

The Value of Including Social Sciences and Humanities (SSH) in EU - funded Innovation and Research:

The HIDDEN project

by

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Executive Summary

This article describes the evolving role and critical importance of Social Sciences and Humanities (SSH) in European Union (EU)-funded research and innovation (R&I), particularly within transport technology projects. It contrasts the earlier technology-centric approach of Horizon 2020 with the more integrated, multidisciplinary focus of Horizon Europe, where SSH is now a core requirement in project design, implementation, and evaluation.

There are five key points in the article: (1) the strategic integration of SSH is essential for addressing complex societal challenges, ensuring that technological solutions are ethical, inclusive, and aligned with real user needs; (2) case studies, such as the HIDDEN project, demonstrate the value of early and continuous SSH involvement, leading to more socially responsible and accepted technology innovations; (3) SSH disciplines help identify and address the needs of diverse user groups, including vulnerable road users (VRUs), by informing co-creation, human-centered design, and societal readiness assessments; (4) SSH contributes to legal, ethical, economic, and behavioral aspects of innovation, ensuring that new technologies are not only technically sound but also socially viable and equitable; and (5) by embedding SSH throughout the innovation lifecycle, from problem definition to deployment and impact assessment, we move beyond tokenistic SSH involvement by actively engaging SSH experts and diverse citizens from the start, and foster interdisciplinary collaboration and co-creation to ensure that technology serves real societal needs, not just technical objectives. Integrating SSH is not just a regulatory requirement but a strategic necessity for developing transport and mobility innovations that are ethical, inclusive, and truly beneficial to society.

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Introduction

If one compares Horizon 2020 (H2020) and Horizon Europe (HE) Call texts side-by-side, one realises that the approach towards Innovation and Research (I&R) in the EU has actually evolved from “How can technology solve this problem” (H2020: 2014-2020) to “How can technological, social, economic, behavioural and governance innovations together help address the problem successfully?” (HE: 2021-2027). That is why the Social Sciences and Humanities or SSH as the European Commission (EC) refers to them, are nowadays an integral part of most of the EU funding Calls for project proposals.

All that is commendable, of course, but are we really using the SSH input and feedback on lessons learned while running the innovation EU-funded projects, or are we just ticking the box of the Call requirement for SSH in our Project Proposal? Are we taking advantage of this very important input and guidance to the proposed solution to the problem before, during and after the successful proposal that is now running as a 36-month project? Or are we treating SSH as nice-to-have in the various project Work Packages and Tasks, leaving only a couple of Deliverables incorporating SSH expertise throughout the project duration?

Hybrid Intelligence for Advanced Collective Perception and Decision-Making in Complex Urban Environments (HIDDEN) is one of the I&R EU-funded projects that is taking SSH contributions into account from the early stages of its project work. The HIDDEN project is developing advanced Collective Awareness (CA) and decision-making algorithms to ensure safe and socially responsible autonomous mobility in complex urban settings. The project applies “Hybrid Intelligence” across the perception-to-decision chain to detect occluded objects and vulnerable road users (VRUs) and predict their trajectories in both real-world and simulated environments. Central to its approach is the integration of SSH perspectives into technical development, ensuring that artificial intelligence (AI) models and decision-making systems are aligned with human behaviour, ethical principles, legal considerations, and societal expectations.

Why is SSH Important to the Transport-related Innovation and Research Projects?

In HE, the SSH requirements were specifically referenced in many of the Transport-related Call topics. The EC instructed the topic drafting teams to integrate SSH into the text setting out the expected outcomes, the scope, impacts and stakeholder engagement, requirements with regard to identifying the relevant SSH disciplines and/or including SSH expertise in the consortium. The aim of the EC was to ensure that SSH methods contribute to the research design and outcomes while at the same time enabling I&R projects to demonstrate societal impact and stakeholder engagement¹¹.

The EU Calls request applicants for EU funding to integrate the socio-economic dimension of the problem and solution into the process of designing-developing-implementing research in new transport technologies. The decision to increase the SSH requirement from Horizon to HE was supported by evidence that SSH can provide essential contributions to transport research by supporting changes in citizens’ behaviour to use resource-efficient forms of transport, which respect the environment; by contributing towards making mobility not only more environmentally friendly, but also more user friendly and last but not least, by contributing

¹¹ [SSH Integration in Horizon Europe](#), Cluster 2, Horizon Europe NCP Portal; Integration of the Humanities and Social Sciences in Horizon Europe, EURAXESS.

towards assessing the success of the proposed technologies based on user acceptance analytics¹².

Are ‘user habits and attitude’ and ‘influencing user behaviour’ the only reasons why SSH is part of today’s EU-funded R&I though? No, the EC has a clear position: SSH is a horizontal priority in I&R as it contributes to “effectively address complex global challenges, serve the well-being of EU citizens and communities, and align with the EU’s social policy objectives.”¹³

Throughout the recent European ITS Congress in Istanbul (April 2026), the inclusion of SSH in several HE projects was discussed. For example, the interactive discussion during Special Interest Session (SIS) 14 on ‘Safety, Resilience and User Acceptance’¹⁴, organised and moderated by Christoph Vollath, analysed the topic of user acceptance and validation on products and services resulting from EU-funded R&I in the field of Intelligent Transport Systems (ITS). The validation and ITS experts in the audience came from both Science, Technology, Engineering, and Mathematics (STEM) and purely technical backgrounds but also from SSH. An excellent and honest exchange of experiences and practices in the field of user acceptance concluded that a common mistake in EU-funded projects is treating SSH as a dissemination or communication task at the end of the project. What projects tend to do is use SSH to ‘validate’ the result of the project rather than discussing with the users the design and implementation and deployment plans before these are finalised and set in motion by the more technical partners in the consortium.

The importance of this aspect was further highlighted by a poll at the end of the discussion in which participants unanimously agreed that users may well accept the innovation, but it still may not get adopted. “To facilitate adoption and deployment, it is not only critical to integrate feedback from users early on but also to better understand who the users are that need to accept the innovation; and that it may not only be the end users” (Christoph Vollath).

An example discussed at SIS 14, was that of automated enforcement systems using AI and cameras. When the specific I&R product was piloted in a major European city as part of the EU-funded project, users (drivers receiving the fines for speed violations) perceived these cameras as revenue generators for the local and national government, while there were cities (also a user in this case) that complained about the high cost of the implementation of the service. The SSH involvement of experts from the SSH disciplines in such projects would possibly uncover the city’s unwillingness to cover the cost for the deployment of the product before completion of the project.

Also, the SSH experts would have most probably been able to identify the negative feelings from the drivers relating to the positioning of the cameras in locations within the road infrastructure that did not necessarily justify the safety claim of the authorities for installing the speed cameras. These locations were already known as ‘speed traps’ with police patrolling these spots for years. The example proved that if accident reduction or traffic improvements are marginal but the financial burden on users is significant and widespread, user acceptance is low. Had the SSH subject matter experts (SMEs) had the opportunity to be involved in the project from the

¹² [Success Stories in SSH-STEM collaborations](#) (2021), www.Net4society.eu

¹³ [SSH Integration: Integrating Social Sciences and Humanities across research and innovation framework programmes](#) (13 June 2026), European Commission Research and Innovation.

¹⁴ Speakers at SIS 14: [Dr. Johanna Tzanidaki](#), [François Brambati](#) (Psychology expert at at Deep Blue), [Lampros Yfantis](#) (Transport modelling and MaaS expert at ERTICO -ITS Europe) and [Lorenzo Valletta](#) (Sociology expert at TTS Italia)

beginning, they would have been able to conduct the relevant Cost -Benefit Analysis as well as the consultation with the users on the perceived value of such a digital traffic tool. The SSH experts would have most probably identified the unfairness of the proposed solution and the equity issues faced by lower income segments in society, when faced with high fines for a traffic challenge that could have been addressed by deploying simpler and less costly solutions.

One potential reason for these conclusions in SIS 14 was discussed in another session at the ITS European Congress – that is the fact that many ITS project consortia may not have worked with SSH-related organisations before and are unsure how to engage SSH SMEs in these types of ITS projects. In Strategic Future Session (SFS) 7, a model called Knowledge-Interest-Social (KIS) Graphs was presented to properly incorporate SSH expertise and organisations into projects that should include or require SSH input¹⁵. These specialised graph databases map complex networks to enable smarter, decentralised planning and mobilisation that incorporate SSH input, and have been used in active HE consortia across the transport sector.

Other approaches to incorporating SSH were discussed in SFS 7 – one in particular is called backcasting, which is a future-oriented planning approach that starts from a desired future scenario and works backwards to identify how to achieve it. Instead of extrapolating current trends, it allows stakeholders, including SSH SMEs, to go beyond existing constraints and think more creatively about long-term change from an SSH perspective.¹⁶

Including SSH not only for the Adoption of Technology but Answering Real Citizens' Needs

Despite increasing efforts to integrate SSH perspectives into EU R&I projects, several limitations remain regarding how SSH disciplines and citizens are involved in technological development. First, SSH disciplines are, in most cases, integrated to assess user perspectives. While the perspectives of VRUs have received increasing attention in recent years, citizens' perspectives are still often considered through a techno-centric lens, where technological development remains the primary focus and citizens' perspectives are mainly used to improve technological performance, for example in terms of safety or efficiency. However, this approach does not sufficiently account for the broader social, economic, institutional, and infrastructural factors that shape the adoption and use of technology.

“While developing safe, secure, and efficient technologies is important, it is limiting to assume that technological improvement alone can solve systemic transport and mobility challenges. Such an approach overlooks the wider conditions that influence access to and use of transport services” (Dr Louison Duboz). As a result, access to Cooperative, Connected, and Automated Mobility (CCAM) may remain limited for certain population groups if barriers related to digital access and digital literacy are not considered. Similarly, transport accessibility must also be taken into account. Even if CCAM services are available, people may not be able to access it if the surrounding infrastructure, such as pedestrian pathways or access points, is inadequate. A broader perspective is therefore needed to understand how technological, social, and infrastructural factors interact and shape access to and use of CCAM services.

This techno-centric lens is also reflected in the way citizens are involved in co-creation processes. Integrating SSH perspectives and citizens into co-creation processes raises the

¹⁵ Mehmet Golhan in SFS 7, “Moving Everyone Forward: Accessibility-Driven Transport Solutions,” ITS European Congress, April 29, 2026.

¹⁶ Floridea Di Ciommo in SFS 7, “Moving Everyone Forward: Accessibility-Driven Transport Solutions,” ITS European Congress, April 29, 2026.

question of how they can be effectively involved. So far, citizens have often been included at later stages of the innovation process, although some initiatives have tried to engage them from the beginning. A project that followed a bottom-up approach to capture the mobility needs of European citizens, and paid special attention to the needs of vulnerable users and under-researched groups was the Social INnovation to FOster iNclusIve cooperative, Connected and Automated Mobility (SINFONICA) project¹⁷. Different segments of society were represented and directly engaged in a participative process. This contributed to the development of a wide inventory of knowledge organised in the form of knowledge maps and to the creation of an innovative tool – the Knowledge Map Explorer – able to exploit the knowledge by providing practical guidelines and long-term recommendations to ensure that CCAM solutions meet social inclusion criteria.

The [SINFONICA project](#), through extensive co-creation activities involving more than 6,000 participants with different socio-economic backgrounds, abilities, ages, and mobility needs, showed that users' expectations, fears, and lived experiences significantly influence the acceptance, effectiveness, and societal readiness of CCAM solutions. "AI and automation cannot be developed in isolation from the people these technologies are intended to serve. Human diversity is not an exception to be managed, but the starting point for innovation. Human-centred design should therefore be considered a fundamental design principle rather than a validation step conducted at the end of technology development. The real challenge is not making AI smarter, but making it meaningful for everyone." (Dr Giulia Renzi)

The Example of SSH Involvement in Cooperative, Connected, and Automated Mobility (CCAM): the HIDDEN project

The [HIDDEN EU PROJECT](#) at its webinar 'From Principles to Practice: Social Sciences and Humanities (SSH) in AI-Driven CCAM' (26 May 2026), asked each of the speakers to bring forward the specific perspective of their SSH discipline while discussing the topic of occlusion in CCAM. During the insightful discussion among the SSH experts a number of points were made:

Technology alone is not enough. European I&R has to address the ethical and societal blindspots by using human-centred design and co-creation. *"if we do not do this, CCAM risks excluding vulnerable groups and losing the public trust that any technology ultimately depends on — a challenge the HIDDEN project is tackling head-on by combining machine and human intelligence in the development of safer, more ethical automated mobility systems"* (Dr. Angelos Amditis). In CCAM "we often focus on sensors, algorithms, connectivity, and AI. However, research indicates that many safety-critical failures in automated systems are not solely technical problems; there are also significant human-centred and societal challenges related to issues such as trust and acceptance" (Dr İbrahim Öztürk).

Human factors research revealed recurring patterns: if people trust automation too much, they may stop monitoring it, and if they do not trust it enough, they will not use it and will not benefit from the system. Mode confusion, "Is the system on? What is it doing?", is especially problematic in driving assistance and automated driving systems. Trust calibration is even more critical with AI. Since AI can perform extremely well in many situations, users may overestimate its capabilities. Ultimately, AI introduces a new layer of uncertainty, and studies show that people may accept systems conditionally or reluctantly, or even reject them despite acknowledging their value and finding them socially acceptable. "There are many demographic, psychosocial, social, and cultural factors associated with variations in user acceptance. There

¹⁷ <https://sinfonica.eu/project/>

seems to be no single type of attitude towards the systems, nor any general acceptance of them” (Dr İbrahim Öztürk). SSH are able to contribute to designing systems that people can understand, predict, and work with.

Without considering the end-users' needs and expectations, technology that is supposed to improve mobility will not be accessible or **useful to all end-users**. Inclusivity in the field of Transport and Mobility dictates that Vulnerable Road Users (VRUs) are NOT edge cases. Their voices and needs should be the starting point for technology development through co-creation. At the same time, SSH is able to help STEM I&R in CCAM “to cater for vulnerabilities that are not always (or only) physical but can also be social. Digital literacy, language, gendered safety perceptions and mental disabilities are not recognisable by (only) physical markers and new technologies such as vehicle automation and AI need to be trained, with the help of SSH, to support and facilitate the mobility of such users”(Pinelopi Alexiou).

The human context of the legal aspects of CCAM is critical. Individual perception is now a legal consideration and **liability can no longer be attributed solely to a single vehicle or driver** -the network becomes a co-actor in every safety critical decision. In CCAM, “single-agent Line-of-Sight (LoS) sensors face structural limitations in dense urban environments and resolving occlusions requires a reliance on ‘Collective Awareness’ via Vehicle-to-Vehicle (V2V) and Vehicle-to-Infrastructure (V2I) networks. In terms of liability, this architectural shift disrupts traditional tort law by transitioning the standard of care from the subjective human ‘reasonable person’ to an objective, evolving ‘state of the art’ benchmark in perception technology, thereby shifting liability rules toward manufacturers under modern frameworks like the EU Product Liability Directive and distributing responsibility between driving system developers and infrastructure providers” (Prof. Avv. Maria Cristina Gaeta).

Risk is NOT mode-specific although our transportation planning often starts with modes rather than traveller needs for mobility.

Interestingly, **standardisation can also claim a valid contribution in ensuring more human-like technologies** and tools in transport and mobility projects, such as HIDDEN. Standards have traditionally taken a very technical/technological approach in CCAM as this ensures interoperability and scalability in products and services around the globe. Following the evolution of R&I methodologies in the EU -funded projects, “standardisation is also attempting to find ways of adding the human dimension into its Recommendations and Best Practices. Standards should be able to recognise the diverse human reactions to CCAM, such as gender safety perception or digital literacy and not treat humans as a homogeneous body because they are not” (Dr. Johanna Tzanidaki). In the HIDDEN project, standardisation efforts are focusing on VRUs and occlusion.

Nonetheless, more and more standardisation activities are linked to aspects of Societal Readiness in relation to CCAM. How prepared society (the direct and indirect users) is to adopt, accept, embrace and benefit from new technologies in transport and mobility is an important dimension of Societal Readiness and what the SSH work intimately contributes to CCAM projects. Many European CCAM projects use the concept of Societal Readiness Levels (SRLs) as a critical factor for moving automated mobility from pilot projects to widespread real-world adoption.

“Successful deployment of CCAM systems requires much more than technological excellence. Social Sciences and Humanities (SSH) must be integrated throughout the entire development

lifecycle - from problem definition and design to implementation, evaluation, and societal impact assessment” (Prof. Andreas Riener). In HIDDEN, the hybrid intelligence approach adopted by the project combines human and machine intelligence by incorporating vulnerable road users’ (VRUs) behaviour, human state sensing, explainability, and human-AI shared awareness into the development process. “Rather than treating ethics, trust, and acceptance as afterthoughts, we operationalise them through empirical studies, Value Sensitive Design, and real-world validation with diverse user groups, including children and teenagers. Our overarching goal is to develop AI-based CCAM systems that are not only technically advanced but also safe, trustworthy, inclusive, and aligned with human values, behaviours, and societal expectations” (Prof. Andreas Riener).

Beyond HIDDEN, SSH should receive greater prominence in future EU funding calls, national strategies and policy frameworks, and become a more integral component of industrial innovation processes. Human-centred, ethical, and societal perspectives are not secondary considerations, but key enablers for the successful adoption and long-term acceptance of future mobility technologies.

Conclusion: Impactful, Real and Necessary

Integrating SSH into I&R through interface design, behavioural modelling, training strategies, and regulations based on actual human behaviour rather than assumptions, means treating human behaviour as a design resource rather than a problem to be eliminated. Systems, such as CCAM and solutions to challenges such as occlusion in automated vehicles (AVS) have to be built around real human capabilities, limitations, and social behaviour.

The work of SSH focuses on identifying the user(s), the benefits for the user(s) and the best pathway towards ensuring that technology brings added value to users’ every day challenges but it does not stop in that. Legal considerations, societal attitudes and perceptions along with identifying economic challenges related to technology -based innovation also makes part of the contribution of SSH into EU -funded R&I. Understanding the users and their needs is crucial in ensuring that the EU -funded I&R project work answers real societal needs and concerns while developing products and solutions with true societal readiness.

Beyond the HIDDEN project, SSH provides immeasurable value in the design, development and deployment of ITS. In other EU-funded projects, such as Active Mobility Innovations for Green and Safe city sOlutionS (AMIGOS) and Shared multimodal Mobility for ALL (SMALL), SSH has played a key role throughout these projects and ITS deployments. For example, the SMALL project has relied on co-creation to incorporate SSH in five distinct activities¹⁸:

- Co-identify, which is conducting qualitative and quantitative research to identify the disproportion between mobility demand and service;
- Co-develop, which uses workshops and focus groups with interested local relevant stakeholders
- Co-implement, which is using communication campaigns to promote the services
- Co-evaluate, which is gathering data and conducting an evaluation using key performance indicators (KPIs) that were developed during the co-development process

¹⁸ Esen Köse, “SMALL in the BIG picture: co-innovating shared mobility for all,” SIS 54, ITS European Congress, Istanbul, April 28, 2026.

- Co-disseminate, which is distributing and communicating materials, forming new partnerships, and reconsidering business models for shared mobility.

Citizens are still in most EU -funded projects, rarely involved as active participants in technological development and are often perceived as consulted actors or users rather than as actors shaping the technology itself. This is particularly the case for marginalised groups and women, who remain underrepresented in the more technical aspects of technological development.

Actively hiring and retaining more people from these groups in technical roles, such as technology developers, would allow their perspectives and needs to be integrated from the beginning of the development process, rather than being addressed through retrofitting at a later stage. It would also enable them to play a more active role in shaping technologies that are safer, more inclusive, and better suited to the needs of a diverse range of users.

Moving beyond the focus on citizen's adoption and engaging project resources in answering real societal and citizen's needs will allow SSH disciplines not only to assess user and VRU acceptance, but also to identify the wider conditions required to ensure that CCAM technologies are accessible, inclusive, and beneficial for all segments of the population.

“Mobility is critical in everyday life and when we design and build technology without considering the traveller's needs, behaviours, and attitudes, we are only building technology for technology's sake. Incorporating SSH into ITS ensures that we have considered all elements of “The Complete Trip.” This means that technology is designed and deployed to be accessible to and usable by everyone at every point in a journey, that it ensures safety and sustainability, and that it facilitates trust and acceptance in the technology” (Carol Sweiger).