TRUST Traffic Safety Culture | A Systematic Transition towards Shared Responsibility for Safe and Sustainable Mobility in the EU

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Statement on the use of AI

During the preparation of this work, the authors used ChatGPT to support language editing, including checking for grammatical errors, improving clarity, shortening text, and identifying overly long or repetitive sentences or sections that could be shortened or moved to an appendix. This support was used solely for editorial and structural purposes and did not affect the substantive content, analysis, or conclusions of the work.

In addition, NotebookLM was used in a limited and supportive capacity during parts of the literature review process to assist with the organisation and exploration of a large body of literature and to support the drafting of preliminary summaries. The outputs generated through this process served as preliminary input only and were critically reviewed, revised, and supplemented through additional manual reading by the responsible researchers. References and interpretations were not adopted automatically and were subject to manual verification.

All AI-generated suggestions and outputs were reviewed and validated by the authors, who take full responsibility for the content of the publication. See also Appendix 2 for an elaboration on the role of AI in the literature review.

Table of Contents

Glossary & abbreviations

Term / abbreviation	Explanation
AEG	Academic Expert Group
ADAS	Advanced Driver Assistance Systems
ADS	Automated Driving System
AV	Autonomous Vehicle
CMV	Commercial Motor Vehicle
DMS	Driver Monitoring System
eHMI	External Human-Machine Interface
EU	European Union
HGV	Heavy Goods Vehicle
LGV	Large Goods Vehicle
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
TPB	Theory of Planned Behaviour
TSC	Traffic Safety Culture
UTAUT	Unified Theory of Acceptance and Use of Technology
VRU	Vulnerable Road User

Executive summary

Road safety in the European Union has improved significantly over the past decades, yet progress has slowed in recent years as the transport landscape has grown increasingly complex. The rise of new mobility modes, advances in vehicle technologies, and changing patterns of road use have transformed how people interact within traffic environments, highlighting the limitations of relying solely on traditional safety measures. Achieving further reductions in fatalities and serious injuries increasingly depends on understanding the cultural dynamics that shape road user behaviour. In this context, Traffic Safety Culture (TSC) has gained importance as a framework for examining how shared values, social norms, attitudes, beliefs and institutional practices contribute to safety outcomes.

The overarching aim of this deliverable is to examine recent developments that have shaped road transport and to analyse their implications for TSC. To achieve this aim, the study adopts a structured approach focusing on three key thematic areas:

1. Micromobility and new transport modes,
2. Technological innovations and digitalisation,
3. Evidence-based policy making and governance

The methodological approach combined a systematic literature review with a two-round expert Delphi study. The literature review, conducted using Scopus, applied a simplified PRISMA methodology with a three-step screening process at title, abstract, and full-text levels, retaining only studies with direct relevance to TSC. Data extraction followed a consistent framework addressing TSC levels, transport modes, measurement approaches, and behavioural and safety outcomes. The Delphi study involved 52 experts in Round 1 and 37 in Round 2, representing diverse professional backgrounds and European countries. Participants rated structured statements on a five-point Likert scale, with group median feedback provided in the second round to support convergence.

Across all three thematic areas, the combined findings confirm that TSC is a multidimensional and context-dependent construct shaped by the interaction of behavioural, socio-cultural, institutional, and technological factors, with road user behaviour serving as the primary pathway through which it influences safety outcomes. The Delphi study complemented the literature by surfacing expert concerns about the cultural consequences of automation, the limitations of policy approaches without systemic change, and the growing influence of social media on safety norms. Methodological gaps persist, particularly in the limited use of objective safety indicators and the geographical concentration of research in Europe and North America.

These findings provide a solid foundation for the design of targeted interventions and for the continued development of TSC as a research and policy framework within the TRUST project, supporting the EU's goal of halving road fatalities by 2030.

1. Introduction

1.1. Background

Every year, approximately 20,000 people die on EU roads and at least 100,000 are seriously injured (European Commission, 2025). Despite the progress over the last decades, these numbers are still unacceptably high and a key challenge for all European countries. There are even signs that the trend of decreasing road fatalities is stagnating or reversing in some countries, and most European countries face great challenges with a large number of seriously injured pedestrians and cyclists. Whilst progress can still be expected from improved infrastructure, (vehicle) technology and traffic laws and enforcement, many road safety experts believe that a change in the values, social norms, attitudes and beliefs of all stakeholders in road safety and road users is needed (Nævestad et al., 2019). These changes imply the need for a cultural change, which does not only apply to road user groups, but also – if not more – to those who are responsible for shaping the traffic system through their roles in organisations. This focus on safety culture and the crucial role of all stakeholders influencing the road traffic system is also underlined by the Academic Expert Group (AEG) of the Fourth Global Ministerial Conference on Road Safety, in Marrakech 2025. Leveraging a cultural change that may improve TSC across European countries requires, however, a well-developed definition of the TSC concept; clarifying what it is and what it is not; is necessary to establish it as an effective tool for measurements and targeted interventions.

In recent years, TSC has gained increasing attention among both researchers and policy makers, but the concept remains insufficiently developed and lacks a shared understanding regarding its definition, operationalisation, and policy integration. This has led to confusion and occasional misuse of the term, highlighting the need for greater conceptual clarity. To ensure its effective use in improving road safety, TSC must be clearly defined and operationalised, including its key components such as values, norms, attitudes, and beliefs, in line with established social science frameworks and adapted to different implementation contexts.

1.2. Aims

The overarching aim of this deliverable is to identify progress and developments that have shaped road transport in recent years and to investigate their impact on TSC. The analysis addresses three thematic areas: the emergence of micromobility and new transport modes, technological innovations and digitalisation, and evidence-based policy making and governance. To achieve this, the study combines an extensive literature review with a two-round Delphi survey of international road safety experts, ensuring that a broad range of perspectives is captured across these domains in a consistent analytical manner.

This study is part of the EU-funded TRUST project: "Traffic safety culture a systematic transition towards shared responsibility for safe and sustainable mobility in the EU" (Grant agreement ID: 101197992). The project addresses the challenge that progress in road safety has slowed, with signs of stagnation or even reversal in some countries, while current efforts may not be sufficient to achieve the EU target of a 50% reduction in fatalities by 2030, highlighting the need to foster a stronger TSC. This deliverable is based on Task 2.2, which is part of Work Package 2 (WP2). WP2 aims to establish a shared framework of TSC and its contribution to road safety and sustainable mobility.

2. Methods

2.1. Extensive literature review

This review focuses on identifying recent developments that have shaped road transport and assessing their impact on TSC. The analysis examines developments over the last years that influence road user behaviour, safety-related values, norms, attitudes, beliefs and governance mechanisms. The review addresses three main areas: the emergence of micromobility and new transport forms, technological innovations and digitalisation, and evidence-based policy making and governance frameworks. The review followed a simplified version of the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) method (Page et al., 2021).

1.1.1. Search strategy

Literature searches were performed within Scopus. The search terms were adjusted within the platform to ensure consistency of the underlying concepts, and the platform's specific functions were utilized where they facilitated the search process. Annex 3 presents the conceptual search strings, the applied restrictions, and the number of retrieved hits for each thematic area. The searches were designed to cover the three thematic areas that correspond to the Task 2.2 targets. They were limited to studies about the road transport sector, and the focus was on the literature that deals with TSC or similar concepts.

2.1.1. Screening procedure

All search results were manually checked at the title and author level to identify and remove duplicate records, including duplicates arising from spelling inconsistencies or database overlaps. After the removal of duplicates, the screening process was conducted in three steps. In the first step, publications were screened based on their titles to exclude clearly irrelevant studies. Broad inclusion criteria were applied at this stage, and publications for which relevance was uncertain were retained for further screening. The screening criteria applied at the title screening stage are presented in Annex 4.

In the second step, abstracts were reviewed to further assess the relevance of the publications. At this stage, the screening criteria were refined and applied more strictly, allowing for a clearer distinction between relevant and non-relevant studies. Publications that could not be confidently excluded based on the abstract alone were retained for full-text assessment.

In the third step, full-text screening was conducted. Publications for which the full-text version could not be accessed were excluded. The remaining studies were thoroughly reviewed in full and subsequently either included in the final review or excluded based on the predefined criteria.

Overall, this three-step screening process ensured a consistent selection of studies, with particular emphasis on retaining publications that were directly relevant to TSC and its related behavioural, attitudinal, and governance dimensions. The results of the searches and screening process for each search are documented in flowcharts in Annex 4.

The literature search on micromobility and new transport modes yielded a very limited number of publications. The search focused on emerging mobility modes such as e-scooters, e-bikes, shared mobility services, ride-hailing, and other new forms of urban transport. Data extraction focused on identifying how micromobility developments influence safety-related values, norms, attitudes, beliefs but also behaviours and perceptions, as well as interactions between different road users, within different TSC contexts.

For technological innovations and digitalisation, the literature search initially yielded a large and heterogeneous set of publications addressing autonomous vehicles, advanced driver assistance systems (ADAS), artificial intelligence, and connected vehicle technologies. During title and abstract screening, the screening criteria were progressively refined to exclude studies whose primary focus was on technical system development, algorithmic performance, engineering design, simulation models, or validation of technological components, where these were not explicitly linked to TSC. In particular, publications focusing on machine learning models, trajectory prediction, functional safety standards, system architectures, or interface design were excluded when they lacked a behavioural, cultural, or societal perspective. Studies addressing automation solely from an engineering, human–machine interaction, or safety performance standpoint were also screened to determine if they failed to consider safety-related values, norms, attitudes, beliefs, trust, acceptance, and behavioural adaptation. In addition, publications from non-transport domains or unrelated scientific (e.g., industrial robotics, computer vision benchmarking, or aviation automation with no road-safety application) fields were excluded. Only studies addressing issues such as social acceptance of automation, trust in automated systems, ethical and cultural implications of autonomous driving, cross-cultural differences in technology perception, and behavioural interactions between automated vehicles and other road users were retained. For the studies included after screening, data extraction focused on identifying the mechanisms through which technological innovations and digitalisation influence TSC, including changes in risk perception, trust in automation, responsibility attribution, behavioural adaptation, and interactions between human drivers, vulnerable road users, and automated systems

The literature search on evidence-based policy making and governance initially yielded a diverse set of publications addressing road safety, driver behaviour, and regulatory or institutional frameworks. During title and abstract screening, the screening criteria were refined to exclude studies whose primary focus was on technical systems, enforcement technologies, infrastructure design, training programmes, or crash statistics, where these were not explicitly framed within a TSC perspective. Studies approaching road safety solely from an engineering, technological, or epidemiological standpoint, without consideration of cultural, normative, or governance-related dimensions, were also screened out. In addition, publications focusing on isolated behavioural measurements, operational policy descriptions, or educational interventions were excluded when they lacked a clear link to broader governance mechanisms, value systems, or societal norms shaping TSC. This screening process substantially reduced the initial pool of studies, ensuring that only publications with a clear conceptual or analytical focus on TSC within policy and governance contexts were retained. For the studies included after screening, data extraction focused on identifying the policy- and governance-related mechanisms through which TSC is shaped at different levels (national, regional, organisational, and community).

2.1.2. Data extraction

Information relevant to each study was extracted to support a narrative synthesis of the findings. A consistent extraction framework was applied across all topics to ensure comparability among the studies. This framework was based on a shared set of guiding questions, which are outlined below.

- **TSC level(s) addressed,** distinguishing between national, regional, local, and organisational contexts, as well as private and professional road user settings where applicable
- **Transport mode(s) examined,** such as car drivers, motorcyclists, pedestrians, or other road users.
- **TSC dimensions analysed,** including values, norms, attitudes, beliefs and broader socio-cultural factors related to road use.
- **Measurement approach,** documenting how TSC aspects were operationalised and assessed, including the use of survey instruments and example questions where available.

- **Individual road safety behaviour,** noting whether and how behavioural aspects were measured.
- **Safety outcomes,** including the measurement of crashes, or other safety-related indicators.
- **Hypothesised relationships and mechanisms,** describing the proposed links between TSC elements, behaviour, and safety outcomes, as well as the theoretical framework underpinning these relationships.
- **Contextual influencing factors,** such as infrastructure, education, interaction between road users, and policy or governance measures.
- **Links to broader sustainability goals,** identifying whether objectives beyond road safety (e.g., environmental or social sustainability) were addressed.

2.2. Delphi approach

Based on the extensive literature review conducted on TSC in society and organisational contexts, a Delphi study was carried out to gather expert opinions on the factors shaping TSC. The Delphi technique is a method for structuring group communication in which several rounds of surveys are used to gather viewpoints from experts on a topic of interest (Beiderbeck et al., 2021; Fish & Busby, 2005; Linstone and Turoff, 2002). In practice, experts answer the same set of questions independently and typically anonymously across successive rounds; after each round, responses are summarised and fed back to the group, allowing participants to reconsider their views in light of the collective results, with the process repeated until responses sufficiently converge or stabilise. The method is used within a wide range of research fields, including the social sciences, medicine, health sciences, and education, and is well suited for collecting expert opinions and building consensus within a group of specialists, particularly to inform decision making in areas characterised by limited existing information or conflicting viewpoints (Fish & Busyby, 2005).

The aim of the Delphi study presented here was to gather expert input on factors and developments that influence TSC in both societal and organisational contexts. The literature review conducted previously served as a preparatory phase, providing the foundation for the Delphi questionnaire and informing the formulation of the survey questions. The Delphi study was conducted in two online survey rounds, addressing topics such as micromobility, technological innovations, driver assistance systems, evidence-based policies, education and training initiatives, and digital enforcement measures. In particular, the Delphi questionnaire included a range of questions on recent developments, emerging technologies, and policy measures that may influence TSC, such as micromobility, digital enforcement, driver assistance systems, ADAS uptake, evidence-based policy approaches, and education and training initiatives. In the following sections, the methodology and procedures used to administer the survey and collect expert insights are described.

A unique questionnaire based on the summary of the literature review was developed to capture expert insights on a range of factors and developments influencing TSC. The questionnaire was programmed and distributed using Microsoft Forms, with experts receiving email invitations containing the survey link. The first survey round was conducted in February 2026, and the second round in April 2026. Full details of the Delphi questionnaire are provided in Annex 6.

2.2.1. Surveys

The first survey round was structured into four main sections, following a logical progression from conceptual mechanisms to broader developments, future perspectives, and finally participant background information.

The questionnaire began with Section 1, which focused on behavioural, social, and human–technology mechanisms influencing TSC. In this section, participants were asked to assess the extent to which factors such as social norms, peer behaviour, and trust in systems, authorities, and technologies affect the acceptance and proper use of new mobility solutions and compliance with traffic rules. Section 2 addressed recent developments influencing TSC and was further divided into three thematic areas. The first subsection examined the emergence of micromobility and new transport forms, including issues related to conflicts in public space, infrastructure, regulation, and the role of shared mobility operators. The second subsection focused on technological innovations and digitalisation, covering topics such as digital enforcement, navigation tools, driver assistance systems, and behavioural adaptation to automation. The third subsection explored evidence-based policy making, governance, and system-level support, including the role of policy frameworks, legitimacy, enforcement, and education in shaping safety culture. In Section 3, participants were asked to reflect on the broader integration and future relevance of TSC. This included assessing its importance in relation to technological advancements and providing additional input on emerging trends, developments, or technologies not explicitly covered in the previous sections through an open-ended question. Finally, Section 4 collected background information about the participants, including demographic and professional characteristics such as country of employment, gender, age, type of organisation, professional background, years of experience, and level of familiarity with the concept of TSC.

Across Sections 1 to 3, participants were asked to indicate their level of agreement with a series of statements using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree); these ratings constituted the core Delphi component of the questionnaire and the basis for the feedback provided in Round 2. These statements were designed to capture expert judgement on the factors and developments influencing TSC across the different thematic areas. Finally, the survey in Round 1 also included an open-text question to capture participants' reflections on the topics addressed. Specifically, participants were invited to identify any additional recent developments, emerging technologies, or trends not covered in Section 2 that they believe influence TSC, either positively or negatively. This allowed experts to contribute further insights and to highlight aspects they considered important but were not explicitly included in the questionnaire.

In the second survey round, participants were asked to rate the same elements as in Round 1. For each item, they were also presented with the median score from the group in the previous round. This feedback was provided with the aim of encouraging convergence among participants' views, allowing them to reconsider their responses in light of the group opinion and ultimately supporting the identification of more robust and consistent conclusions. In contrast to the first round, no open-text question was included in the second round. The full wording of all survey items and the questionnaire flow are provided in Annex 7.

2.2.2. Recruitment of experts

In Delphi studies, participants are typically recruited through purposive panel selection based on their expertise in the relevant topic, rather than through random sampling (Fish & Busby, 2005). Panels may bring together individuals with similar expertise or assemble a group with varying levels and types of knowledge, and recommended panel sizes range from at least 15–20 experts per subgroup (Beiderbeck et al., 2021) to over 150 participants in larger studies (Elvebakk et al., 2016), depending on the analytical objectives and the available expert pool.

In this study, participants were recruited through a targeted email invitation sent to all TRUST project partners. Partners were asked to complete the survey themselves and to share it with colleagues within their organisations who work in the field of road safety, even if not directly involved in the TRUST project. This approach aimed to extend the panel beyond the project consortium and capture a broader range

of expert perspectives on TSC. All responses were processed anonymously and treated in strict confidence, in full compliance with GDPR requirements.

To support the analysis and interpretation of results, the questionnaire included a dedicated section collecting background information about the participants. Specifically, experts were asked to indicate the country in which they are currently employed, their gender and age group, the type of organisation they primarily work for, their professional background, and the number of years they have worked in their field of expertise. In addition, participants were asked to report their level of familiarity with the concept of TSC. Contact information, including name and email address, was also collected for communication purposes within the Delphi process.

The expert panel was designed to include variation in expertise and professional perspectives. Participants consisted of individuals working with traffic safety in different capacities, including academics, researchers, and practitioners. They represented a range of organisational types, such as research and academic institutions, road and transport authorities, public bodies and policy institutions, non-profit organisations, and private sector companies. Furthermore, the panel reflected a diversity of disciplinary backgrounds, including technical and engineering fields, social sciences and humanities, health sciences, and law, economics, and business. This diversity was considered important to capture a broad range of insights and perspectives on TSC.

3. Results of the literature review

3.1. Introduction

This section presents the findings of the literature review on recent developments influencing road safety and TSC. The review covers three key areas that have shaped new road transport:

1. Micromobility and new transport modes,
2. Technological innovations and digitalisation,
3. Evidence-based policy making and governance

For each topic, key developments, their impact on traffic behaviour, safety culture, and adoption by stakeholders are examined. This provides a foundation for understanding how recent developments interact with behavioural, organisational, and systemic aspects of road safety, and sets the stage for the synthesis of results presented in the following sections. Also, a synthesis of the overall results is presented, providing a comprehensive overview of how these developments collectively influence TSC. This synthesis forms the basis for further recommendations and policy considerations aimed at fostering a safer, more sustainable road transport system.

All selected papers were systematically evaluated to address a set of predefined questions and criteria, ensuring consistency across the literature review. For each study, information was extracted regarding the following aspects: year of publication, title, country or region where data were collected, and to answer the following questions:

1. Which TSC levels (community: national, regional, local, organisational) do the paper include? (Some papers may include both private and professional contexts.)
2. Which transport mode is included (car driver, motorcycle, pedestrian, etc.)?
3. Which aspects of TSC are included in the paper? (e.g., descriptive norms, freedom values, fatalistic beliefs, the sociocultural position of pedestrians, etc.)
4. How are the aspects measured? Which survey questions were used?
5. Is individual road safety behaviour measured? With which questions?
6. Are crashes or other safety outcomes measured?
7. What are the hypothesized relationships and mechanisms between TSC elements, behaviour, and crashes, and which theoretical framework supports them?
8. What do the studies find regarding these relationships?
9. Does the study report factors influencing different aspects of TSC? (e.g., infrastructure, education, interactions, policies)
10. Does the study include other sustainability goals beyond safety?

This structured assessment allowed for a comprehensive comparison across studies and provided a clear framework to synthesise evidence on the impact of recent developments on TSC. The extracted data were organised in a tabular format to facilitate analysis and to support interpretation of trends and key findings.

3.2. Overview of the literature search yield

The literature search conducted for each of the three defined targets revealed an uneven distribution in the number of relevant studies identified. Specifically, some targets yielded a significantly larger body of literature, while others were supported by comparatively fewer studies, indicating differences in research maturity and focus across the examined areas. The chronological distribution of references shows that most studies were published between 2021 and 2023, followed by the period 2015-2020. Only a few studies were published prior to 2010, indicating a recent surge of interest in developments influencing road safety and TSC. The geographical distribution of references highlights that most studies originate from Europe and North America. This suggests that evidence on TSC is currently concentrated in developed regions, with limited representation from low- and middle-income countries. These distributions are summarised in the figures below. Across the reviewed studies, TSC is predominantly examined at the national level, with fewer contributions addressing local, regional, or organisational dimensions. At the same time, research has traditionally focused on drivers of conventional vehicles, although increasing attention is being given to vulnerable road users and emerging transport modes, reflecting a gradual shift toward a more inclusive understanding of traffic systems.

The corresponding figures are presented in Annex 5.

Traffic Mode / User Type	Number of Studies
Autonomous Vehicles (AVs)	14
Shared Autonomous Vehicles	1
Normal Cars	8
Drivers	17
Non-drivers	1
Cyclists / E-bikes	11
Motorcyclists	5
Trucks / HGV / LGV / HDVs	4
Bus / Professional transport	2
Pedestrians	12
Vulnerable Road Users (VRUs)	4
All types of traffic	1

TABLE 1 | Modes of transport distribution

3.3. Micromobility and new transport modes

The review of the literature indicates that a limited number of studies explicitly address the relationship between micromobility and TSC, highlighting a gap in this research area. The identified studies are relatively recent, published between 2018 and 2024, reflecting the emerging nature of micromobility. In terms of geographical distribution, the available evidence is concentrated primarily in Europe.

TSC levels included: Research on TSC spans primarily the national and local levels. Both cross-country cultural differences (Kapousizis et al., 2024) and city-specific socio-cultural dynamics (Nikitas, 2018) are shown to significantly influence user perceptions and acceptance.

Modes of transport included: The literature focuses on emerging and alternative transport modes within micromobility, particularly e-bikes (including pedelecs and speed-pedelecs) (Kapousizis et al., 2024) and bicycles in bike-sharing systems (Nikitas, 2018). These modes are consistently framed as

sustainable urban mobility solutions and serve as a basis for examining behavioural adaptation to new transport technologies.

Aspects of TSC included: Both individual and socio-cultural dimensions are addressed. On the one hand, psychological and technology acceptance factors such as effort expectancy, perceived safety, and social status are highlighted (Kapousizis et al., 2024). On the other hand, broader socio-cultural elements including descriptive norms, pro-social perceptions, trust, and cultural barriers are also considered (Nikitas, 2018).

Measurement of TSC aspects: TSC dimensions are primarily assessed through structured questionnaires using five-point Likert scales. Key psychological constructs, grounded in established behavioural models like UTAUT2, such as performance expectancy, effort expectancy, social influence, perceived safety, and behavioural intention, are operationalised through multiple items capturing users' perceptions and motivations toward micromobility (Kapousizis et al., 2024). Sample questions include: "I expect that a smart e-bike would be useful for me" and "I believe that people who are important to me think that I should use a smart e-bike." At the same time, broader socio-cultural factors, like attitudes toward cycling, travel norms, and bike-sharing acceptability, are assessed through multi-item surveys organised into thematic sections covering travel behaviour, cycling perceptions, and perceived benefits (Nikitas, 2018). Sample questions include: "Cycling is an environmentally friendly travel mode" and "Public bicycles should be introduced in the city of Drama in Greece."

Individual road safety behaviour: Individual road safety behaviour is not directly measured, but rather approximated through proxy variables such as behavioural intention and expected usage patterns. Behavioural intention to adopt new mobility technologies is used as a key indicator (Kapousizis et al., 2024), while anticipated usage frequency is employed to capture intended behaviour (Nikitas, 2018). This reflects a focus on pre-behavioural stages rather than actual observed behaviour.

Crashes and safety outcomes: Safety outcomes are only partially addressed. Specifically, crash-related variables such as crash involvement and perceived safety are incorporated to examine their influence on behavioural intention (Kapousizis et al., 2024), whereas other studies focus primarily on perceptions and acceptability without including objective safety indicators (Nikitas, 2018). As a result, safety is more often conceptualised as a perceived construct rather than a measurable outcome.

Hypothesis: The hypothesized relationships are based on the extended UTAUT2 framework, suggesting that psychological factors such as performance expectancy, effort expectancy, social influence, hedonic motivation, social status, and perceived safety positively influence behavioural intention to use micromobility technologies (Kapousizis et al., 2024). Prior crash involvement is also expected to increase behavioural intention, as individuals with crash experience may place greater value on safety benefits. In the context of bike-sharing, emphasis is placed on pro-social perceptions and perceived effectiveness as key drivers of acceptance, while perceived barriers such as safety concerns and infrastructure limitations are expected to reduce willingness to adopt cycling behaviours (Nikitas, 2018).

Relationship findings: Empirical evidence generally supports the proposed relationships between micromobility and TSC. Performance expectancy emerges as the strongest predictor of behavioural intention, followed by hedonic motivation and perceived safety. Social influence and effort expectancy have smaller positive effects, whereas social status is not significant. Crash involvement also has a modest but significant positive effect, although the strength varies by country (Kapousizis et al., 2024). Regarding bike-sharing, positive attitudes toward cycling and perceived pro-social benefits strongly increase public acceptability, but actual use depends more on personal attitudes, expected usage,

cycling culture, and perceived safety (Nikitas, 2018). Barriers such as safety concerns and infrastructure limitations negatively affect adoption.

Factors affecting TSC: Key factors influencing acceptance and behaviour include infrastructure availability, digital skills, age, gender, and national cycling culture for micromobility adoption (Kapousizis et al., 2024). For bike-sharing, lack of cycling infrastructure, cultural attitudes, policy-support, environmental awareness, and perceived safety are critical determinants (Nikitas, 2018).

Sustainability objectives other than safety: Two studies incorporate sustainability goals beyond safety, addressing traffic congestion, emissions reduction, and promotion of sustainable urban mobility (Kapousizis et al., 2024; Nikitas, 2018). In the same studies environmental, economic, social sustainability, and health improvement objectives are explicitly recognised, linking micromobility adoption and bike-sharing acceptability to broader sustainability agendas.

3.4. Technological innovations and digitalisation

The review of the literature indicates that a substantial and growing body of research examines the relationship between autonomous vehicles (AVs) and TSC, with a strong emphasis on cultural, social, and behavioural dimensions. The identified studies span the period between 2015 and 2025, reflecting the rapid evolution of automation technologies and the increasing interest in their societal implications. In terms of geographical distribution, the evidence is heavily concentrated in North America, Europe, and parts of Asia, with fewer studies from developing regions. This uneven distribution suggests that current knowledge of TSC in the context of AVs is shaped primarily by specific socio-economic and cultural environments, potentially limiting its global generalisability.

TSC Levels included: TSC is predominantly examined at the national level, often complemented by regional and local perspectives. Several studies also incorporate organisational-level analysis, particularly in professional driving and fleet safety contexts (Camden et al., 2022; Fitzharris et al., 2017). Cross-cultural comparisons reveal that national culture plays a fundamental role in shaping safety norms, trust in automation, and behavioural expectations (Edelmann et al., 2021; Yerdon et al., 2017). At the same time, local traffic conditions and informal norms significantly influence real-world interactions and safety outcomes (Goedicke et al., 2022; Xiao et al., 2021).

Modes of transport included: The focus lies primarily on AVs and their interaction with other road users, including car drivers, pedestrians, cyclists, and vulnerable road users (VRUs). Some studies also examine shared autonomous mobility systems and commercial vehicle operations. Additionally, interactions between AVs and human-driven vehicles are frequently analysed as hybrid traffic systems, where differences in behaviour and expectations become critical for safety (Valdovinos et al., 2023).

Aspects of TSC included: The findings show that TSC is examined through a wide range of dimensions, spanning cognitive, behavioural, social, and cultural aspects. Key psychological and behavioural components include trust in automation, risk perception, perceived safety, overreliance, driver engagement, and behavioural intention (Krishnan et al., 2022, Yerdon et al., 2017). At the socio-cultural level, studies emphasise cultural norms, social influence, communication patterns, moral values, and informal traffic rules as central elements of TSC (Dong et al., 2024; Shah and Guven, 2025; Tennant et al., 2021). Additionally, interaction-related aspects such as reciprocity, coordination, and implicit communication between road users are highlighted as critical for safe system functioning (Stanciu et al., 2018; Straub et al., 2019). Overall, the literature demonstrates that TSC in the context of AVs is strongly socially embedded, extending beyond individual attitudes to include shared norms and collective behavioural patterns.

Measurement of TSC aspects: TSC dimensions are assessed through a combination of qualitative and quantitative approaches, reflecting their multidimensional nature. Common quantitative methods include questionnaires and Likert-scale surveys assessing trust, acceptance, perceived safety, and attitudes toward automation (Edelmann et al., 2021; Qu et al., 2019), meta-analyses, and aggregated results from multiple empirical studies (Krishnan et al., 2022).

Several studies employ naturalistic driving data, simulations, and sensor-based measurements to capture real-time behavioural indicators such as speed, acceleration, distance, yaw rates, gaze direction, steering and pedal inputs, and interaction patterns with other road users (Goedicke et al., 2022; Lanzaro et al., 2023). Qualitative approaches, including semi-structured interviews, focus groups, conceptual analyses, and content analysis, are widely used to explore cultural meanings, social norms, and ethical considerations, often including specific questions on driving behaviour, ADAS use, or shared mobility preferences (Dolins et al., 2021; Gonçalves and Quaresma, 2015; Tennant et al., 2021). Some studies also combine these methods, for example using video-based observations with rating scales or eye contact and gesture analysis during pedestrian-vehicle interactions (Ranasinghe et al., 2021).

Individual Road Safety Behaviour: Individual road safety behaviour is measured both directly and indirectly in 68% of the reviewed studies dealing with technological innovations and digitalisation. Direct approaches include observable driving behaviours such as interaction patterns, communication cues, and risky actions like distraction, fatigue, and unsafe manoeuvres, as well as specific indicators like turn signal use, yielding, and pedestrian–cyclist interactions (Fitzharris et al., 2017; Senserrick et al., 2023; Stanciu et al., 2018). At the same time, many studies rely on proxy variables, including behavioural intention, trust, and willingness to use automated vehicles, with trust identified as a key determinant influencing misuse or underuse (Krishnan et al., 2022; Qu et al., 2019; Yerdon et al., 2017). Behavioural adaptation effects, including reduced attention and driver distraction, are also highlighted as key safety-related behaviours in automated driving contexts (Bisht et al., 2018; Valdovinos et al., 2023). Additional measures include performance-based indicators such as speed, acceleration, response time, and driver errors (e.g., mode confusion and over-trust), along with interaction behaviours and organisational safety metrics like driver scorecards (Camden et al., 2022; Goedicke et al., 2022; Xiao et al., 2021).

Crashes and Safety Outcomes: Safety outcomes are moderately represented in literature, with 34% of studies reporting them. Some include objective indicators such as crash rates, injury outcomes, fatigue events, near-miss incidents, unsafe driving scores, and property damage (Camden et al., 2022; Fitzharris et al., 2017; Valdovinos et al., 2023). Specifically, measurements include crashes and fatalities, crash rates, reduction in crashes, injury severity, types of crashes, and hours of service scores. Other studies refer to crash risk indirectly, linking behavioural or communication factors to safety without measuring crashes explicitly. Overall, the evidence suggests that while safety outcomes are recognised as relevant, there is variability in how comprehensively they are measured.

Hypothesis: The reviewed studies collectively suggest that TSC influences crashes through a network of cultural, technological, and behavioural mechanisms. Cultural values, such as individualism - collectivism, shape AV safety behaviour and user interactions (Shah and Guven, 2025), while participatory regulation aligns policy with citizen preferences, improving compliance and safety outcomes (Hemesath and Tepe, 2020). Human factors, including poor interface design, overreliance, and loss of attention, mediate the relationship between automation and crash risk (Bisht et al., 2018; Valdovinos et al., 2023). Language and communication context also play a crucial role, high-context versus low-context cues influence honking behaviour, misunderstandings, and traffic efficiency (Dong et al., 2024). Mismatches between human and automated behaviour further increase the likelihood of conflicts and "social crashes" (Stanciu et al., 2018).

Training and safety culture interventions, strengthen self-regulation and reduce risky behaviours, whereas inadequate ADAS training leads to misuse (Senserrick et al., 2023). Trust and acceptance of AVs are shaped by perceived safety, risk, and social norms, which vary across cultural contexts (Edelmann et al., 2021; Krishnan et al.; 2022, Yerdon et al., 2017). Feedback mechanisms, real-time warnings, and culturally adapted External Human-Machine Interface (eHMIs) mitigate fatigue, communication breakdowns, and misinterpretations (Fitzharris et al., 2017; Ranasinghe et al., 2021). Finally, formalising AV behaviours through legal and technical codification can reduce human error but may also shift accountability, highlighting the intertwined role of law, technology, and culture in shaping driving behaviour (Bin-Nun et al., 2022; Tennant et al., 2021).

Relationship findings: The evidence consistently shows that TSC shapes behaviour and crash outcomes across contexts. Cultural, regional, and regulatory differences influence safety priorities, trust in automation, and risk tolerance, making TSC highly context-dependent (Shah and Guven, 2025; Yerdon et al., 2017). Regulatory and institutional frameworks that emphasise participation and precaution strengthen safety norms, responsibility, and institutional trust, with strong public support for higher safety standards (Hemesath and Tepe, 2020). Human factors play a central role, as overreliance on automation, reduced attention, and poor understanding of system limits increase crash risk, while excessive in-vehicle interaction raises distraction (Bisht et al., 2018; Valdovinos et al., 2023). Communication and cultural differences also shape driving behaviour, with variations in social interactions (e.g., honking) affecting safety outcomes (Dong et al., 2024; Stanciu et al., 2018). Training reduces risky behaviour, whereas poorly designed or insufficient training increases misuse and overreliance (Senserrick et al., 2023; Gonçalves and Quaresma, 2015). Finally, formalisation of AV rules and system behaviour can reduce human error but also shift responsibility onto road users, highlighting the interdependence of law, technology, and culture in determining safety outcomes (Bin-Nun et al., 2022; Tennant et al., 2021).

Factors Affecting TSC: The reviewed studies identify multiple influencing factors spanning infrastructure, policy, education, social context, technology, and socio-economic conditions. Road design, traffic management, and vehicle conditions affect crash risk and driver behaviour (Shah and Guven, 2025; Xiao et al., 2021; Lee et al., 2019). Policies, legislation, enforcement, and supervision shape compliance and legal adherence (Hemesath and Tepe, 2020; Ranasinghe et al., 2021), while education and awareness initiatives improve knowledge and safe practices (Valdovinos et al., 2020). Social norms, attitudes, and community interactions guide behaviour and shape human-automation interactions (Gonçalves and Quaresma, 2015). Emerging technologies such as Driver Monitoring System (DMS), ADS and other interaction or monitoring tools support safer driving and reduce risk (Bisht, et al., 2018; Fitzharris et al., 2017; Yerdon et al., 2017). These factors are further shaped by broader cultural and socio-economic conditions (Stanciu et al., 2018).

Sustainability objectives other than Safety: Overall, 64% of the reviewed studies focusing on technological innovations and digitalisation report outcomes related to broader sustainability dimensions. Several studies indicate that sustainability considerations are increasingly integrated into traffic safety research, encompassing objectives such as equity, accessibility, environmental protection, congestion reduction, and efficiency. Equity and economic considerations are linked to traffic planning and AV deployment (Shah and Guven, 2025; Shammut et al., 2023), while privacy, environmental protection, and ethical prioritisation influence policy and public acceptance (Hemesath and Tepe, 2020). Traffic flow optimisation, air quality, congestion management, and mental health considerations are also identified as sustainability objectives connected to driver behaviour and infrastructure design (Valdovinos et al., 2023). Transportation efficiency and reductions in noise pollution are noted as important environmental goals, particularly in cross-cultural traffic contexts (Dong et al., 2024), and mobility benefits are reported as a central outcome of advanced traffic management and infrastructure

planning (Lanzaro et al., 2023). Further dimensions include accessibility, affordability, energy efficiency, land-use optimisation, and user-centred factors such as comfort and time acceptance, all contributing to broader societal and environmental benefits (Bin-Nun et al., 2022; Edelmann et al., 2021, Krishnan et al., 2022; Yerdon et al., 2017).

3.5. Evidence-based policy making and governance

The literature review highlights a growing body of research examining the role of evidence-based policy making and governance in shaping TSC across various road users. The studies span a period from 2004 to 2026, reflecting the evolving understanding of how policy frameworks and regulatory enforcement influence road user behaviour and safety outcomes in different socio-economic contexts. Geographically, research is concentrated in Europe, North America and Asia, while fewer studies focus on developing regions, indicating that insights into the effectiveness of evidence-based traffic policies may be context dependent and shaped by local governance and infrastructural conditions.

TSC Levels included: Most studies investigate TSC at the national level, often complemented by regional, local, or organisational perspectives. Organisational analysis appears mainly in professional and commercial driving contexts, such as HGV or fleet operations (Newnam et al., 2019). Cross-cultural comparisons indicate that national and regional norms strongly influence individual risk perception, rule compliance, and social acceptance of dangerous behaviours (Nævestad et al., 2022; Suzuki et al., 2022). Local traffic conditions, infrastructure, and enforcement practices also mediate real-world behaviour, highlighting TSC as a multi-level construct shaped by the interaction of culture, infrastructure, and organisational environment.

Modes of transport included: The literature covers a wide range of transport modes and user groups. Motorcyclists are frequently examined, with research highlighting risky riding behaviours, socio-cultural influences, and enforcement gaps that contribute to crash risk (Melinder, 2007; Nambiza et al., 2026). Passenger vehicles, including cars and SUVs, are also a major focus, with studies examining driver behaviour, tolerance for violations, and compliance with traffic regulations (Saeidi et al., 2024; Suzuki et al., 2022; Tilleczek, 2004; Timmermans et al., 2022). Professional drivers (car, bus, HGV/LGV) are analysed to assess safety management systems and regulatory enforcement (Nævestad et al., 2022; Newnam et al., 2019; Mesa et al., 2015). VRUs are considered in studies focusing on perceived safety and behavioural intentions (Nordfjaern et al., 2016; Obregón-Biosca et al., 2022). Some studies adopt a system-wide perspective, integrating interactions between motorised and non-motorised users and the role of governance and policy in shaping overall safety culture (Al-Karablieh et al., 2021; Gaygısız, 2010).

Aspects of TSC included: TSC is assessed across psychological, behavioural, social, cultural, and organisational dimensions. Frequently examined factors include risk perception, overconfidence, sense of invincibility, habitual risky behaviour, engagement, behavioural intention, and self-reported violations (Nambiza et al., 2026; Tilleczek, 2004; Timmermans et al., 2022). Socio-cultural and normative aspects capture peer pressure, moral and ethical norms, social acceptance of violations, institutional trust, youth driving culture, and collective beliefs about risk and responsibility (Gaygısız, 2010, Melinder, 2007; Saeidi et al., 2024). Organisational and policy-related dimensions, including safety values, management priorities, enforcement practices, adherence to regulations, and accountability, are examined in professional and fleet contexts (Mesa et al., 2015; Newnam et al., 2019). Contextual factors (weather, time of day, infrastructure, mobility patterns) are also considered for their influence on behaviour and safety (Al-Karablieh et al., 2021; Obregón-Biosca et al., 2022). Overall, tolerance for violations, perceived safety, and regulatory and cultural frameworks are central to understanding TSC, particularly in low-enforcement environments (Nævestad et al., 2022; Suzuki et al., 2022).

Measurement of TSC aspects: A combination of qualitative, quantitative, and macro-level approaches is used. Qualitative methods (focus groups, semi-structured interviews) explore behavioural patterns and context (Nambiza et al., 2026; Newnam et al., 2019). Most studies employ self-reported questionnaires to assess attitudes, perceptions, norms, and behavioural intentions, often based on frameworks such as the TPB, with factor analysis used to identify constructs (Obregón-Biosca et al., 2022; Saeidi et al., 2024; Suzuki et al., 2022; Timmermans et al., 2022). Standardised tools are also used to examine driving behaviour and risk perception (Al-Karablieh et al., 2021; Tilleczek, 2004). Additionally, some studies incorporate objective data from GPS monitoring to capture actual driving behaviour (Mesa et al., 2015), while others use national-level indicators (governance, cultural dimensions) to assess TSC at a broader scale (Gaygısız, 2010; Nævestad et al., 2022; Nordfjaern et al., 2016; Melinder, 2007).

Individual road safety behaviour: Approximately 85% of studies examine individual road safety behaviour, mainly through self-reported measures of violations, unsafe driving, and crash involvement (Nambiza et al., 2026; Saeidi et al., 2024; Obregón-Biosca et al., 2022; Timmermans et al., 2022). Additional indicators include aggression, impaired driving, compliance with safety practices, and standardised behavioural scales or monitoring tools capturing both pedestrian and driver risk (Nordfjaern et al., 2016; Tilleczek, 2004; Newnam et al., 2019; Mesa et al., 2015).

Crashes and safety outcomes: Most studies focusing on evidence-based policy making and governance include safety outcomes, typically measured as crashes, violations, fatalities, and near-misses. These outcomes are measured through both objective indicators, such as crash records, GPS-monitored violations, and organisational safety metrics, and self-reported data on accidents and violations. Higher tolerance for risk, weak enforcement, and cultural acceptance of violations are consistently associated with increased crash involvement (Nævestad et al., 2022; Suzuki et al., 2022). Some studies further incorporate aggregate indicators, including crash rates, fatalities, and incident-related costs, to capture safety performance at a broader level (Gaygısız, 2010; Newnam et al., 2019; Melinder, 2007).

Hypotheses: The studies suggest that TSC influences behaviour and safety outcomes through psychological, social, and institutional mechanisms. Many are grounded in the TPB, linking attitudes, norms, and perceived control to behavioural intentions and risky behaviour (Nordfjaern et al., 2016; Obregón-Biosca et al., 2022; Saeidi et al., 2024). Several studies emphasise that social norms and social acceptance of violations normalise risky driving and increase crash risk (Suzuki et al., 2022; Timmermans et al., 2022), while cultural values and governance conditions further shape outcomes (Gaygısız, 2010; Nævestad et al., 2022). Other approaches highlight human errors, violations, and organisational safety practices as key mechanisms affecting safety outcomes (Al-Karablieh et al., 2021; Mesa et al., 2015; Newnam et al., 2019). Overall, TSC is consistently viewed as influencing safety indirectly through its effect on individual behaviour.

Relationship Findings: Evidence consistently shows strong links between TSC, risky behaviour, and crash outcomes. Within this framework, social norms emerge as a particularly strong predictor, reinforcing risk acceptance and unsafe intentions (Obregón-Biosca et al., 2022; Saeidi et al., 2024; Timmermans et al., 2022). A strong normalisation of violations, economic pressure, and weak enforcement further promote risky behaviour and higher crash involvement, especially among younger or high-risk users (Nambiza et al., 2026; Suzuki et al., 2022). Cultural values and governance also play a key role, with weaker institutional frameworks linked to poorer safety outcomes, while stronger institutional frameworks reduce cultural effects on fatalities (Al-Karablieh, et.al, 2021; Nævestad et al., 2022; Gaygısız, 2010). At the organisational and system level, safety-oriented management, monitoring, and feedback mechanisms improve compliance and reduce incidents, highlighting the importance of institutional safety practices (Mesa et al., 2015; Newnam et al., 2019).

Factors affecting TSC: Almost all studies dealing with evidence-based policy making and governance reported at least one influencing factor, including policy, enforcement, infrastructure, education, social norms, technology, and economic pressures (Suzuki et al., 2022; Timmermans et al., 2022). Cultural and demographic aspects such as individualism - collectivism, youth culture, and gender norms further shape how these factors influence road user behaviour. Education and training consistently promote safer behaviour, while infrastructure conditions affect exposure and risk levels (Gaygısız, 2010; Nambiza et al., 2026; Obregón-Biosca et al., 2022). Social and socio-economic conditions further affect compliance through norms and values, alongside organisational and technological measures such as supervision and feedback systems (Al-Karablieh, et al., 2021; Mesa et al., 2015; Newnam et al., 2019).

Sustainability objectives beyond safety: More than half of the studies reported sustainability-related goals, mainly linked to sustainable mobility and transport efficiency, including accessibility and congestion reduction (Nambiza et al., 2026; Obregón-Biosca et al., 2022; Timmermans et al., 2022). Several studies also highlight environmental and economic objectives, including reduced pollution, energy savings, and financial cost reduction (Al-Karablieh, et al., 2021; Tilleczek, 2017). In addition, some research emphasises broader societal benefits such as crash cost reduction, improved insurance outcomes, regional economic growth, and system efficiency (Mesa et al., 2015).

3.6. Summary

This chapter reviewed the literature on recent developments influencing road safety and TSC across three thematic areas. In the area of micromobility and new transport modes, the rapid growth of e-scooters, e-bikes, and shared mobility services has introduced new safety challenges, particularly regarding conflicts between road users in shared spaces and the need for adapted infrastructure and regulatory frameworks. In the area of technological innovations and digitalisation, advanced driver assistance systems, autonomous vehicles, and connected technologies are reshaping risk perception, trust, and behavioural adaptation, while concerns around overreliance, misuse, and uneven adoption across populations remain prominent. In the area of evidence-based policy making and governance, the literature highlights the importance of transparent, data-driven policy frameworks and the Safe System Approach, while also noting that policy legitimacy alone does not automatically translate into behavioural change without complementary enforcement and education measures. Across all three areas, the findings consistently indicate that TSC is a multidimensional and context-dependent concept shaped by the interaction of behavioural, socio-cultural, institutional, and technological factors. However, a notable methodological limitation is that most studies rely on self-reported measures and behavioural intention frameworks, with limited use of objective safety indicators and real-world crash data.

Overall, while the literature provides substantial insight into the determinants of TSC, gaps remain regarding the integration of objective safety outcomes, the inclusion of more diverse geographical contexts, and the stronger alignment of behavioural, technological, and policy perspectives. These gaps and insights provide the foundation for the Delphi study presented in the next chapter, which sought to validate and complement the literature findings through structured expert consultation.

4. Results of the Delphi study

The Delphi process aimed to assess expert consensus on factors influencing TSC using a 5-point Likert scale (from *strongly disagree* to *strongly agree*) across two rounds. In Round 2, participants were presented with the median responses from Round 1 and invited to reconsider their answers.

4.1. Quantitative findings

4.1.1. Participants

A total of 52 experts completed the first survey round, and 37 experts completed the second survey round. Among the 52 experts, a slightly higher proportion were male (52%). Most had an academic background in the social sciences (52%), followed by technical/engineering/natural sciences background (40%). In terms of age, the largest share was in the 40-49 years age group (31%), followed closely by the 30-39 years age group (27%). The sample also reflects relatively broad geographic distribution. The most represented countries were Belgium (33%), Greece (22%) and Norway (16%). Other participating countries included Austria, Italy, Serbia, Sweden, Bulgaria, Finland, Bosnia and Herzegovina, and the Czech Republic.

4.1.2. Overall Results

The results from Round 1 indicate a generally high level of agreement across most statements with the majority of items achieving a median rating of "Agree". Overall, the findings reveal clear thematic consistency across the evaluated dimensions of TSC.

Social and behavioural factors were consistently rated as highly important, indicating strong consensus that TSC is shaped by collective behavioural dynamics, including norms, peer influence, and trust in institutions. In the context of micromobility, experts generally agreed that the growth of e-scooters and e-bikes has increased conflicts in public space and influenced perceptions of safety. At the same time, improved infrastructure was perceived as encouraging safer behaviour. However, the more neutral evaluation of shared expectations among road users suggests some uncertainty regarding the extent to which micromobility reshapes behavioural norms across different user groups.

Regarding technology, experts recognised the role of advanced driver assistance systems in shaping safety expectations. However, there was also strong agreement that misuse, overreliance, and misunderstanding of such systems may reduce driver attentiveness and risk awareness. Finally, strong consensus emerged around policy and enforcement-related statements. Evidence-based policy approaches were considered important for defining clear safety goals, although experts also acknowledged that such approaches do not automatically translate into behavioural change. In addition, education and awareness initiatives alone were widely viewed as insufficient to produce substantial improvements in TSC. Full descriptive statistics for all Delphi statements are reported in Annex 6.

4.1.3. Comparison between rounds

As described in Section 2.2.1, participants reconsidered their Round 1 ratings in Round 2 in light of the group median feedback, and were invited to reflect on the identified factors, provide comments, and suggest any additional elements they considered missing.

The comparison between rounds reveals that expert opinions converged further after the controlled feedback provided in Round 2. The second round led to a noticeable reduction in neutral and extreme responses, reflecting a strengthening of consensus. Where individual adjustments occurred, participants tended to move towards the group median, indicating that the feedback mechanism effectively

supported the alignment of expert judgement. Overall, this pattern confirms the added value of the iterative Delphi process: rather than merely reproducing initial responses, the second round refined the distribution of opinions and reinforced areas of agreement without imposing uniformity. Changes in responses between Round 1 and Round 2 are presented in Annex 6.

4.2. Interpretation of response patterns

4.2.1. Behavioural, social and human-technology mechanisms

The response patterns indicate that social norms and peer behaviour are perceived as important factors influencing the acceptance of new mobility technologies. The high levels of agreement suggest that behavioural adaptation is strongly linked to collective expectations and social influence. Similarly, the distribution of responses highlights the role of trust in systems, authorities, and technologies as a key enabling factor. Between rounds, a slight shift from "strongly agree" towards "agree" can be observed, suggesting a mild convergence of responses rather than a change in overall direction.

4.2.2. Micromobility and new transport forms

The results indicate that the emergence of micromobility is associated with increased complexity in road user interactions. High agreement levels suggest that experts perceive growing conflicts in shared spaces as an important factor influencing safety perceptions. Responses related to infrastructure responses show a noticeable share of neutral responses, indicating moderate variability and less uniform consensus compared to other statements. The statement on shared expectations shows the highest level of dispersion within this group, with a large proportion of neutral responses and a non-negligible share of disagreement. This suggests uncertainty or lack of alignment among experts on this issue. Agreement patterns for statements related to shared micromobility operators further indicate that organisational and design-related factors are perceived as influencing user behaviour. Overall, the observed shift towards the "agree" category in Round 2 suggests convergence of opinions, with reduced extreme responses and more centralised agreement.

4.2.3. Technological innovations and digitalisation

The response patterns suggest that technological systems are generally perceived as contributing positively to TSC, particularly through increased accountability and behavioural guidance. At the same time, the results indicate a parallel concern regarding behavioural adaptation. The levels of agreement observed in statements related to misuse and overreliance suggest that experts recognise potential negative effects of automation on driver attentiveness and risk awareness. Responses related to digital navigation tools show a more mixed distribution, indicating that their impact on safety culture may be perceived as context dependent. This suggests that while digital tools support efficiency, their influence on safety is not uniformly evaluated. Overall, the findings reflect a balanced perception in which technology is seen as both an enabler and a potential risk factor, depending on its use and integration into the broader traffic system. Between rounds, a consistent pattern can be observed in several statements, with a shift from "strongly agree" towards "agree" and a reduction in both neutral and extreme responses.

4.2.4. Evidence-based policy making and governance

The results show strong agreement for most policy-related statements, particularly those related to evidence-based approaches, where responses are highly concentrated in the positive categories, with further consolidation in Round 2. However, the distribution of responses also indicates that policy effectiveness is not considered automatic. Agreement with statements related to limited behavioural impact suggests that experts distinguish between policy legitimacy and actual behavioural change. The response patterns further highlight the importance of transparency, with agreement indicating that lack of justification may negatively affect safety culture. In addition, responses to education-related

statements suggest that awareness-raising alone is perceived as insufficient without complementary measures. Overall, the findings indicate that governance, implementation, and system-level integration are considered key components in shaping TSC.

4.2.5. Open-ended question

The final section of the Delphi questionnaire included an open-ended question:

Are there any other recent developments, emerging technologies, or trends not covered in Section 2 that you believe influence traffic safety culture (positively or negatively)?

Overall, most experts did not identify additional factors, which may indicate that the main developments had been largely captured, although it could also reflect reduced motivation to elaborate further at the end of the questionnaire. However, several participants provided complementary insights. These primarily related to the growing role of digitalisation and emerging technologies, including increased distraction from in-vehicle systems and wearable devices, as well as the uncertain impact of artificial intelligence and higher levels of automation.

In addition, some experts highlighted the influence of social and cultural trends, such as social media, cultural diversity, and changing attitudes towards regulation and enforcement. Developments in mobility patterns, particularly the rise of micromobility and associated conflicts between road users, were also noted. A smaller number of responses emphasised the importance of systemic factors, including infrastructure conditions and broader community values, as well as behavioural aspects such as distraction and risk perception. Overall, these responses reinforce the view that TSC is shaped by a combination of technological, social, and systemic factors. The detailed responses are presented in Annex 6.

4.3. Summary

This chapter has presented the findings of the Delphi study conducted to assess expert consensus on factors influencing TSC. A total of 52 experts participated in Round 1 and 37 in Round 2, representing a broad range of disciplinary backgrounds and geographic contexts. The results indicate a high degree of agreement across most statements, with strong convergence of opinions already evident from the first round and further consolidation observed in the second round. The iterative feedback mechanism effectively supported the alignment of expert judgement: in Round 2, neutral and extreme responses decreased, and participants tended to move towards the group median, confirming the added value of the Delphi process.

Across the four thematic areas, several consistent patterns emerged. In the domain of behavioural, social and human-technology mechanisms, social norms, peer influence, and trust in institutions were consistently rated as highly important factors shaping TSC. Behavioural adaptation was perceived as strongly linked to collective expectations and social influence, with trust in systems, authorities, and technologies recognised as a key enabling factor.

Regarding micromobility and new transport forms, experts agreed that the rapid expansion of e-scooters and e-bikes has increased complexity in road user interactions and heightened conflicts in shared public spaces. Infrastructure improvements were perceived as encouraging safer behaviour; however, the extent to which micromobility reshapes shared behavioural expectations across different user groups remained an area of notable uncertainty, with considerable response dispersion.

In the area of technological innovations and digitalisation, advanced driver assistance systems were recognised as contributing positively to safety culture through increased accountability and behavioural

guidance. At the same time, experts expressed strong concern that misuse, overreliance, and misunderstanding of such systems may reduce driver attentiveness and risk awareness. The influence of digital navigation tools on safety was perceived as context-dependent, reflecting a balanced view of technology as both an enabler and a potential risk factor.

With respect to evidence-based policy making and governance, experts strongly endorsed data-driven and transparent policy approaches for defining clear safety goals. However, they also distinguished clearly between policy legitimacy and actual behavioural change, noting that evidence-based approaches do not automatically translate into improved safety outcomes. Education and awareness initiatives alone were widely viewed as insufficient without complementary enforcement and implementation measures.

Finally, the open-ended responses reinforced these findings and highlighted additional concerns, including growing distraction from in-vehicle systems and wearable devices, the uncertain impact of artificial intelligence and higher levels of automation, the influence of social media and cultural diversity on safety attitudes, and the continuing importance of infrastructure conditions and community values.

Overall, the results reflect a consistent and balanced expert perspective, emphasising that TSC is a multidimensional and context-dependent concept shaped by the interaction of behavioural, socio-cultural, technological, and institutional factors. These findings provide a robust empirical foundation for informing future research priorities and policy directions, as discussed in the following chapter.

5. Summary and discussion

5.1. Synthesis of results

The overarching aim of this deliverable is to identify progress and developments that have shaped road transport in recent years and to investigate their impact on TSC. The analysis addresses three thematic areas: the emergence of micromobility and new transport modes, technological innovations and digitalisation, and evidence-based policy making and governance. To achieve this, the study combines an extensive literature review with a two-round Delphi survey of international experts, ensuring that a broad range of perspectives is captured across these domains in a consistent analytical manner.

The literature reviewed across the three thematic areas collectively confirms that TSC is a multidimensional, socially embedded, and context-dependent construct. Rather than operating as a single, uniform phenomenon, TSC emerges from the dynamic interaction of individual psychological factors, collective behavioural norms, institutional frameworks, and broader socio-cultural conditions. Across all three domains, road user behaviour consistently functions as the primary pathway through which TSC influences safety outcomes, while infrastructure, regulation, and cultural norms serve as enabling or constraining conditions.

The Delphi study provided expert corroboration of these findings, though since the Delphi statements were derived directly from the literature review, this alignment reflects expert appraisal and triangulation of literature-derived propositions rather than fully independent validation. On several core themes, the two methods aligned closely. The centrality of social norms, peer behaviour, and trust in institutions, identified in the literature as key determinants of TSC, was confirmed by the expert panel with near-unanimous agreement across both rounds. Similarly, the finding that evidence-based policy approaches do not automatically translate into behavioural change, documented in studies on governance and enforcement, was strongly endorsed by experts, with several explicitly distinguishing between policy legitimacy and actual cultural impact.

At the same time, the Delphi study produced nuances that the literature did not fully capture. While the reviewed studies on advanced driver assistance systems and automation generally highlighted overreliance and distraction as risks, the expert panel went further, expressing strong agreement that such systems actively weaken social norms around driver attentiveness and responsibility, a more culturally embedded concern than what most technical studies emphasised. On micromobility, the literature focused primarily on acceptance and infrastructure barriers, whereas experts placed greater emphasis on conflicts in shared public space as a cultural phenomenon shaping safety perceptions. The open-ended responses further introduced topics largely absent from the reviewed studies, including the influence of social media on younger road users, mobile phone addiction, the growing size of vehicles, and AI-driven enforcement. These differences confirm that the Delphi study added value beyond what the literature alone could provide, capturing emerging real-world dynamics and grounding the findings in practical expert experience.

A recurring pattern across the reviewed literature is the predominance of self-reported measures and behavioural intention frameworks as the primary tools for assessing TSC. While these approaches offer valuable insights into attitudes, perceptions, and motivations, they also reflect a broader tendency in the field to focus on pre-behavioural and perceived dimensions of safety rather than directly observed outcomes. Objective safety indicators, such as crash records, real-world driving data, and verified incident reports, remain underrepresented, limiting the ability to establish robust causal links between TSC dimensions and actual safety performance.

The geographical concentration of studies in Europe and North America further constrains the generalisability of current findings. Evidence from low- and middle-income countries remains scarce, even though these regions often face the greatest road safety challenges. Similarly, the temporal distribution of the reviewed studies, with most published between 2021 and 2023, reflects a rapidly evolving field, particularly with respect to emerging technologies and new mobility modes, where research is still catching up with real-world developments.

In terms of analytical focus, TSC is predominantly examined at the national level, with comparatively fewer studies addressing regional, local, or organisational dimensions. This bias toward macro-level analysis risks overlooking the significant role that local norms, community-level dynamics, and organisational safety cultures play in shaping everyday road user behaviour. At the same time, while research has traditionally centred on drivers of conventional vehicles, a gradual but notable shift toward including vulnerable road users, cyclists, pedestrians, and users of emerging transport modes is evident, reflecting a more inclusive understanding of the traffic system. Addressing these gaps will be essential for strengthening the empirical basis of TSC research and for ensuring that policy interventions are grounded in robust and representative evidence.

5.2. Strengths and limitations

5.2.1. Literature reviews

The literature review was conducted systematically across three thematic areas, following a simplified PRISMA approach with transparent search strategies, a three-step screening process, and a consistent data extraction framework. This structured design ensured comparability across thematic domains and provided a robust basis for narrative synthesis. The use of Scopus as the primary database, combined with topic-specific search strings, enabled targeted coverage of the most relevant literature while maintaining methodological consistency. However, several limitations should be acknowledged when interpreting the results.

A primary challenge concerned the limited availability of studies directly addressing the intersection of recent transport developments and TSC. TSC is a relatively new research field, and the body of empirical literature examining it remains comparatively small. This was particularly evident in the first thematic area (micromobility and new transport modes) where only a very limited number of studies explicitly linking micromobility to TSC could be identified. As a result, the evidence base for this area is too narrow to support robust statistical conclusions, and findings should be interpreted with caution.

A further difficulty arose from the use of broad search concepts, which initially generated a high number of hits but also returned a large proportion of studies that did not directly address TSC. Many of the retrieved articles approached road safety from technical, engineering, or epidemiological perspectives without engaging with cultural, normative, or behavioural dimensions. This made the screening process demanding and required careful judgment to distinguish studies that were genuinely relevant from those that touched on related topics only tangentially.

Additionally, some of the studies did not answer the predefined extraction questions directly but rather addressed them implicitly. In such cases, relevant information had to be inferred from the broader context of the study, which introduced a degree of interpretive uncertainty into the analysis. This limitation is partly inherent to the nature of TSC research, where concepts such as values, norms, and attitudes are often embedded within wider theoretical frameworks rather than measured as primary outcomes.

Finally, the reliance on a single database (Scopus) and the restriction to English-language publications may have excluded relevant studies indexed elsewhere or published in other languages. Although Scopus offers broad interdisciplinary coverage, supplementing the search with additional databases or grey literature sources could have increased the comprehensiveness of the evidence base.

5.2.2. Delphi study

The Delphi study offered a structured and iterative platform for consolidating expert judgement on TSC. Key strengths include the diversity of the expert panel, which encompassed professionals from multiple disciplines, organisational types, and European countries, and the use of controlled feedback between rounds, which enabled systematic convergence of opinions while preserving individual variation. The iterative design, combined with the quantitative Likert-scale ratings and the single open-ended question included in Round 1, allowed the study to capture the direction of expert agreement, complemented by selected qualitative insights into themes not otherwise captured by the closed-ended items. Nevertheless, several methodological limitations should be considered when interpreting the findings.

A first limitation concerns the number of participants and the attrition between rounds. While Beiderbeck et al. (2021) recommend that a Delphi subgroup should include at least 15-20 experts to support meaningful comparison, the panel size in this study, though sufficient, remains relatively modest for quantitative analysis. Notably, participation dropped from 52 experts in the first round to 37 in the second, representing a loss of approximately 29% of respondents. This attrition is not uncommon in Delphi studies, as completing two rounds of a structured survey is time-consuming, and participant dropout between rounds is a known methodological challenge. Nevertheless, it should be considered when interpreting the results, as the second-round sample may not fully reflect the diversity of perspectives present in the first round. This is partly a reflection of the nature of the field itself: TSC is a relatively new research area, and the population of specialists with direct expertise in this domain is limited, making it inherently challenging to recruit and retain a larger panel throughout the process. In addition, because the comparison between rounds (Section 4.1.3) is based on the overall group distributions rather than on paired analysis of the 37 experts who completed both rounds, part of the observed reduction in dispersion may reflect this attrition rather than genuine convergence at the individual level.

A second limitation relates to the number of Delphi rounds conducted. In the literature, Delphi studies typically involve three to four iterations, with the first round being exploratory and subsequent rounds progressively refining the focus. In this study, only two rounds were carried out, primarily due to time constraints. However, the high degree of convergence observed already in the first round, with median ratings remaining largely stable in the second, suggests that a third round would have been unlikely to produce substantially different results.

Further consideration concerns the level of familiarity with TSC concepts among participants. Although the expert panel was diverse in terms of professional background and disciplinary expertise, not all participants had the same depth of knowledge regarding specific TSC dimensions. This may have influenced how certain statements were interpreted and responded to, particularly those requiring fine distinctions between related concepts.

Despite these limitations, the Delphi study demonstrated strong internal consistency, with high levels of agreement from the first round and meaningful convergence in the second. It should also be noted that, because participants were recruited via TRUST project partners and their professional networks mainly within their organisations, an unknown share of respondents may have had an existing affiliation with, or exposure to, the consortium's framing of TSC; this potential recruitment-related bias could not be quantified within the scope of this study but may have contributed to the observed levels of agreement.

The complementarity between the structured quantitative ratings and the exploratory open-ended responses strengthens confidence in the robustness of the findings and their relevance for informing future research and policy directions.

5.3. Future research

The findings of this deliverable point to several directions for future research that would strengthen the evidence base on TSC and support more effective policy interventions. A clear need exists to move beyond self-reported measures of attitudes and behavioural intentions towards the integration of objective safety indicators. Future studies should seek to combine attitudinal and perceptual data with real-world outcomes such as crash records, near-miss data, and naturalistic driving observations. Establishing robust causal links between TSC dimensions and actual safety performance remains a critical methodological priority.

The geographical concentration of existing research in Europe and North America limits the generalisability of current findings. Expanding TSC research into low- and middle-income countries, which often face the most severe road safety challenges, would provide a more comprehensive understanding of how cultural, institutional, and infrastructural contexts shape safety behaviour across diverse settings.

The predominantly national-level focus of TSC research should be complemented by studies at regional, local, and organisational levels. Local norms, community dynamics, and workplace safety cultures play a significant role in shaping everyday road user behaviour, yet these dimensions remain underexplored. Multi-level research designs that capture the interplay between macro-level policy environments and micro-level behavioural practices would offer valuable insights.

The rapid pace of technological change calls for continued investigation into the safety culture implications of emerging systems, including higher levels of vehicle automation, AI-driven enforcement tools, and connected infrastructure. The Delphi findings highlighted that expert concerns extend beyond technical performance to encompass the cultural and normative consequences of automation, such as the erosion of driver attentiveness norms and shifting perceptions of responsibility. Longitudinal research tracking how these dynamics evolve as technologies mature and adoption increases would be particularly valuable.

The role of social media, digital communication, and cultural diversity in shaping safety attitudes and behaviours represents a relatively new area of inquiry that warrants further exploration. The Delphi experts identified these as emerging influences on TSC, yet the existing literature offers limited empirical evidence on their mechanisms and effects.

TSC is inherently multidimensional, and research approaches that bridge disciplinary boundaries are more likely to capture its complexity and to produce findings that translate into practical, evidence-based interventions. Hence, future research would benefit from stronger interdisciplinary collaboration, integrating perspectives from psychology, sociology, engineering, public health, and policy science.

6. Conclusion

This study set out to examine recent developments influencing TSC, combining a systematic literature review with an expert-based Delphi survey. Across both methods, a consistent picture emerged: TSC is a multidimensional, socially embedded, and context-dependent construct, shaped by the dynamic interplay of individual behaviour, collective norms, institutional frameworks, and technological change. Road user behaviour functions as the primary pathway through which TSC influences safety outcomes, while infrastructure, regulation, and cultural context act as enabling or constraining forces. Critically, no single factor determines TSC in isolation. Effective improvements require integrated approaches that operate simultaneously across behavioural, technological, and governance dimensions.

The findings highlight both progress and persistent gaps in the current understanding of TSC. While research has advanced considerably in recent years, particularly in relation to autonomous vehicles and evidence-based governance, significant knowledge gaps remain in the understanding of micromobility, in the representation of low- and middle-income country contexts, and in the use of objective safety outcomes rather than self-reported measures. The Delphi study complemented the literature by surfacing expert concerns about the cultural consequences of automation, the limitations of policy approaches without systemic change, and the growing influence of digital and social media on safety norms, capturing emerging dynamics that the literature has not yet fully addressed.

Together, these findings provide a solid foundation for the design of targeted interventions and for the continued development of TSC as a research and policy framework. Strengthening TSC across European countries will require not only improved measurement approaches and more geographically diverse evidence, but also a genuine cultural shift among road users, organisations, and policymakers toward shared responsibility for safe and sustainable mobility.

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Annex 1 | Ethical, open science and transparency considerations

Open science compliance statement

This deliverable follows the Open Science principles outlined in the Grant Agreement. The study design, methods, and analytical approach are described transparently to support reproducibility and critical appraisal. Where possible, results are reported in a way that allows traceability from data collection to interpretation.

Publications arising from this work will be made available through open-access channels in accordance with project requirements. Data generated in the course of the study are handled in line with ethical and GDPR obligations. As the study involves expert input and qualitative material, some underlying data cannot be made fully open due to confidentiality and anonymisation constraints. However, aggregated results, methodological descriptions, and analytical frameworks are reported in sufficient detail to support reuse and secondary analysis. Any limitations to data sharing are justified on ethical and legal grounds, and do not affect the transparency of the study's methods or conclusions.

Ethics/GDPR statement

The methods for data collection used in the present project comply with the requirements of the General Data Protection Regulation (GDPR) and relevant national legislation on personal data protection. Oversight in matters related to data protection is ensured by the Hellenic Data Protection Authority.

Data collection activities, including the Delphi survey, were conducted in accordance with applicable ethical guidelines and the General Data Protection Regulation (GDPR). Participation in the study was voluntary, and all participants were informed about the purpose of the study, the types of data collected, and their rights as research participants prior to providing informed consent (cf. descriptions of participants' rights in Annex 7).

Personal data were collected only to the extent necessary for the purposes of the research. Responses from the Delphi survey were processed and analysed in anonymised or pseudonymised form, and no personally identifiable information is reported in this deliverable. Data were stored securely and accessed only by authorised members of the research team. Participants were informed of their right to withdraw from the study at any time without consequences. The handling of data, including storage, processing, and analysis, was carried out in accordance with GDPR principles and applicable national data protection requirements.

Use of generative AI

During the preparation of this work, the authors used ChatGPT to support language editing, including checking for grammatical errors, improving clarity, shortening text, and identifying overly long or repetitive sentences or sections that could be shortened or moved to an appendix. This support was used solely for editorial and structural purposes and did not affect the substantive content, analysis, or conclusions of the work.

In addition, NotebookLM was used in a limited and supportive capacity during parts of the literature review process to assist with the organisation and exploration of a large body of literature and to support the drafting of preliminary summaries. The outputs generated through this process served as preliminary input only and were critically reviewed, revised, and supplemented through additionalmanual reading

by the responsible researchers. References and interpretations were not adopted automatically and were subject to manual verification.

All AI-generated suggestions and outputs were reviewed and validated by the authors, who take full responsibility for the content of the publication. See also Appendix 2 for an elaboration on the role of AI in the literature review.

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Annex 2 | Researchers involved in the literature review process and the use of AI

In the following, we provide an overview of researchers involved in the literature review process, including the use of Artificial Intelligence in the process. There are generally three processes involved in our D2.2a literature search:

1) Identification and first screening of studies. The first search resulted in a very high number of titles, which required exclusion of clearly irrelevant titles. Researchers from the National Technical University of Athens conducted this initial step across all literature searches to ensure a consistent and standardised approach. They were also involved throughout the remaining PRISMA stages to ensure methodological uniformity, particularly in relation to the application of inclusion and exclusion criteria.

2) Analysis of the papers and presentation of this analysis in a text summary which was included in the deliverable. This is the final step in the literature review process and was based on the final identified number of studies included in the reviews, after the screening process.

Use of Generative AI. In selected cases, the work to structure and summarise evidence on recent developments in road transport and their impact on TSC was supported by AI (NotebookLM). NotebookLM was used to assist in organising extracted information from the final set of included studies and to support the identification of key mechanisms through which these developments influence TSC. The tool was used to structure and cluster relevant findings and to support the drafting of an initial synthesis of the evidence base. This process was continuously quality-assured by the responsible researchers, who reviewed and validated all AI-assisted outputs to ensure that the analysis remained grounded in manual review of the literature and expert judgement. Initial summaries of the evidence base were prepared through systematic reading of the selected studies, while the AI-supported process was subsequently used to support organisation and synthesis across studies. The AI-generated material was used strictly as preliminary input and was revised and refined through further iterative analysis of the literature. No AI output was adopted without verification against the original sources.

To summarise, the use of AI followed a structured and controlled process: initial manual analysis of the literature, followed by AI-supported organisation and synthesis of extracted evidence, and subsequent iterative validation and refinement by the research team. The final outputs were developed through continuous expert review, ensuring that generative AI served only as a supplementary tool within a fully human-led analytical process.

Simplified PRISMA (Preferred Reporting Items for Systematic review and Meta-Analysis). We applied a simplified PRISMA approach. While PRISMA is primarily designed for systematic reviews aimed at effect estimation and meta-analysis, the present reviews had a conceptual and exploratory purpose. PRISMA principles were therefore applied to ensure transparency and traceability in the search and screening process. We have, however, applied a simplified approach, which means that we have not followed all the steps in the PRISMA guidelines. This means for instance that we have not carried out full protocol registration, or formal risk-of-bias assessment.

When it comes to full protocol registration, PRISMA-P (PRISMA Protocols) is a reporting guideline for the development of protocols for systematic reviews. It specifies how planned methods should be documented in advance, including the objectives of the review, predefined eligibility criteria, search strategies, data extraction procedures, and plans for synthesis. The purpose of PRISMA-P is to ensure transparency and methodological clarity at the planning stage, before the review is conducted.

Finally, we have neither conducted a full formal risk-of-bias assessment (as required by the full PRISMA guidelines), which involves the systematic assessment of the reliability of findings in individual studies, e.g. selection bias (who participates in a study), measurement bias (how variables are operationalised and measured), publication bias (the selective publication of statistically significant or positive findings). These types of assessments are central in PRISMA-based reviews with an effect-oriented aim, but in our study, the central aim has been to identify and synthesise definitions and conceptual elements.

Annex 3 | Detailed search terms for the systematic literature search

Topic	Database	Search string	Restrictions	Hits *
Micromobility and new transport modes	Scopus	(''micro-mobility'' OR ''e-scooter'' OR ''e-bike'' OR ''shared mobility'' OR ''electric bicycle'' OR ''emergency transport modes'' OR ''e-mobility'') AND (''traffic safety culture'' OR ''road safety culture'' OR ''traffic culture'' OR ''safety culture'')	Searched title, abstract, and keywords. English language. Publication type: Article or review article, book or book chapter, conference paper	2
Technological innovations and digitalisation	Scopus	("autonomous vehicle" OR "automated driving" OR "self-driving" OR "connected vehicle" OR V2X OR "intelligent transport system" OR "advanced driver assistance" OR ''ADAS'') AND (''safety culture'' OR ''traffic safety culture'' OR ''road safety culture'')	Searched title, abstract, and keywords. English language. Publication type: Article or review article, book or book chapter, conference paper	76
Evidence-based policy making and governance	Scopus	("safe system approach" OR "holistic road safety" OR "vision zero" OR ''data-driven'' OR ''evidence-based'' OR ''road regulations'') AND ("traffic safety culture" OR ''traffic culture'' OR ''road safety culture'')	Searched title, abstract, and keywords. English language. Publication type: Article or review article, book or book chapter, conference paper	41

*Hits are the total number of hits in Scopus, excluding duplicates. All searches were conducted in early November 2025

TABLE 2 | Search strings, restrictions, and the total number of unique hits in databases for each of the literature searches

Annex 4 | Screening procedure in the literature review

All search results were manually checked at the title and author level to identify and remove duplicate records, including duplicates arising from spelling inconsistencies or database overlaps. After the removal of duplicates, the screening process was conducted in three steps. In the first step, publications were screened based on their titles to exclude clearly irrelevant studies. Broad inclusion criteria were applied at this stage, and publications for which relevance was uncertain were retained for further screening. The screening criteria applied at the title screening stage are presented in TABLE 3 with some examples.

Topic	Exclusion criteria (screened out if..)	Examples of excluded publication types
Micromobility and new transport modes	-	-
Technological innovations and digitalisation	The study is clearly unrelated to road transport or traffic safety. Focus is on non-transport domains. No relevance to safety culture or safety-related behaviour	"Toward microfluidic continuous-flow and intelligent downstream processing of biopharmaceuticals"; "Development and characterisation of dendritic cell internalisation and activation assays contributing to the immunogenicity risk evaluation of biotherapeutics"
Evidence-based policy making and governance	Focus on technical systems or enforcement tools without addressing safety culture, behaviour, or attitudes; No link to Traffic Safety Culture concepts; Focus is on training, education, or policy measures without a safety culture or governance perspective	"Advancing Road Safety: A YOLOV8-Based Approach to Automated Traffic Violation Detection and Enforcement"; "Cloud-Driven Traffic Monitoring and Control Based on Smart Virtual Infrastructure"; "Methods of Cyclist Training in Europe"

TABLE 3 | Title screening criteria for each topic

In the second step, abstracts were reviewed to further assess the relevance of the publications. At this stage, the screening criteria were refined and applied more strictly, allowing for a clearer distinction between relevant and non-relevant studies. Publications that could not be confidently excluded based on the abstract alone were retained for full-text assessment.

In the third step, full-text screening was conducted. Publications for which the full-text version could not be accessed were excluded. The remaining studies were thoroughly reviewed in full and subsequently either included in the final review or excluded based on the predefined criteria.

Overall, this three-step screening process ensured a consistent selection of studies, with particular emphasis on retaining publications that were directly relevant to TSC and its related behavioural, attitudinal, and governance dimensions.

The results of the searches and screening process for each search are documented in flowcharts in Figure 1, Figure 2 and Figure 3.

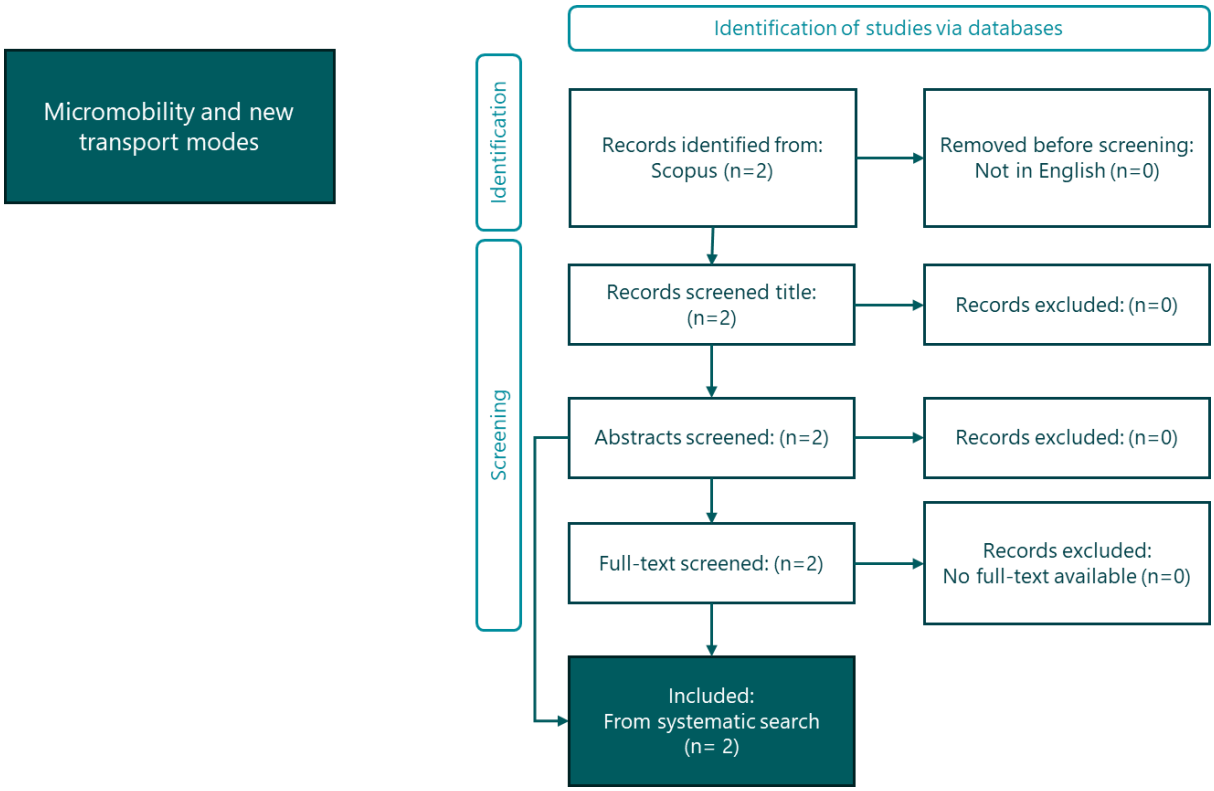

FIGURE 1 | PRISMA flow diagram for literature search for micromobility and new transport modes

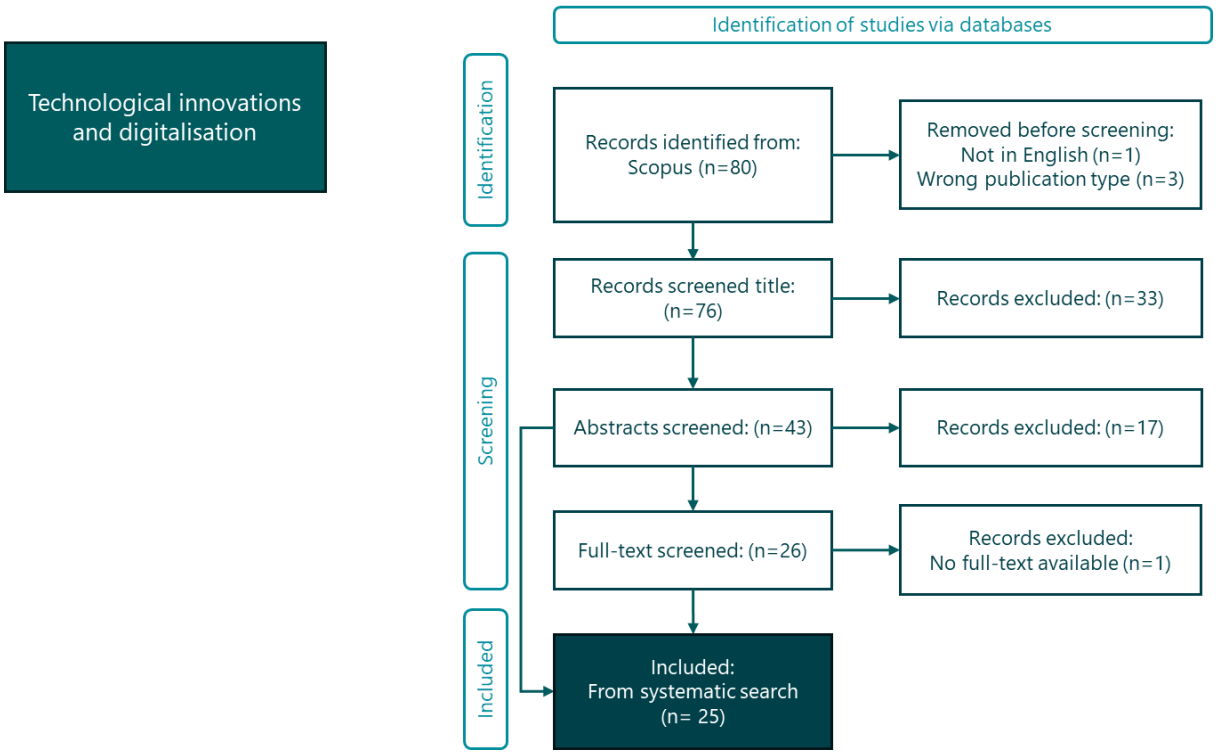

FIGURE 2 | PRISMA flow diagram for literature search for technological innovations and digitalisation

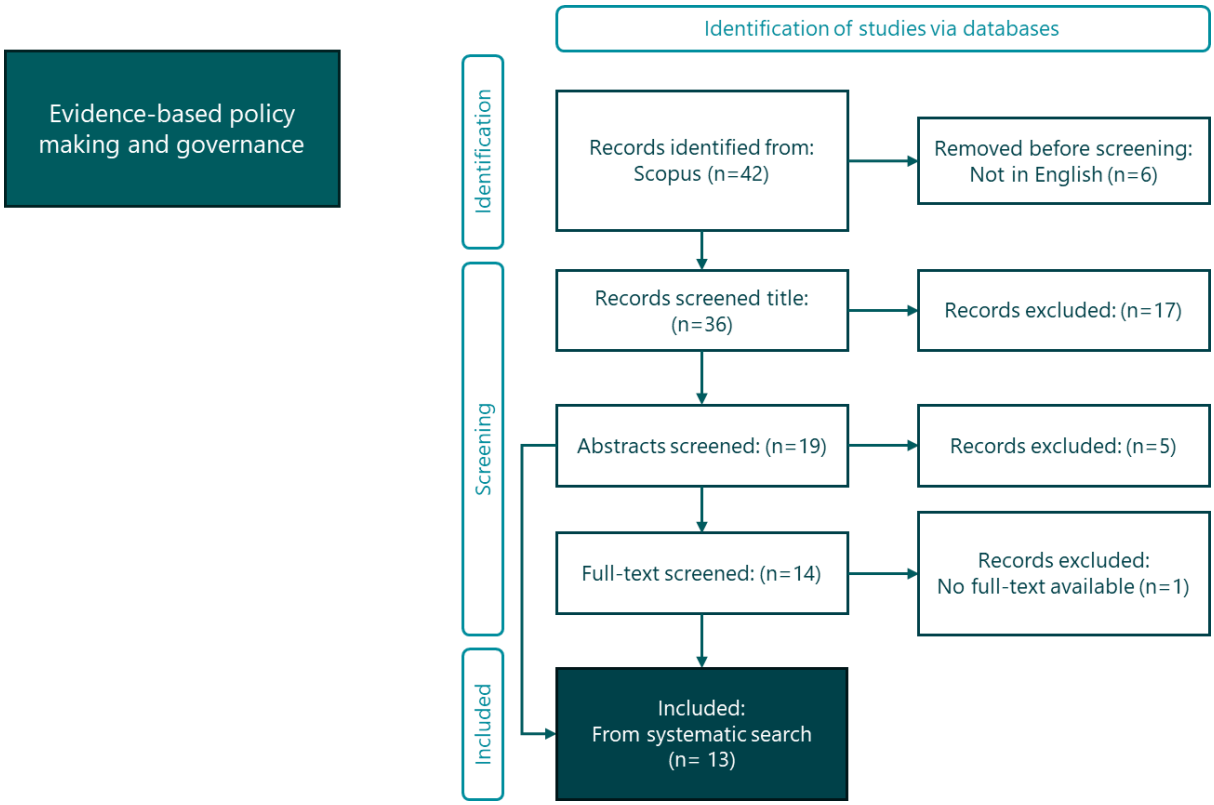

FIGURE 3 | PRISMA flow diagram for literature search for evidence-based policy making and governance

Annex 5 | Supplementary figures - literature review

This annex presents the supplementary figures referenced in Chapter 3, providing a visual overview of the distribution of reviewed studies across chronological, geographical, and thematic dimensions.

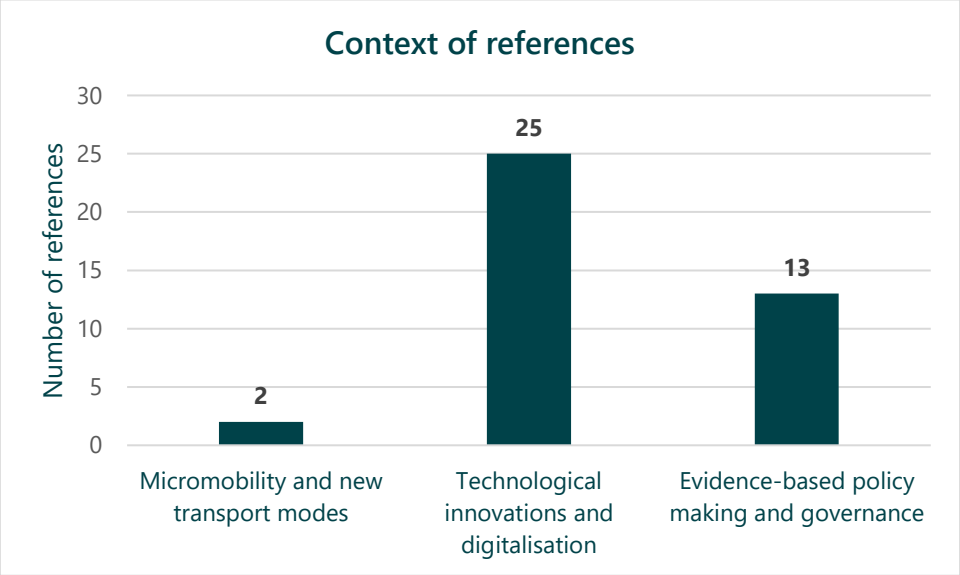

FIGURE 4 | Distribution of Reviewed Studies by Thematic Area

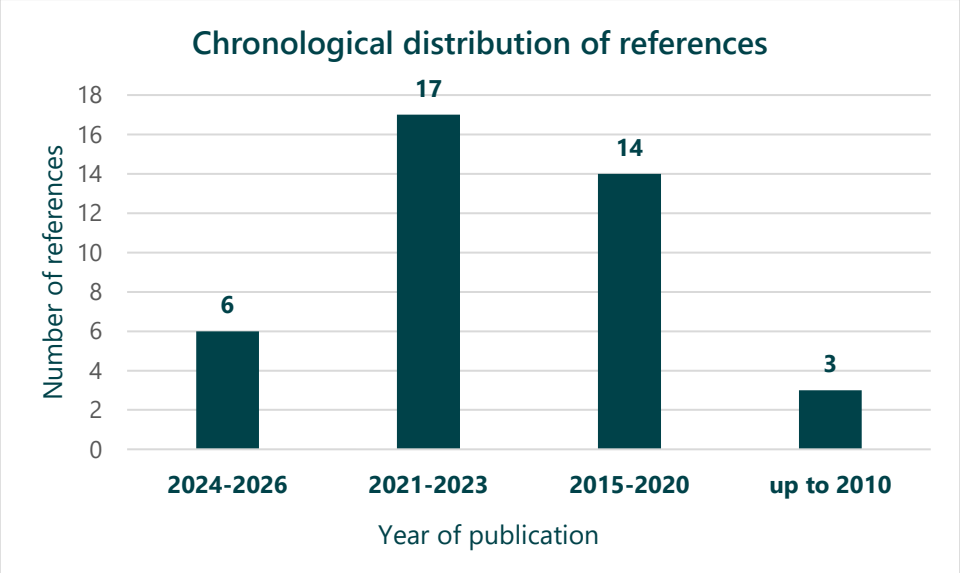

FIGURE 5 | Overall chronological distribution

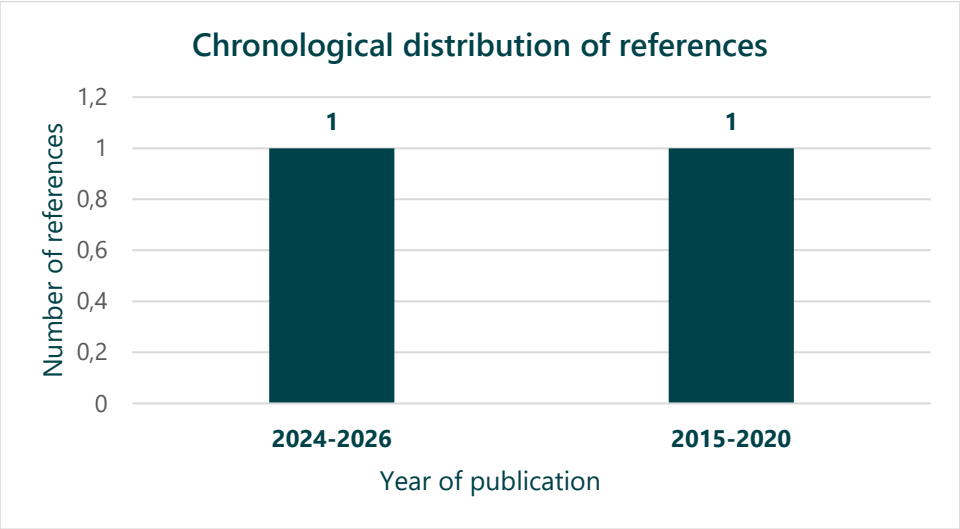

FIGURE 6 | Micromobility and new transport modes

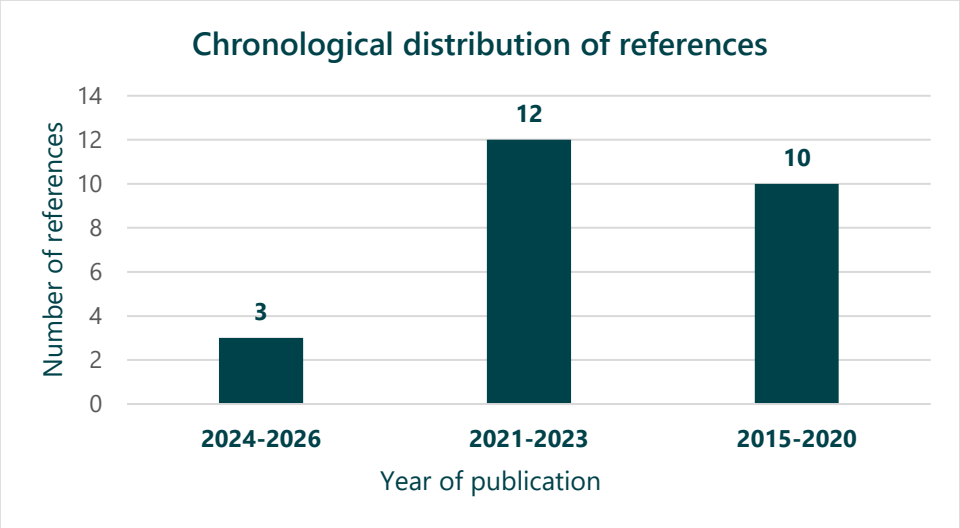

FIGURE 7 | Technological innovations and digitalisation

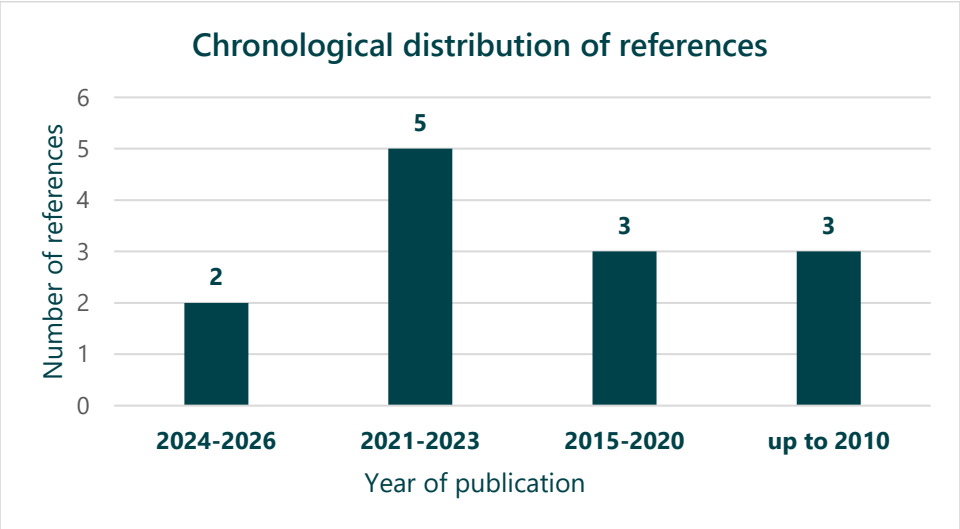

FIGURE 8 | Evidence-based policy making and governance

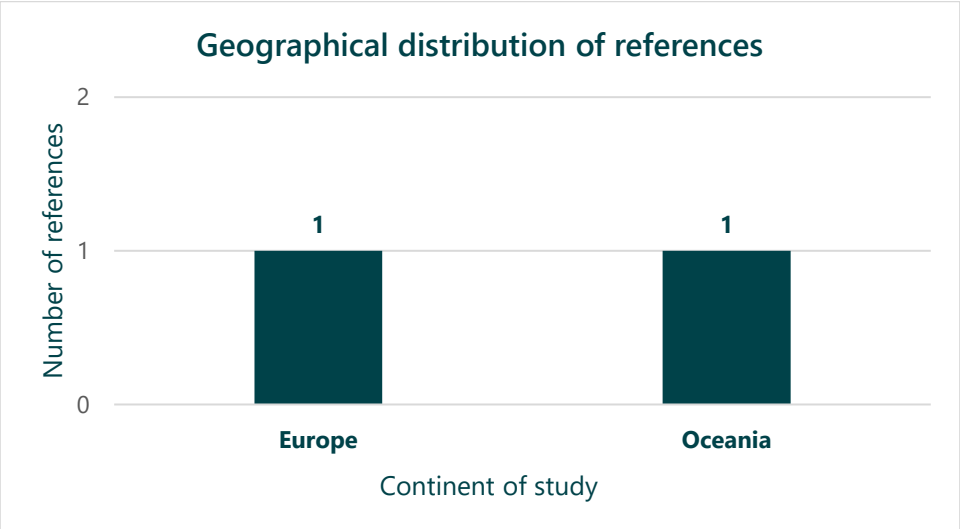

FIGURE 9 | Micromobility and new transport modes

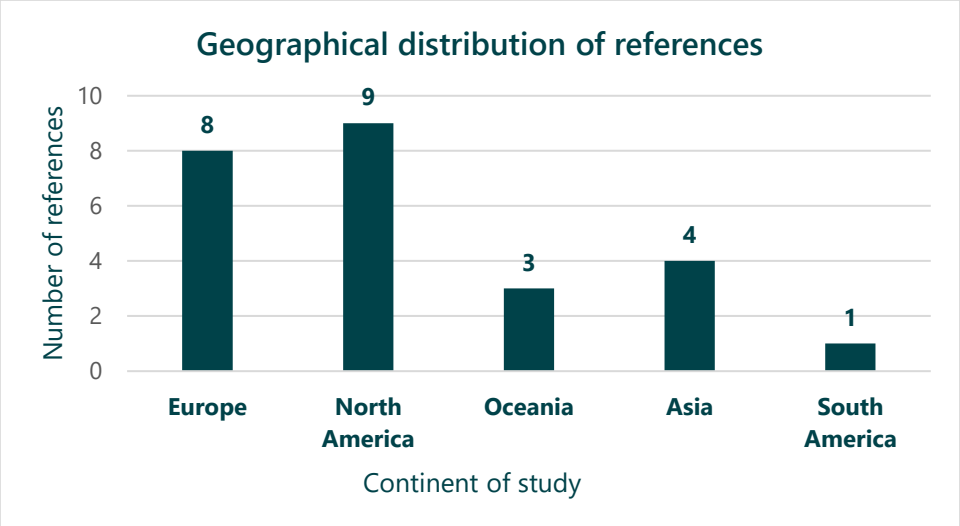

FIGURE 10 | Technological innovations and digitalisation

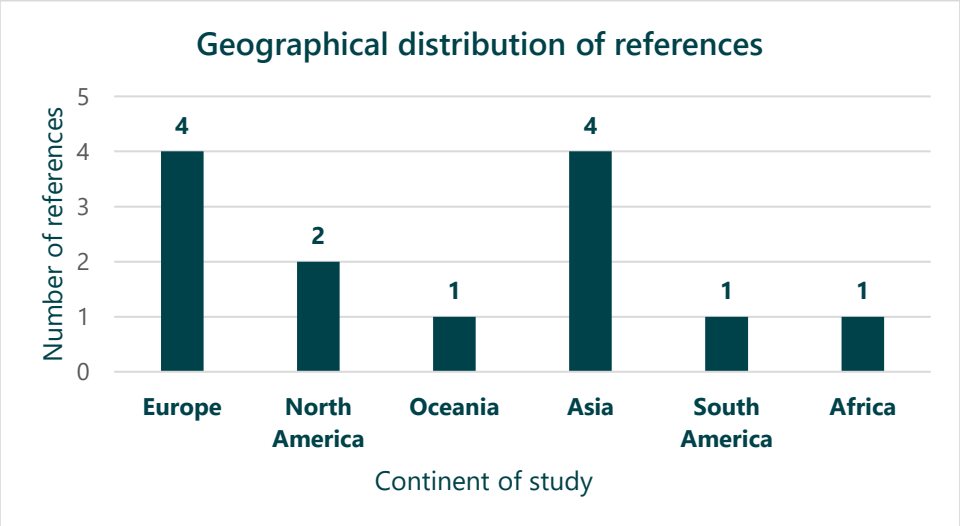

FIGURE 11 | Evidence-based policy making and governance

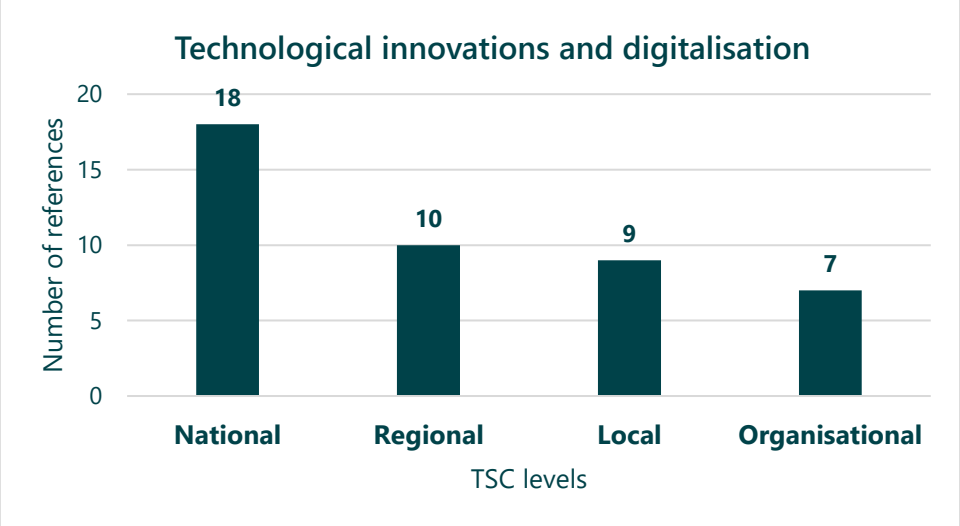

FIGURE 12 | Distribution of TSC Levels

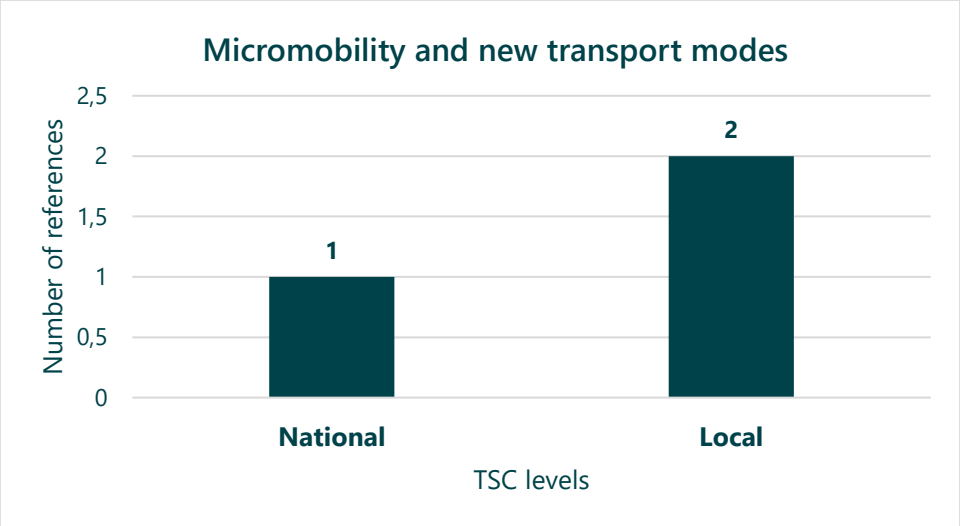

FIGURE 13 | Distribution of TSC Levels

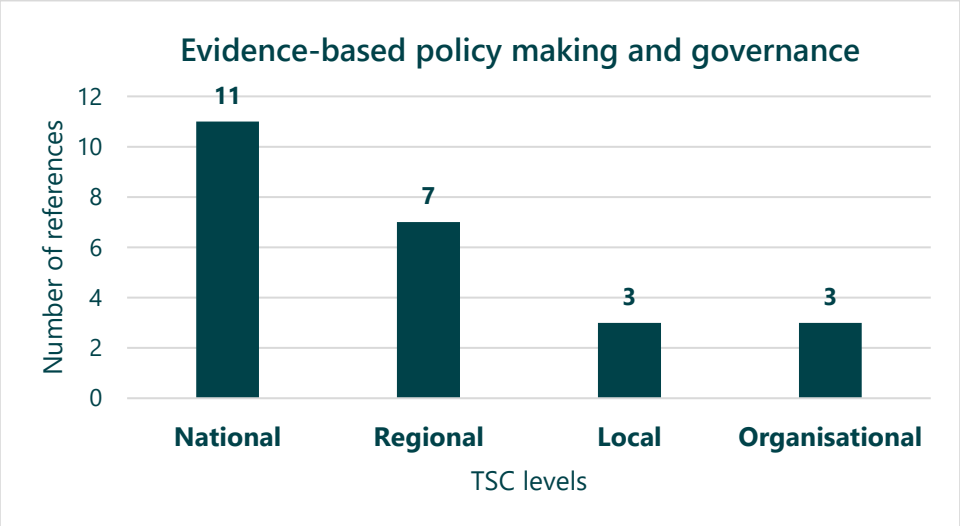

FIGURE 14 | Distribution of TSC Levels

Annex 6 | Detailed Delphi study results

Recent developments in transport and Traffic Safety Culture

A structured questionnaire was developed based on the findings of the literature review in order to capture expert insights on key factors and developments influencing TSC. The questionnaire was programmed and distributed via Microsoft Forms, and experts were invited to participate through email invitations containing a link to the survey. The first round of the Delphi study was conducted in February 2026, followed by a second round in April 2026. Figure 15 presents an overview of the overall Delphi study design, including the main phases and methodological steps.

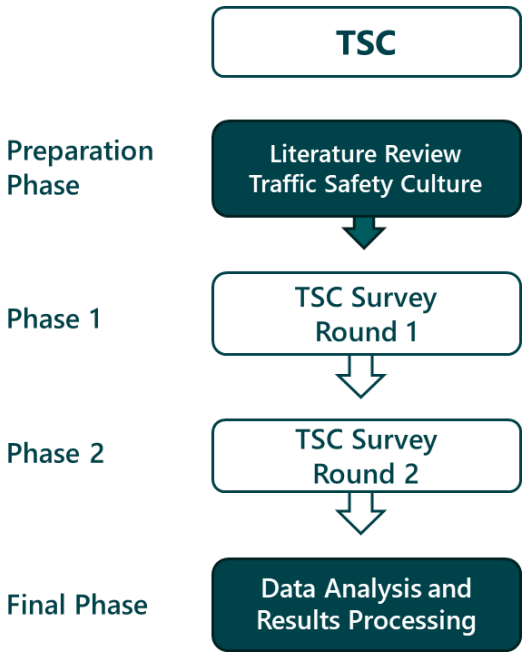

FIGURE 15 | Overview of the Delphi process

Following this, Figure 16 presents the number of participants in each Delphi round.

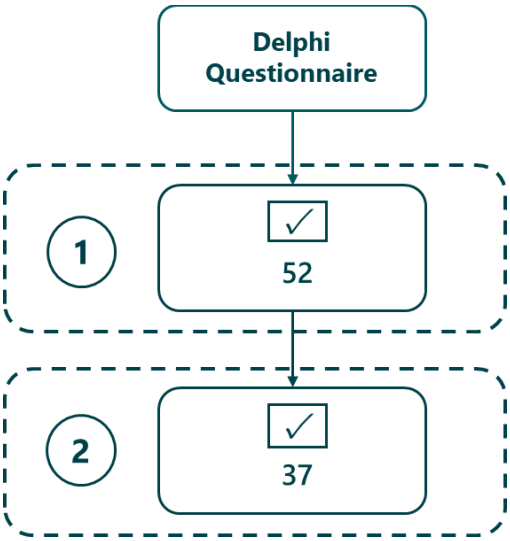

FIGURE 16 | Participant distribution across Delphi rounds

Detailed quantitative findings

Below, all results from the Delphi study are presented for each question. The responses from the first and second rounds are displayed side by side to enable a clear comparison.

Social norms and peer behaviour significantly affect acceptance of new mobility technologies.

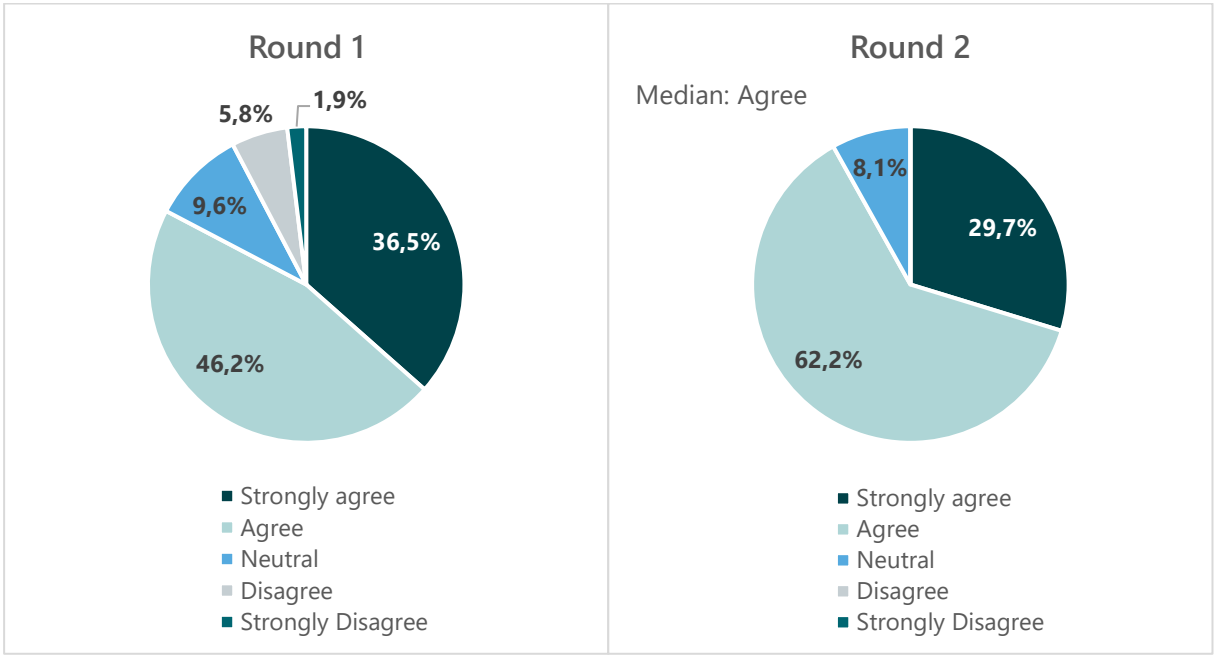

FIGURE 17 | Social norms and peer behaviour significantly affect acceptance of new mobility technologies.

Trust in road safety systems, authorities and technologies significantly affects whether people accept new mobility technologies.

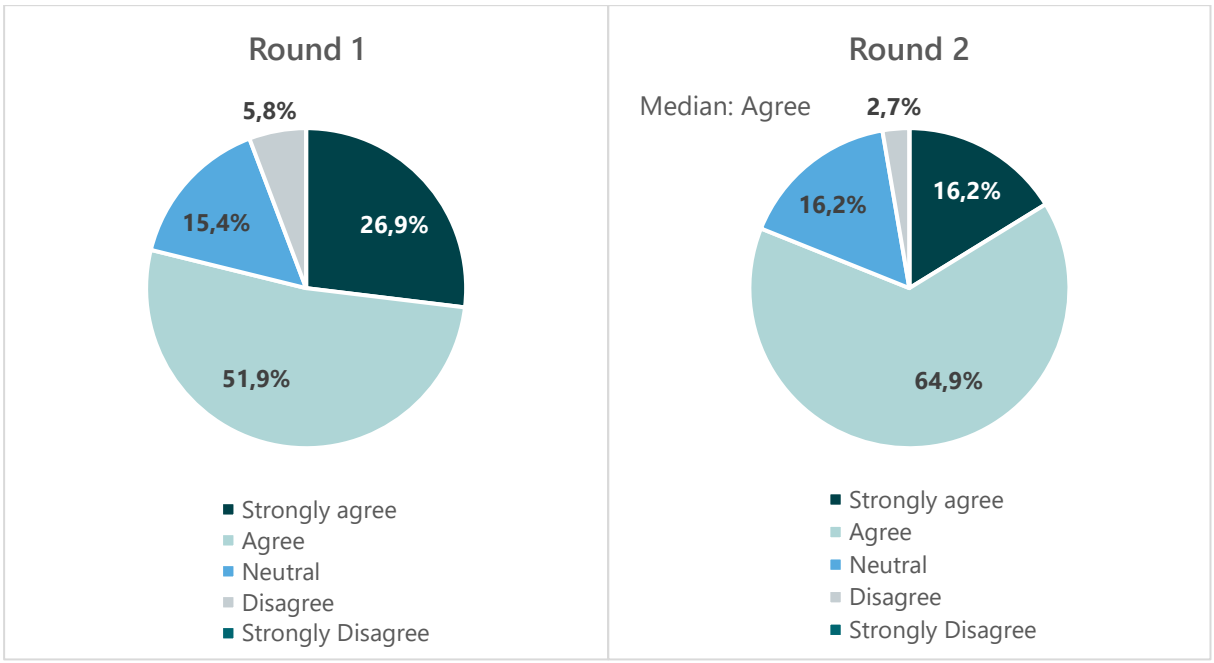

FIGURE 18 | Trust in road safety systems, authorities and technologies significantly affects whether people accept new mobility technologies.

The growth of e-scooters and e-bikes has increased conflicts in public space that affect perceptions of safety.

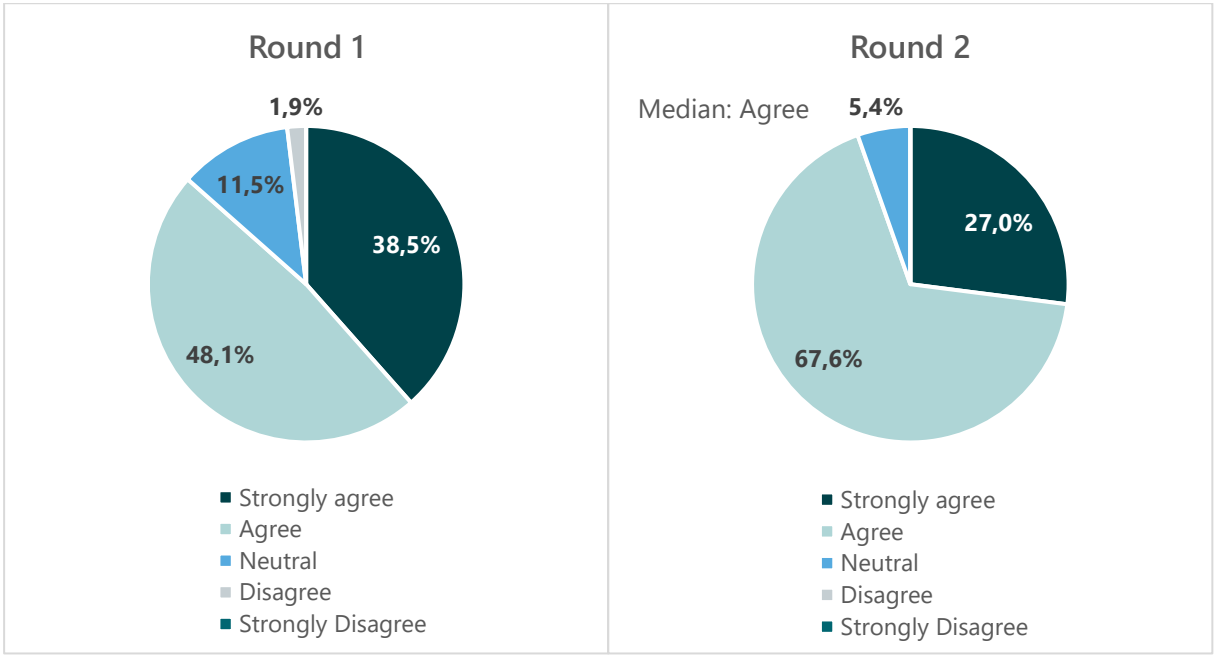

FIGURE 19 | The growth of e-scooters and e-bikes has increased conflicts in public space that affect perceptions of safety.

Improved micromobility infrastructure (e.g., protected lanes) encourages safer behaviour.

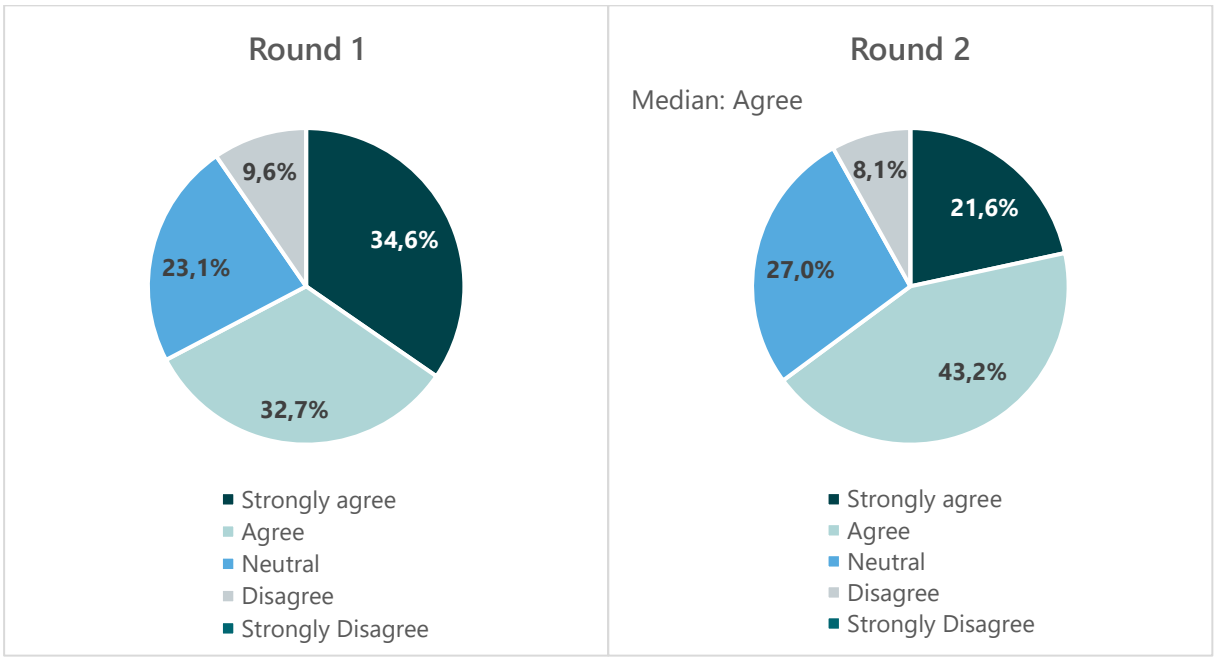

FIGURE 20 | Improved micromobility infrastructure (e.g., protected lanes) encourages safer behaviour.

Micromobility has reduced shared expectations about appropriate road user behaviour.

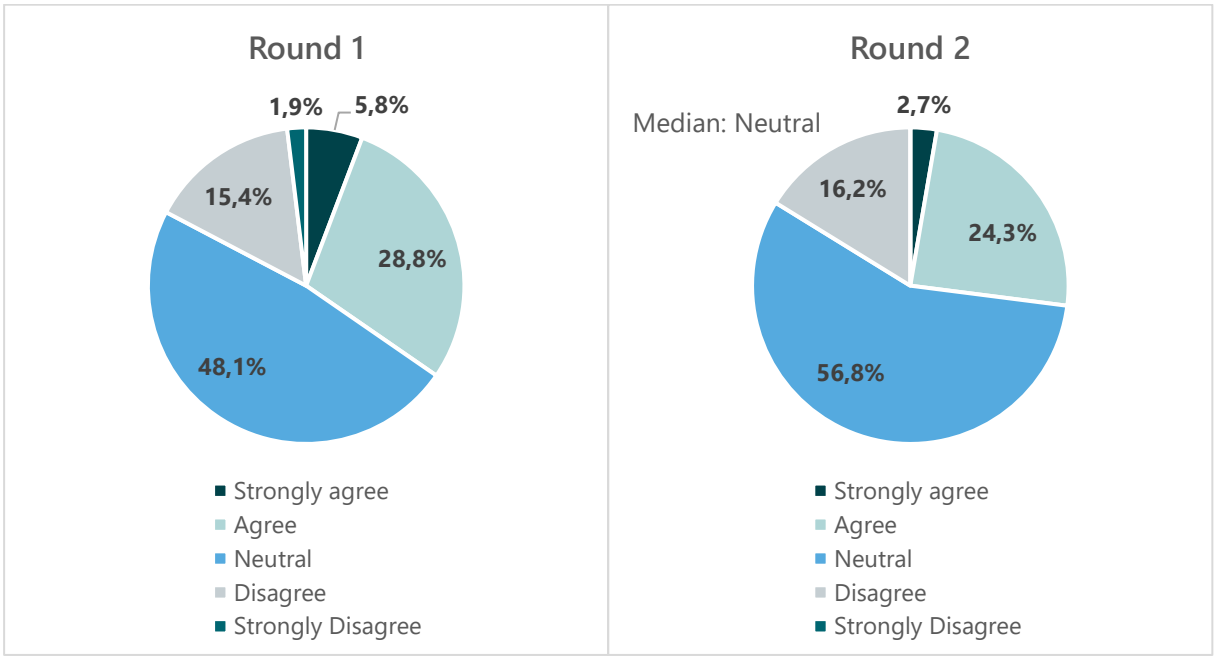

FIGURE 21 | Micromobility has reduced shared expectations about appropriate road user behaviour.

Strong enforcement makes micromobility regulations effective in shaping TSC.

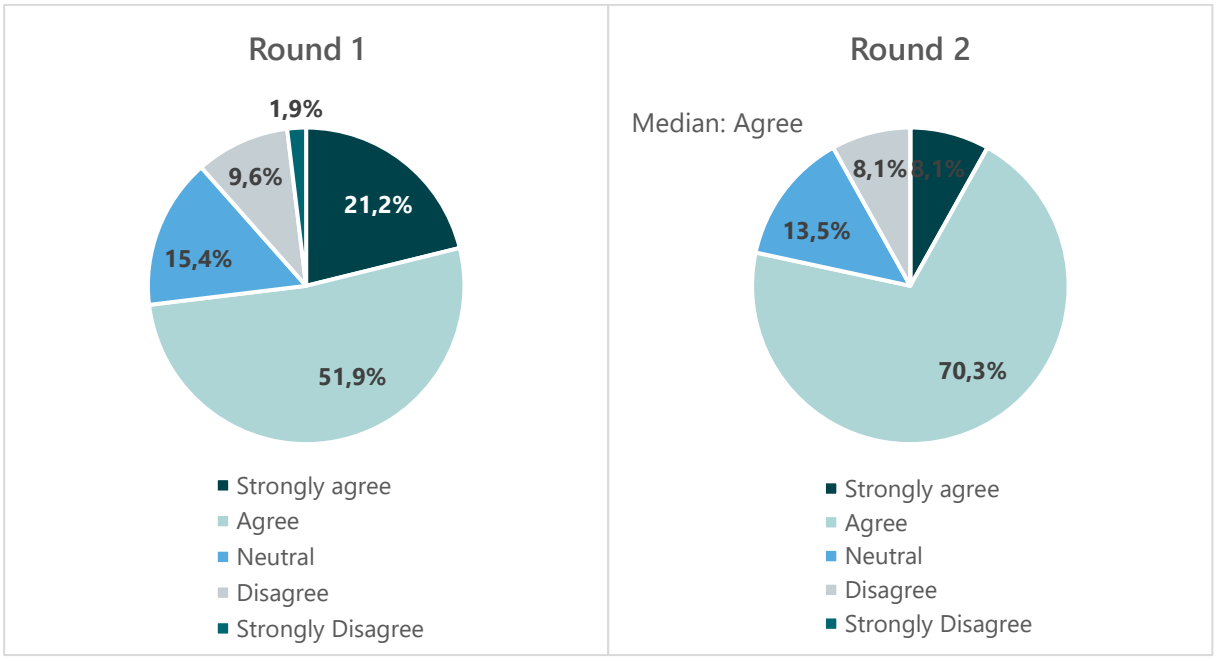

FIGURE 22 | Strong enforcement makes micromobility regulations effective in shaping TSC.

Shared micromobility operators can meaningfully influence TSC through design and user policies (e.g., training, geofencing).

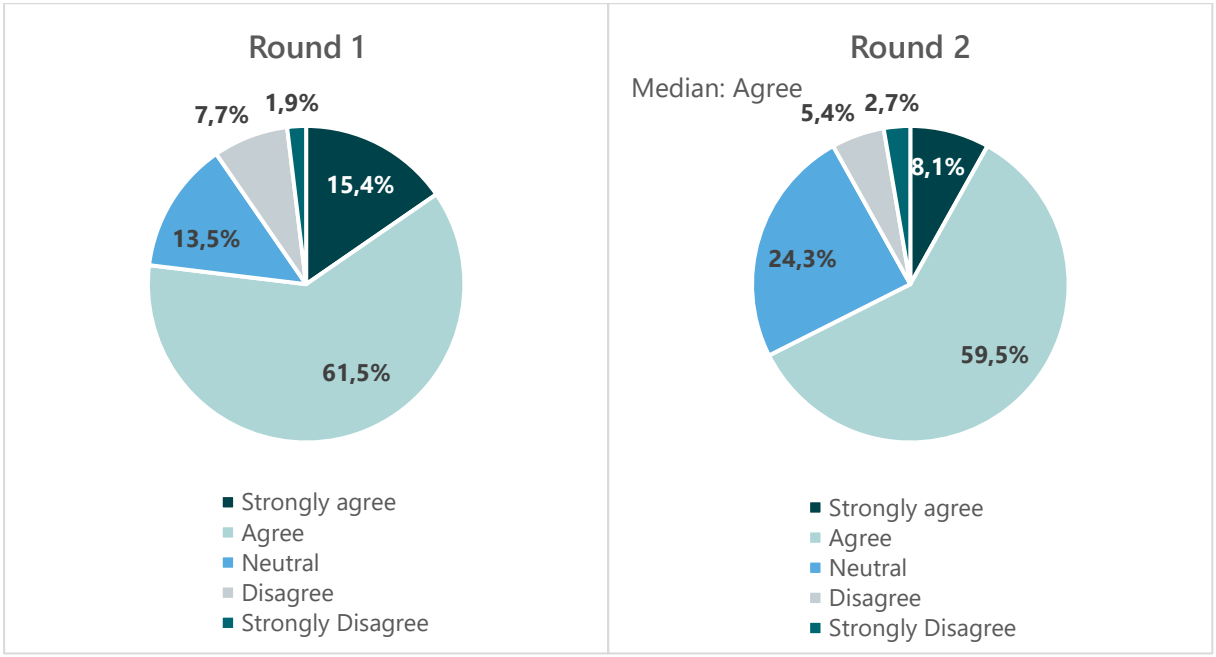

FIGURE 23 | Shared micromobility operators can meaningfully influence TSC through design and user policies (e.g., training, geofencing).

Digital enforcement (e.g., speed cameras, red-light cameras) improves TSC by increasing perceived accountability.

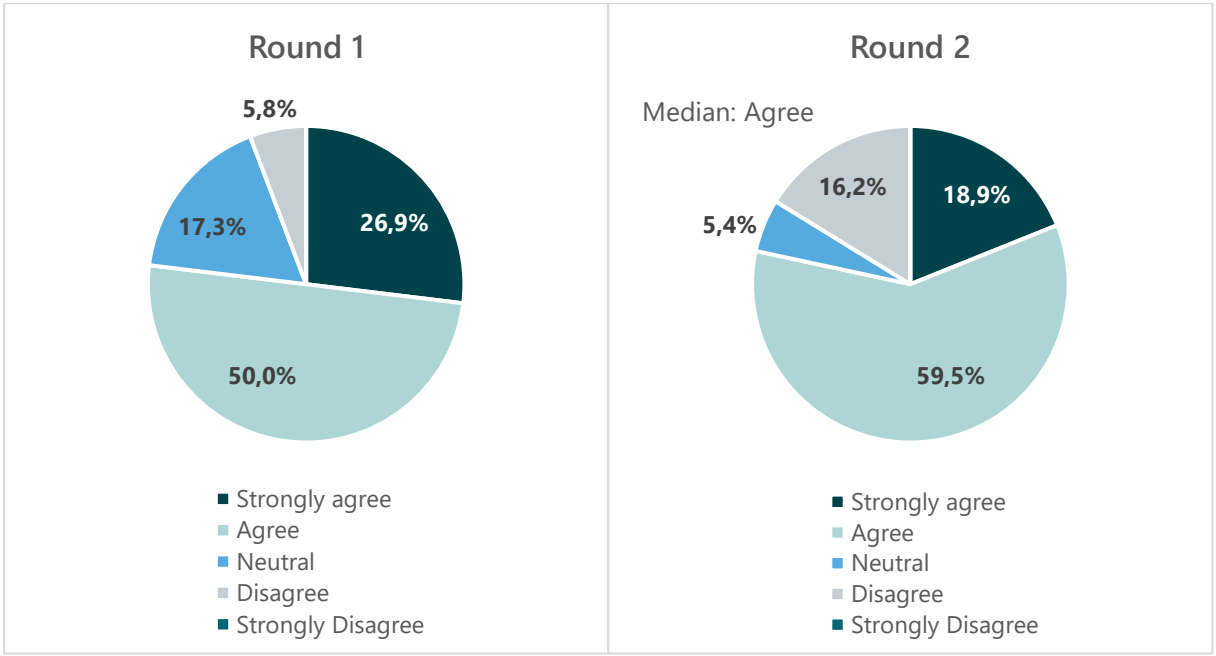

FIGURE 24 | Digital enforcement (e.g., speed cameras, red-light cameras) improves TSC by increasing perceived accountability.

Digital navigation tools prioritise efficiency over safety, potentially undermining safety culture.

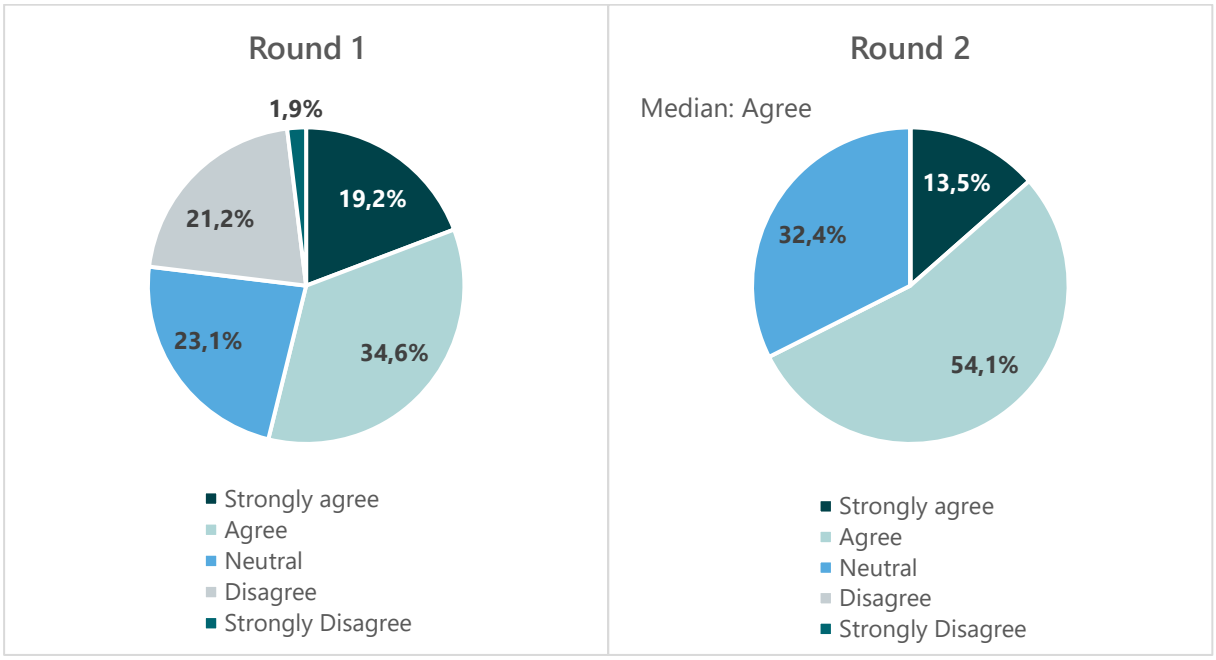

FIGURE 25 | Digital navigation tools prioritise efficiency over safety, potentially undermining safety culture.

Wider use of ADAS (e.g., AEB, ISA, lane keeping) strengthens expectations that safety is "built in".

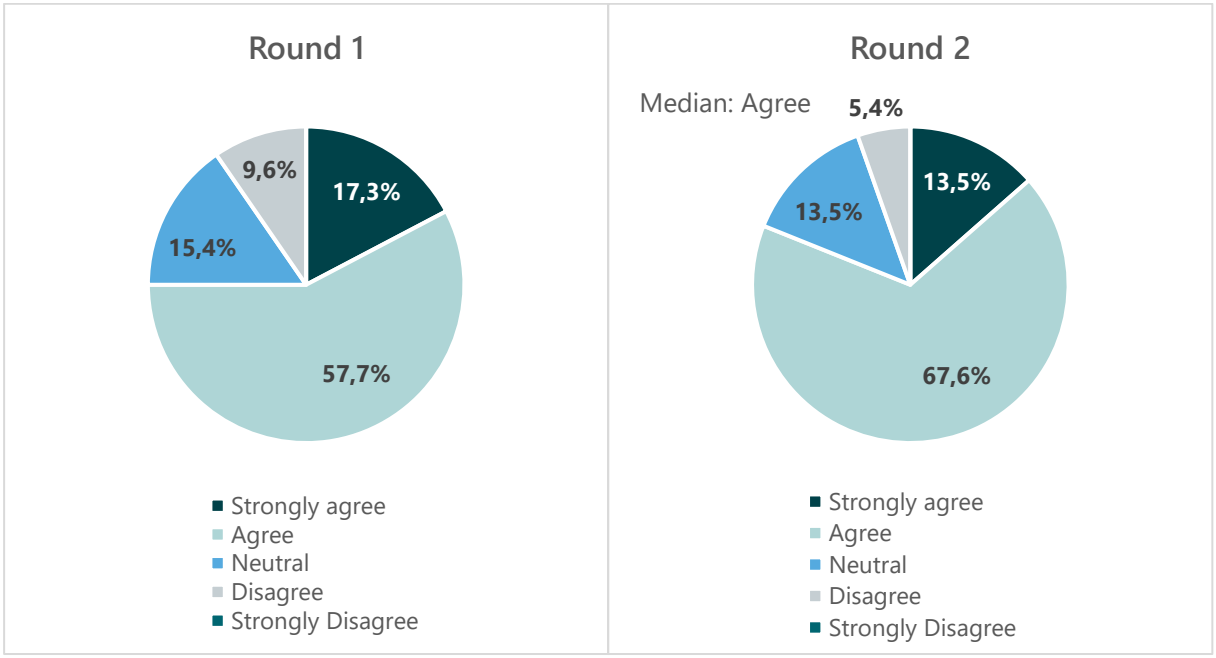

FIGURE 26 | Wider use of ADAS (e.g., AEB, ISA, lane keeping) strengthens expectations that safety is "built in".

Driver assistance systems and automation technologies weaken social norms related to driver attentiveness and responsibility.

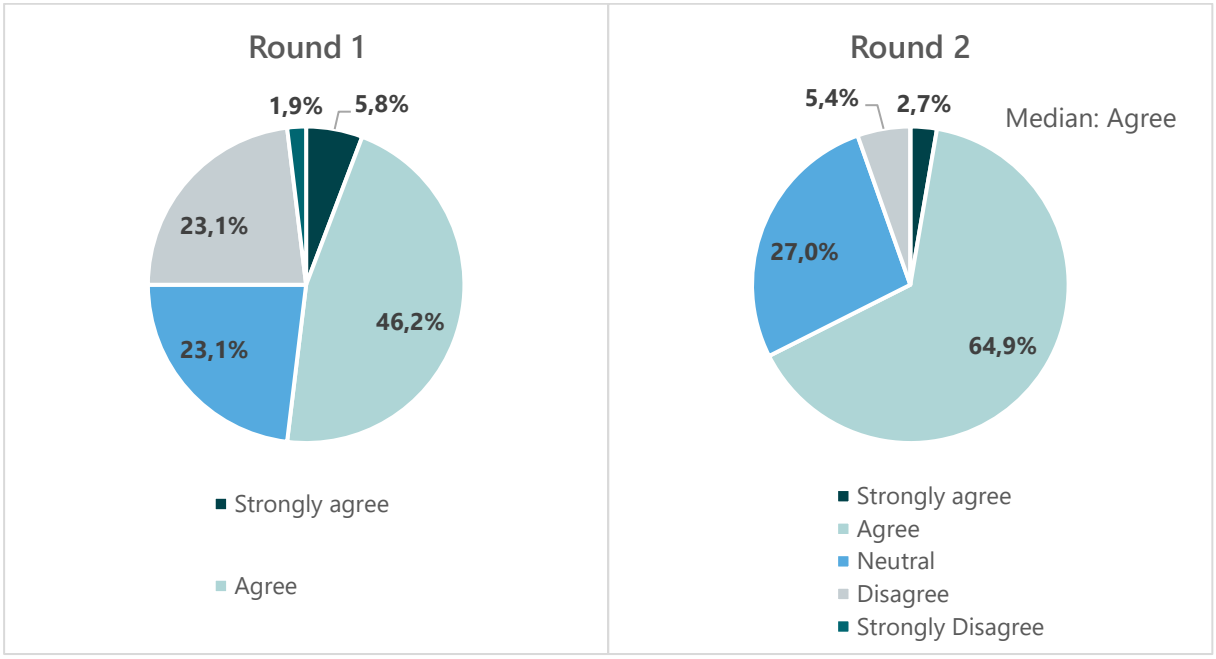

FIGURE 27 | Driver assistance systems and automation technologies weaken social norms related to driver attentiveness and responsibility.

Misuse, overreliance on, or misunderstanding of driver assistance and automation technologies reduces drivers' risk awareness.

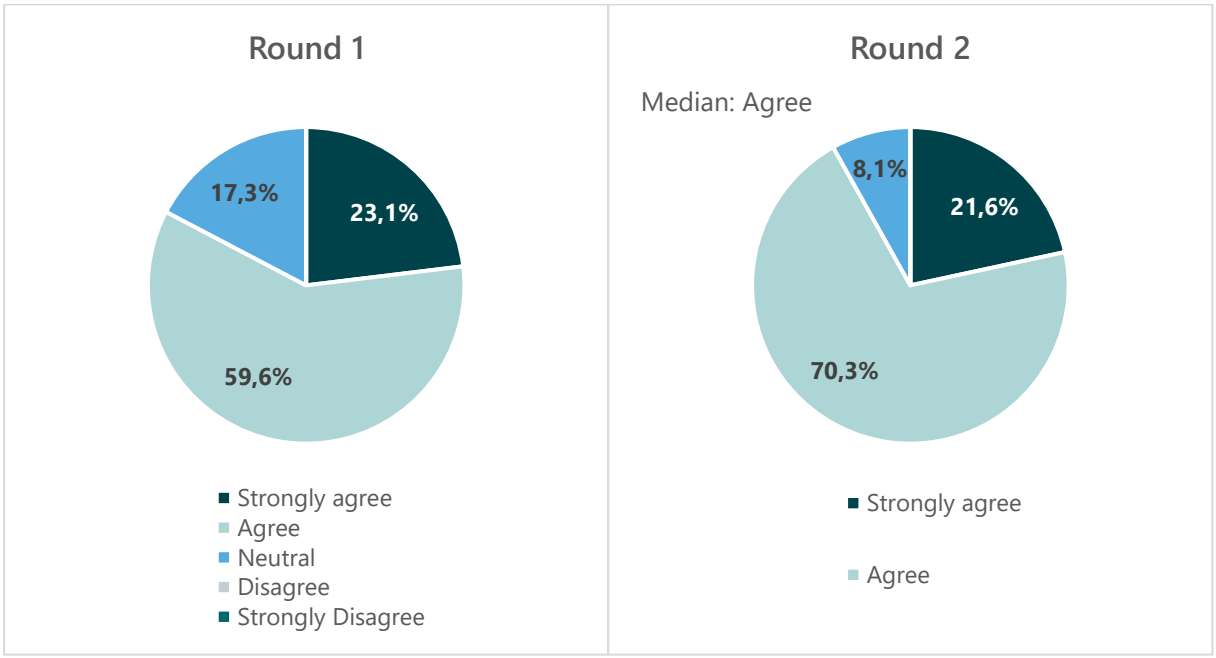

FIGURE 28 | Misuse, overreliance on, or misunderstanding of driver assistance and automation technologies reduces drivers' risk awareness.

Digital feedback and monitoring systems (e.g., telematics, in-vehicle alerts, drivers score apps) help drivers develop safer behaviour.

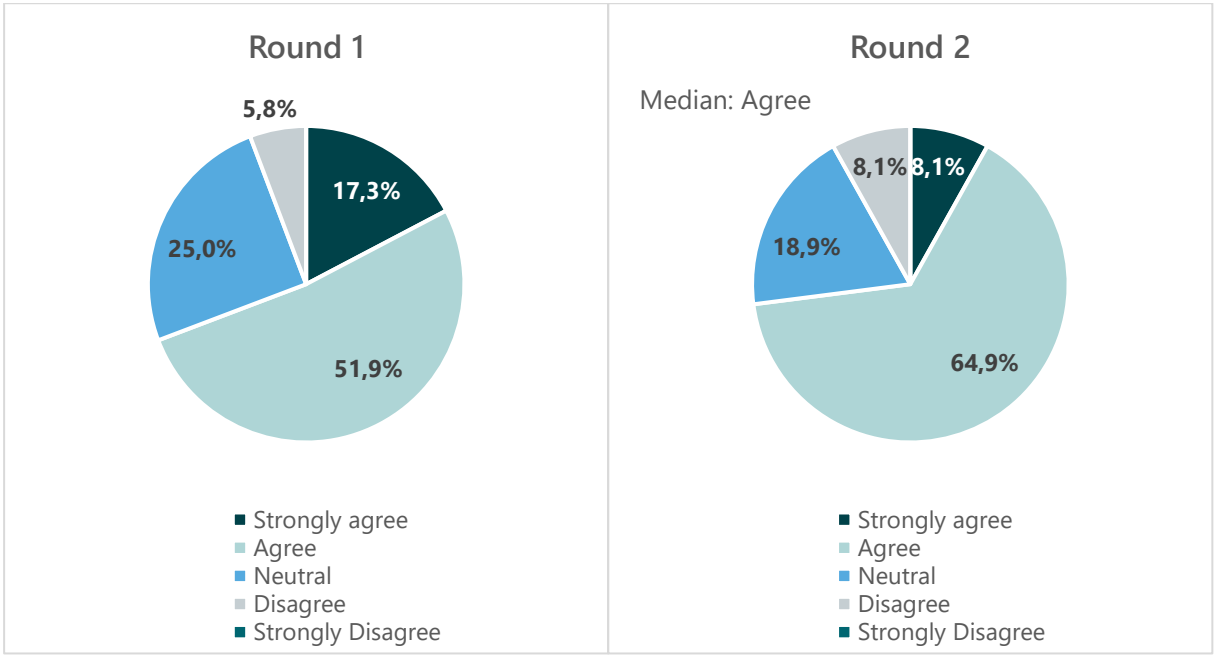

FIGURE 29 | Digital feedback and monitoring systems (e.g., telematics, in-vehicle alerts, drivers score apps) help drivers develop safer behaviour.

Evidence-based policy approaches (e.g. Safe System, Vision Zero) set clear safety goals and behavioural expectations, guiding strategies that strengthen TSC.

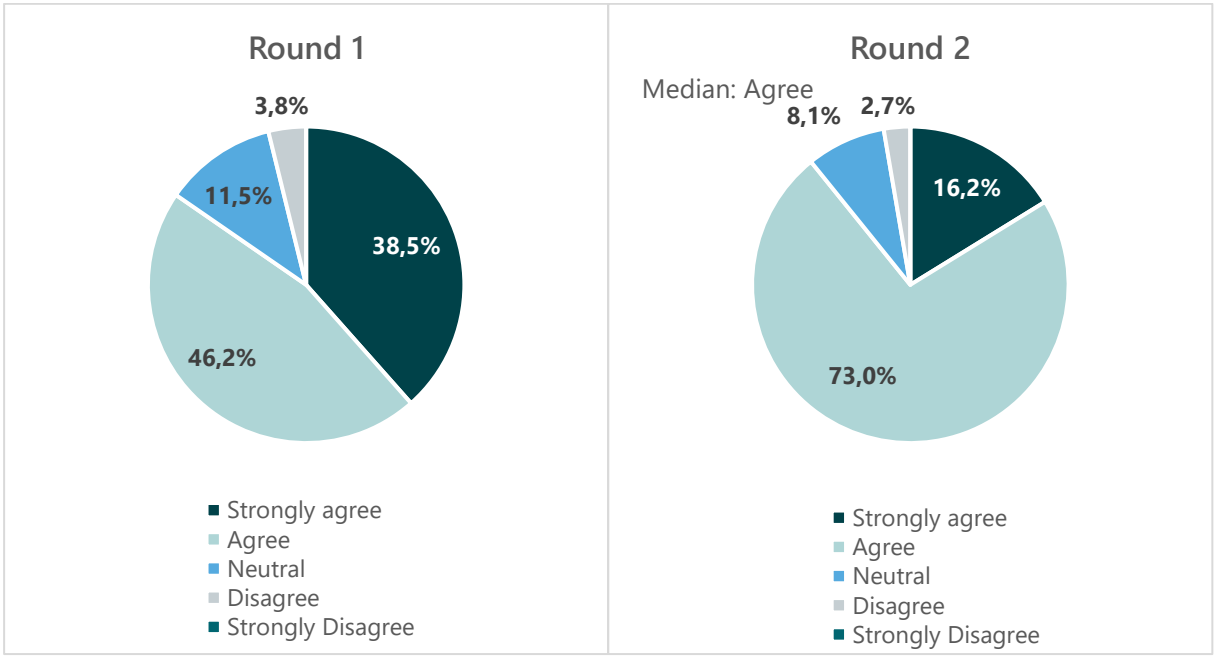

FIGURE 30 | Evidence-based policy approaches (e.g. Safe System, Vision Zero) set clear safety goals and behavioural expectations, guiding strategies that strengthen TSC.

Evidence-based policy making increases legitimacy but does not necessarily change behaviour.

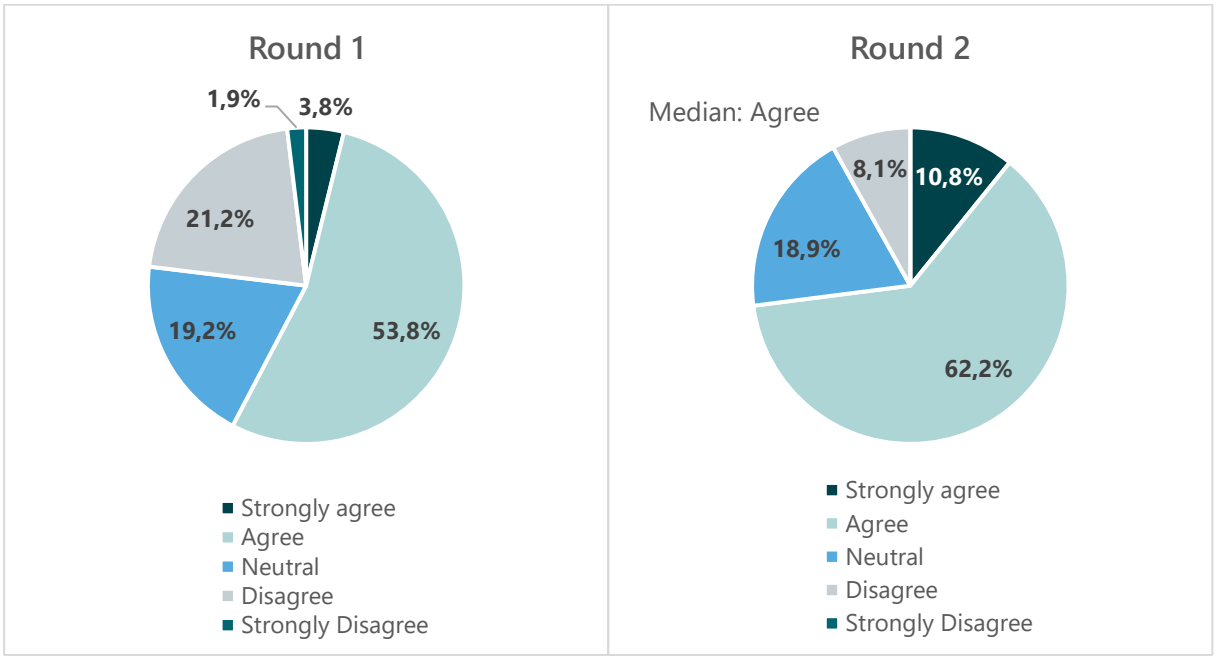

FIGURE 31 | Evidence-based policy making increases legitimacy but does not necessarily change behaviour.

Speed reduction policies face cultural resistance even when evidence is strong.

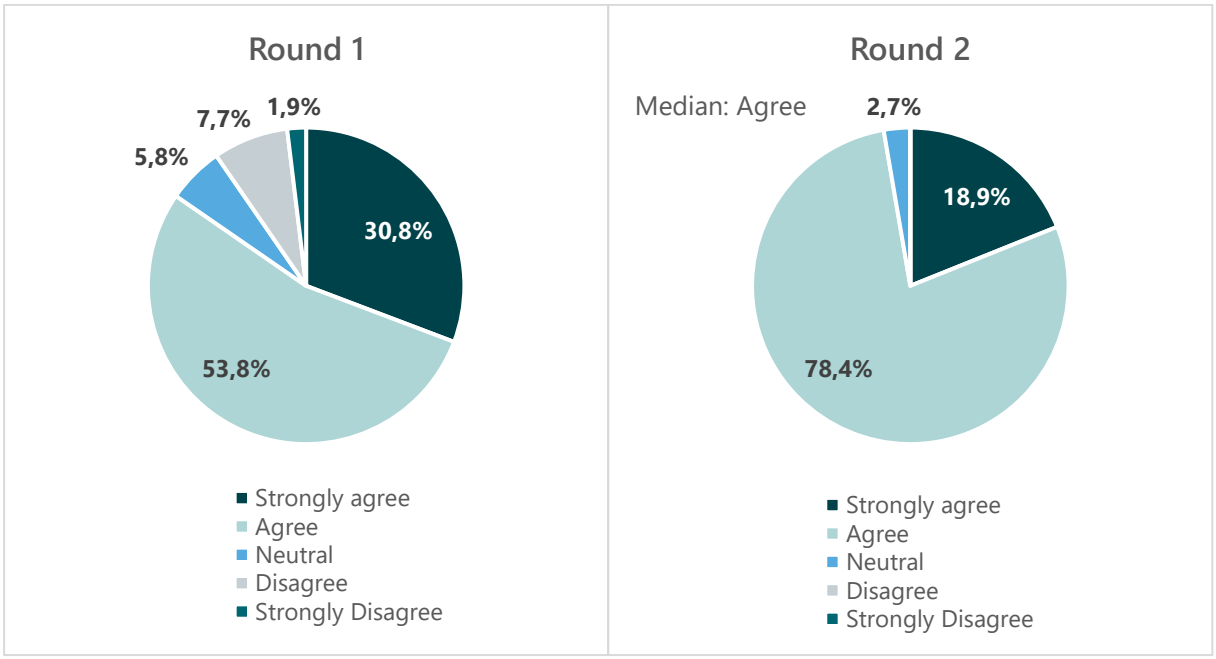

FIGURE 32 | Speed reduction policies face cultural resistance even when evidence is strong.

Education, training, and awareness initiatives alone are insufficient to change TSC.

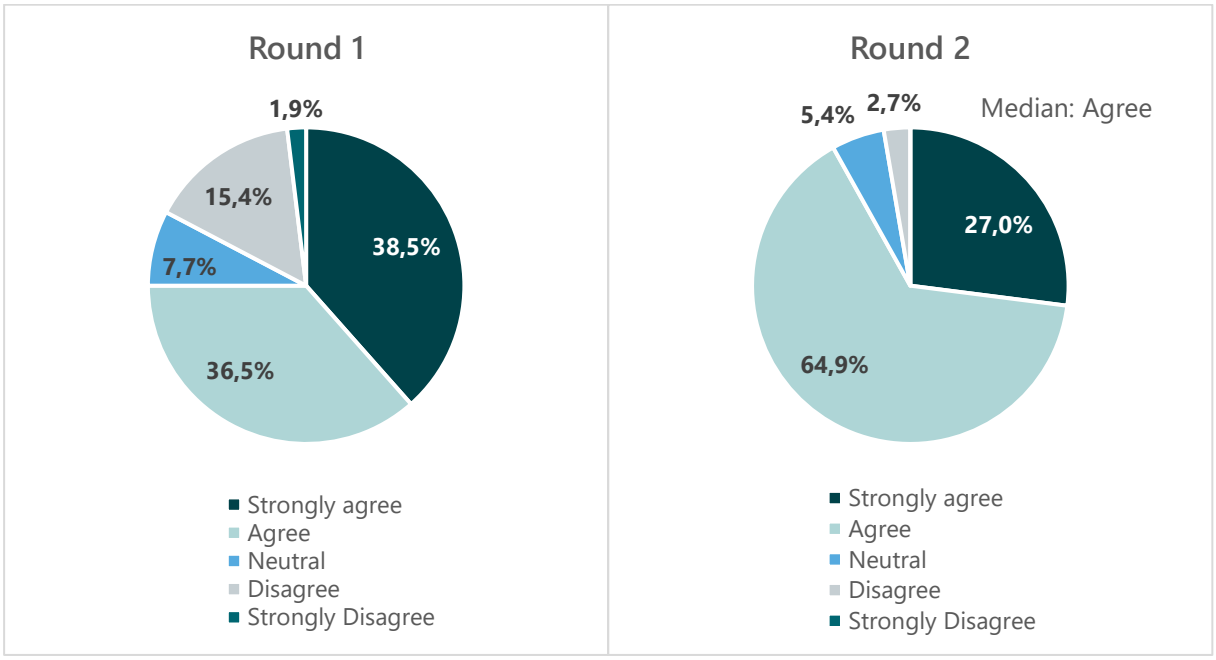

FIGURE 33 | Education, training, and awareness initiatives alone are insufficient to change TSC.

When policy decisions are not transparently justified with evidence, TSC is weakened.

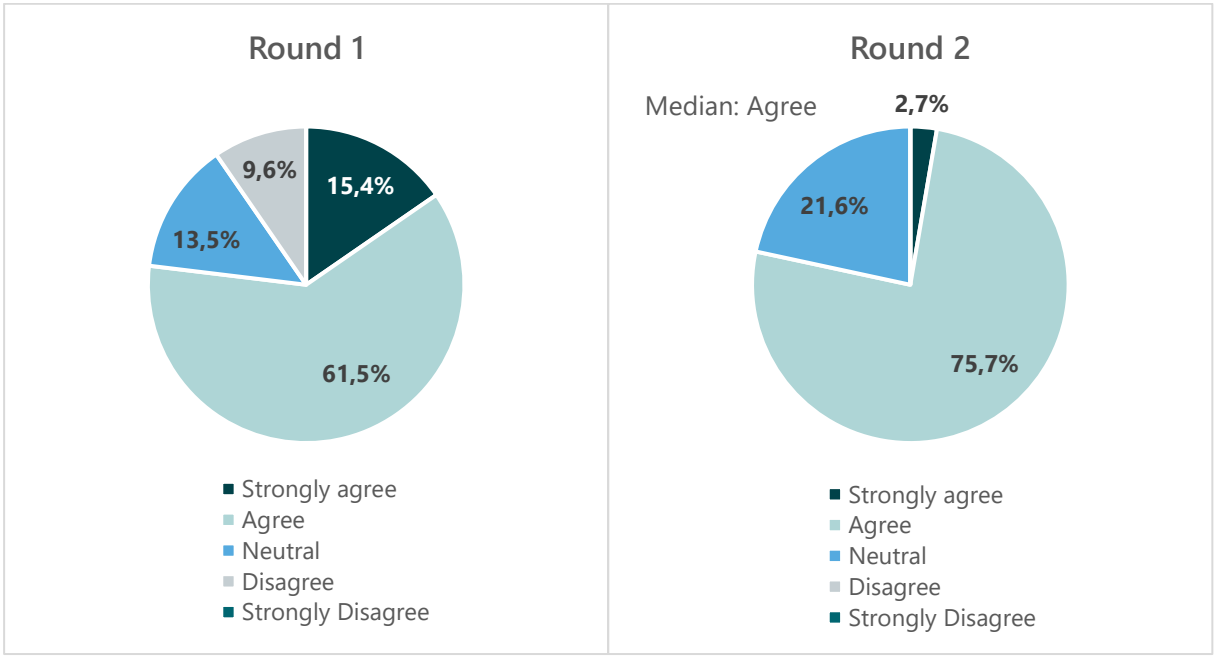

FIGURE 34 | When policy decisions are not transparently justified with evidence, TSC is weakened.

Strengthening TSC is equally important as technological advancement for achieving sustainable road safety improvements.

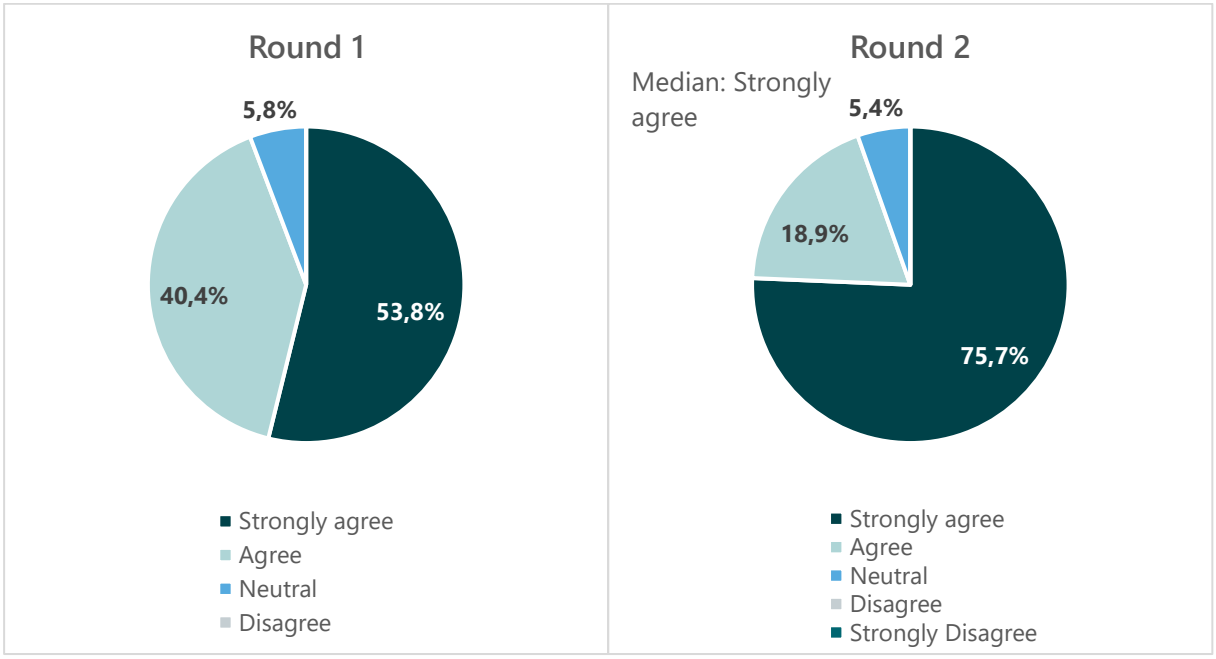

FIGURE 35 | Strengthening TSC is equally important as technological advancement for achieving sustainable road safety improvements.

Detailed qualitative findings

Are there any other recent developments, emerging technologies, or trends not covered in Section 2 that you believe influence TSC (positively or negatively)?

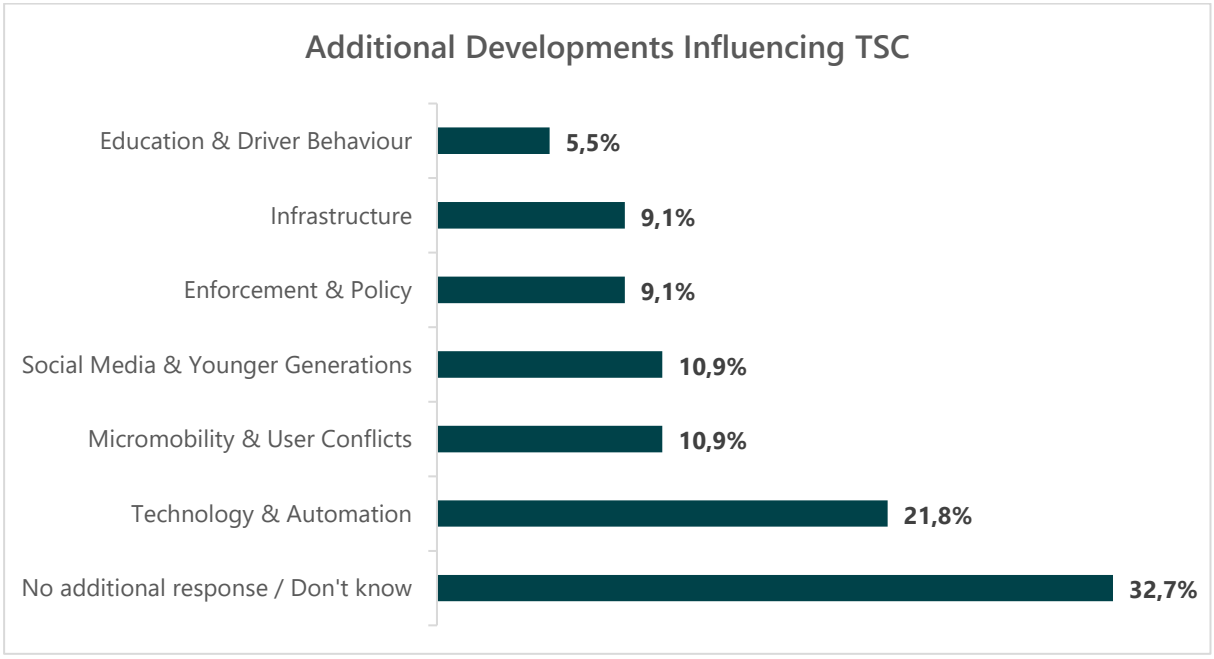

FIGURE 36 | Are there any other recent developments, emerging technologies, or trends not covered in Section 2 that you believe influence TSC (positively or negatively)?

Annex 7 | Delphi study procedure details

Background and demographic questions

About this study

This Delphi study is conducted within Task 2.2 and looks at the developments influencing road safety and TSC.

For the purposes of this study, three key targets have been selected, representing major areas of recent development with a significant potential impact:

- Emergence of micromobility and new transport forms (e.g. e-scooters, e-bikes, ride-hailing services, and other emerging mobility modes)
- Technological innovations and digitalization (e.g. Advanced Driver Assistance Systems – ADAS, autonomous vehicles, Intelligent Transport Systems – ITS, Vehicle-to-Everything – V2X communication, etc.)
- Evidence-based policy making and governance (e.g. the Safe System Approach, Vision Zero)

This is the first round of the Delphi process, and it takes about 15 minutes to complete. Based on the study needs and the results of this round, a second round may be conducted. All responses will be processed anonymously and treated in strict confidence, in full compliance with applicable data-protection regulations (GDPR).

Purpose

The purpose of this study is to collect expert perspectives from professionals in road and traffic safety on key developments that have shaped road transport in recent years (e.g. technological, regulatory, behavioural, and societal developments) and to assess their impact on TSC.

Through this Delphi process, we aim to identify areas of consensus and divergence among experts and to support a structured and uniform assessment of how these developments influence TSC.

Your task

In this survey, you are asked to assess the influence of recent developments in mobility, technology, and governance on TSC and related safety outcomes. You will be asked to express your level of agreement with a series of statements and to share your expert views on emerging challenges, interactions, and future relevance.

There are no right or wrong answers, we are interested in your professional experience and opinions.

This is the first round of the Delphi study, if a second round is deemed necessary due to divergent or inconclusive responses, participants will be contacted by email.

Thank you for participating!

Start the survey

More information about the survey and data protection

Propose

The TRUST project seeks to improve road safety by developing tools and frameworks for strengthening TSC. As part of this work, we are conducting a Delphi study aimed at assessing the impact of recent developments in road transport on TSC for research and practice.

A Delphi study is a structured process where experts are asked to provide their views in several rounds of questionnaires, with the aim of reaching a shared understanding or consensus on a complex topic.

The goal of this Delphi study is to identify and refine the key developments influencing TSC in society to arrive at a broadly supported, expert-based assessment through consensus.

By participating, you will contribute directly to identifying which developments most influence TSC and how they affect road safety. Your input will help ensure that the assessment is relevant, practically applicable, and accepted across different professional fields.

Who is responsible?

This study is conducted by the National Technical University of Athens (NTUA), Department of Transportation Planning and Engineering, located in Greece. It is funded through the EU research program HORIZON. The study is part of the larger research project TRUST. You can read more about the project here: www.trafficsafetyculture.eu

What does participation involve?

Participation involves answering a short online survey (in one up to two rounds) sent to you by e-mail. Each survey takes about 15 minutes to complete. You will be asked to give your views on the key developments that influence TSC in society.

Round 1 (exploratory): reflect on key developments and assess their impact on TSC. Round 2 (refinement): review aggregated findings and provide feedback or comments to refine the assessment, if needed.

Between rounds, the research team will aggregate and anonymize responses and provide controlled feedback (e.g., summary statistics and key themes) to inform the next round.

Participation is online, and you may complete each round at your convenience. You may be re-contacted to take part in subsequent rounds and/or brief clarifications.

Voluntary participation

Participation is voluntary. If you choose to take part in the survey, you may withdraw your consent at any time without giving a reason. All your personal data will then be deleted. There will be no negative consequences for you if you do not participate or later choose to withdraw.

Your privacy – how we store and use your data

We will only use the information about you for the purposes described in this document. We will treat the data confidentially and in accordance with data protection regulations (GDPR). Only the project team

in the TRUST consortium will have access to the information collected in the project. The information will be stored in a restricted-access, password-protected area. To ensure secure transfer of data within the TRUST consortium, we use encryption tools such as 7-Zip. This provides end-to-end protection by encrypting files during transfer and requiring a password for access, which reduces the risk of unauthorized interception or data breaches.

The results of the project will be presented in a report, and may also be used in scientific publications, but in such a way that no individuals or organizations can be recognized.

What happens to your data when the project ends?

The data will be anonymized when the project ends, by deleting directly identifiable information. Once the data have been anonymised, they may be stored in a public research data repository and made available for use in future research projects. Any data shared in this way will not contain information that can identify you.

Your rights

As long as you can be identified in the dataset, you have the right to: access the personal data registered about you, have incorrect data corrected, have personal data deleted, obtain a copy of your personal data (data portability), and submit a complaint to the Data Protection Officer or the Norwegian Data Protection Authority (Datatilsynet) regarding the processing of your personal data.

Contact

If you have questions about the study, please contact Alexandra Laiou from NTUA (alaiou@central.ntua.gr).

Start the survey I don't wish to participate -> That's ok, thank you for your interest in our study.

Round 1

SECTION 1: Behavioural, social & human-technology mechanisms

Q1. Social norms and peer behaviour significantly affect acceptance of new mobility technologies.

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q2. Trust in road safety systems, authorities and technologies significantly affects whether people accept new mobility technologies.

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

SECTION 2: Recent developments influencing traffic safety culture

2.1 Emergence of micromobility and new transport forms

Q3. The growth of e-scooters and e-bikes has increased conflicts in public space that affect perceptions of safety.

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q4. Improved micromobility infrastructure (e.g., protected lanes) encourages safer behaviour.

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q5. Micromobility has reduced shared expectations about appropriate road user behaviour.

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q6. Strong enforcement makes micromobility regulations effective in shaping traffic safety culture.

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q7. Shared micromobility operators can meaningfully influence traffic safety culture through design and user policies (e.g., training, geofencing).

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

2.2 Technological innovations and digitalization

Q8. Digital enforcement (e.g., speed cameras, red-light cameras) improves traffic safety culture by increasing perceived accountability.

1 = Strongly disagree
2 = Disagree

3 = Neutral
4 = Agree
5 = Strongly agree

Q9. Digital navigation tools prioritize efficiency over safety, potentially undermining safety culture.

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q10. Wider use of ADAS (e.g., AEB, ISA, lane keeping) strengthens expectations that safety is "built in".

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q11. Driver assistance systems and automation technologies weaken social norms related to driver attentiveness and responsibility.

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q12. Misuse, overreliance on, or misunderstanding of driver assistance and automation technologies reduces drivers' risk awareness.

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q13. Digital feedback and monitoring systems (e.g., telematics, in-vehicle alerts, driver score apps) help drivers develop safer behaviour.

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

2.3 Evidence-based policy making, governance, and system support

Q14. Evidence-based policy approaches (e.g. Safe System, Vision Zero) set clear safety goals and behavioural expectations, guiding strategies that strengthen traffic safety culture.

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q15. Evidence-based policy making increases legitimacy but does not necessarily change behaviour.

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q16. Speed reduction policies face cultural resistance even when evidence is strong.

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q17. Education, training, and awareness initiatives alone are insufficient to change traffic safety culture.

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q18. When policy decisions are not transparently justified with evidence, traffic safety culture is weakened.

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

SECTION 3: Integration & future relevance

Q19. Strengthening traffic safety culture is equally important as technological advancement for achieving sustainable road safety improvements.

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q20. Are there any other recent developments, emerging technologies, or trends not covered in Section 2 that you believe influence traffic safety culture (positively or negatively)?

Open text

SECTION 4: Background information

B1. In which country are you currently employed?

Open text

B2. What is your gender?

- Male
- Female
- Other
- Prefer not to answer

B3. What is your age?

- 20–29 years
- 30–39 years
- 40–49 years
- 50–59 years
- 60 years or older
- Prefer not to answer

B4. Which type of organisation do you primarily work for?

- Research or academic institution
- Road or transport authority (national, regional, or local)
- Public body or policy institution (e.g. ministry, agency)
- Non-profit organisation working with traffic or road safety
- Private company (e.g. consultancy, transport operator, vehicle manufacturer, insurance)
- Other (please specify)

B5. Which of the following fields best describe your professional background?
(Select all that apply)

- Technical / Engineering / Natural sciences
- Social sciences / Humanities
- Medicine / Health sciences
- Law / Economics / Business
- Other (please specify)

B6. How many years have you worked in your current field of expertise?

- 0–5 years
- 6–10 years
- 11–20 years
- 21 years or more

B7. How familiar are you with the concept of traffic safety culture?

- Very familiar
- Quite familiar
- Neither familiar nor unfamiliar
- Slightly familiar
- Not at all familiar

Round 2

SECTION 1: Behavioural, social & human-technology mechanisms

Q1. Social norms and peer behaviour significantly affect acceptance of new mobility technologies. Round 1 result: Median = Agree

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q2. Trust in road safety systems, authorities and technologies significantly affects whether people accept new mobility technologies. Round 1 result: Median = Agree

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

SECTION 2: Recent developments influencing traffic safety culture

2.1 Emergence of micromobility and new transport forms

Q3. The growth of e-scooters and e-bikes has increased conflicts in public space that affect perceptions of safety. Round 1 result: Median = Agree

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q4. Improved micromobility infrastructure (e.g., protected lanes) encourages safer behaviour. Round 1 result: Median = Agree

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q5. Micromobility has reduced shared expectations about appropriate road user behaviour. Round 1 result: Median = Neutral

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q6. Strong enforcement makes micromobility regulations effective in shaping traffic safety culture. Round 1 result: Median = Agree

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q7. Shared micromobility operators can meaningfully influence traffic safety culture through design and user policies (e.g., training, geofencing). Round 1 result: Median = Agree

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

2.2 Technological innovations and digitalization

Q8. Digital enforcement (e.g., speed cameras, red-light cameras) improves traffic safety culture by increasing perceived accountability. Round 1 result: Median = Agree

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q9. Digital navigation tools prioritize efficiency over safety, potentially undermining safety culture. Round 1 result: Median = Agree

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q10. Wider use of ADAS (e.g., AEB, ISA, lane keeping) strengthens expectations that safety is “built in”. Round 1 result: Median = Agree

1 = Strongly disagree
2 = Disagree

3 = Neutral
4 = Agree
5 = Strongly agree

Q11. Driver assistance systems and automation technologies weaken social norms related to driver attentiveness and responsibility. Round 1 result: Median = Agree

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q12. Misuse, overreliance on, or misunderstanding of driver assistance and automation technologies reduces drivers' risk awareness. Round 1 result: Median = Agree

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q13. Digital feedback and monitoring systems (e.g., telematics, in-vehicle alerts, driver score apps) help drivers develop safer behaviour. Round 1 result: Median = Agree

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

2.3 Evidence-based policy making, governance, and system support

Q14. Evidence-based policy approaches (e.g. Safe System, Vision Zero) set clear safety goals and behavioural expectations, guiding strategies that strengthen traffic safety culture. Round 1 result: Median = Agree

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q15. Evidence-based policy making increases legitimacy but does not necessarily change behaviour. Round 1 result: Median = Agree

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q16. Speed reduction policies face cultural resistance even when evidence is strong. Round 1 result: Median = Agree

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q17. Education, training, and awareness initiatives alone are insufficient to change traffic safety culture. Round 1 result: Median = Agree

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Q18. When policy decisions are not transparently justified with evidence, traffic safety culture is weakened. Round 1 result: Median = Agree

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

SECTION 3: Integration & future relevance

Q19. Strengthening traffic safety culture is equally important as technological advancement for achieving sustainable road safety improvements. Round 1 result: Median = Strongly agree

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree