assumptions reflect:

- differing understandings of what KVIs are,
- how they should work,
- what their results should look like,
- what evidence is appropriate for the indicators, and
- who they are ultimately for.

Not all of these assumptions fit together neatly into a single picture, and some need to be reconciled or clarified as the projects move forward.

At the core of these assumptions is the question of **what exactly a KVI is**. For many, **KVIs are seen as a means of providing evidence of change**. However, there's disagreement on how this change should be expressed. Some believe that the change must be quantifiable and objective, while others argue that qualitative or descriptive indicators—although more subjective—are necessary to capture the full richness of change and impact. This tension reflects a deeper challenge: Can change always be quantified, or are some aspects of impact beyond numerical measurement?

Assumptions around what KVIs represent also reveal tensions. On one hand, **some participants view KVIs similarly to KPIs**, believing that they should be measurable, objective, and tied to clear thresholds or targets to evaluate progress during the project. For instance, some assumptions include:

- KVIs are to be mapped onto KPIs to evaluate during the project
- KVIs are measurable, objective, and need to be quantified
- KVIs have thresholds or targets to be met, similar to KPIs.

This set of assumptions suggests a straightforward, **performance-driven approach to KVIs**, with clear metrics to guide project development.

At the same time, there are other assumptions that **position KVIs as something distinct from KPIs, functioning at different timescales and covering different scopes.** Some see KVIs as enablers for future change, pointing to long-term societal shifts that may not be measurable during a project's lifecycle, but that could be assessed later—after market release or in follow-up projects. Assumptions along these lines include:

- KVIs are enablers for something to unfold in the future
- KVIs are qualitative and subjective
- Quantitative and objective measurements of KVIs are practically impossible
- KVIs represent factors that might not even be present during a project's lifetime
- KVIs point to changes in the world in the future
- Indicators should not just be focused on engineering or technology
- KVIs do not always require empirical validation.

These assumptions imply that KVIs are inherently qualitative, subjective, and may not require empirical validation in the traditional sense. This highlights a key challenge: How can 6G technology innovation projects measure something that represents a potential future change, especially when this impact might not be immediately visible and relate to non-technical aspects?

These contrasting views about KVIs' nature extend to their applicability across projects. On one side, some believe **KVIs should be specific to each use case**, unique to the context of the technology being developed. On the other side, others assume that common KVIs could emerge, with agreed-upon definitions, that **apply across different projects and TRL levels** or be adaptable, **capable of working both with and without specific use cases**. This duality raises the question of whether KVIs should be flexible and context-specific, or standardized and universally applicable.

There are also assumptions **about the characteristics KVIs should possess**. Many believe that KVIs should build on easily available data that isn't costly or difficult to obtain. At higher TRLs, where the technology's impact is more tangible, KVIs might be easier to quantify, while at lower TRLs, the flexibility of early-stage research allows for more exploration of long-term visions and potential outcomes.

Further assumptions emerge around the process and the roles of key actors in defining and applying KVIs. These are strongly tied to the hopes and fears expressed above.

- KVIs should be established before the development of technology enablers, ensuring that the indicators guide the design process from the start.
- All stakeholders will be equally invested in KVIs
- Projects will use KVIs to promote ecosystem change for the better
- Multidisciplinary teams will be created to ensure that robust, comprehensive indicators are developed.
- Industry leaders, larger organizations, and even standardization bodies should play a significant role in defining and driving the development of KVIs, helping to steer the initiative at a larger scale.

Finally, assumptions about **what KVIs do beyond guiding technological design** have also been expressed. Many see KVIs as a way to communicate the benefits of the developed technology, making them more understandable to customers and increasing the likelihood of acceptance. In this sense, KVIs are viewed not just as indicators of progress but as a value proposition—offering a clearer, more relatable way to understand complex technologies. For example, privacy-related KVIs might be easier for consumers to grasp than the technical details of privacy technologies themselves, thus increasing the probability of customer adoption.

QUESTIONS

One aim in the workshop was to gather the questions projects have about KVIs as they have been working from theoretical understandings towards practical applications. Key questions raised by participants revolved around three primary themes:

1. How do you make the values more tangible to developers? A central question raised in the workshop was how to make societal values more concrete and actionable for technology developers. Participants highlighted the need for multi-disciplinary teams that can bridge the gap between technical and non-technical perspectives, providing the ability to engage new types of data as well as accessing new sources of data. There's a tension between the need for clarity on when and how KVIs can be measured and the challenge of incorporating non-technical or qualitative data that isn't easily quantified.

This ties into the larger question: **What makes for a relevant KVI?** For many projects, there's uncertainty about how to define the most relevant values and how to prioritize them amidst diverse stakeholder perspectives. Questions like, "Which priorities should we focus on?" and "What are the key values, and how do we define them?" are pressing. Many projects wonder if there needs to be consensus on the definitions of these values, and what happens if stakeholders don't share the same understanding. Additionally, there are questions about the focus of KVIs when there are no direct users involved. For example, how do you evaluate values in industrial settings where human impact is not immediately evident?

Another set of related questions lie in defining KVIs for **lower TRLs**, where it is even harder to assess societal impact. How can KVIs be objectively evaluated when the focus is purely on technical development? Projects expressed concern that in these early stages, KVIs may seem speculative rather than evidence-based, raising the question: **How can we avoid reducing KVIs to mere projections of societal impact?**

In addressing these concerns, there's also the question of **if and how failures to engage or work towards KVIs should be made consequential**? Participants expressed the need to understand the consequences of not working toward the defined values. If there are no tangible repercussions for ignoring societal impact, then the KVIs themselves risk remaining abstract. The questions become: **Are there consequences for making claims about value that do not play out or are minimally? Are there gains to be had from demonstrating societal benefit beyond increased market share?**

2. What is the link between KVIs and KPIs? Another critical question centres around the relationship between KVIs and KPIs. Are they the same? If not, how do they differ? KVIs are often viewed through the lens of KPIs, which offer predefined thresholds to mark success. This alignment can be useful, particularly when trying to link technology development with potential sustainability impacts. However, many societal outcomes linked to KVIs may only become measurable far beyond the project's timeline, raising the questions: **Can KVIs have measurable thresholds, and if so, how do we define them? Are there targets or thresholds for all KVIs, especially the non-technical ones? If so, how should they be defined?** For example, it is not readily obvious how to identify and measure thresholds for a service supporting lower household energy costs for individuals, supporting more marginalised communities to benefit from a service, helping disaster responders save more lives, or improving health outcomes, sense of community, or well-being. This brings us to a key issue: **What kind of approach is needed for KVIs that can't be quantified like traditional KPIs?** And once defined, **how do we evaluate and validate these indicators to demonstrate real societal impact?**

3. How can the scope and ambition of KVIs be clearly defined? The final main question revolves around **how to define the scope and ambition of KVIs** without overcomplicating

them. The challenge is determining how far KVIs should look in the future. For example, should KVIs focus on the energy efficiency of a specific component, or should they address broader societal goals, such as improving environmental sustainability or public health? There's a fine line between defining KVIs that are realistic and relevant to current technological development and ensuring that they capture long-term, large-scale impacts. How far into the future should KVIs look? Is it reasonable to include potential impacts, like improved air quality five years after deployment, or should the focus remain on current design features and technology outputs?

This question is closely tied to the practical challenge of **how to manage the scope** of KVIs to avoid them becoming too broad or complex to be useful. Projects need to define what they can influence and clearly demonstrate causality or correlation between their work and societal outcomes. The question of **how many KVIs are needed to signal meaningful impact** also looms large. Projects need to understand how a set of KVIs can provide the evidence necessary to guide design decisions and demonstrate change. They need to understand how they can determine if they have enough relevant data to prove that a technology enabler is truly making a difference. They need to know how to appropriately bound the problem in ways that support filtering priorities and values in order to identify concrete and relevant KVIs, all without losing track of the impact, out there, in the future.

An overarching question that cuts across all three themes is: **How do you ensure KVIs are actually taken into account?** There's a fundamental concern about whether KVIs will be integrated into decision-making processes. As part of the, some participants had questions about the relationship between KVIs and business models: **Do business models shape KVIs, or do KVIs define business models?** This speaks to the broader challenge of how to ensure that the identified KVIs remain relevant, actionable, and influential within the context of ongoing technology development.

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BREAKOUT SESSION 2: LINKING EVIDENCE TO IMPACT VIA KVIs

In this activity, participants were asked to select a specific impact to brainstorm on and to identify how they would know they are making an impact and how they would show an external stakeholder they are creating a foundation for that impact. This kind of showing involves knowledge regarding verticals, contexts, and the non-technical goals of stakeholders in order to identify what would tangibly and convincingly indicate to someone outside a project that action towards a value was taken. The aim of the activity was twofold. First to gather ideas for this flow from project to impact, building on best practices in creating new KPIs. Second, to further gather questions and pain points to understand what needs to be done to better support projects in working with KVIs.

Difficulty in Defining and Measuring Impact

From this exercise, it emerged that one of the biggest challenge was for projects to be able to link an indicator with an impact. One of the first challenges faced by projects is defining what "societal impact" means and then determining how to measure it. Discussions revealed that societal values like trust, well-being, and inclusivity are often seen as too abstract or inconsistently defined, making it difficult to link them directly to measurable evidence. There is also a tendency to blur user needs with societal impact, a relationship that requires further clarification. Some projects do not agree on the fundamental values being addressed, or the definitions vary significantly depending on the project's scale and scope. For instance, when asked to define the scale and scope of impact, participants raised questions such as: What does "trust" mean in this context? Is privacy a distinct value, or simply an element of trust? What does "well-being" encompass—does it go beyond satisfaction with a service to include broader aspects like physical health, safety, and quality of life? The answers to these questions change depending on the user (e.g. business, worker, marginalized community), the project's scale (e.g., global vs. local), and the specific context (e.g. vertical, use case). For example, one group discussed the concept of improving worker well-being. Since "well-being" is a broad term that includes much more than injury prevention or job satisfaction, the group first needed to clarify which aspects of well-being they were focusing on. Without this clarity, the progress towards defining evidence for impact could have diverged in different directions.

Addressing the Challenge of Stakeholder Education

Showing impact also requires interactions with users, with stakeholders more broadly, or with experts in the field to support interpretations and assumptions being made by the projects. Many participants noted that users often do not know how to define values such as trust or inclusivity, or they may have different interpretations than the projects themselves. Some users may struggle to articulate their understanding because the concept of societal values is not part of their everyday experience. This raises the question: Should projects be responsible for educating users about these values?

Identifying and Collecting the Right Data

Once societal impact is defined, the next challenge is determining what data will best demonstrate whether the impact has been achieved. Projects discovered that they often lacked the expertise to identify relevant data beyond technical KPIs. In many cases, the data needed to measure impact must come from outside a project. For example, a factory owner may have the necessary statistics about worker injuries or the proximity of workers to unsafe machinery, or a healthcare provider may have the data on remote surgeries. Similarly, stakeholders outside the project may possess the data to indicate whether people are directly engaging with a service. This highlights a gap between technical teams and broader societal goals,

emphasizing the need for a broader range of stakeholders in defining and collecting data. Projects cannot rely solely on internal data; external evidence is necessary to measure real-world impact.

Building Feedback Loops with Stakeholders

Building a feedback loop with multidisciplinary stakeholders is critical. These stakeholders, such as policymakers, social forums, or researchers in related fields (e.g., political scientists, environmental scientists), provide crucial insights and act as representatives of the societal impact. Engaging these stakeholders allows projects to continuously refine their assumptions and integrate community feedback, ensuring that their work remains relevant and effective.

Who Needs to Know What About What?

This also raises previously unexplored questions: How much do stakeholders need to know about the progress toward impact? Do they need to see behind-the-scenes technical details, or just the outcomes? For instance, does the operator of a smart vehicle need to understand the intricacies of the 6G network or the sensors used in precision agriculture? Or is it sufficient for them to know that the system works as intended and delivers the desired benefit? These questions also connect to the broader issue of *literacy*—the understanding that stakeholders (e.g., business experts vs. technical experts) need in order to contribute meaningfully to defining and assessing impact.

The Complexity of Measuring Long-Term and Large-Scale Impacts

Measuring the long-term impact of societal changes is particularly complex. Many societal impacts, such as improved well-being or public health, may not be immediately measurable within the project's timeframe, especially given the influence of external factors like economic conditions or policy changes. For instance, a project focused on improving digital literacy might start by measuring immediate access to educational resources, but over time, it would need to track more complex long-term outcomes, such as employment rates or community health. Projects must therefore plan for long-term data collection, even after the project has ended, to track whether the intended societal impact is realized over time.

Additionally, translating large-scale societal impacts—such as global improvements in health, well-being, or poverty reduction—into smaller, tangible indicators for tracking within a project is challenging. Projects must balance both short-term and long-term indicators and understand how to apply them across different contexts. The challenge becomes even more pronounced at lower technology readiness levels (TRLs), where future use and impact remain uncertain.

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NEXT STEPS

The results of the workshop are currently being used by 6G4Society to strengthen an action that builds on the observations collected from the interventions of the participants. These results highlight the steps that projects can take or activities that 6G4Society can support across projects in order to address the fears, answer the questions, work towards the hopes, and produce a set of good practices in showing the impact KVIs seek to achieve. To this end, the workshop pointed to the need to:

Clarify Key Value (KV) Definitions and Applications. Develop a clearer, standardized definition of KVs that aligns with both societal values and technological goals. This includes specifying what about a value indicators should measure and when they differ from KPIs. This also needs to include ways of defining potential and future impacts. It also needs to include support for projects to prioritise between values.

Create a Strategic KVI Framework for Managing Scope and Ambition. Develop a framework for scoping the ambition of KVIs within projects (or even within funding calls) to ensure they remain manageable and relevant. This should include defining what impacts are realistically within a project's control, how far KVIs should project into the future, and when to consider trade-offs between societal goals and technical needs.

Create a Framework for Measuring KVIs Across TRLs and application contexts. Establish a flexible framework for defining and evaluating KVIs that accounts for different TRL stages. For lower TRLs, focus on indicators related to enablers and potential impact, while for higher TRLs, allow for more concrete, measurable outcomes tied to specific societal impacts. This also needs to simplify how KVIs are developed and function within projects.

Build Multi-Disciplinary Teams for KVI Development. Promote the formation of multi-disciplinary teams that bring together technologists, social scientists, economists, and other relevant experts to define, assess, and implement KVIs. Identify different pathways for this engagement. Facilitate collaboration between tech companies, research institutions, policymakers, and other stakeholders to develop and refine KVIs.

Develop Guidelines for Engaging Non-Technical Data. Create guidelines on how to gather and use non-technical, qualitative data to assess KVIs. Explore data collection methods that do not rely on traditional quantitative metrics.

Define Clear Methods for KVI Validation: Develop a robust approach for validating KVIs, particularly those that focus on long-term societal outcomes and those that inform more than just design decisions. This could include frameworks for assessing the potential impact of a technology over time, methods for validating qualitative and subjective indicators, as well as approaches to indicators that inform policy or stakeholder decision-making.

Establish Clear Processes for Mapping KVIs to KPIs. Clarify the relationship between KVIs and KPIs and explore ways to align them in projects where possible.

Ensure Stakeholder Alignment and Consensus on Values. Foster alignment and consensus-building activities among 6G stakeholders to ensure a shared understanding of societal values and KVIs.

Drive Accountability and Transparency in KVI Implementation. Establish clear mechanisms for accountability in relation to KVIs, including mechanisms for tracking progress, assessing outcomes, and ensuring that the values behind KVIs are actually being achieved.

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Set up regular review processes and public reporting on KVI performance. Establish clear mechanisms for understanding the potential consequences of failing to meet KVI targets, both during and after the project. This may include setting up a feedback loop to evaluate whether KVIs are delivering the expected societal benefits and adjusting them accordingly.

Ensure Integration of KVIs into Business Models, Business Goals, and Decision-Making. Build business cases around the societal benefits that KVIs aim to deliver, linking them to corporate KPIs and strategic decision-making.

Avoid Speculation and Base KVIs on Realistic Assumptions. Be cautious about KVIs that are based on speculation or over-optimistic assumptions about the technology's impact. Make sure that KVIs are grounded in realistic projections, supported by evidence.

Account for Long-Term Impacts and Uncertainty. Build mechanisms for assessing the long-term impact of 6G, such as post-project assessments, sharing between projects, or follow-up studies that capture the societal changes after the technology is deployed.

Set Clear Expectations for KVI Evaluation and Validation. Define how KVIs should be defined and evaluated throughout a project's lifecycle.

Address Misalignment Between Technological and Societal Goals. Develop strategies to balance the potential misalignment between business objectives (such as cost efficiency, market competitiveness) and societal goals (such as sustainability, privacy, equity).

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Co-funded by the European Union