International Transport Forum

Data-informed Mobility Governance

Summary and Conclusions

200 Roundtable

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The International Transport Forum

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Cite this work as:

ITF (2025), Cite this work as: ITF (2024), *Data-informed Mobility Governance*, ITF Roundtable Reports, No. 200, OECD Publishing, Paris.

For any inquiries, contact our research center.

Acknowledgements

This report builds on expert discussions during an ITF Roundtable, “Data for an Informed Mobility Governance”, held in Paris and virtually on 10 and 11 June 2024. Professor Susan Grant-Muller, Chair in Technologies and Informatics at the Institute for Transport Studies and Leeds Institute for Data Analytics at the University of Leeds, chaired the Roundtable.

At the ITF, Camille Combe, Philippe Crist and Vatsalya Sohu (in alphabetical order) wrote the report. Philippe Crist and Orla McCarthy, both of ITF, provided valuable and substantive comments on the final draft. Camille Combe co-ordinated the overall project, while Edwina Collins and Camille Larmanou (ITF) managed the editorial process. Mila Iglesias and Apostolos Skourtas provided administrative and technical support to the Roundtable.

The authors would like to thank Professor Susan Grant-Muller (University of Leeds), Gabriele Grimm (Federal Ministry of Transport and Digital Infrastructure), and Lucie Kirstein (Acatech) for their valuable comments on the draft report.

The ITF would like to thank Laura Babío (POLIS Network), Pietro Buffoni (Transport for Cairo), Philippe Crist (ITF), Tania Gullón Muñoz-Repiso (Spanish Ministry of Transport), Changju Lee (UN ESCAP), Joanne Leung (New Zealand Ministry of Transport), Daniel Oviedo Hernandez (University College London), Catalina Vanoli (CAF – Development Bank of Latin America) for their presentations during the Roundtable. Annex A lists the names and affiliations of the 39 registered Roundtable participants from 18 countries.

This Roundtable Report is part of the ITF’s core Programme of Work for 2024-2025, co-ordinated by Orla McCarthy.

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Executive summary

Key messages

Data is a representation of reality, not reality itself

Data offers valuable insights on phenomena but often comes with limitations. Data can be outdated, biased, or incomplete. While data analytics help to simplify and interpret complex phenomena, they may also neglect critical nuances that require deeper context.

Data is a compass, not a roadmap

Data measures a phenomenon, but it does not provide guidance on how to manage it. Data should not blindly drive policy makers; not all data constitute evidence or are policy relevant.

Informing policies requires a panoramic lens, not a narrow perspective

Because societies are complex systems multiple data sources are required to best inform policy decisions in a holistic way.

Main findings

The rapid growth of big data and digital transformation offers both opportunities and challenges for transport authorities and other users. Decision making often does not make use of the full variety of datasets that exist on transport-related topics. Big data is complex: governments must improve their data literacy and analytical skills of their staff so they can integrate data at the different stages of the policy-making process. Doing so improves the impact and efficiency of transport policy delivery, transparency and communication.

Evidence-based policy is the exception rather than the norm. Simply gathering more data does not necessarily lead to more evidence-based policies: policies can be evidence-aware or evidence-influenced. Political cycles are an inevitable reality that data alone cannot counteract, and political timing is often incompatible with evidence gathering. This leads to decisions based on their short-term political value rather than on evidence, often prioritising speed and visibility rather than longer-term desired outcomes. Aligning anticipated and actual policy outcomes means improving the integration of policy-relevant data and better policy evaluation throughout the policy-making process.

In the digital era, data constitutes a critical infrastructure supporting multiple downstream applications, including evidence-based decision-making in the transport sector. Like other infrastructure – such as transport networks, health, and education systems – data infrastructure will require an increase in funding and skilled staff to build and maintain it. Assessment of data needs and data poverty (i.e. under provision of necessary data) lack attention in current processes.

Public authorities are central to establishing the framework that governs data infrastructure. Data infrastructure that informs evidence-based transport policy making is comprised largely of public-sector data, with gaps for data collected and managed by other stakeholders (e.g. transport operators, service providers, etc). Access to and use of policy-relevant data can be improved by robust data-reporting and interoperable mandates yet to be established. Safeguards to ensure privacy and personal data protection, data security, and the responsible use of data help to ensure compliance with data protection and privacy rules. Clear and transparent mechanisms can help build trust among stakeholders, and uphold individual

rights, including controlled access, data anonymisation, and rules relating to the collection, sharing, storage and deletion of data

Stakeholders must be able to trust data and data processes for data infrastructure to provide real and lasting value. Just as physical infrastructure delivers societal value because of trust in its reliability and safety, data infrastructure must be built on transparency and reliability. Some of the core elements that collectively foster trust in data processes are transparency, inclusiveness, governance, and engagement. The governance framework should also include mechanisms to ensure stakeholders sharing or accessing data can be trusted and that they comply with existing data protection regulations.

Vision-led policies are more responsive to unexpected changes or disruptions than data-led policies. Focussing on desired outcomes with data collected accordingly, rather than predicting outcomes based on available data, gives policy makers more flexibility to adapt strategies as needed. Data limitations and poor or absent data interpretation methodologies contribute to this situation.

Evidence is crucial not only to better inform policies but to validate their effectiveness over time. The monitoring and evaluation of decisions will be necessary to ensure that policies are refined in the long term, that successful measures can be duplicated and scaled, and that unintended consequences are addressed.

Top recommendations

Treat data as infrastructure to improve the integration of evidence in policy decisions

Data should be treated as critical infrastructure for evidence-based decision making in the transport sector, enabling public authorities to support policy effectively. Data as an infrastructure relies on three components: a governance framework, funding streams and capacity building. Policy makers need to be able to trust the data infrastructure will serve the functions it is built to carry out. Data-governance frameworks reinforce trust in the data infrastructure by establishing rules for accessing data, mechanisms to ensure sources and identities can be trusted, clarifying the roles and responsibilities of the stakeholders, and ensuring data use complies with privacy regulations. Just like other infrastructure, the data supporting evidence-based policy making needs to be collected and updated, requiring adequate funding and data-related skills to do so.

Encourage citizen engagement and establish feedback mechanisms for data processes

Trust in data infrastructure can be strengthened by engaging stakeholders regularly throughout the data lifecycle, from data collection to its use in support of policy. To reinforce transparency and inclusivity in the decision -making process, community representatives, policy makers, and industry experts should be involved in discussions about data practices and priorities. Public consultations, participatory data -governance panels, and regular updates on data use in policy making help to build a shared understanding of data practices, which bolsters public trust and responsiveness to community needs. Establishing feedback loops will also ensure that users' concerns are heard and addressed, which can help to refine data practices and policies continuously. This ongoing dialogue strengthens accountability, improves data quality, and supports greater trust in data-driven mobility policies.

Develop and enforce legal and ethical standards for data management and AI applications

Policy makers should adopt comprehensive guidelines for ethical data management, particularly concerning privacy, security, access, and fairness. For AI applications, this includes creating clear protocols for handling sensitive data, reducing algorithmic biases, and ensuring that data is responsibly sourced and equitably used. Ethical guidelines serve as safeguards, helping decision-makers to balance innovation with accountability, thus enhancing public confidence in data-supported policies.

Adopt a vision-led, proactive approach to transport planning

Emphasise a vision-led proactive approach in transport planning, exemplified by the "decide and provide" model. Rather than relying solely on forecasts based on historical data forecasts, this method encourages the establishment of long-term goals and desired outcomes that align with social and environmental public policy priorities. Vision-led planning enables policy makers to then leverage data iteratively to assess progress and adapt strategies in real time. This approach is more resilient to unforeseen changes and promotes inclusivity, as it integrates community and stakeholder input at each stage of the planning process, ensuring that transport infrastructure evolves sustainably and equitably.

Establish cross-sectoral intergovernmental data sharing with continuous evaluation

Creating cross-sectoral data-sharing protocols and mechanisms enables public authorities to find, access and collaboratively share data related to public-sector transport, health, environment, and urban planning. This reinforces comprehensive, evidence-informed policy making. This data-sharing ecosystem should include continuous evaluation that regularly assesses policy impacts, and aligns with broader objectives like improved air quality, reduced emissions, and enhanced active travel uptake. A transparent system that incorporates performance indicators and public reporting through data dashboards would support adaptive policy adjustments and advance public trust. The collaborative nature of the data-sharing ecosystem would enable government departments to access shared insights, facilitating holistic interventions and joint accountability across sectors.

Data, policy making and data-driven policy making

Chapter summary

- The rise of big data and digital transformation in society has created vast opportunities and challenges for transport authorities where large datasets and real-time data sources can inform decisions.
- Data is complex. Governments will need to improve data understanding and related skills to enable policy makers to interpret data.
- Integrating evidence throughout policy making helps to inform and enforce policies effectively. Evidence should be used to improve evaluation, transparency, and communication of transport authorities.
- Evidence does not always lead to informed decisions. Closing the gap between evidence and policy requires public authorities to collaborate with data sources and conduct regular policy evaluations to align decisions with expected and observed outcomes.

Advances in technology and the digital transformation of societies have created new tools and methods to produce, gather, store and analyse data. Big data, defined here as the collection and analysis of large-scale datasets, has introduced a paradigm shift in our societies, particularly in terms of decision making and policy making (Hossin et al., 2023). For example, access to new data sources offers new opportunities for public authorities to better understand and improve the delivery of their public mandates. On the other hand, big data and the digitalisation of society has proved to be associated with complex challenges requiring public authorities to keep pace with technological progress, as well as their citizens' expectations (OECD, 2019b). Improvements in data production and analysis, both in terms of the volume of data analysed and the depth of analysis, could potentially transform how public authorities understand, manage, and regulate transport.

Within the transport sector, the emergence and widespread use of intelligent transport systems (ITS) facilitated by the advancements and diffusion of low-cost sensing devices and data storage have improved the ability of transport stakeholders to capture and analyse mobility (ITF, 2015). Data produced as a byproduct of transport service operation or connected devices represent a significant opportunity that public authorities and policy makers wish to leverage. New and emerging data streams could augment existing transport analysis and enhance efficiencies (Harrison et al., 2020; ITF, 2016). These data often require additional handling by public authorities before they can be used(OECD, 2019b).

Data collection and analysis are not new (ITF, 2015). However, compared to traditional data collection processes (e.g. surveys), these new and emerging data sources (or big data) can be characterised by the volume, the variety of available data (i.e. different types of data sources, subjects, and formats) (Hammer et al., 2017), the velocity at which data can be accessed (i.e. rapid data generation and transfer) (Bayer, 2011; Giest, 2017), and the veracity of data (i.e. data quality) (Höchtl et al., 2016). Most of this data also provides spatially and temporally located information on transport, thus enabling more detailed analysis (ITF, 2016).

This access to new data sources enables policy makers to shift from a passive approach of data collection and decision making – where decisions usually lag behind the observed phenomena – to a more active approach due to the analysis of close to real-time data. Additionally, the value of new data streams stems

from their combination or integration with other data sources (ITF, 2015; Witlox, 2015). Implementing policies to address the complex challenges faced by transport policy makers could benefit from cross-sectoral analysis using new and emerging data sources.

Yet, data is not automatically synonymous with insights for policy makers (Witlox, 2015). Data's complex and diverse characteristics can pose significant challenges for seamless integration into the policy-making cycle.

From data to knowledge: The challenges inherent to data characteristics

Data describes a raw, unprocessed, purely descriptive context-less measurement (e.g. texts, symbols). Data on its own has no direct value or significance: it requires interpretation through processing and analysis. The information which results from data analysis and processing is valuable as it provides the raw data with context and meaning (Figure 1). Analysing this information produces policy-relevant knowledge, which can later inform authorities' actions and decisions (de Streel et al., 2021; ITF, 2023a).

Figure 1. From data to knowledge

Source: de Streel et al. (2021); ITF (2023a).

From upstream (i.e. data collection) to downstream data applications (i.e. data analysis to generate knowledge), several data characteristics can impact the transformation of data into policy-relevant knowledge.

Data is a partial and often imperfect, or incorrect representation of reality. It has a limited scope and sample (i.e. data focuses on specific variables), and measurements and collection methods can pose several challenges. On the one hand, data has inherent blind spots: not everything important produces data, and not every data is related to important phenomena. Some abstract, but often crucial, phenomena are difficult to measure (i.e. perception of safety, well-being). These limitations can prevent data users from capturing the complexity of transport phenomena.

Additionally, data can be inaccurate. Data collection methods may introduce biases and inaccuracies which can misrepresent a situation or perpetuate existing inequalities (i.e. gender or racial biases). Data's scope is determined by the conditions and contexts under which it was collected. Policy makers must be aware

of these potential biases and implement the necessary policies and procedures (i.e. data validation) to mitigate their potential impact.

Finally, as coined by statistician George E.P. Box, "All models are wrong, but some are useful" (Box, 1979). In other words, models provide useful approximations to complex phenomena. However, statistical models – and by extension data-driven strategies – are often over-simplified to approach complex phenomena in a more manageable way. Important nuances might not be captured by models. Conversely, some models may be overcomplicated for their use case.

Data are plural and heterogeneous. Data can be classified into different categories depending on how the data was sourced (i.e. provided, observed, derived, inferred) (Abrams, 2014), the nature of the data (i.e. personal, proprietary or private, public data) (OECD, 2019a), its function (i.e. informational, operational, or transactional), and its access (i.e. close, restricted, or open). Figure 2 provides a taxonomy of data categories.

Figure 2: A taxonomy of data based on its source

How the data originates	Sub-level	Example
Observed *Data collected by observing or recording events.*	**Engaged**	*Activated sensor on a personal device*
	Not anticipated	*Data from sensor technology in a car*
	Passive	*Wi-Fi readers in public space*
Volunteered *Data originating from direct actions taken by an individual or entity.*	**Provided**	*Application registration*
	Transactional	*Bills paid*
	Posted	*Social network postings*
Derived *New data formed from the transformation or combination of existing datasets.*	**Computational**	*Average purchase per visit*
	Notational	*Classification based on common attributed*
Inferred *Data generated following a deduction or cross-referencing of other data.*	**Statistical**	*Response score*
	Advanced analytical	*Engagement score based on multivariable analysis*

Source: Adapted from Abrams (2014); ITF (2023a); OECD (2019).

Technological advancements in mobile phone technology, sensors, and the internet opened new possibilities of transport monitoring. Traditional data-collection methods have been complemented by new and emerging data sources. K. Lee and Sener (2020) provide a taxonomy of data sources distinguishing

traditional (e.g. survey, counting) and emerging data-collection methods. Those emerging include mode-specific (e.g. transport apps, fitness tracking, etc.) and mode-blind data-collection methods (e.g. mobile data, Wi-Fi, multi-app location-based services). While access to these data sources is an important opportunity from a transport monitoring perspective, it raises several questions regarding data accuracy and policy relevance.

Data diversity represents an acute challenge for data integration. The advent of computing and sensing technology contributed to the growth of datasets containing audio, images, mobile activity, and text, which are often unstructured, i.e. they do not follow conventional data models, thus complexifying their downstream process. The combination of heterogeneous data structures and types is technically challenging for policy makers and, more generally, data users. Policy makers can encourage data interoperability or standardisation to improve consistency across diverse data types (ITF, 2023a). Additionally, data sources may use different terminology to refer to similar concepts. Semantical harmonisation could be developed to ensure semantical interoperability between data. Examples of such convergence can be found in Europe, where Datex II and TN-ITS agreed to align and merge their standards in 2023 to avoid ambiguity when data was shared (DATEX II, 2024).

Data is a means rather than an end. The demand for most data is mainly driven by downstream activities relying on data as an input (i.e. tailored services, data analysis, etc.) (OECD, 2015). Some data types may contradict this assumption: for example, transport statistics on public transport ridership directly satisfy a demand for their reader. However, most data types will be used as input for other services or products (e.g. personal data for customised transport services). Data's relevance for other downstream applications (e.g. online schedule, trip planner, etc.) will largely depend on data characteristics, particularly data timelines and accuracy.

Data is not always fit for policy-making purposes. While data can be produced and analysed for policy-making purposes and collected for a specific reason (i.e. transport surveys), a large share of data available nowadays is produced by service providers and infrastructure managers and is not purposely made for policy-making purposes (ITF, 2015; OECD, 2015). Data is usually produced and structured for specific applications, but theoretically, there are no limits to data re-use (OECD, 2015). Data from other fields, such as energy and health, can produce benefits when applied to inform transport policies. However, policy makers must identify and collect policy-relevant data from a large volume of available datasets (Grant-Muller et al., 2015), which represents a costly and time-consuming process. Additionally, accessible data might not be sufficient to inform policy decisions.

Secondly, collecting and analysing large amounts of data pose technical for public authorities. Transport authorities may lack the capacity to conduct effective data collection and analysis. OECD (2019b) notes that governments must establish data-driven leadership and enable staff to acquire data-related skills and talents.

Policy insight: Data literacy and analytical capabilities are necessary to handle the complexity of data

Data heterogeneity makes it complex to handle and analyse. Identifying and collecting policy-relevant data is costly and requires data management and analytical capacities. This can be achieved by either improving capacities within governments (i.e. hiring qualified staff, upskilling staff) or externalising data management and analysis (i.e. outsourcing tasks). One approach for public authorities can be to consolidate these data capabilities at a higher level, which will then provide inhouse analytical services to local governments.

From knowledge to evidence: Data quality for policy-relevant data

Not all data constitutes evidence. Evidence can be described by what it is and what it enables. On the one hand, evidence is being produced because of collection, compilation, processing or data analysis (Executive Office of the President, 2019). On the other hand, US GAO (2024) describes evidence as an available body of information enabling a person or an entity to determine if a statement or belief is valid or not. Evidence can inform policy makers' decisions and ensure that they are grounded in evidence. Evidence can take different forms: it can be qualitative information (e.g. structured data as part of transport surveys) or quantitative information (e.g. unstructured information collected).

Good data quality is the cornerstone of robust evidence. The concept of data quality refers to how well a dataset can serve a specific purpose, or be useful for a specific user based on several data characteristics (i.e. validity, completeness, consistency, timeless, etc.). The various purposes and uses of data can lead to differing data-quality dimension requirements (Abudayyeh et al., 2023; Barretta et al., 2022). Abudayyeh et al. (2023) note that several of these dimensions have been identified, with some overlapping depending on the discipline considered (e.g. transport, health, industry). Brackstone (1999) proposed a taxonomy of data-quality components for statistical agencies composed of elements related to data relevance, accuracy, timeliness, accessibility, interpretability and coherence. OECD (2018) proposed to complement this set of dimensions to include characteristics required to enable data to be of good quality (i.e. discoverability, interoperability, machine-readable), including non-public data (e.g. licensing, disaggregation, non-proprietary format used, etc.). The aggregation of these different characteristics contributes to improving the data value and usefulness for the final user, namely, policy makers in the context of this report. This report proposes several determinants of data quality in the context of transport policy making (Table 1).

Table 1. Data-quality determinants and issues

Data quality	
Determinants	Definition
Complete data	The data contains all necessary elements without omissions, ensuring that the dataset is comprehensive and sufficient for its intended purpose.
Timely data	Data accurately reflects reality at a specific point in time.
Accurate data	Data accurately represents the element it refers to.
Consistent data	Data can be matched across different data stores.
Unique data	Elements measured by data will be recorded only once.
Valid data	Data conforms to the syntax of its definition (i.e. format, type, range).
Data issues	
Determinants	Definition
Redundant data	Data in which the same appears repeatedly, or there are similar duplicate records.
Missing Data	Missing data in database tables; incomplete data collected.
Noisy data	Attribute domain error; refers to data with large deviation.
Erroneous data	Format-related errors, including misspelled attribute values.
Conflicting data	Inconsistent field identification in stored data fields, syntactically or semantically heterogeneous data.
Sparse data	The data collected are not evenly distributed in the temporal or spatial dimension, making the data appear discontinuous and incomplete.

Source: OECD (2018) ; Brackstone (1999) ; Si et al. (2023) ; DAMA UK (2013).

The criteria in Figure 3 play an essential role in ensuring the credibility of policy decisions (Brackstone, 1999). Good-quality data is crucial for evidence-based policy making. Policy makers should ensure overall data quality by establishing the adapted quality check and safeguard mechanisms (e.g. data validation, cleaning, maintenance) and functions (e.g. data stewardship) at every step of the data lifecycle. Data-quality issues can arise at the generation or collection stage (Si et al., 2023). Proper data quality assessment and correction or cleaning mechanisms mitigate the risk associated with poor quality data impacting downstream applications. Entur, the Norwegian National Access Point for mobility data, provides validation tools and a comprehensive data-quality dashboard for real-time data referenced in its catalogue which aims to improve shared-mobility data quality (Entur, 2024).

On the contrary, low-quality data can negatively affect policy makers' decisions by impeding their capacity to effectively plan, deliver and monitor their actions. Low-quality data also poses financial and reputational risks for organisations. Data-quality issues can arise at the generation or transmission stage (Harrison et al., 2020; Si et al., 2023). Proper data-quality assessment and correction or cleaning mechanisms address the risk associated with poor-quality data impacting downstream applications.

Beyond data quality, several data handling decisions can make data more useful for policy makers (Metzenbaum, Katz, et al., 2022):

- Adopt a comprehensive approach to data collection: Public authorities at all levels maintain extensive datasets related to their operations and programmes. Sharing detailed information about these datasets enables other policy makers to easily identify, access, and use these data to make informed decisions. Metadata describes the dataset's structure, thus facilitating its re-use by other stakeholders. Ireland's transport data strategy adopted several principles to ensure data are discoverable and accessible and that datasets have appropriate identifiers to enable their linkability to others (Irish Department of Transport, 2023).
- More frequent data collection can boost data usefulness: at the beginning of the collection process, policy makers should consider frequent collection to enable the rapid generation of insights. Metzenbaum, Katz, et al. (2022) note that for data measuring variating phenomena, more frequent data collection tends to reinforce the data's usefulness. During the Covid-19 pandemic, local authorities gathered information through frequent polls and interviews to inform policy decisions in the short term (ITF, 2023b). Furthermore, more frequent and consistent data collection over poorly measured phenomena can make data more useful to policy makers. To measure the travel behaviour changes following a re-allocation of public space, several cities established daily traffic measurements for travel behaviours where evidence was lacking (i.e. pedestrians, cyclists, micromobility) (Cerema, 2023; ITF, 2023b).
- Data collection is valuable; but timely data collection is even more valuable. Several authorities included data reporting clauses in contracts or charters ruling mobility services operations (Mairie de Paris, 2018). These clauses usually define the types of data which must be shared with the authority, and how regularly. The collection timing should be consistent with the purpose for which the data are to be used. Metzenbaum, Katz, et al. (2022) note that data corresponding to a given period are often shared several months after the end of the given period, thus making it less time relevant.

Policy insight: Timely and good quality data use is essential for evidence-based policy making

Policy makers should establish mechanisms and controls to ensure data quality, and that data collection is frequency adapted to their needs.

From evidence to policy: Integrating data into the policy-making cycle

Evidence-based policy making aims to implement the best possible actions, based on existing knowledge (Davies et al., 2000). In practice, it refers to the integration of empirical evidence and data within the different stages of the policy-making process (Box 1), to better plan, deliver, and manage transport services and infrastructure (Harrison et al., 2020; ITF, 2016). Digital technology and the growth in data availability and analysis are expected to fundamentally challenge governance and policy makers (Höchtl et al., 2016). Policy makers are embracing this new paradigm by informing transport policies with data. However, beyond the growth in access to data and evidence, the development of evidence-based policy-making results from various factors, such as the increasing emphasis on efficiency, accountability, and scrutiny in government (Davies et al., 2000).

Box 1 . The policy-making cycle

The policy-making cycle refers to a framework that analyses and understands recurrent patterns of stages that constitute the elaboration and implementation of public policies. The cycle can be schematically broken down into five distinct stages:

- Agenda-setting: The issues perceived by the policy-making community as requiring government action are placed on the political agenda.
- Policy formulation: Policy makers identify, develop, and refine policy options for the different problems identified.
- Decision-making process: Decision making describes the government's adoption of a specific course of action.
- Policy implementation phase: Describes the translation of the options identified in the previous stage into actions using public administration tools (e.g., rules, taxes, etc.).
- Policy evaluation: Enables the policy-making community, including societal actors, to monitor the policies' impact and reconceptualise the initial problem identified and the proposed solutions to enable a new iteration of the policy-making cycle.

Real-world policy making may not always follow this linear progression. This schematical approach suggests that policy making is an iterative process where the evaluation enables policy makers to review and adjust policies. It also emphasises the involvement of the wider policy-making community, which can include non-governmental organisations, academics, and people concerned with the subject.

Within the transport sector, and particularly for urban transport, policy-making cycles can differ depending on policy time horizons (Liu and Dijk, 2022). Short-term policy making tends to focus on immediate issues with results expected quickly (e.g. public transport fare adjustments, emergency or temporary measures affecting traffic), while long-term policy making spans over several years to address broad and more strategic objectives (e.g. infrastructure development, vision, urban planning, etc.).

Source: Jalava, (2006); Liu and Dijk, (2022).

Evidence for better-informed policies

Evidence can inform policies in various ways (Metzenbaum et al., 2021). It can be applied at several stages of the policy-making process to inform policies:

- Pre-implementation: Anticipation, policy formulation and planning

Evidence helps policy makers to understand problems and identify solutions. It assists authorities in detecting problems and guiding their focus and funding. Evidence can help policy makers pinpoint specific issues and priorities and allocate resources more effectively.

In Spain, the HERMES Transport Infrastructure within the Ministry of Transport was built to monitor transport networks, including different modal perspectives. It gathers data from different stakeholders within the transport ecosystem. Planning decisions also rely on the progressive integration of big data sources (e.g. smartphone data) to complement and refine results. This combination of public sector and public-interest data provides policy makers with evidence on existing travel patterns, demographics and land use to better estimate needs for new infrastructure (e.g. bicycle lanes, bus routes, railway services).

- Post-implementation: Evaluation, monitoring and feedback loop

Evidence helps to monitor and evaluate policies. Data must be integrated into policy evaluation practices to measure policies' impact and performance. "What matters is what works" (Sanderson, 2003): evidence can help authorities identify the determinants of well-functioning policies. Data collection can help policy makers to understand the differences between predicted outcomes and the initial results following policy implementation (Liu and Dijk, 2022).

Analysis of these determinants is crucial to ensure policy improvement and that well-functioning policies can continuously be adapted to future requirements. Evidence is a prerequisite for future adjustments to enhance policy effectiveness. Data analytics should lead to concrete policy adjustments. Audits on data-informed policies will be important to assess if the integrated data and evidence in policy making led to more efficient delivery of policy objectives. In Spain, the HERMES application aims to interface big data sources with existing Transport data GIS infrastructure. This will allow the assessment of the impacts of implemented policies (e.g. impacts of the establishment of public transport fares on ridership).

- In parallel: Informing about policies

Beyond informing policies, evidence can help policy makers to be informed about policies. Public communication of evidence can help to improve public behaviours and reduce less effective or harmful ones. For example, road safety awareness-raising campaigns aim to influence road users towards safer behaviours (Kaiser and Aigner-Breuss, 2017). Phillips et al. (2011) noted these awareness campaigns could encourage safer behaviours, and several factors were associated with a greater reduction in crashes (i.e. targeted communication, limited campaign timeframe, roadside communication).

Policy makers should also gather information regarding the communication of evidence . The existence of evidence does not guarantee its appropriate use by policy makers. Evidence must be communicated to the relevant stakeholders (e.g. policy makers, civil servants, and people affected by the government's policy or actions) appropriately so they can access it when they need it. Data on how to communicate evidence can inform the delivery of evidence and identify more effective ways to encourage its use. Evidence can be communicated through different communication channels (e.g. training, outreach campaigns, etc.) (Metzenbaum et al., 2021; Metzenbaum, Nightingale, et al., 2022). Evidence users should be able to easily find, access, and interpret the evidence to appropriately apply it (Metzenbaum, Nightingale, et al., 2022).

Evidence for better-enforced policies

Enforcement of the policy implementation process translates the framework set by policies into concrete results, allowing policies to maximise their intended objectives and effectiveness.

Policies provide a framework drawing a clear line between what is and is not compliant with the targets set by public authorities. The policy framework is designed to ensure that compliant behaviours (e.g., low speed in cities) are in line with the public policy objectives (e.g., road safety). Enforcement strategies are crucial for ensuring consistent policy application and determining the role and responsibilities of each policy stakeholder (Transport Canada, 2019).

Access to real-time or near real-time data is fundamental to allow policy makers to enforce policies continuously rather than by relying on periodic checks. Traditionally, policy enforcement relied on observation and on-the-spot checks (i.e. vehicle or license inspection, speed cameras, ticket inspection, etc.). Progress in sensing technologies and digitalisation progressively enabled policy enforcement to integrate automated enforcement systems (i.e. speed radar, electronic verification of licenses with

real-time access to databases, GPS tracking, etc.). These solutions enhanced the cost-effectiveness and consistency of policy enforcement strategies. Real-time data helps public authorities to allocate their resources more efficiently: they can automate routine checks and free up human resources for more complex tasks and investigations.

Public authorities also rely on more proactive approaches to policy enforcement (Webb, 2020) (i.e. not in reaction to a violation). This offers both new opportunities and risks. More preventive and dynamic policy enforcement is one such opportunity, which is particularly relevant in the context of short-term policy making (e.g. temporary reallocation of road space) (Liu and Dijk, 2022). However, Webb (2020) notes that this introduces a switch of the enforcement focus from public space to individual trips, which raises concerns over discriminatory algorithmic enforcement. Biases in predictive policing techniques (i.e. applying algorithmic techniques to enforcement actions) can lead to disproportionately targeted areas or specific demographics based on historical enforcement data. Improving the upstream data collection process to correct structural data biases is crucial to ensure that downstream applications of such data, including enforcement, do not result in biased or inequitable outcomes (ITF, 2021b).

The regulatory challenges posed by the development of new mobility services (i.e. micromobility) require short-term decision making. Disruptions to the deployment of these new services were often associated with demands for regulatory reaction by the public (Homem de Gouveia et al., 2023). Machine-readable regulations, such as an Application Programming Interface (API), consistently enable public authorities to communicate applicable rules on different topics (i.e. vehicle caps, speed limits, authorised parking areas) while ensuring that services are provided. The Mobility Data Specification's (MDS) Policy API streamlines the enforcement of mobility services by enabling public agencies to proactively push their policies to mobility service providers. At the same time, operators can query the Policy API to access the current regulations applying to their service (Open Mobility Foundation, 2024). This can ensure, for example, the enforcement of parking requirements for micromobility devices, by ensuring compliancy by design by defining areas where vehicles can be parked (i.e. geofencing).

Evidence at different moments in the policy-making cycle

Data inputs can create differing issues for decisions across the policy-making cycle. Table 2 highlights the key challenges of increased data use in short- and long-term policy cycles. In the short term, technical issues and challenges in selecting and analysing relevant data can obstruct quick, effective decision making and policy adjustments. For long-term policies, data fragmentation and continuity issues can undermine tracking and assessment, while stakeholder conflicts often complicate data-driven consensus. These challenges underscore the complexities and resource demands of leveraging data across policy timelines, influencing both immediate and sustained policy outcomes.

There is need for a nuanced approach to data-informed transport policy. One that acknowledges inherent data gaps, biases, ethical complexities, and that strives to complement quantitative insights with other decision inputs and broader contextual understanding.

Table 2. Disadvantages of increased data use in short- and long-term policy cycles

Short-term policy cycle	Long-term policy cycle
Technical problems: Technical issues such as data loss, system errors, and user-unfriendly data processing models can hinder the use of data for immediate policy-making needs. These problems can result in incomplete or unreliable data, affecting timely decision making and adjustments.	**Fragmentation and continuity issues:** For long-term policy making, fragmented data sets and lack of continuity in data collection are significant issues. Inconsistent data-collection practices can make it challenging to track progress, assess long-term impacts, and to integrate data over extended periods.
Data selection and analysis challenges: Even in the short term, selecting the most relevant data from large volumes can be difficult. Limited analytical resources and expertise can prevent thorough analysis, potentially leading to less informed or suboptimal short-term policy decisions.	**Data selection and analysis challenges:** The difficulty in selecting appropriate data persists in long-term policy cycles. Over time, the relevance and quality of data need continuous evaluation, and inadequate data analysis can affect the robustness of long-term policies.
	Stakeholder conflicts: In long-term policy making, conflicts among stakeholders (e.g., mobility policy makers, environmental regulators, local businesses) can impact data use. Disagreements over policy goals and data interpretation can hinder consensus and affect the implementation of long-term strategies.

Source: Liu and Dijk, (2022).

New Zealand's Transport Evidence Base Strategy (TEBS), (see Box 7), exemplifies a structured and collaborative approach to data-informed policy. The TEBS encompasses initiatives like the Transport Domain Plan, Transport Research Strategy, and an Evaluation Strategy, aimed at embedding research and data at the core of policy making. This systematic approach drives enhanced well-being and liveability across New Zealand by aligning the government's transport priorities with research-derived evidence.

Policy insight: Evidence is useful at every stage of the policy-making process

Effective integration of evidence throughout the policy-making cycle helps policy makers to better inform policies, from the inception to the evaluation process, but also to better enforce policies. It requires active efforts in evaluation, transparency, and informed communication for impactful governance.

Bridging the evidence policy gap in transport

Policy making also requires the human dimension of decision making. Emotions, opinions, and beliefs remain crucial influencers of individuals' preferences as well as political behaviour (Umbach et al., 2018). These human elements can lead to evidence avoidance or denial of evidence when it contradicts the decision makers' own experience.

The availability of evidence does not guarantee its effective integration into the policy-making process. The role of evidence in policy making is often far from its full potential (Davies et al., 2000; Leicester, 1999). Rather than evidence-based, Davies et al. (2000) suggest that policy making is generally evidence-aware or evidence-influenced. In such contexts, evidence is not the determining factor for decisions; instead, it

is considered as a pressure influencing how policy questions and their potential solutions are framed. Several factors can explain why evidence-based policy is an exception rather than the norm (Box 2).

Box 2. The elements constraining evidence-based policy making

Several factors can prevent governments from implementing evidence-based decisions. As coined by Leicester, the "enemies" of evidence-based policy making are multifaceted and can affect the use of evidence at an organisational (i.e. within a government) or an individual level (i.e. attitudes preventing from using evidence). Some of these constraints are also present in organisations providing evidence, such as research institutions and academia. Several authors distinguish various forms of constraints at an organisational level:

- Organisational culture describes a decision path dependency based on previous decisions. Things are done in a specific way because they have always been done this way.
- The bottom-line logic describes the tendency to focus on easily quantifiable measures and performance metrics which, however, are a poor indicator of a policy's effectiveness.
- Consensus refers to the fact that decisions are hinged on consensus rather than evidence. "What works" is defined here as "What satisfies everyone".
- Politics constitutes a form of consensus. This logic aims to implement what is possible instead of what works best.
- Civil service culture implies a strong distrust towards new sources of information, particularly those generated outside of the system.

These constraints are also reinforced by impeding factors at an individual level. Authors distinguish:

- Knowledge and skills are necessary to research, evaluate and communicate evidence.
- Individual judgment can affect the use of evidence when personal beliefs, ideology, or personal experience can interfere with the integration of evidence into policy making.
- Cynicism refers to a conscious misuse of evidence. This logic describes an attitude where decision makers accept conventional views of a topic, even if they know it to be false.
- Lack of time describes a lack of resources – particularly in this context, time – which impedes reflection and the possibility of implementing evidence-based policy decisions.

Source: Leicester (1999), INASP (2016), Liverani et al. (2013), Weyrauch et al. (2016).

Public authorities should aim to reduce the disconnection between evidence and practice. The evidence-practice policy gap describes the difference between the best accessible evidence and how policies are actually implemented (Al Laban et al., 2022). Bridging data gaps and evidence policy gaps in transport could leverage new efficiencies (ITF, 2016). Public authorities can act on both pillars (i.e. evidence and practice) to reduce the gap.

Using evidence: Policy makers should improve the integration between evidence-building entities and decision-makers.

An example from the United Kingdom shows that while the Department for Transport (DfT) has a strong role in generating and analysing evidence, it is also part of a wider ecosystem of evidence-generating stakeholders including government-owned companies (e.g. Highways England), executive agencies (e.g.

National Infrastructure Commission, British Transport Police Authority, etc.), and research bodies (Baldwin and Shuttleworth, 2021). Evidence gathering can be harder to co-ordinate in such systems, particularly when data collection and sharing is inconsistent across the ecosystem, or when institutional roles are unclear (i.e. which entity should participate and how, in policy making).

In New Zealand, the Transport Evidence Base Strategy (TEBS) put forward actions for public authorities to improve access to evidence, with the development of a transport open-data strategy and evidence plans on key priority programmes, and, adopt common data standards and management strategies aimed at improving the governance of evidence to facilitate its sharing between stakeholders and integration with policies (New Zealand Government, 2022).

Best practice: Transport authorities should enhance policy evaluation practices by making it mandatory and consistent as a determining factor for the allocation of funds.

Ex-ante evaluations (appraisal hereafter) should be complemented by ex-post evaluations of projects (evaluations hereafter) (ITF, 2017). Ex-post evaluation assesses if the anticipated benefits of a policy have been delivered. The French Government established an evaluation requirement for large-scale transport projects (e.g. highway construction, heavy public transport construction or extension projects, etc.) (Article L1511-6 - Code Des Transports, 2010). The *Bilans LOTI* provide a socio-economic evaluation of projects five years after the infrastructure's commissioning. These evaluations aim to confront project appraisal previsions with evidence based on observations following commissioning and provide publicly available recommendations for future similar projects (IGEDD, 2024). Policy evaluation and auditing should be carried out by independent entities such as National or regional audit offices (ITF, 2017).

Policy makers can advance evidence-based policies, tying future investment to performance-based evaluation of policies. This requires setting key performance indicators depending on the type of targeted policy objectives (e.g. safety, environment, economic, etc.) (ITF, 2024b). Washington State Department of Transportation (WSDOT) established a Project Evaluation Model process which identifies investments that align with the State's transport policy objectives (WSDOT, 2023). Projects can be ranked from 'highly recommended investments', which describe projects that deliver the best possible outcome for multiple State's policy goals; 'recommended investments' refers to investments that deliver significant advancements for one or more policy goals; to 'discretionary investments', which generate low to moderate value to policy objectives. The ranking provides evidence relating to project performance to inform future funding decisions and facilitates the prioritisation of the State's grants. Finally, evaluation programmes should mainly be targeted at improving policies; otherwise, as Baldwin and Shuttleworth (2021) stress, there is a risk that decision makers will perceive evaluation as a tool for assigning blame rather than as an opportunity for learning and improving policies, thus not consistently enforcing evaluations.

Policy insight: Collaboration and evaluation are central to closing the evidence policy gap

Bridging the gap between evidence and policy requires improved access to data and consistent integration of evidence into decision-making processes. To achieve this, public authorities should enhance collaboration with evidence-generating entities and mandate regular policy evaluations, ensuring policies are informed by both anticipated and observed outcomes.

Governing data as an infrastructure

Chapter summary

- Data is crucial for evidence-based decision making in the transport sector. It should be treated as critical infrastructure that enables public authorities to support policy effectively.
- Data gaps limit evidence-based decisions. Governments must actively work to identify and close policy-relevant data gaps.
- Like other infrastructure, data is dependent on funding and skills to manage it.
- Governments must invest in data infrastructure (i.e. fund data collection and maintenance) to support evidence-based policy making. They should prioritise investments towards the most policy-relevant datasets.
- Public authorities should also invest in skills development for policy makers. To maximise the impact and cost-efficiency of capacity-building, public authorities should tailor these efforts considering factors such as the governance level, the timing of policy making and the state of evidence used in the policy-making process.

Data must be considered an infrastructure for the digital era (Banerjee et al., 2021; ITF, 2023a). An infrastructure can be described as elements or structures enabling a society to function properly. Infrastructure networks form the backbone of societies: they underpin societies' development in multiple dimensions (e.g., transport, education, energy, etc.). Infrastructure is functional. As noted by Frischmann (2012), infrastructure should be viewed from a functional perspective rather than focusing on its materiality. Furthermore, infrastructure is a means to other ends (Cressman, 2021). For example, just as with roads, railways, and healthcare systems, data constitutes a community-wide amenity that can be used as an input into other processes (Box 3). It allows data-enabled systems to function and satisfies user demands, including those of policy makers (Estermann et al., 2018). The data infrastructure is a foundational element to provide transport services. Failure to provide data might result in downstream application errors (i.e. failure to provide safe and reliable transport services).

Box 3. Distinguishing the data infrastructure from the digital infrastructure supporting data

Data infrastructure describes a form of infrastructure composed by mobility data, software, code, algorithms and syntaxes. It forms a foundational form of infrastructure as several downstream services directly depend on it (i.e. trip planners, real-time schedules, payment systems, etc.). This form of infrastructure is integrative by nature as it allows the digital connection of services operating on the transport network infrastructure.

Data infrastructure should not be conflated with digital infrastructure or infrastructure supporting data, which are made of the physical and digital elements that enable data to be collected, processed, stored and shared. The digital infratructure is composed of servers, wires, processors, sensors, and software that enable data to be shared among between data users. This form of infrastructure is connective by nature, as it enables data to flow.

Source: ITF, 2023a; Swiss Federal Office of Transport, 2023.

Public authorities play a central role in infrastructure development and maintenance. Like other infrastructure, public authorities are responsible for aligning the data infrastructure design and characteristics with broader societal goals, including economic and sustainable development. While roads have specific characteristics to enable the transport of goods and people, the characteristics of infrastructure data should aim to facilitate the downstream use of data, including for evidence-based policy making (Etalab, 2019). This next section considers the different actions public authorities must take to ensure the mobility data infrastructure can support evidence-based policy making.

Integrating relevant data in the policy-making process

The transport data ecology is diverse: data may originate from different data sources and be structured in different ways. Beyond publicly open data, public authorities rely on different types of data sources: purposely collected data, data generated as a byproduct of transport services and non-transport data. These data sources often represent an untapped source of evidence for policy-making purposes that public authorities could build on.

Encouraging legal re-use of existing data

Purposively collected data are gathered through data-collection methods such as surveys, censuses, and interviews. They provide insight into targeted areas such as user satisfaction, traffic flows, etc. Policy makers historically relied on this form of data to inform policies. This type of data is periodic: surveys provide insights at a given point in time. They often need to be repeated to ensure comparable time-series data. Data collected through surveys are particularly relevant for long-term policy cycles (e.g. infrastructure investments and planning decisions) (Liu and Dijk, 2022). Crucially, survey data is treated to protect the privacy of those surveyed and to prevent the reidentification of individuals.

Surveys can be conducted by different public authorities at the national or local levels. Overlap of survey content can occur unintentionally, even within the same department. Public authorities might not have a comprehensive overview of the surveys that have already been conducted and the results. When survey participants agree to the re-use of their responses, the management of survey results should encourage their re-use by other policy makers. In the United Kingdom, the Office for National Statistics apply the

'Collect once, use many times' data management principle, which aims to maximise survey and statistics use (ONS, 2022). This approach encourages reporting to a centralised entity responsible for maintaining and re-sharing data. Originally designed to reduce the burden on respondents, this principle also allows statistical offices to avoid duplicating surveying efforts. Surveys that have already been obtained can be used multiple times and for different purposes. On the one hand, collected surveys can be enriched by non-survey data already obtained (ONS, n.d.). On the other hand, they can inform a larger number of policy makers than the ones who first collected the data. This requires three pre-conditions: obtaining permission for data-use from survey participants, data discoverability, and consistency across public-sector data.

Public organisations are among the largest data holders. Fragmentation and the lack of collaboration between levels of government pose significant challenges in disseminating already collected data. Data discoverability refers to the ability of an entity to easily find and use relevant data for their needs (Solatorio and Dupriez, 2024). Survey and data repositories act as structured data nodes. In Europe, the National Access Points for transport data (NAPs) act as a hub where transport data sets are shared in agreed-upon standardised formats. They aim to facilitate access to and the use of transport data in Europe. Metadata catalogues, which provide descriptive information regarding the data stored, play an essential role in data discovery. In addition to repositories, public authorities can implement AI-enabled tools to improve data discoverability by expanding research beyond semantical information (Solatorio and Dupriez, 2024).

Common standardised data formats and models create better comparability between authorities, thus enabling the data that has already been collected to inform other authorities. Greater consistency across purposely collected data is crucial for data comparability. For example, comparable data would allow municipal authorities to consult already obtained data pertaining to other municipalities with common characteristics (e.g. mode share, number of residents, etc.). In 2021, the United Kingdom established a Data Standards Authority (DSA), which promotes common data-sharing practices and co-ordinates data standardisation and interoperability across the administration. The DSA works with experts within the administration, sets the direction for standards development in government, and provides guidance to other public entities to facilitate standards adoption. For example, to make sure address referencing is consistent across data collection, DSA recommends using the AddressBase dataset, which matches postal addresses with unique property references, when accessing address data (Ordnance Survey, 2024; UK Government, 2021).

Shifting the focus towards public-interest data rather than public-sector data

Beyond the public, other stakeholders hold policy-relevant data. Public authorities should shift their focus from public-sector data to "public-interest data" (Ponti et al., 2024). Public-interest data describes data that can contribute to the public good. In other words, public authorities should seek to improve access to policy-relevant mobility services data rather than focusing solely on government-held data. Public and private mobility service providers are an essential component of the data infrastructure as they provide valuable static and dynamic data which can support policy making. Legal and purposive collection of transport data can inform and support the delivery of public policy objectives (ITF, 2021b). Liu and Dijk (2022) note that transport service data particularly play a central role in short-term policy adaptations and real-time adjustments (e.g. traffic regulations).

Public authorities should encourage greater involvement of public-interest data holders in policymaking (ITF, 2021b; Ponti et al., 2024). They should establish sound data-governance frameworks comprising two main pillars: data reporting and data sharing (ITF, 2021a, 2021b). On the one hand, data reporting describes the provision of data by transport stakeholders to public authorities to enable public authorities to inform or enforce public policies. Data reporting enables public authorities to access policy-relevant

public-interest data held by market participants. On the other hand, data-sharing refers to data shared among market participants, which enables the delivery of transport services (ITF, 2021b). A governance framework for transport data sharing should set rules to facilitate and encourage data re-use by public authorities. Data standardisation is expected to technically facilitate data re-use by public authorities (Swiss Federal Office of Transport, 2023). Additionally, implementing data protection and security protocols can help to alleviate concerns and reduce barriers to data sharing from private companies holding public-interest data.

Establishing data reporting requirements aligned with targeted outcomes

Transport policy requires some level of data reporting. A governance framework enabling the data infrastructure to inform policy decisions should include clear data reporting mandates and policies to more effectively leverage data generated by transport systems (ITF, 2021b). Public-interest data is increasingly held by private actors. Public authority access to this data requires an appropriate data governance framework to address potential risks associated with commercially sensitive or personal data and transparency of the data collection and processing.

Public authorities can establish mandatory or conditional reporting requirements for transport ecosystem stakeholders to inform policies in various ways. These requirements should be tied to a central question: for what purpose will the data be used? Each purpose requires different types of data with different levels of sensitivity. Data for planning purposes will likely have to be more aggregated data to allow public authorities to get insights on where and when transport is correctly supplied. Planning data should not contain personal data. On the other hand, enforcement activities will require access to privacy-sensitive data such as personal or vehicle-specific data. By default, data collected and processed for enforcement purposes should be treated with the highest protection standards and with adapted procedures to protect privacy.

Data reporting should not erode trust, user privacy or the competitiveness of transport operators. A data-governance framework, including data reporting mandates, should balance the benefits of data reporting while ensuring a high level of protection for both data subjects (i.e. individuals) and data owners (i.e. companies). This protection can reinforce trust by secure access and usage conditions for certain data, and by allowing datasets to be cleaned from sensitive elements. Data reporting should prioritise privacy by default, especially avoiding the use of personal data for planning and operational purposes. For enforcement actions, where data on contravening incidents may be collected, protocols should ensure that reporting pathways are highly secure, separate from other data, and maintain privacy-preserving practices. The guiding principle should be to collect only data directly relevant to enforcement actions while ensuring high protection levels and clear data management, retention and deletion protocols.

The data-governance framework for data reporting should also be clear and transparent. Data reporting should be explicitly linked to a purpose and lawful objective. Documents specifying data-reporting mandates – whether they are conditional (i.e. code of conduct) or mandatory (i.e. a service contract) – should clearly state the purpose for data collection, the type of data needed, and if applicable, the frequency at which data should be reported. This framework should also define clear roles and responsibilities for data custodianship and stewardship, especially in contexts lacking overarching personal data protection regulations (i.e. European Union's General Data Protection Regulation, California Consumer Privacy Act, South Korea's Personal Information Protection Act, Argentina's Personal Data Protection Act, etc.) (CNIL, 2024; ITF, 2021b).

Finally, data reporting should not be the only way for public authorities to gather information and inform policies. Data reporting should be done on a lawful basis and tied to a specific and clearly stated purpose.

As a prerequisite, authorities must first start to assess alternatives to reported data. This assessment should be transparent and open to transport stakeholders contributing and sharing information (ITF, 2021b).

Defining transport data standards and specifications to support the data infrastructure

Standards represent a crucial element of the data infrastructure to enable the cost- and time-efficient implementation of data infrastructure (Swiss Federal Office of Transport, 2023). Standardisation enables more efficient data sharing and interoperability and facilitates collaboration between transport stakeholders. Without standards, public authorities using data would need to build evidence based on a multiplicity of proprietary formats, which impedes the efficiency of decision making. Some standard families emerged from already established mobility services such as public transport (e.g. GTFS, NETEX, SIRI, OpRa) or traffic information (e.g. DATEX II). The growth in new mobility services is associated with the rise of new data standards (e.g. GBFS, MDS, etc.). The standards landscape within the transport sector is broad and heterogeneous. Standard scopes vary depending on the type of infrastructure (e.g. road, rail), the type of service or mode (e.g. multimodal, public transport, on-demand service), and the type of actor maintaining the standard (e.g. publicly backed initiative, private group of stakeholders, etc.). Some transport services may be covered by different standards. Several entities developed taxonomies for existing standards for urban transport (Chevallier et al., 2021; La Fabrique des Mobilités, 2022).

Public authorities are as responsible for specifying the standards by which the data infrastructure should be expressed as they are for setting standards pertaining to roads' geometry, performance, and pavement material. The transport standard domain is highly dynamic, and new developments and deprecated standards should be expected. Public authorities should not require a unique standard for public-interest data. While a low number of supported standards is associated with cost savings for public authorities, it may hinder innovation in the long term (Swiss Federal Office of Transport, 2023). Instead, public authorities should encourage broad support for standards and promote interoperability between them. While several standards are relevant for policy making, public authorities should pay particular attention to standard characteristics. They should establish reference standards that benchmark the performance other standards should replicate or improve. The Swiss Federal Office of Transport (2023) proposed a set of principles to guide public authorities when specifying standards for data infrastructure (Box 4).

Box 4. Overarching principles to select standards for transport data infrastructure in Switzerland

The proposition document describing the role and specifications of the Mobility Data Infrastructure (MODI) in Switzerland provides a state-of-the-art description of standards for ground transport. It recommends a list of principles to guide the selection of data standards to enable the cost-efficient implementation of the National Data Network Infrastructure for Mobility (NADIM), which acts as the connective infrastructure for data exchanges between mobility ecosystem stakeholders supporting various downstream applications, including informing policy making. Standards will facilitate data integration between stakeholders. Guiding principles for data standardisation are directly tied to NADIM's role and specifications. Standards should be:

- Open – NADIM is a public service. Standards should be open and have non-restrictive licensing conditions. To reduce costs, the standard user should have access to them free of charge.
- International – NADIM aims to enable national and international interoperability. Standards should be international to allow data exchange and service operations across borders.
- Simple – NADIM's scalability is tied to the simplicity of the standards it will rely on. Standards should be simple and documented, and support should be provided to facilitate their use.
- Established – Standards should already be in use to facilitate the deployment of NADIM. This is also associated with additional benefits such as a higher level of acceptance by the transport industry compared to a new standard and already available practice learnings and illustrative examples from standard specialists.
- Evolving – As the data infrastructure will likely evolve under the constant developments in the transport sector, standards should be able to evolve. This includes backward compatibility which stabilises the infrastructure by avoiding breaks in case of a change in the standard used.
- High quality – NADIM's operation and services will depend on data quality. Standards should be high quality and cover NADIM's functional requirements as much as possible.
- Compliant – NADIM will support several downstream applications (e.g. trip planner, service booking); thus it should be compliant with existing regulations. In addition, new standards considered should be interoperable with the ones already used.
- Unambiguous – To avoid any mistranslation or misinterpretation of data, standards should be unambiguous and clear, and misunderstandings should be avoided as much as possible. Semantics and syntax should be defined, and procedures should be clarified (i.e., specify a status as confirmed or successful).

Source: Swiss Federal Office of Transport (2023).

These principles provide foundational guidance that enable data infrastructure to inform policies. From a policy-making perspective, data accessibility (i.e. presence of protocols and screenings before accessing the data), availability (i.e. establishment), simplicity, and standards capacity to evolve are crucial because they allow for greater integration of data inputs into policy-making processes. The international dimension, compliance, high quality, and unambiguity are additional characteristics to consider for the integration of cross-border data into the policy-making process and to mitigate risks associated with data quality and potential misinterpretations.

Public authorities should regularly update their standard taxonomy to allow the introduction of new standards, which will inform their policy decisions more effectively. They should also evaluate standards against their guiding principles to assess the extent to which standards can fulfil their objectives. Evaluations should be conducted by policy makers in close collaboration with standards experts and informed by the available literature and documentation of the existing standards.

Policy insight: Public authorities must engage with public-interest data holders to better inform policies

Public authorities should encourage greater involvement of public-interest data holders in policy making. They can establish data reporting requirements and foster public interest in data sharing. They should also establish privacy-respecting data-governance frameworks, adaptable and interoperable standards.

Addressing data gaps

The provision of data infrastructure is not equal between countries or even between regions within the same country. Just like particular geographies can be infrastructure-poor, they can also face data paucity. These gaps condition the ability of policy makers to access enough data to fulfil their needs (Lucas et al., 2020). Data gaps are multidimensional and depend on several factors:

- Geography – policy-relevant data might not exist in a specific area. Significant and often persistent data gaps can exist, particularly in less urbanised areas or in developing economies (Okyere et al., 2024).
- Mode or service – Some modes, such as walking and cycling, are more challenging to measure. Additionally, emerging modes are poorly measured, if at all. Finally, data relating to informal or popular transport services, an essential component of transport networks, can be challenging to collect (Chevance et al., 2024; Digital Transport for Africa, 2023).
- Data findability and access rules –the under-provision or restricted access to public -interest data can limit policy makers being able to build evidence and further inform policy decisions. However, not all public-interest data should be open or findable, particularly if not aggregated. Public authorities must be mindful that data on threat-susceptible parts of transport systems may be at risk. Data relating to these components require restricted access. Public authorities should ensure that they regularly undertake risk-based reviews of data access arrangements.

Public authorities should identify data gaps and implement actions to fill them. As part of its Transport Evidence Base Strategy (TEBS) (Box 5), New Zealand identified a list of high-priority data relating to its five defined outcomes for its transport system (i.e. sustainability, economic prosperity, inclusive access, health, resilience) (New Zealand Ministry of Transport, 2018). New Zealand's Transport Indicators (Box 6), which are made up of several indicators relating to these five targeted outcomes, provide policy makers with indicators, metrics, and data sources to inform policy decisions relating to different aspects of each outcome.

Box 5. New Zealand's Transport Evidence Base Strategy

New Zealand's Transport Evidence Base Strategy (TEBS) stands out as a comprehensive approach to embedding data-driven decision making into the transport sector. The strategy integrates key initiatives such as the Transport Domain Plan, Transport Research Strategy, and a new Evaluation Strategy, all of which aim to ensure that data, research, and evaluation are central to policy development. The primary objective of this strategy is to ensure the availability of the right data and research for informed decision making and to cultivate a culture where evidence-based policy is the norm. By aligning these efforts with the government's updated transport priorities, New Zealand is actively working to enhance the delivery of transport outcomes that improve wellbeing and liveability across the country.

A distinctive feature of the TEBS is its structured approach to identifying and addressing knowledge gaps within the transport sector. The 3-Step Knowledge Development and Prioritisation Framework is at the heart of this effort. Step one focuses on identifying gaps in knowledge that hinder the achievement of long-term sector outcomes, ensuring that these gaps are understood in the context of desired transport objectives. Step two involves pinpointing the nature of these gaps to ensure research efforts are effectively distributed across various types of data and research needs. The final step prioritises these gaps based on key principles, ensuring that closing them will yield the maximum benefits for the sector. This iterative process provides a clear roadmap for how government transport agencies can systematically prioritise and address critical areas of uncertainty.

Ultimately, the success of the TEBS depends on a collaborative and co-ordinated approach among New Zealand's transport agencies, including the Ministry of Transport, Waka Kotahi NZ Transport Agency, Maritime New Zealand, and the Civil Aviation Authority. By fostering a culture of collaboration and evidence-based decision making, the TEBS aims to enhance the transport sector's capacity to deliver a system that meets current demands and supports future well-being and liveability. The strategy's emphasis on evaluation and the consistent application of formal frameworks ensures that the transport sector remains adaptive and responsive to emerging challenges, continually improving its knowledge base and research capabilities.

Source: (New Zealand Government, 2022)

New Zealand's TEBS recommends investing in filling the gaps in the Transport Indicators. It recommends gathering already collected but often poorly shared data such as fleet profiles, and information relating to often unmeasured phenomena (e.g. people not able or not choosing to travel, walk or cycle, etc.). In addition, addressing existing data gaps aims to reflect changes in the transport systems, particularly the emergence of new data sources (New Zealand Ministry of Transport, n.d.).

Box 6. Transport Indicators in New Zealand

New Zealand's Transport Indicators form a framework of indicators measuring the contribution of transport to several outcomes (i.e. sustainability, economic prosperity, inclusive access, health, resilience) . Each indicator is associated with the different outcomes. Indicators are collected on different transport modes such as walking, cycling, road and rail transport, maritime and aviation. The Transport Indicators provide a state-of-the-art repertoire of the best available information to assess the performance of the different components of the transport networks. The reporting requirements and data sources are specified for each indicator. The list of indicators and their definitions are expected to remain stable from one year to another to allow for comparability over time. The Transport Indicators are intended to be complemented when new data sources become available with the development of new transport services.

The document provides an inventory of indicators that are already reported, those in development, and that require further work. It also summarises the existing data gaps depending on the associated outcomes and the relevant mode. It links every data gap to recommended initiatives included in the Transport Evidence Base Strategy's initiative. Each recommended initiative specifies the aim of the initiative, the role and responsibilities of personnel, and its progress.

Source: New Zealand Ministry of Transport (n.d.); New Zealand Ministry of Transport (2023).

Policy insight: Data gaps are a barrier to informed policy making

Data gaps are multidimensional and can be related to the area's characteristics, the type of transport service, or unjustified stringent data access rules. Public authorities should proactively identify and address these gaps to enhance evidence-based decisions.

Investing in infrastructure and capacity to enhance evidence-informed policy making

Just like roads or railways, the data infrastructure supporting evidence-based policy decisions must be built, maintained and administered. Data infrastructure will require adequate funding and several data-related skills to function.

Funding data infrastructure

Long-term access to consistent and high-quality policy-relevant data will require sustainable investments to build (i.e. data collection) and maintain (i.e. updating data and standards) data infrastructure. Just as for other forms of infrastructure, inadequate investments in the data infrastructure can result in infrastructure disruptions, such as the inability to access data. Upstream failures in accessing data will likely result in more errors in downstream applications, including evidence-based policy making relying on data.

Public authorities should provide sustained funding to allow policy makers to access policy-relevant data. Unlike roads or railways, data is an intangible infrastructure: investments in roads and physical infrastructure provide clear and visible evidence of government spending and action. On the contrary, investments in data infrastructure may not produce a visible outcome. Access to data can, for example, enable policy makers to take less visible but tactical short-term actions (e.g. dynamic management of a road segment). However, public authorities face pressure to prioritise funding for projects with public visibility despite the central role of the data infrastructure in several downstream applications, including informing policy making.

Many governments recognise the importance of data infrastructure in evidence-based policy making. In Europe, funding mechanisms such as the European Commission's Connecting Europe Facility (CEF) provide sustained funding to connect and harmonise transport data across Europe. The National Access Points (NAPs) for transport data act as data nodes storing static and real-time transport data regarding each European country to facilitate downstream use of data by service providers and public authorities according to the EU Intelligent Transport Systems (ITS) directive (Directive 2010/40/EU, 2010).

Public authorities' funding of data can further inform policy decisions (OECD, 2020). Publicly funded data should also include public-interest data (e.g. operational data related to transport services). Public authorities should assess the economic impact of funding the access, collection, and maintenance of policy-relevant datasets. They should prioritise funding towards datasets generating both direct and indirect economic and societal gains through their integration in the policy-making cycle. This could also imply accessing real-time data to better enforce policies, particularly in terms of safety (Liu and Dijk, 2022).

Enhancing capacity for evidence-based transport policy

Public authorities often lack the capacity to effectively integrate evidence into policy making despite its availability (OECD, 2022). The ability to find, access, and integrate evidence in the policy-making process are important factors contributing to evidence-based policy decisions. Public authorities should develop their capacities to address complex policy challenges (OECD, 2019b). Enhancing the data literacy and knowledge of authorities will improve their capacity to design, shape, establish and evaluate policies that can enable them to reach their public policy objectives (Langer et al., 2016; OECD, 2019b). Public authorities should invest in capacity-building initiatives to improve and reduce the evidence-practice gap. Upskilling programmes should encompass a wide spectrum of capabilities related to data and evidence

management, including skills to understand, access, interrogate, assess, integrate evidence in policy-making processes, and evaluate policies using data (OECD, 2019b, 2019a).

While the link between enhancing policy makers' capacity to use evidence and more effective policy decisions is clear, the types of interventions to effectively improve policy makers' capacity are not straightforward (Langer et al., 2016). A literature review conducted in various sectors shows that interventions to improve policy makers' skills towards evidence use are only effective when they rely on two pillars: the improvement of capability (i.e. upskilling processes) and motivation to use evidence (i.e. incentives) (Langer et al., 2016). Authors note that capacity-building programmes were not positively correlated with greater evidence use in policy making when applied at a low intensity (e.g. one- or two-day programmes). Public authorities should ensure that capacity-building initiatives aimed at enhancing data-related skills are maintained over the long term. Sustained programmes are crucial to nurturing and improving data literacy and data-related skills of policy makers.

Capacity-building efforts should be tailored to policy maker needs (Langer et al., 2016; OECD, 2019b). Policy-making practices differ depending on the level of governance (i.e. central and local) and the policy-making timing (i.e. short- or long-term) (Liu and Dijk, 2022). To maximise the impacts and the cost efficiency of investments in capacity building, public authorities should consider the specificities of the context in which policy making happens, as well as the state of evidence used in policy-making processes. Several categories of effective interventions have been identified by Langer et al. (2016), including adult learning principles such as mentoring and communities of practice. Additionally, public authorities could benefit from using online educational programmes (i.e. online learning and evidence-based use apps).

Policy insight: Public authorities must invest in data and related skills

To enhance evidence-informed policy making, public authorities must invest in both data infrastructure and capacity-building initiatives. Sustainable funding is essential to maintain high-quality, accessible data systems, while targeted, long-term training programmes can equip policy makers with the skills needed to leverage evidence effectively in transport policy decisions.

Fostering trust in data-informed decisions

Chapter summary

- Improving public trust in governments, data processes, and data itself is essential for ensuring data driven decisions align with public interests and remain credible.
- A reliable governance framework is critical for fostering trust in the data-sharing ecosystem, but also with those concerned by data-informed decisions.
- Trust frameworks for data exchanges should be established to maximise data's public benefits in policy making. Existing trust arrangements are often fragmented and based on contractual agreements. Trust frameworks bring a more holistic approach to facilitate trustworthy and secure data exchanges between data-sharing ecosystem stakeholders.
- A trust framework could be structured around two main components: a clear set of policies and rules regarding the governance of the data-sharing ecosystem and technical building blocks enabling the main functions of the trust framework.

Trust is essential for the effective action of governments and public institutions. Yet, an increasing share of the world population expresses no- or low-trust in various levels of government (OECD, 2024). The erosion of trust in governments and public institutions has been accentuated by the evolution of the informational landscape towards the rapid spread of misleading narratives, often amplified by digital platforms. False information and trust in governments are closely tied: disinformation and misinformation can weaken the perceived legitimacy of public decisions (OECD, 2024). The WEF (2024) introduced false information as one of the severe risks that could negatively impact various aspects of societies.

Governments are taking action to reinforce public trust. OECD (2024) identified a positive correlation between trust in governments and the use of evidence in policy. Public trust in governments hinges on the way information is generated, presented, shared and ultimately consumed. Governments can better communicate on their actions, the processes leading to actions, and the evidence supporting their actions (OECD, 2024). Additionally, fostering citizen engagement is expected to play a crucial role in developing trust as people who feel they have a say in government actions show significantly higher trust levels compared to those who do not (OECD, 2024).

Trust in data-driven policies and the data supporting them is not simply about the reliability of the data itself but is also heavily shaped by the public's confidence in the institutions and processes that generate and use this data. Rather than viewing trust purely through a technical lens, it is essential also to consider how previous levels of trust in government or public agencies and their policy-making processes influence the perception of data as a reliable basis for decision making (Carter and Bélanger, 2005).

Building trust in government, decisions, and data

Public trust in government relies on the trustworthiness of several upstream processes. Trust must be ensured at every level, from the government's actions, the processes they use to make decisions, and the inputs used to inform their decisions.

Trust in governments, authorities and policies

The ability of governments to implement policies is greatly influenced by the public's confidence in the institutions and processes that lead to policy decisions. Public authorities' actions rely on citizens' trust and co-operation to ensure the success and expected benefits of public initiatives (such as e-government projects, new public policies, etc.) for the whole society (Gracia and Casaló Ariño, 2015). Trust is a functional necessity in societies. In dependency relations (i.e. where the trustor depends on the trustee – to do something), uncertainty regarding the other persons' intent can arise. Trust acts as an enabler to embrace uncertainty and assume that the trustor will act in the best interest of the trustee. Beyond interpersonal relations, trust can also be located within impersonal systems such as infrastructure or a service (Van Der Sloot and Keymolen, 2022).

Competence and values are two preconditions to a government's trustworthiness (OECD, 2017). On the one hand, as noted by the OECD (2017), trust is contingent on stakeholders' ability to deliver an expected mandate. Without such competence, even a person or organisation with good intentions cannot be considered trustworthy. The provision of transport-related policies (e.g. public transport services, traffic management, etc.) requires technical competencies. In modern and digitalised societies, such competence includes governments' capacity to collect and use transport-related data to inform their decisions (i.e. data analytics).

OECD (2017) distinguishes two essential dimensions of trust: reliability and responsiveness.

- Reliability describes the capacity of governments to adapt to uncertain environments and anticipate needs consistently to mitigate the impacts of such uncertainty on societies (i.e. economic, social, and political). Government ability to adapt transport strategies to address challenges related to disruptions or challenges (e.g. climate resilience of networks, electrification of fleets) will be essential to ensure their trustworthiness.
- Responsiveness describes the capacity of governments to address citizen demands and to serve their evolving expectations in an appropriate timeframe. The responsiveness of public authorities can be facilitated by data analytics to understand and address citizen needs.

Trust in policies is anchored in an alignment with the values and motivations guiding public authority decisions. Citizen assessment of government trustworthiness depends on how governments act, how policies are formulated and how decisions are informed (OECD, 2017).

Three dimensions framing public authority action underpin trust: openness, fairness, and integrity.

- Openness describes the capacity for stakeholders to engage with the policy-making process. Beyond paying taxes, citizens can contribute to policy design and implementation. Crowdsourcing campaigns to enable citizens to report local problems constitute an example of how data can be used to contribute to enabling better policy applications.
- Fairness emphasises the equitable treatment of citizens by the government to ensure that policies promote the well-being of societies as a whole.

- Integrity is the constant ethical standards that governments put in place to reinforce their legitimacy. Maintaining these standards improves government trustworthiness, thus enabling more effective policy implementation.

A lack of trust threatens the effective governance of societies, social cohesion and political participation (OECD, 2024). Several factors can critically impact public trust in government. Among them, the public authorities' ability to deliver on their public mandate and meet citizen expectations. The transparency of public action, and the possibility of engagement from citizens can strengthen public trust (Kumagai and Iorio, 2020). Public authorities must identify priority domains and actions to maintain or improve their trustworthiness among citizens and foremost among these is bolstering trust in government decision making.

Trust in processes used to make decisions

Trust in the underlying processes leading to decisions increases trust in the decisions themselves. Data-driven decision making shows promise in reducing distortions and biases compared to human-based decision making (Lepri et al., 2018). However, the introduction of digitally mediated interactions (i.e. including an automated process) raised new challenges for digital risks and trust in decision making (Duenas-Cid and Calzati, 2023). In particular, growing reliance on algorithmic decision making to address complex policy issues raises several challenges that have increased distrust.

Reliance on digital data introduces new sources of risk, such as the potential erosion of privacy and a lack of transparency, which may foster distrust. Data-driven processes tend to be far from public scrutiny and most citizens lack the knowledge to fully understand how these systems operate, and how they might affect their rights and interests (Duenas-Cid and Calzati, 2023; Van Der Sloot and Keymolen, 2022).

While data-driven systems and processes operate autonomously, they are ultimately designed and implemented by humans. They thus reflect values and biases inherent in societies and may replicate inequalities. This can result in distrust towards public authorities' actions, particularly from individuals who are more likely to be negatively impacted by data-driven decision making.

Trust acts as the invisible infrastructure underpinning interactions in our societies. Just like tangible infrastructure (e.g. roads, rail, health systems), trust does not emerge passively: it must be actively built and maintained. Investments in infrastructure maintenance, safety standards, and quality checks constitute mechanisms that ensure that material infrastructure can be trusted and that it will serve the functions for which it was built (Star, 1999). Establishing trust in data infrastructure implies deploying analogous measures to ensure that infrastructure works as intended and does not fail people concerned by the decisions it informs.

Trust cannot be imposed. It should emerge organically instead of being addressed after-the-fact through communication campaigns. The trust placed by users and citizens in a decision-making process does not necessarily reflect the quality and reliability of processes. Promoting trust without addressing systemic issues related to biased decision making can lead to flawed, and ultimately distrusted, systems (Kennedy, 2020). To address this challenge, the focus should shift from increasing public trust in data-driven decisions to ensuring that the data infrastructure supporting decision making is fundamentally trustworthy.

Trust in the inputs used to make decisions

Trust in decision making is closely linked to how information supporting decisions is created, shared and used. Evidence on data-driven policy making indicates that the use of the best available information to make decisions is positively correlated with an increase of public confidence (OECD, 2024).

Data quality is central to fostering trust in mobility data. For people to act on the insights derived from mobility data, they must believe that the data is sufficiently accurate and fit for its intended use. This need for trusted data is particularly crucial in the public sector, where the outcomes of decisions affect large segments of society. Issues such as data representativeness are often at the forefront. For instance, when data is sourced from specific providers or displays limited demographic coverage, it can skew insights and contribute to biased decisions. Relying solely on data from a few major service mobility providers might overlook the needs of smaller or underserved communities, potentially leading to inequities in transport services.

The challenge of representativeness is not unique to mobility data. It is a broader issue that affects various data sources, including surveys and big data analytics. While methodologies have been refined to improve data collection, perfect representativeness remains elusive. This can result in certain groups benefiting more from data-driven services than others – especially when this data is digitally generated. Addressing such disparities is crucial to maintaining trust in data-driven transport services, ensuring that decisions made using this data serve the broader public good.

The temporal aspects of mobility data influence trust in the decisions this data informs. Governments often need consistent time-series data to monitor policy impacts over longer periods. Many digital data sources, such as social media or digital traffic, may not provide reliable historical data, as trends in platform usage or data availability can change over time (Mokbel et al., 2024). Similarly, changes in data sources or their accessibility could impact the long-term value of mobility data, posing challenges for policy makers who rely on such data to evaluate the effectiveness of policies.

To build trust in informed policy making, it is essential that mobility data adheres to key quality and ethical standards throughout its lifecycle. This approach supports the responsible use of data, enabling policy makers to make decisions based on reliable, relevant, and ethically managed information, which ultimately strengthens public confidence in policy outcomes (ITF, 2021b; Sustainable Mobility for All, 2021). This includes ensuring that data is free from political influence, representative of diverse user groups, and directly responsive to the needs of transport planners and the public. Additionally, data should be accessible, enabling a wider range of stakeholders to use and interpret it. Transparency in data management and the ability to reuse data can amplify its impact and foster trust among users, allowing for more collaborative and effective policy making.

In this context, trust in mobility data infrastructure is not solely about data accuracy but also about transparency and inclusiveness in its governance. A comprehensive approach to data governance can clarify the reasons for data collection, address concerns around privacy, and establish transparent mechanisms for data sharing. By doing so, public authorities can create a digital mobility infrastructure that engenders trust, ensuring that data-driven decisions are not only technically sound but also unbiased and aligned with the needs of all stakeholders. Such an approach lays the groundwork for resilient, trustworthy mobility systems that can adapt to future challenges.

The data infrastructure: A foundation for trustworthy decisions

An essential feature of any infrastructure is that its users trust that it will function as expected and deliver the benefits that it promises. Data infrastructure must similarly be anchored in trust that its use will contribute to broader societal benefits. Trust goes beyond mere reliance; when the infrastructure fails to deliver as expected, it can create a sense of betrayal, revealing the deeper role of trust in shaping public confidence in data systems (Cressman, 2021). Given that data and evidence are integral to both short- and long-term policy decisions, decision-makers and citizens alike must have confidence in the systems and processes that support data-driven decision making.

Traditional trust-building mechanisms in public administration rely on institutional reputation and familiarity, which foster stability in the public's interactions with government policies and services (Jalava, 2006). In the context of data infrastructure, however, trust must also stem from governance practices that ensure transparency, accuracy, and ethical handling of data. For mobility data, the integrity of data-governance frameworks is paramount, as it assures decision-makers and citizens that data-informed policies are not only well-founded but also fair, secure, and deliver societal benefit. Ensuring trust in data itself and in the institutions managing it is vital to establishing a foundation for effective and equitable policy outcomes.

Trust in data infrastructure is fundamental to ensure that data-informed decisions support effective and equitable transport outcomes for societies. Mobility data shapes fundamental aspects of transport planning, operations, and policies. People and organisations rely on this data infrastructure to function smoothly, making it essential that the data be trusted.

Policy insight: Trust in data is essential but not sufficient for effective governance

Trust cannot be imposed. It must be reinforced at every stage of governance, starting from a government's actions to processes guiding decisions and extending to the data and inputs used to inform decisions.

A trust framework for data-driven policies

Improving the governance of data exchanges is a precondition for enabling data's wider public benefits in decision making. Data-driven policies can only achieve their full potential if data flows between transport ecosystem stakeholders that can be trusted and vetted. Arrangements to build trust in the ecosystem already exist but are fragmented. Similarly to other sectors, these arrangements are sometimes developed as ad-hoc contractual agreements between parties (Brewer et al., 2021). Transport market actors are often required to provide specific data to public authorities (i.e. data reporting) as part of public service obligations (ITF, 2021b). Due to their contractual basis, data reporting arrangements usually cover a type of transport service (e.g. public transport, dockless bikes or scooters). They outline the specific actions taken by public authorities to build trust in their data reporting mandates to reassure transport operators that public authorities will conduct themselves according to pre-agreed rules (ITF, 2021b).

However, as the transport data ecosystem becomes more complex with the availability of new data sources and the integration of new stakeholders, these existing arrangements may fail to enable trust in the entire system, thus requiring a new and more holistic data-governance approach. This new approach aims to deepen trust among transport ecosystem stakeholders to better facilitate policy relevant data

exchanges. Trust frameworks establish the foundations for multilateral data exchanges between ecosystem stakeholders. According to Temoshok and Abruzzi (2018) and Brewer et al. (2021), a trust framework describes a set of rules, specifications and agreements governing the operation and interactions within multiparty systems established for a common purpose. A trust framework for data-driven transport policies should be designed in a way that policy-relevant data – whether held by public authorities, transport operators, or transport users – can be accessed by public authorities in a timely and secure manner. At the same time, the framework must guarantee that the data is of high quality and can be shared efficiently while maintaining strong security and privacy safeguards.

The function of a trust framework

The primary function of a trust framework is to build cross-organisational trust to enable policy-relevant data flows from stakeholders to public authorities. Data sharing is a precondition for allowing public authorities to access timely, accurate data to inform their policy decisions. The trust framework must establish clear rules, guidelines, and safeguard mechanisms to ensure data can be shared and later processed by public authorities.

The trust framework also acts as the link between several entities within the ecosystem:

- The trustor places trust in another party. The trustor is more vulnerable, and its actions rely on the trustee's performance and actions.
- The trustee is expected to act in a reliable and competent manner to meet the trustor's expectations.
- The trust object is the target of the trustor's reliance (e.g. service, product, action). The trustor believes that the trustee will manage the trust object as expected.
- The trust environment refers to the external factors influencing the relationship between the trustor and the trustee (e.g. socio-cultural, organisational factors).

Categorising and defining these subfunctions provides a structured approach to examining how each subfunction contributes to the overarching objective of fostering trust in the ecosystem. Not covering one of these different aspects may create a weak trust link which may erode trust in data-informed policy decisions.

Several sub-functions should be considered for:

- Trustors and trustees: different subfunctions should apply to trustors and trustees due to their different responsibilities. For trustors, this involves rules and guidelines for understanding the level of control they have over their data, and what mechanisms are put in place to protect it. For trustees, it implies implementing clear rules regarding secure data collection and handling, while ensuring compliance with applicable regulations.
- The trust object (i.e. data and related processes), the trust framework should enable secure and ethical data handling. Additionally, it should promote interoperability among the ecosystem using interoperable data formats. Finally, trust can be reinforced by making sure data processes (i.e. data collection, sharing, and use) are transparent and explainable.
- The trust environment, as the data-sharing ecosystem and the technological landscape are constantly evolving, a rigid framework might become obsolete. The trust framework should ensure that trust mechanisms remain relevant, robust and adaptable to address new concerns over time.

Trust framework as a network for data sharing in policy decisions

The trust framework to foster data-sharing for better-informed policy decisions relies on the interactions and interdependencies between the different stakeholders participating in the data-sharing ecosystem. Trust must be ensured at different levels thus requiring clear rules and protocols to ensure the security and reliability of data exchanges (ITF, 2024a).

Additionally, the trust framework should acknowledge that the same entity or person can be a trustor and a trustee at different moments. Rules should apply to the role of stakeholders in the interaction (e.g. trustor, trustee), rather than their role in the ecosystem (e.g. public authority, transport operator). Rules should clearly define the responsibilities and rights associated with each role. For example, public authorities may rely on data reported by transport operators to make policy decisions; at the same time, they may provide the same transport operators with data regarding the operations they lead (ITF, 2021b, 2023a). This approach ensures that participants, whether they are new in the market or not, are subject to similar rules when they perform similar functions, regardless of their primary role in the ecosystem.

Furthermore, several technical protocols designed to establish a level playing field in interactions can foster trust in the context of data sharing between the transport ecosystem stakeholders. Having a clear understanding of where the data comes from and who accesses it requires a set of control mechanisms to verify the identity of data holders and users. The first guiding principle of the iShare Trust Framework defines three fundamental factors to foster trust in every data transaction: identification, authentication, and authorisation (iSHARE Foundation, 2024).

Identification

Representing the identity of a person or an entity is essential to build trust. Without identification, protocols to ensure trust in another stakeholder may fail. Identification should be based on a minimal but sufficient level of information to enable later authentication. Stakeholders involved in the data-sharing ecosystem should identify themselves by providing information on their name, organisation, role, etc. Identification is the first step in the interaction process. Establishing identity is typically a one-time process that takes place at the start of the data-sharing request (ITF, 2023a).

Authentication

The trust framework should enable stakeholders involved in data-sharing to authenticate their counterparts. Authentication describes a protocol determining whether an actor is who they claim to be (ITF, 2024a). This protocol prevents unauthorised access to data from malicious stakeholders. Authentication should occur for each data request (ITF, 2023a). Following the authentication process, the data holder must clearly communicate the access authorisation to the data requester.

The Zero-Trust (ZT) framework can paradoxically provide a solution to enable trust between stakeholders by assuming that no entity, within or outside the ecosystem, should be trusted by default (Fernandez and Brazhuk, 2024). Unlike traditional “trust *but* verify” approaches, ZT’s core principle is that authentication should always happen before accessing any data (i.e. ‘verify, *then* trust’), even if the stakeholder or entity was authenticated in the past. It aims to provide the trust framework with robust mechanisms to ensure that data-sharing ecosystem participants can be trusted. This architecture ensures the constant authentication of stakeholders. It also enables the authorisation of stakeholders to access a minimal but sufficient level of information to perform their tasks.

Authorisation

Finally, the trust framework should ensure that stakeholders can be authorised to access specific datasets while ensuring security in handling personal or commercially sensitive data.

Once authenticated, authorisation protocols provide data requesters with information regarding the scope of their access. It determines what actions or resources an authenticated user is permitted to access (Laanaya, 2023). In the context of policy-relevant data sharing, authentication should be considered at two levels:

- a basic authorisation control, which describes whether an actor can access certain datasets (e.g. an actor can or cannot access a dataset)
- and a context-based authorisation, which provides a more nuanced, and multi-factor authorisation (e.g. an actor is authorised to access a dataset under certain conditions such as the level of aggregation, timespan, etc.).

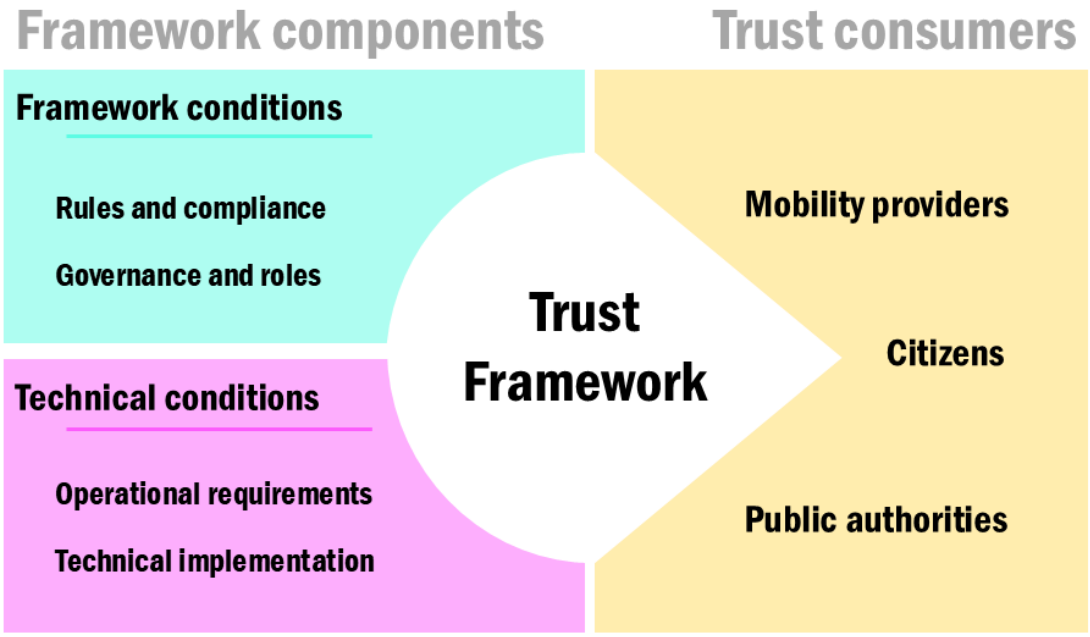
Additionally, several mechanisms should be implemented to enable different levels of access depending on the type of stakeholders, their role within the data-sharing ecosystem, and the task for which they require data. Public authorities may require access to policy-relevant data produced by other stakeholders to inform transport planning and the management of their operations or to enforce transport regulations (ITF, 2021b). For each of these specific tasks, the level of aggregation of the required dataset is different: planning data can be aggregated and does not have to be collected with low latencies and high frequencies, while data for enforcement purposes are highly sensitive by nature as they must be tied to individuals, devices or vehicles and linked to specific events.

Decentralised information-sharing models such as self-sovereign information sharing enable organisations and individuals to keep full ownership and control over the data they share and whom they share it with. PrepDSpace4Mobility (2024) recommends embracing Self-Sovereign Identities (SSI) as one of the building blocks to enable trustworthy data-sharing in the context of a data space. SSI is a user-centric approach to digitally identify. It allows individuals and organisations to manage their digital identity without relying on centralised authorities to store their data. The decentralised nature of SSI can be a catalyser of trust in more complex ecosystems. Yet, public authorities may have a role to play in making sure data holders are trustworthy. Firstly, public authorities play a crucial role in building trust by verifying data holders, especially in critical or conflictual situations. They should also implement revocation mechanisms to invalidate credentials to ensure trust in the ecosystem.

What should the trust framework be made of?

From a more practical perspective, the trust framework is made of several components that enable trust in data sharing among stakeholders. Several categories of components of trust frameworks can be identified (van der Peet et al., 2024). In the context of data sharing to better inform policy decisions, this report identifies two main categories, each including two components (Figure 3).

Figure 3. The trust model for data-informed policy decisions



Framework conditions

The first category includes building blocks defining the framework conditions to enable trust within the ecosystem.

- Rules and compliance: a set of rules, policies, guidelines, and principles defining trust and the best practices to ensure safe and trustworthy data sharing within the ecosystem.

These rules aim to ensure the alignment between practices and legal and regulatory standards. A robust governance framework within data infrastructure is essential to uphold reliability, security, and public confidence. This involves striking a balance between data privacy, security, and accessibility to make data both protective of individual rights and publicly beneficial. Establishing clear rules on data handling and accessibility assures stakeholders that data infrastructure is trustworthy and secure.

To further foster trust, open-source practices engage citizens in governance by allowing them to participate in or observe data compliance processes. Involving the public in data-related decisions, like public input in urban planning, bolsters transparency (Hood and Heald, 2006). It also ensures that data governance is responsive to community needs, laying the groundwork for data infrastructure that is inclusive, fair, and aligned with public interest.

Ethical data management practices can help protect data privacy and uphold inclusivity. For example, data-governance frameworks can stipulate that mobility data collected from ride-sharing apps or public transport systems be securely managed while also ensuring that these data sources represent diverse urban populations (Bibi, 2024). These frameworks can guide the intentional inclusion of diverse data sources while recognising that some datasets may be purposefully targeted toward specific demographic groups, such as individuals under 25 years or over 65 years, to address policy objectives. Balancing targeted data collection with broader representativeness is crucial to ensuring that the resulting insights do not inadvertently reinforce biases or overlook the needs of other populations.

Implementing these compliance frameworks across the data lifecycle creates an accountable system that minimises biases, safeguards public trust, and promotes fairness in AI-driven mobility solutions. By adopting diverse data sources, rigorous bias audits, and transparent data practices, policy makers can work towards mobility systems that are not only efficient but also equitable. In the broader context of the integration of AI in policy-making processes, these approaches ensure that AI-driven mobility policies support accessible, fair, and socially responsible transport policy measures.

- Governance and roles: this is the overall governance structure of the ecosystem and identifies the roles and responsibilities of each participating stakeholder. It must identify clear roles for the trustor and the trustee, depending on their relationship with the data (i.e. data user, data controller, data holder, etc.).

Trust extends to include the people and institutions interpreting and using the data. Public confidence in data-driven decisions is closely linked to trust in those responsible for managing and overseeing data infrastructure. This framework should define clear roles and responsibilities for data custodianship and stewardship, especially in contexts lacking overarching personal data protection regulations (i.e. General Data Protection Regulation, GDPR) (ITF, 2021b). Data custodian refers to entities and individuals responsible for managing the technical environment where data is stored, and ensuring secure transport and storage of data (i.e. functions related to data handling). Data stewards are responsible for the quality and usage of the data itself (i.e. functions related to data usage).

While decision-makers play a critical role in guiding the application of data towards policy and operational contexts, the custodianship of data often depends on the source, sensitivity, and scale of the data. Increasingly, the storage and access arrangements for data are outsourced to specialised organisations that comply with established standards, such as ISO certifications, to ensure security and reliability.

Clear and transparent frameworks for decision making mirror accountability practices in managing physical infrastructure, creating consistency among practices and reinforcing trust. Routine audits and reviews are vital for ensuring that data practices remain fair, relevant, and publicly accountable. These assessments, particularly in sensitive areas such as transport and urban planning, where policies have substantial impacts on daily life, help maintain trust in both the data itself and the institutions using it.

Additionally, with the growing integration of AI in processing and interpreting data, concerns around algorithmic bias and the lack of explainability or interpretability of algorithmic outcomes have intensified (ITF, 2018). If an outcome cannot be understood or easily interpreted, it becomes less trustworthy. Moreover, decisions based on data transformed through AI algorithms are susceptible to inherited biases if the initial data is not sufficiently representative of the population at large. Addressing these issues necessitates regular audits, accountability measures, and open communication about the data's origin, usage, and limitations.

Beyond technical measures, improving trust in data requires empowering citizens and stakeholders with greater agency in how data is collected, used, and governed. Efforts to modernise data governance are evolving, focusing on strengthening privacy, security, and accessibility to data, while actively involving the public in data-related decisions. This citizen-focused approach emphasises that data processes should not only respect individual privacy but also remain accountable and responsive to community needs. By building frameworks that prioritise inclusivity, accuracy, and fairness, decision-makers can cultivate a transparent and equitable data infrastructure that inspires trust and promotes long-term engagement from all stakeholders. Figure 5 illustrates the core elements that collectively foster trust in data processes through:

- **Transparency**, which promotes clear documentation and open access, allowing stakeholders to understand data origins, context, and limitations
- **Inclusiveness**, which ensures that data collection represents diverse groups and includes stakeholder voices in decision making, forming a basis for fairness in data practices
- **Governance**, which incorporates risk mitigation and accountability measures to enhance secure, responsible data handling, vital for building confidence in data systems
- **Engagement**, which highlights the role of public involvement and feedback loops, enabling communities to contribute to, question, and understand data practices.

Figure 4. Cornerstones of trust in data infrastructure

Technical conditions

The second category of data sharing to better inform policy decisions includes building blocks related to the technical conditions enabling trust in data sharing.

- **Operational requirements:** defines the rules, processes and protocols related to how data should be shared, accessed, and used to support policy decisions.

Access policies and rules enable data holders to maintain sovereignty over the data they share or expose (PrepDSpace4Mobility, 2024). Data sovereignty enables organisations or individuals to maintain control over their data by making data subject to domestic laws. It plays a critical role in fostering trust and enabling data security as existing domestic privacy laws generally emphasise data protection through a different set of mechanisms and protocols (i.e. anonymisation, access control, etc.).

Implementing data handling protocols and processes is crucial to reducing risks associated with data sharing (ITF, 2023a) and fostering trust among stakeholders. These protocols should address every stage of the data lifecycle and ensure that data is collected and processed for its intended purposes. The data

value chain unfolds across four primary stages: collection, publication, uptake, and impact (Open Data Watch, 2018).

In the collection stage, data must be gathered in ways that safeguard against biased sourcing and strive for full societal representation. In the publication stage, making data more accessible and easier to understand is paramount. By removing constraints and offering data in open formats wherever appropriate, organisations enable its use and re-use within policy-making processes, fostering a culture of open information (Vincent-Lancrin and González-Sancho, 2023). During the uptake phase, the focus is on creating environments that encourage proper data use, allowing users to extract maximum value. Education and training initiatives play a key role in helping policy makers understand how to apply data responsibly, legally and ethically (Digital Regulation Platform, 2024). Finally, encouraging feedback mechanisms can help authorities to refine future data-collection efforts, accounting for evolving contexts and fostering ongoing improvement (ITF, 2023c). Transparency remains essential in the impact phase, allowing stakeholders to understand and evaluate the effects of data-driven decisions.

The nature of data processing directly affects the trustworthiness of the policy-related outcomes. Trust in data infrastructure cannot be achieved solely by focusing on the data itself but requires a holistic approach that encompasses transparency, inclusiveness, and rigorous governance frameworks.

- Technical implementation: is the technical architecture supporting these operational requirements and the trust framework capabilities.

The trust framework should ensure that every trust-building functionality is paired with adequate technical mechanisms. Functionalities related to identity and access control (i.e. identification, authentication, authorisation), data accessibility (i.e. data discoverability), sharing (i.e. exposure and sharing mechanisms), interoperability (i.e. data models and standards), and portability should be covered by the trust framework. Public authorities can build upon ongoing developments in related data-sharing ecosystems such as data spaces, or Mobility as a Services projects, which integrate such technical building blocks (DSSC, 2023; ITF, 2024a; PrepDSpace4Mobility, 2024). ITF (2024a) provides a list of trust framework functions and related technical mechanisms in the context of Mobility as a Service. Similarly, DSSC (2023) suggested several technical building blocks to enable data-sharing in the context of a data space.

Policy insight: Public authorities should establish trust frameworks to enable trust in data-driven decisions

A comprehensive framework is essential for enabling trust in data exchanges within the transport policy ecosystem. It should ensure that data-driven policies are informed by accurate, legally and ethically collected data while maintaining transparency and explainability in decision-making processes. By establishing clear rules, safeguards, and adaptable governance structures, this trust framework builds cross-organisational trust and enhances the reliability of data for policy decision making.

Towards outcomes-based policy decisions

Chapter summary

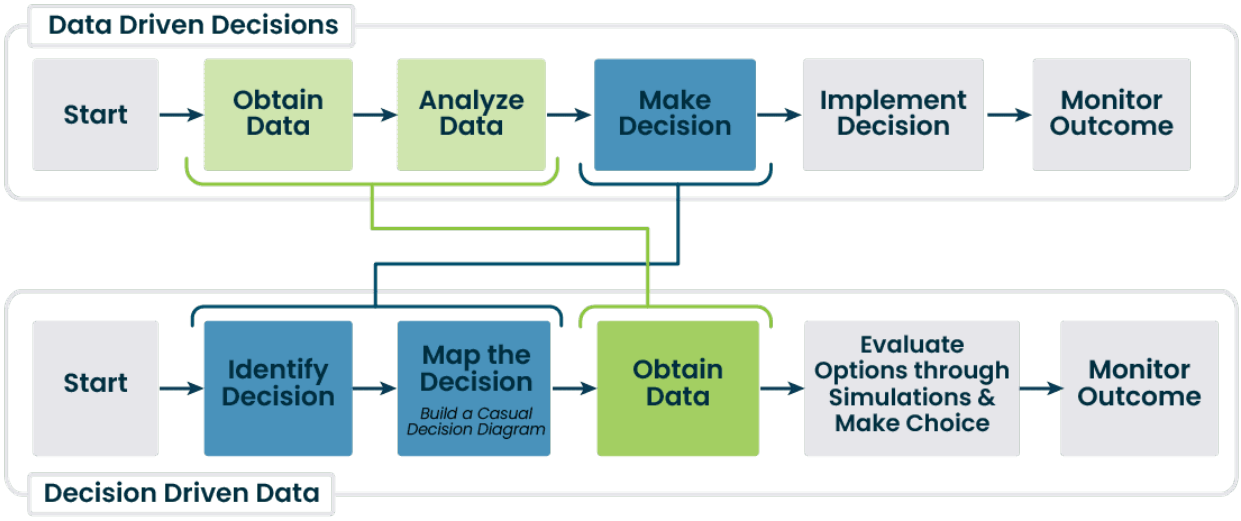
- The “decide and provide” (D&P) strategy focuses on shaping future transport outcomes rather than reacting to past data. The D&P model allows for greater adaptability to unforeseen changes, making it more suitable for addressing uncertainties.
- Transport policy must integrate evidence from other sectors, such as health, environment, and land use, to create more holistic, sustainable strategies. Some level of standardisation and data quality alignment will be necessary to make cross-sector collaboration more efficient. This co ordination ensures that transport investments align with broader societal goals like public health and environmental sustainability.

The shift from ‘Data for evidence-based decisions’ to ‘Data on evidence-based decisions’ focuses on assessing the effectiveness of policies over time. Continuous monitoring and evaluation enable policy makers to refine strategies based on real-world outcomes.

Data alone is not sufficient for informing and shaping transport policies. Data helps to answer essential questions that policy must address but collecting the right data to answer the wrong question fails both policy makers and the public alike. Public authority decisions must be built on a holistic policy-making approach that includes a range of inputs. This chapter explores how data can support proactive, purposive and outcomes-focused policy making and planning. It addresses the importance of incorporating data produced outside of the transport sector and the need to critically assess evidence on the use of data in making decisions and in monitoring the efficacy and long-term impacts of transport policies.

Today, while some public authorities have access to large volumes of data, they may face other limiting factors preventing them from using it. Access to data-related knowledge and skills among public authority staff can hamper their capacity to effectively use data to make meaningful decisions that are relevant to the policy objectives. Traditional data-driven approaches have often led authorities to amass vast amounts of information, while sometimes lacking the knowledge and skills needed to address specific objectives. While data alone can reveal patterns, a purely data-driven method may not lead to expected outcomes if it does not account for the strategic objectives and mandates of transport authorities. Essentially, data alone does not necessarily integrate policy-relevant contextual information. A data-driven approach puts the emphasis on data, assuming it will provide all the answers to inform policy decisions (Eselgroth, 2024). However, this approach tends to overlook outcomes sought. A more decision-driven approach shifts the focus back onto the real-world outcomes authorities hope to achieve and aligns data collection to support informed and purposive decisions that align with those aspirations (Figure 5).

Figure 5. Paradigm shift from data-driven decisions to decision-driven data



Source: Eselgroth (2024).

Note: This figure illustrates how the predict-and-provide and decide-and-provide approaches apply at the decision-making level. With some similarities with the Predict-and-Provide approach, data-driven decision-making starts with data and then identifies possible outcomes based on that data. The scope of retained actions will be heavily shaped by the existing data.

On the opposite, and like the Decide-and-Provide approach, "Decision-driven data" flips the relation and prioritises the decision to determine the information needed to better inform it. This approach enables the scope of data collection to be narrowed, thus making it more efficient.

The main subject of data-driven decisions is the decision, not the data. By shifting the emphasis from data (i.e. data-driven decision) to decisions (i.e. decision-driven data), policy makers ensure that what matters the most is the decision being made, and not the data used. The decision-driven approach puts the focus on human judgment and intelligence. This approach also prevents policy makers from focusing too much on data and thus abandoning the idea that every data is crucial to policy making. Finally, this approach enables public authorities to more easily navigate the complexity and abundancy of data.

Decide and provide: A proactive approach to future transport planning amidst uncertainty

Data inputs are as integral to the "predict-and-provide" accommodative policy as they are of the decision-driven "decide-and-provide" approach (ITF, 2021c). However, what data is collected and how and when it is used differs between them.

The transport sector faces a range of uncertainties influenced by various factors. These include changing travel demand, the effects of climate change on infrastructure, the transition from fossil fuels, the impacts of decreased fossil fuel tax revenues for authorities and the impact of digitalisation on travel behaviour. Additionally, the development and deployment of intelligent, automated, and connected vehicles, alongside traditional factors like population growth, fuel prices, disposable income, and land-use distribution, add layers of complexity.

When these uncertainties make it difficult to rely on past trends and experience to inform policy, predict-and-provide forecasts become increasingly untenable. Predict-and-provide approaches require largely historical data, yet these reinforce existing trends and may lead to outcomes that do not align with current realities or future aspirations (ITF, 2021c; Steer, 2022; TRICS, 2022).

An increasing number of authorities are considering and adopting decide-and-provide strategies for planning and infrastructure investment. In these approaches, decisionmakers clearly articulate a vision of where they wish to go and then design and implement policies that lead to that vision (ITF, 2021c). Decide-and-provide approaches use data to assess progress towards the desired vision, providing a more proactive and adaptive planning framework. Broad public participation and input in establishing the vision encourages wider public support and ensures a broad spectrum of perspectives is considered in shaping long-term plans. One of the key strengths of the decide-and-provide approach is its ability to manage future uncertainty. Unlike the predict-and-provide model, which is constrained by the limitations of forecasting, the decide-and-provide method is adaptable to unforeseen changes and external disruptions (TRICS, 2021).

Figure 6. illustrates predict-and-provide and decide-and-provide approaches to decision making. Decide and provide begins with vision development, where a desired future state for transport is defined for a city or region, establishing an overarching direction based on long-term aspirations. This vision development is informed by community and stakeholder input that help to validate the vision and ensure it reflects the needs and values of the broader community. Next, evaluating the vision within a set of plausible future scenarios helps identify key factors and decision points that will impact achieving the vision under uncertainty. Working back from the vision and identifying key decisions and actions that enable delivery of the vision (e.g. back casting) helps to establish flexible pathways aligned with the vision, allowing for adjustments as conditions evolve. Identifying, collecting and validating data in support of each stage of the process allows policy makers to evaluate whether their actions are aligned with the outcomes they wish to achieve, understand what developments may impact achieving their vision and to monitor progress towards the vision. These insights help authorities to confirm or modify their strategies. Finally, data in support of implementation and adaptation enhance built-in flexibility, allowing strategies to respond dynamically to emerging trends or disruptions, supporting resilience and sustained alignment with the long-term vision.

Importantly, the decide-and-provide approach streamlines data collection by targeting only what is essential. This framework promotes effective collaboration among teams, pinpointing which datasets are necessary, actionable, and relevant to stakeholders. By focusing on how data informs specific actions, organisations can foster clearer alignment across departments, minimise redundant data collection, and ensure efforts contribute to measurable, meaningful impacts.

Policy insight: Adopt a vision-led, proactive approach to transport planning

Policy makers should adopt a decide and provide approach, setting long-term, goal-oriented targets and using data to track and adapt strategies as needed. This approach is flexible, responsive to change, and integrates stakeholder input, ensuring transport systems develop equitably and sustainably.

Beyond silos: Other data is necessary to establish and evaluate transport decisions

Data from outside the transport sector may also play a major role in informing effective transport policies. Public authorities should seek to integrate policy-relevant data from various sectors to align transport decisions with wider societal goals, such as improved health outcomes, environmental sustainability, and social inclusivity. For example, transport systems influence public health by affecting injury and mortality rates, physical activity levels and air quality, yet current datasets often fail to link these outcomes to transport infrastructure (Cavoli et al., 2015). Health data can reveal the impact of transport modes on public health by highlighting trends in obesity, respiratory illnesses, and injuries (Glazener et al., 2021). Without integration across these domains, policy makers are left with an incomplete understanding of the true costs and benefits of transport policies, making it difficult to design interventions that promote both mobility and well-being. Integrated data allows for a more holistic analysis, enabling governments to align transport strategies with broader public health and environmental goals.

This cross-sectoral data collaboration can ultimately enhance the effectiveness, resilience, and responsiveness of transport policies regarding complex, interdependent challenges (Box 7). Such challenges can no longer be effectively addressed through siloed approaches. Co-ordinated planning that integrates transport with land use, environmental sustainability, and public health not only strengthens sectoral policy outcomes but also empowers governments to make decisions that deliver long-term benefits for both the economy and the population. For example, transport data on vehicle emissions and traffic patterns could guide energy sector strategies on charging infrastructure placements or help urban planners design more liveable, lower-emission cities.

Box 7. New Zealand's Integrated data infrastructure (IDI)

Established by New Zealand's National Statistical Office (Stats NZ) in 2011, the Integrated Data Infrastructure (IDI) allows for cross-sectoral and whole-population data analysis. The data stored in IDI describes individuals' interactions with government bodies in different areas (i.e. justice, education, health, etc.). IDI has been updated throughout the years to provide access to new data records (Jones et al., 2022).

IDI serves to inform policy decisions and contribute to reducing the need for surveys by matching recorded transport-related data (e.g. vehicle registration and driving licenses) with census and household data. IDI enables evidence-based policy-making and advanced research on social outcomes by integrating data from multiple sectors such as health, education, justice, income, housing, and population dynamics. IDI does not yet include household travel survey data. Additionally, there are remaining challenges to allow mobility-related datasets storage on IDI (e.g. commercial restrictions prevent data such as cellphone data being included).

Milne et al. (2019) identified several data-related challenges that warrant attention:

- Potential biases: There are existing challenges related to data bias since IDI does not include data relating to individuals who never access government agencies and services.
- Data comprehensiveness: While the data was recently released for research, the documentation lags (Milne et al., 2019). Documentation is stored at the agency level without a central storage database. There is ongoing work to address some of these issues.
- Data quality: data stored in IDI was collected by different agencies and for different purposes (i.e. accounting, operational, monitoring), resulting in a variation in data quality. However, Milne et al. (2019) note that data quality is improving over time.
- Data privacy: Stats NZ implemented the "Five Safes framework" (i.e., people, projects, settings, data, output) to ensure secure access to data stored on IDI and that downstream data use is only possible for public-good research, including policy and intervention research (Milne et al., 2019).

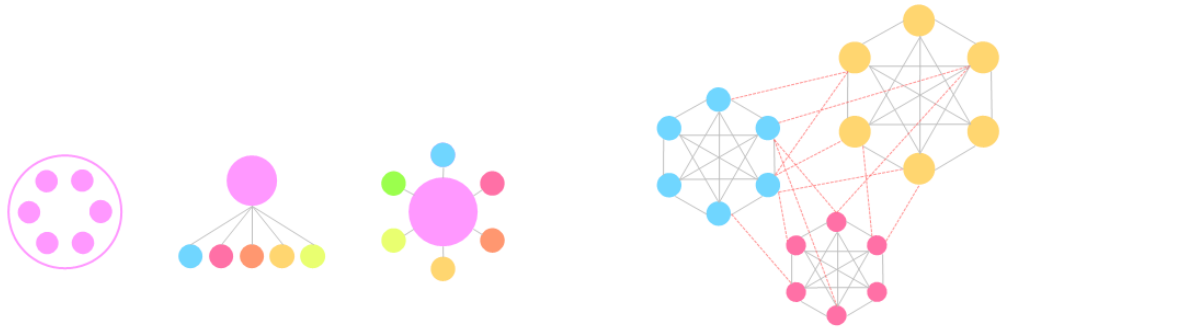
Stats NZ's legislative framework for providing safe access to data for research was strengthened in 2022. The research access framework in Part 5 of the Data and Statistics Act 2022 reflects the Five Safes and Ngā Tikanga Paihere. Ngā Tikanga Paihere is a tikanga-based framework that supports ethical data practice and research by providing guidance about informing or involving communities of focus, transparency of data use, and thinking about the consequences of data use for communities. Before authorising access to data for research (including accessing data held in Stats NZ's Integrated Data Infrastructure), the Government Statistician must be satisfied that there are appropriate measures to protect privacy, confidentiality and security of data. The Act requires researchers to sign a confidentiality certificate – this is a lifelong commitment to maintain confidentiality, with penalties for breaches. Statistical confidentiality ensures that individuals and organisations are not identifiable in published data. To support transparency, Stats NZ is required to publish information about researchers accessing data, what data they can access and for what purpose. Researchers are also required to publish a summary of their research results and methodologies.

Source: Jones et al. (2022), Milne et al. (2019)

This integrated approach to policy making is critical as policy decisions rarely rely on empirical analysis alone. Instead, they result from a blend of practical judgment, political strategies, and a complex interplay of competing interests and values (Head, 2010). In this context, the value of integrating data lies not only in providing empirical evidence but also in enabling a more nuanced understanding of how transport policies intersect with societal objectives. For example, data that reflects public health outcomes can highlight the broader health-related benefits of investing in cycling and walking infrastructure.

Enhanced data interoperability and quality improves effective collaboration across sectors and departments and will contribute to more efficient and secure data integration. For example, in Europe, developments around data spaces are expected to enable cross-sectoral collaboration on data (Figure 6). The European data strategy sets out the foundations of a single market for data to make data available for access and re-use (European Commission, 2020). Within the scope of this strategy, data availability and sharing rely on the establishment of common data spaces defined as "relevant data infrastructures and governance frameworks in order to facilitate data pooling and sharing" (European Commission, 2022). The Commission announced the gradual deployment of sector-specific European data spaces in strategic sectors such as agriculture, transport, finance, manufacturing, and health, among others (European Commission, 2024). The Common European data space aims to support the emergence of cross-sector collaborations through data sharing and re-use and further improve the integration of policy-relevant data from other sectors into the transport policy-making process.

Figure 6. Traditional data platforms and data spaces



Source: Adapted from Gaia-X Hub France (2024).

As part of this broader strategy, the European Mobility Data Space (EMDS) specifically focuses on enhancing data-exchange practices in the transport and mobility sectors. The EMDS aims to create a federated ecosystem where stakeholders, including public authorities, mobility service providers, and researchers, can securely exchange and access mobility-related data (European Commission, n.d.). By facilitating seamless integration of data from various sources such as public transport systems, traffic management centres, and emerging mobility platforms, the EMDS seeks to improve decision-making

processes, enable innovative mobility solutions, and support the transition towards more sustainable transport systems. This initiative underscores the importance of aligning data-governance frameworks with the goals of decarbonisation, accessibility, and digitalisation.

Furthermore, integrated planning can help to address inefficiencies and blind spots that arise when policy areas are treated independently. In the transport, urban planning, environment, and public health sectors, issues such as poor co-ordination between departments or conflicting priorities between local and national governments can hinder progress for society (Nieuwenhuijsen, 2016). By creating a shared framework for data collection and analysis across sectors, integrated planning can overcome these obstacles, promote innovation, and encourage a more strategic approach to policy making. As a result investments in transport infrastructure not only meet mobility needs but also contribute to improving public health, reducing environmental impacts, and fostering sustainable urban growth.

Additionally, the move towards digitalisation and cross-sectoral integration addresses the organisational challenges of data management. Municipalities and governmental departments often operate in siloes, with data treated as proprietary rather than a shared resource (Acar et al., 2021). Overcoming this requires the creation of cross-cutting collaborative platforms or other mechanisms where diverse stakeholders, ranging from transport planners and public health officials to urban designers can work together to analyse and interpret data. This collaboration enables more strategic decision making that is both data-driven and responsive to the practical realities of implementation. By fostering a culture of openness and collaboration, governments can better align their transport strategies with broader goals such as climate resilience and social equity, creating a more integrated planning process.

Policy insight: Informing complex challenges will require breaking down data siloes

Cross-department and cross-sector collaboration are critical for informing transport policies that address wider and more complex societal challenges such as health, environmental sustainability, and social equity. Adopting interoperable data standards and frameworks can enhance data access across sectors, enabling public authorities to build more effective, resilient, and responsive transport policies. Performance indicators and transparent public dashboards support adaptive policy making, fostering trust through openness and facilitating shared accountability across sectors.

Monitoring the efficiency of evidence-based policy making

Transitioning from data *for* evidence-based decisions to data *on* evidence-based decisions implies a change in how data is used in the policy-making process. While data has long served as a foundation for guiding decisions, it is equally crucial to gather and publish data that assesses the effectiveness of those decisions. Monitoring and evaluating the outcomes of evidence-informed policies can enhance transparency, inform future decisions, and foster greater trust among stakeholders, including the public. This section examines the challenges and benefits of gathering evidence on the effectiveness of evidence-informed policy making, the importance of continuous evaluation and feedback, and how transparency in sharing results can build trust in the policy process.

Data on evidence-informed policy making

The role of evidence in shaping transport policy is an ongoing discussion in the practice of policy evaluation and within academic literature. In the transport sector, this approach has been particularly relevant for issues like road safety, public transport efficiency, congestion management and emissions reduction. For

example, research has shown that using evidence-informed interventions in road safety, such as the Safe System approach, can significantly reduce traffic fatalities and injuries when implemented consistently (ITF, 2022). The traditional approach to road safety aims to understand the causes of a crash and then suggest how to avoid them. The Safe System approach, by contrast, is centred on preventing injuries by accommodating human error; it advocates for the road system to be planned, designed and operated to be forgiving of inevitable human error (ITF, 2022).

There are also limitations and challenges to assessing the efficacy of evidence-informed policies. One common issue is the gap between the availability of evidence and its practical application (i.e. evidence-practice gap). Studies often point out that policy makers may not always have access to comprehensive data or that the data may not be well-aligned with the specific needs of transport policies. For instance, Head (2010) discusses how the complexity of policy environments and the influence of political pressures can result in evidence being underutilised or selectively used to support predetermined policy directions.

Moreover, evidence-informed approaches can be hampered by a focus on short-term results. According to Smith (2009), policy makers often prioritise data that supports quick wins. In the transport sector, these can be outcomes such as visible reductions in congestion or short-term improvements in air quality at the expense of long-term strategic investments. This can result in shifting resources away from more transformative transport interventions that require sustained commitment, such as building infrastructure for active transport modes (e.g., cycling and walking).

To maximise the effectiveness of evidence in policy, a robust data-governance framework is necessary. This involves not only collecting high-quality data but also creating institutional incentives for its consistent use. For transport, this could mean investing in long-term data-collection systems that track changes over time, such as modal shift trends or the impacts of low-emission zones. Such frameworks can help policy makers to better understand the causal effects of interventions and adjust their policies based on solid evidence.

Overall, while evidence-based policy making holds significant potential, its impact depends on how well it is integrated into the policy process and the extent to which data is matched to the realities of transport challenges. It requires a commitment to long-term evaluation, transparency in data use, and the capacity to adapt policy based on emerging findings. Addressing these factors can help ensure that evidence is used not just as a tool for justifying existing policies but as a means for achieving improved outcomes in the transport sector.

The importance of evaluation, monitoring, and the feedback loop

Data plays multiple roles across the lifecycle of transport policy making, guiding the shift from the formulation to the evaluation of policies. In the initial stages, it serves as the foundation for evidence-informed decision making. Policy makers rely on transport activity data, demographic information, and environmental indicators to identify key challenges and opportunities. As policies are implemented, the role of data shifts towards monitoring and adjustment. Data collection continues to track the impacts of enacted policies, such as changes in vehicle kilometres travelled, modal shifts, reduced crash and injury rates or reductions in emissions. This feedback loop allows policy makers to make real-time adjustments, ensuring that the intended outcomes are being achieved.

The move towards gathering data on evidence-informed decisions reflects this shift, emphasising the need to use data not only to inform initial decisions but also to validate their effectiveness over time. This approach helps in refining strategies, scaling successful measures, and addressing unintended

consequences. For example, regular data collection on public transport use can reveal shifts in demand, leading to adjustments in service frequency or routes to better serve commuters.

In the later stages of the policy lifecycle, data becomes critical for evaluation and impact assessment (Barbero et al., 2016). Detailed analysis of performance indicators, such as reductions in emissions or improvements in safety metrics, allows for a thorough evaluation of policy success. This phase also involves comparing the initial projections with actual outcomes, enabling a deeper understanding of what worked and why. By focusing on data on evidence-informed decisions, policy makers can ensure that future policy iterations are grounded in lessons learned, facilitating a more adaptive and resilient approach to transport challenges. Data thus serves as a continuous thread throughout the policy lifecycle, guiding the shift from hypothesis-driven formulation to adaptive implementation and rigorous evaluation.

Evaluation is a critical component in the policy lifecycle, playing a central role in understanding whether transport policies meet their intended goals. Effective evaluation enables policy makers to assess the success of their strategies, adjust where necessary, and ensure that interventions remain aligned with broader objectives. This process is particularly important in complex policy environments, such as those that govern urban mobility, where multiple variables, ranging from safety and environmental impacts to economic costs, must be considered. Evaluation, thus, serves as a critical step in verifying if a policy has achieved its desired outcomes, while also highlighting areas for improvement.

The iterative nature of policy development is enhanced through continuous monitoring and feedback mechanisms (Acar et al., 2021). By maintaining a systematic process for collecting, analysing, and sharing data throughout a policy's implementation, stakeholders can generate actionable insights that support iterative policy refinement. Such feedback mechanisms allow policy makers to adapt strategies in response to emerging needs or changing conditions, fostering a more resilient and adaptive governance model.

In Utrecht in the Netherlands and Bruges in Belgium, ongoing evaluation and monitoring activities are seen as essential to sustaining policy interventions and maintaining their relevance over time. This includes the use of data dashboards to track performance indicators, enabling municipalities to adjust strategies dynamically and avoid irreversible mistakes. For instance, Utrecht has emphasised the importance of embedding monitoring tools directly within policy frameworks to support long-term maintenance and adjustment of transport solutions (Simonofski et al., 2023). These examples illustrate that continuous evaluation, particularly when informed by comprehensive data, can enable more effective policy design and implementation, ensuring that transport initiatives are responsive to both current and future urban challenges.

Communicating on evidence-informed policies

Transparency in the policy-making process is vital for building public trust, particularly in the context of evidence-informed decision making. Making policy outcomes, as well as the evidence base informing them, publicly accessible fosters accountability and encourages stakeholder engagement (ITF, 2023c). This openness allows citizens, experts, and other stakeholders to scrutinise data and hold policy makers accountable, ensuring that decisions are grounded in credible evidence rather than political expediency. For instance, public databases like the EU's CARE database and the European Transport Safety Council's (ETSC) database have been instrumental in promoting transparency by comparing national performance on key safety metrics. These platforms highlight best practices, fostering a collaborative environment where lessons can be shared, and policy innovations can be scaled across regions.

Regular dissemination of evaluation results, such as through annual performance reports or digital dashboards, plays a crucial role in maintaining transparency. Sweden's practice of publishing detailed

reports on road safety progress, which are accessible to all stakeholders, is a noteworthy example of how transparency can lead to improved outcomes in the transport sector (ITF, 2023c). The public availability of such reports ensures that progress is monitored openly, encouraging continuous improvement and adaptation based on the insights generated.

In addition to fostering transparency, publishing data also supports accountability. When governments release regular updates on policy performance, they create a clear record of what has been achieved and where further efforts are needed. This level of openness can strengthen support for evidence-informed policies, particularly when the public and stakeholders see a clear link between policy actions and tangible improvements in urban mobility. Open communication of evaluation results makes the data accessible to a broader audience, enhancing public understanding and engagement with transport policies. As the accessibility of data improves, the feedback loop between policy makers and the public becomes more robust, leading to better-informed policies and greater trust in the decision-making process.

Improved accessibility of reports and dashboards not only enhances transparency but also raises the knowledge level of citizens, ideally encouraging a more knowledgeable electorate that demands evidence-informed decisions. This broadens the public debate, enriching the entire policy ecosystem, from the informed base of voters to elected officials responsible for making decisions. Such accessibility empowers citizens to engage meaningfully with policy discussions, thereby reinforcing democratic accountability and contributing to a more responsive and well-rounded decision-making landscape.

Policy insight: Foster citizen engagement and feedback mechanisms in data processes to reinforce public confidence in policies

Engage communities, policy makers, and experts at all stages of data collection and use.
Public consultations, data-governance panels, and feedback loops allow stakeholders to voice concerns, creating a transparent, responsive data system. This engagement strengthens accountability and public confidence in data-driven policies.

References

Abrams, M. (2014), The Origins of Personal Data and its Implications for Governance, SSRN Electronic Journal, https://doi.org/10.2139/SSRN.2510927.

Abudayyeh, O., Zhuang, Z.-Y., Yang, Y.-W., Krishna, C. M., Ruikar, K., & Jha, K. N. (2023), Determinants of Data Quality Dimensions for Assessing Highway Infrastructure Data Using Semiotic Framework, Buildings 2023, Vol. 13, Page 944, 13(4), 944, https://doi.org/10.3390/BUILDINGS13040944.

Acar, F., Raes, L., Rosseau, B., & Satta, M. (2021), Making Policies with Data: The Legacy of the PoliVisu Project, In P. and R. L. and M. G. Concilio Grazia and Pucci (Ed.), The Data Shake: Opportunities and Obstacles for Urban Policy Making (pp. 105–122), Springer International Publishing, https://doi.org/10.1007/978-3-030-63693-7_8.

Al Laban, F., Reger, M., & Lucke, U. (2022), Closing the Policy Gap in the Academic Bridge, Education Sciences 2022, Vol. 12, Page 930, 12(12), 930, https://doi.org/10.3390/EDUCSCI12120930.

Article L1511-6 - Code Des Transports (2010), https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000023085290.

Baldwin, A., & Shuttleworth, K. (2021), How governments use evidence to make transport policy, https://www.instituteforgovernment.org.uk/sites/default/files/publications/evidence-transport-policy.pdf.

Banerjee, I., Jittrapirom, P., & Dangschat, J. S. (2021), Data-driven urbanism, digital platforms, and the planning of MaaS in times of deep uncertainty: What does it mean for CAVs? AVENUE21, Politische Und Planerische Aspekte Der Automatisierten Mobilität, 441–470, https://doi.org/10.1007/978-3-662-63354-0_20.

Barbero, M., Coutuer, J., Jackers, R., Moueddene, K., Renders, E., Stevens, W., Toninato, Y., van der Peijl, S., & Versteele, D. (2016), Big data analytics for policy making, https://interoperable-europe.ec.europa.eu/sites/default/files/document/2016-07/dg_digit_study_big_data_analytics_for_policy_making.pdf.

Barretta, R., Hassenstein, M. J., & Vanella, P. (2022), Data Quality—Concepts and Problems, Encyclopedia 2022, Vol. 2, Pages 498-510, 2(1), 498–510, https://doi.org/10.3390/ENCYCLOPEDIA2010032.

Bayer, M. A. (2011), "Big Data" and Extreme Information Processing and Management, In Hype Cycle for Cloud Computing, 2011, Gartner, https://cmapsconverted.ihmc.us/rid%3D1JZJKBR35-2C5G28T-ZNM/hype_cycle_for_cloud_computi_214915.pdf.

Bibi, P. (2024), AI and Data Governance: Crafting Policies to Mitigate Algorithmic Bias and Protect Human Rights.

Box, G. E. P. (1979), Robustness in the Strategy of Scientific Model Building, Robustness in Statistics, 201–236, https://doi.org/10.1016/B978-0-12-438150-6.50018-2.

Brackstone, G. (1999), Article Managing data quality in a statistical agency Managing data quality in a statistical agency, Survey Methodology, 25(2), 12–13, https://www150.statcan.gc.ca/n1/en/pub/12-001-x/1999002/article/4877-eng.pdf?st=i9v4yyJ1.

Brewer, S., Pearson, S., Maull, R., Godsiff, P., Frey, J. G., Zisman, A., Parr, G., McMillan, A., Cameron, S., Blackmore, H., Manning, L., & Bidaut, L. (2021), A trust framework for digital food systems, Nature Food 2021 2:8, 2(8), 543–545, https://doi.org/10.1038/s43016-021-00346-1.

Carter, L., & Bélanger, F. (2005), The utilization of e-government services: citizen trust, innovation and acceptance factors*, Information Systems Journal, 15(1), 5–25, https://doi.org/10.1111/j.1365-2575.2005.00183.x.

Cavoli, C., Christie, N., Mindell, J., & Titheridge, H. (2015), Linking transport, health and sustainability: Better data sets for better policy-making, Journal of Transport & Health, 2(2), 111–119, https://doi.org/10.1016/j.jth.2014.08.001.

Cerema, (2023, October 18), Les dispositifs de comptage des cyclistes : Retour sur le Rendez-vous Mobilités du 28 septembre 2023, https://www.cerema.fr/fr/actualites/dispositifs-comptage-cyclistes-retour-rendez-vous-mobilites.

Chevallier, T., Andrzejewski, E., Blanco Justicia, A., Dazzi, P., De-Ryck, D., Latrubesse, F., Lauer, J., Renso, C., Van de Hoef, S., & Wong, C. (2021), State-of-the-art on Mobility Data sharing standards, https://mobidatalab.eu/wp-content/uploads/2022/01/MobiDataLab-D2.4-StateOfTheArtOnMobilityDataSharingStandards-v2.0DRAFT.pdf.

Chevance, G., Nieuwenhuijsen, M., Braga, K., Clifton, K., Hoadley, S., Kaack, L. H., Kaiser, S. K., Lampkowski, M., Lupu, I., Radics, M., Velázquez-Cortés, D., Williams, S., Woodcock, J., & Tonne, C. (2024), Data gaps in transport behavior are bottleneck for tracking progress towards healthy sustainable transport in European cities, Environmental Research Letters, 19(5), https://doi.org/10.1088/1748-9326/AD42B3.

CNIL. (2024), Data protection around the world, Commission Nationale de l'Informatique et Des Libertés, https://www.cnil.fr/en/data-protection-around-the-world.

Cressman, C. (2021), Trust in Infrastructure, Commonplace, 1(1), 2021, https://doi.org/10.21428/6FFD8432.AE158F91.

DAMA UK. (2013), The Six Primary Dimensions for Data Quality Assessment: Defining Data Quality Dimensions.

DATEX II. (2024, February 5). DATEX II and TN-ITS converge for Enhanced Traffic Services Interoperability – DATEX II – European standard for traffic and travel information. Datex II Website, https://datex2.eu/2024/02/05/datex-ii-and-tn-its-merge-for-enhanced-traffic-services-interoperability/.

Davies, H. T. O., Nutley, S., & Smith, P. C. (2000), What Works? Evidence-based policy and practice in public services, In H. T. O. Davies, S. Nutley, & P. C. Smith (Eds.), What works?Evidence-based policy and practice in public services, The Policy Press, https://doi.org/10.1332/POLICYPRESS/9781861341914.003.0012.

de Streel, A., Kraemer, J., & Senellart, P. (2021), Making Data Portability More Effective for the Digital Economy, SSRN Electronic Journal, https://doi.org/10.2139/SSRN.3866495.

Digital Regulation Platform, (2024, October 31), Navigating Data Governance: A Guiding Tool for Regulators, https://digitalregulation.org/navigating-data-governance-a-guiding-tool-for-regulators/.

Digital Transport for Africa, (2023, August 22), DT4A Launches Low-Carbon Transport Futures Project in Lusaka, Digital Transport for Africa, https://digitaltransport4africa.org/fr/dt4a-launches-low-carbon-transport-futures-project-in-lusaka/.

Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport, European Commission (2010),Directive - 2010/40 - FR - EUR-Lex

DSSC. (2023, September), Technical Building Blocks - Building Blocks, Data Spaces Support Centre, https://dssc.eu/space/BBE/178422228/Technical+Building+Blocks.

Duenas-Cid, D., & Calzati, S. (2023), Dis/Trust and data-driven technologies, Internet Policy Review, 12(4), https://doi.org/10.14763/2023.4.1727.

Entur, (2024), Data Quality Dashboard Real-Time(SIRI-ET), Entur Website, https://data-quality.entur.no/.

Eselgroth, J. (2024, June 26), Data-Driven Decisions Or Decision-Driven Data? The Rise Of Decision Intelligence, Highlight, https://highlighttech.com/the-rise-of-decision-intelligence/.

Estermann, B., Fraefel, M., Neuroni, A. C., & Vogel, J. (2018), Conceptualizing a national data infrastructure for Switzerland, Information Polity, 23(1), 43–65, https://doi.org/10.3233/IP-170033.

Etalab, (2019), Data as an essential infrastructure - Report to the Prime Minister on the matter of data in the administration 2016-2017, In Direction interministérielle du numérique et du système d'information et de communication de l'Etat, La Documentation Française, https://www.etalab.gouv.fr/wp-content/uploads/2019/10/AGD_DataInfrastructure_EN.pdf.

European Commission, (n.d.), Creating a common European mobility data space, European Commission Website, Retrieved February 12, 2025, from https://transport.ec.europa.eu/transport-themes/smart-mobility/creating-common-european-mobility-data-space_en.

European Commission, (2020, February 19), Communication from the Commission to the European parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: A European strategy for data, EUR-Lex, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0066.

European Commission, (2022), Proposal for a Regulation of the European Parliament and of the Council on the European Health Data Space, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022PC0197.

European Commission, (2024, January 24), Second staff working document on data spaces, European Commission, https://digital-strategy.ec.europa.eu/en/library/second-staff-working-document-data-spaces.

Executive Office of the President, (2019), Memorandum for Heads of Executive Departments and Agencies, In Executive Office of the President, https://www.whitehouse.gov/wp-content/uploads/2019/07/M-19-23.pdf.

Fernandez, E. B., & Brazhuk, A. (2024), A critical analysis of Zero Trust Architecture (ZTA), Computer Standards & Interfaces, 89, 103832, https://doi.org/10.1016/J.CSI.2024.103832.

Frischmann, B. M. (2012), Infrastructure: The Social Value of Shared Resources, Infrastructure: The Social Value of Shared Resources, 1–436, https://doi.org/10.1093/ACPROF:OSO/9780199895656.001.0001.

Gaia-X Hub France, (2024, October 10), Decoding: "Data Space or Data Platform?" Gaia-X Hub France, https://www.gaia-x-hub.fr/en/decoding-data-space-or-data-platform/.

Giest, S. (2017), Big data for policymaking: fad or fasttrack? Policy Sciences, 50(3), 367–382, https://doi.org/10.1007/S11077-017-9293-1/METRICS.

Glazener, A., Sanchez, K., Ramani, T., Zietsman, J., Nieuwenhuijsen, M. J., Mindell, J. S., Fox, M., & Khreis, H. (2021), Fourteen pathways between urban transportation and health: A conceptual model and literature review, Journal of Transport & Health, 21, 101070, https://doi.org/10.1016/j.jth.2021.101070.

Gracia, D. B., & Casaló Ariño, L. V. (2015), Rebuilding public trust in government administrations through e-government actions, Revista Española de Investigación de Marketing ESIC, 19(1), 1–11, https://doi.org/10.1016/J.REIMKE.2014.07.001.

Grant-Muller, S. M., Gal-Tzur, A., Minkov, E., Nocera, S., Kuflik, T., & Shoor, I. (2015), Enhancing transport data collection through social media sources: methods, challenges and opportunities for textual data, IET Intelligent Transport Systems, 9(4), 407–417, https://doi.org/10.1049/IET-ITS.2013.0214.

Hammer, C., Kostroch, D. C., & Quiros-Romero, G. (2017), Big Data: Potential, Challenges and Statistical Implications, https://www.imf.org/en/Publications/Staff-Discussion-Notes/Issues/2017/09/13/Big-Data-Potential-Challenges-and-Statistical-Implications-45106.

Harrison, G., Grant-Muller, S. M., & Hodgson, F. C. (2020), New and emerging data forms in transportation planning and policy: Opportunities and challenges for "Track and Trace" data, Transportation Research Part C: Emerging Technologies, 117, https://doi.org/10.1016/J.TRC.2020.102672.

Head, B. W. (2010), Reconsidering evidence-based policy: Key issues and challenges, Policy and Society, 29(2), 77–94, https://doi.org/10.1016/j.polsoc.2010.03.001.

Höchtl, J., Parycek, P., & Schöllhammer, R. (2016), Big data in the policy cycle: Policy decision making in the digital era, Journal of Organizational Computing and Electronic Commerce, 26(1–2), 147–169, https://doi.org/10.1080/10919392.2015.1125187.

Homem de Gouveia, P., Boccioli, F., Wrzesińska, D., Kabbaj, L., & Manso García, J. (2023), Catch me if you can! How European Cities are regulating Shared Micromobility, https://www.polisnetwork.eu/wp-content/uploads/2023/11/SHARED-MICROMOBILITY-REPORT.pdf.

Hood, C., & Heald, D. (2006), Transparency: The Key to Better Governance?

Hossin, M. A., Du, J., Mu, L., & Asante, I. O. (2023), Big Data-Driven Public Policy Decisions: Transformation Toward Smart Governance, SAGE Open, 13(4), https://doi.org/10.1177/21582440231215123/ASSET/IMAGES/LARGE/10.1177_21582440231215123-FIG6.JPEG.

IGEDD. (2024, October), Les bilans Loti, Inspection Générale de l'Environnement et Du Développement Durable, https://www.igedd.developpement-durable.gouv.fr/les-bilans-loti-a549.html.

INASP. (2016), Evidence-Informed Policy Making Toolkit, https://www.inasp.info/sites/default/files/2018-04/EIPM%20Toolkit-Ed2-FULL.pdf.

Irish Department of Transport, (2023), Department of Transport Data Strategy 2024-2030, https://www.gov.ie/pdf/?file=https://assets.gov.ie/291948/23e611f0-f3ff-4729-b0ff-0a43375ea8b7.pdf#page=null.

iSHARE Foundation, (2024), Guiding principles, IShare Trust Framework, https://framework.ishare.eu/introduction/guiding-principles.

ITF. (2015), Big Data and Transport: Understanding and assessing options, In Corporate Partnership Board Report, OECD Publishing, https://www.itf-oecd.org/big-data-and-transport.

ITF. (2016), Data-Driven Transport Policy, In Corporate Partnership Board Report, OECD Publishing, https://www.itf-oecd.org/data-driven-transport-policy.

ITF. (2017), Ex-Post Assessment of Transport Investments and Policy Interventions, In ITF Roundtable Reports (Issue No. 162), OECD Publishing, https://doi.org/10.1787/9789282108154-EN.

ITF. (2021a), Developing Innovative Mobility Solutions in the Brussels-Capital Region, International Transport Forum Policy Papers, 97, https://doi.org/10.1787/37CC3A85-EN.

ITF. (2021b), Reporting Mobility Data Good Governance Principles and Practices, https://www.oecd.org/content/dam/oecd/en/publications/reports/2022/03/reporting-mobility-data_6db332c2/b988f411-en.pdf.

ITF. (2021c), Travel Transitions: How Transport Planners and Policy Makers Can Respond to Shifting Mobility Trends, In ITF Research Reports, OECD Publishing, https://doi.org/10.1787/9A83C2F7-EN.

ITF. (2022), The Safe System Approach in Action, https://www.itf-oecd.org/sites/default/files/docs/safe-system-in-action.pdf.

ITF. (2023a), Mix and MaaS Data Architecture for Mobility as a Service, https://doi.org/10.1787/24108871.

ITF. (2023b), Shaping Post-Covid Mobility in Cities: Summary and Conclusions, In ITF Roundtable Reports (Issue 190), OECD Publishing, https://doi.org/10.1787/A8BF0BDB-EN.

ITF. (2023c), Using Safety Performance Indicators to Improve Road Safety: The Case of Korea, https://www.itf-oecd.org/sites/default/files/docs/safety-performance-indicators-road-safety-korea_0.pdf.

ITF. (2024a), Reaching Critical MaaS: Interregional Co-operation for Seamless Mobility in the Brussels-Capital Region, In Case-Specific Policy Analysis, OECD Publishing, https://www.itf-oecd.org/reaching-critical-maas-seamless-mobility-brussels.

ITF. (2024b), The Future of Public Transport Funding, In ITF Research Reports, OECD Publishing, https://doi.org/10.1787/82A4BA65-EN.

Jalava, J. (2006), Trust as a Decision: The Problems and Functions of Trust in Luhmannian Systems Theory, https://core.ac.uk/download/14918770.pdf.

Kaiser, S., & Aigner-Breuss, E. (2017), Effectiveness of Road Safety Campaigns, In European Road Safety Decision Support System, H2020 project SafetyCube, https://www.roadsafety-dss.eu/assets/data/pdf/synopses/Effectiveness_of_Road_Safety_Campaigns_26072017.pdf.

Kennedy, H. (2020, August 20), Should more public trust in data-driven systems be the goal? Ada Lovelace Institute, https://www.adalovelaceinstitute.org/blog/should-more-public-trust-in-data-driven-systems-be-the-goal/.

Kumagai, S., & Iorio, F. (2020), Building Trust in Government through Citizen Engagement, https://documents1.worldbank.org/curated/ar/440761581607070452/pdf/Building-Trust-in-Government-through-Citizen-Engagement.pdf.

La Fabrique des Mobilités, (2022), Baromètre des standards de la mobilité 2022, Wiki FabMob, https://wiki.lafabriquedesmobilites.fr/wiki/Barom%C3%A8tre_des_standards_de_la_mobilit%C3%A9_2022#6_Standards_MaaS.

Laanaya, A. (2023, September 15), Understanding Identification, Authentication, Authorization, Medium, https://medium.com/@laanayabdrzak/understanding-identification-authentication-authorization-1ab20e009102.

Langer, L., Tripney, J., & Gough, D. (2016), The science of using science: researching the use of research evidence in decision-making, In EPPI-Centre, Social Science Research Unit, UCL Institute of Education, University College London, https://eppi.ioe.ac.uk/cms/Default.aspx?tabid=3504.

Lee, K., & Sener, I. N. (2020), Emerging data for pedestrian and bicycle monitoring: Sources and applications, Transportation Research Interdisciplinary Perspectives, 4, 100095, https://doi.org/10.1016/J.TRIP.2020.100095.

Leicester, G. (1999), The seven enemies of evidence-based policy, Public Money and Management, 19(1), 5–7, https://doi.org/10.1111/1467-9302.00145/ASSET//CMS/ASSET/C3DEDCCB-48D3-441C-AAE4-A99DD7DED676/1467-9302.00145.FP.PNG.

Lepri, B., Oliver, N., Letouzé, E., Pentland, A., & Vinck, P. (2018), Fair, Transparent, and Accountable Algorithmic Decision-making Processes: The Premise, the Proposed Solutions, and the Open Challenges, Philosophy and Technology, 31(4), 611–627, https://doi.org/10.1007/S13347-017-0279-X/METRICS.

Liu, X., & Dijk, M. (2022), How more data reinforces evidence-based transport policy in the Short and Long-Term: Evaluating a policy pilot in two Dutch cities, Transport Policy, 128, 166–178, https://doi.org/10.1016/j.tranpol.2022.09.022.

Liverani, M., Hawkins, B., & Parkhurst, J. O. (2013), Political and Institutional Influences on the Use of Evidence in Public Health Policy, A Systematic Review, PLOS ONE, 8(10), e77404, https://doi.org/10.1371/JOURNAL.PONE.0077404.

Lucas, P. J., Robinson, R., & Treacy, L. (2020, December), What is Data Poverty? Nesta, https://media.nesta.org.uk/documents/What_is_Data_Poverty.pdf.

Mairie de Paris, (2018), Charte de bonne conduite relative à la location de vélos en libre-service sans stations, In Mairie de Paris, https://cdn.paris.fr/paris/2019/07/24/b0af7dff4543ccb0402a8381f0833bf2.pdf.

Metzenbaum, S., Katz, B., & Nightingale, D. (2022), Government Decisions and Issues about Collecting and Using Data, https://www.urban.org/sites/default/files/2022-12/Government%20Decisions%20and%20Issues%20about%20Collecting%20and%20Using%20Data.pdf.

Metzenbaum, S., Nightingale, D., & Katz, B. (2021), What Is Evidence, In Urban Institute, https://www.urban.org/sites/default/files/publication/104968/what-is-evidence-basics-of-evidence-brief-1.pdf.

Metzenbaum, S., Nightingale, D., & Katz, B. (2022), Communicating Evidence, In Urban Institute, https://www.urban.org/sites/default/files/2022-09/Communicating%20Evidence%2C%20Basics%20of%20Evidence%20Brief%20%232.pdf.

Mokbel, M., Sakr, M., Xiong, L., Züfle, A., Almeida, J., Anderson, T., Aref, W., Andrienko, G., Andrienko, N., Cao, Y., Chawla, S., Cheng, R., Chrysanthis, P., Fei, X., Ghinita, G., Graser, A., Gunopulos, D., Jensen, C. S., Kim, J.-S., … Zimányi, E. (2024), Mobility Data Science: Perspectives and Challenges, ACM Transactions on Spatial Algorithms and Systems, 10(2), 1–35, https://doi.org/10.1145/3652158.

New Zealand Government, (2022), The New Zealand Transport Evidence Base Strategy, https://www.transport.govt.nz/area-of-interest/strategy-and-direction/transport-evidence-base-strategy.

New Zealand Ministry of Transport, (n.d.), Transport Indicators, Ministry of Transport Website, Retrieved November 9, 2024, from https://www.transport.govt.nz/statistics-and-insights/transport-indicators.

New Zealand Ministry of Transport, (2018), A framework for shaping our transport system: Transport outcomes and mode neutrality, https://transportnz-uat.cwp.govt.nz/assets/Uploads/Paper/Transport-outcomes-framework.pdf.

New Zealand Ministry of Transport, (2023), Transport Evidence Base Strategy: TEBS Progress Report, https://www.transport.govt.nz/assets/Uploads/TEBS-2022-Progress-Report-FINAL.pdf

Nieuwenhuijsen, M. J. (2016), Urban and transport planning, environmental exposures and health-new concepts, methods and tools to improve health in cities, Environmental Health, 15(S1), S38, https://doi.org/10.1186/s12940-016-0108-1.

OECD. (2015), Data-Driven Innovation: Big Data for Growth and Well-Being, OECD Publishing, https://doi.org/10.1787/9789264229358-EN.

OECD. (2017), Trust and Public Policy: How Better Governance Can Help Rebuild Public Trust, In OECD Public Governance Reviews, OECD Publishing, https://doi.org/10.1787/9789264268920-EN.

OECD. (2018), Leveraging accessibility through high-quality open data, In Open Government Data Report: Enhancing Policy Maturity for Sustainable Impact (pp. 87–118), OECD Publishing, https://doi.org/10.1787/9789264305847-6-EN.

OECD. (2019a), Enhancing Access to and Sharing of Data, OECD Publishing, https://doi.org/10.1787/276AACA8-EN.

OECD. (2019b), The Path to Becoming a Data-Driven Public Sector, In OECD Digital Government Studies, OECD Publishing, https://doi.org/10.1787/059814A7-EN.

OECD. (2020), Enhanced Access to Publicly Funded Data for Science, Technology and Innovation, OECD Publishing, https://doi.org/10.1787/947717BC-EN.

OECD. (2022), Going Digital Guide to Data Governance Policy Making, OECD Publishing, https://doi.org/10.1787/40D53904-EN.

OECD. (2024), OECD Survey on Drivers of Trust in Public Institutions – 2024 Results, OECD Survey on Drivers of Trust in Public Institutions – 2024 Results, https://doi.org/10.1787/9A20554B-EN

Okyere, S. A., Frimpong, L. K., Oviedo, D., Mensah, S. L., Fianoo, I. N., Nieto-Combariza, M. J., Abunyewah, M., Adkins, A., & Kita, M. (2024), Policy-reality gaps in Africa's walking cities: Contextualizing institutional perspectives and residents' lived experiences in Accra, Journal of Urban Affairs, https://doi.org/10.1080/07352166.2023.2296105.

ONS. (n.d.), Looking after and using data for public benefit, Office for National Statistics, Retrieved November 8, 2024, from https://www.ons.gov.uk/aboutus/transparencyandgovernance/datastrategy/lookingafterandusingdataforpublicbenefit#how-do-we-collect-manage-and-use-data-while-providing-the-best-standard-of-statistical-information-for-the-public.

Open Data Watch, (2018), The Data Value Chain: Moving from Production to Impact, https://opendatawatch.com/wp-content/uploads/2018/03/Data_Value_Chain-WR-1803126.pdf.

Open Mobility Foundation, (2024), Mobility Data Specification: Policy, Github, https://github.com/openmobilityfoundation/mobility-data-specification/tree/main/policy.

Ordnance Survey, (2024), AddressBase, https://www.ordnancesurvey.co.uk/products/addressbase.

Phillips, R. O., Ulleberg, P., & Vaa, T. (2011). Meta-analysis of the effect of road safety campaigns on accidents, Accident; Analysis and Prevention, 43(3), 1204–1218, https://doi.org/10.1016/J.AAP.2011.01.002.

Ponti, M., Portela, M., Pierri, P., Daly, A., Milan, S., Kaukonen, R., Maccani, G., Peter de Souza, S., & Thabit González, S. (2024), Unlocking Green Deal Data: Innovative Approaches for Data Governance and Sharing in Europe, In Publications Office of the European Union (Issue JRC139026), https://doi.org/10.2760/0517622.

PrepDSpace4Mobility, (2024), Towards a common European mobility data space Perspectives, recommendations and building blocks Deliverable D3.1, In PrepDSpace4Mobility (Vol. WP3, Issue D3.1), https://mobilitydataspace-csa.eu/wp-content/uploads/2024/03/2024-03-19-deliverable-d3.1-analysis-report-v3.pdf.

Sanderson, I. (2003), Is it 'what works' that matters? Evaluation and evidence-based policy-making, Research Papers in Education, 18(4), 331–345, https://doi.org/10.1080/0267152032000176846.

Si, S., Xiong, W., & Che, X. (2023), Data Quality Analysis and Improvement: A Case Study of a Bus Transportation System, Applied Sciences, 13(19), 11020, https://doi.org/10.3390/app131911020.

Simonofski, A., Handekyn, P., Vandennieuwenborg, C., Wautelet, Y., & Snoeck, M. (2023), Smart mobility projects: Towards the formalization of a policy-making lifecycle, Land Use Policy, 125, 106474, https://doi.org/10.1016/j.landusepol.2022.106474.

Smith, C. (2009), A Review Of The British Academy Report, Punching Our Weight: The Humanities And Social Sciences In Public Policy Making, Economic Affairs, 29(1), 95–97, https://doi.org/10.1111/j.1468-0270.2009.01878.x.

Solatorio, A., & Dupriez, O. (2024, May 22), Beyond keywords: AI-driven approaches to improve data discoverability, World Bank Balogs, https://blogs.worldbank.org/en/opendata/beyond-keywords--ai-driven-approaches-to-improve-data-discoverab0.

Star, S. L. (1999), The Ethnography of Infrastructure, Http://Dx.Doi.Org/10.1177/00027649921955326, 3, 377–391, https://doi.org/10.1177/00027649921955326.

Steer, (2022, December 1), Vision-led planning for an uncertain future, https://steergroup.com/insights/news/vision-led-planning-uncertain-future.

Sustainable Mobility for All, (2021), Sustainable Mobility: Policy Making for Data Sharing, https://www.sum4all.org/data/files/policymakingfordatasharing_pagebypage_030921.pdf.

Swiss Federal Office of Transport, (2023), Discussion basis: Proposal for a MODI standardisation concept - Focus on NADIM. https://www.bav.admin.ch/dam/bav/en/dokumente/uebergeordnete-themen/mmm/diskussionsgrundlage-standardisierungkonzept-modi-fokus-nadim-v2.pdf.download.pdf/diskussionsgrundlage-standardisierungkonzept-modi-fokus-nadim-v2.pdf.

Temoshok, D., & Abruzzi, C. (2018), Developing Trust Frameworks to Support Identity Federations, National Institute of Standards and Technology, NISTIR 8149, https://doi.org/10.6028/NIST.IR.8149.

Transport Canada, (2019, July 10), Transport Canada's Enforcement Policy, Transport Canada Website, https://tc.canada.ca/en/corporate-services/transparency/transport-canada-s-enforcement-policy.

TRICS. (2021), TRICS Guidance Note Note on the Practical Implementation of the Decide & Provide Approach, https://www.trics.org/img/trics%20dp%20guidance_web.pdf.

TRICS. (2022), TRICS Decide and Provide Guidance Summary, https://www.trics.org/img/trics_dp_guidance_summary.pdf.

UK Government, (2021, December 21), Data Standards Authority Strategy 2020 to 2023, Gov.Uk, https://www.gov.uk/guidance/data-standards-authority-strategy-2020-to-2023#the-dsas-role-and-scope.

Umbach, G., Guidi, C. F., & Russo, M. (2018), Evidence-Based Policy-Making: From Data To Decision-Making, In Policy Brief (Issue 2018/15), Robert Schuman Centre for Advanced Studies, https://cadmus.eui.eu/bitstream/handle/1814/57324/PB_2018_15.pdf?sequence=4.

US GAO. (2024), Financial Management Systems: DHS Should Improve Plans for Addressing Its High-Risk Area and Guidance for Independent Reviews, https://www.gao.gov/assets/gao-24-106895.pdf.

van der Peet, L., Bharosa, N., Dijkhuis, S., & Janssen, M. (2024), Understanding Trust Frameworks: Goals and Components Identified Through a Case Study, Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), 14891 LNCS, 223–238, https://doi.org/10.1007/978-3-031-70804-6_15.

Van Der Sloot, B., & Keymolen, E. (2022), Can we trust trust-based data governance models? Data & Policy, 4(2), e45, https://doi.org/10.1017/DAP.2022.36.

Vincent-Lancrin, S., & González-Sancho, C. (2023), Data and technology governance: fostering trust in the use of data, In OECD Digital Education Outlook 2023: Towards an Effective Digital Education Ecosystem, OECD Publishing, https://doi.org/10.1787/fd1b8818-en.

Webb, K. (2020, August 2020), Local power in the age of digital policing, Triangulator, https://triangulator.org/blog/local-power-digital-policing/.

WEF. (2024), Global Risks Report 2024, In World Economic Forum, https://www.weforum.org/publications/global-risks-report-2024/digest/.

Weyrauch, V., Echt, L., & Suliman, S. (2016), Knowledge into policy: Going beyond "Context matters" Knowledge into policy, https://i2s.anu.edu.au/wp-content/uploads/2018/04/Going-beyond-context-matters-Framework_PI.compressed.pdf.

Witlox, F. (2015), Beyond the Data Smog? Transport Reviews, 35(3), 245–249, https://doi.org/10.1080/01441647.2015.1036505.

WSDOT. (2023), Performance-based Project Evaluation Model Summary Report, https://wsdot.wa.gov/sites/default/files/2023-06/WSDOT-Project-Evaluation-Model-Report-June2023.pdf.

Annex A. Lists of Roundtable participants

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International Transport Forum

Data-informed Mobility Governance

Digitalisation has generated a wealth of data on transport services, activities, behaviours, offers, infrastructure, and traffic conditions. For governments, improving how they access and use this data plays an important part in meeting their objectives, both at the national and local levels.

To ensure that transport policy decisions ultimately serve the public good, policy makers must gain the best possible understanding of their impacts. This, in turn, requires evidence based on accurate data – among other things. Such transport data can help public authorities capture and understand these policy relevant phenomena, how they interact with their public policy objectives, and help regulate mobility services for better outcomes.

This report explores best practices regarding the collection and use of data and evidence to inform policy decisions. In a time when trust in public authorities is eroding, this report looks at how public authorities can foster public trust in their actions by implementing trust mechanisms at the various stages of the data lifecycle.

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Published: 05/2025 | Photo credit: Shutterstock