Assessment of New Mobility Concepts

A GUIDELINE FOR CITIES

Part of KIP NMC 2024 WP4.2

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TNO innovation for life

Contents

Contextualisation

The rapid pace of innovation in mobility technologies, including shared mobility services, autonomous vehicles, and other emerging transportation concepts, is fundamentally reshaping how cities and regions approach urban transportation. These advancements, while offering promising solutions to long-standing urban challenges, also demand significant attention, time, and resources from governments. As these technologies proliferate, their potential to impact urban environments – both positively and negatively – is becoming increasingly apparent. Yet, the outcomes of their widespread adoption remain uncertain, making it imperative for local governments to navigate these changes strategically.

Cities and regions are at a critical juncture where they must leverage emerging mobility technologies to achieve their long-term goals while avoiding the pitfalls of becoming mere testing grounds for unproven concepts. To do this effectively, they need to ensure that they are not only open to innovation but also mindful of the potential risks and unintended consequences these technologies might bring. This means being vigilant in identifying and mitigating potential disruptions to urban life, understanding the broader implications for equity, accessibility, and sustainability, and making informed decisions about the allocation of public sector resources – in terms of time, money, public trust, and political capital.

The following assessment framework for new mobility concepts is meant to support local governments in this endeavour. This framework provides a structured approach to help governments evaluate the benefits, risks, and trade-offs associated with both current and future mobility innovations. By employing this framework, local governments can make prudent and responsible decisions that balance the excitement and promise of new technologies with the need for cautious optimism. It will enable them to remain adaptable as technologies evolve, ensuring they can capitalise on opportunities while managing risks and protecting the public interest. Ultimately, this approach should help local governments not only survive but thrive in the face of rapid technological change.

Contextualisation

Intended target groups

- Cities, towns, provinces, and others.
- Other public authorities (e.g., ministries).

Intended uses for the framework

Support target group stakeholders to better evaluate the potential challenges, benefits and usefulness of a NMC, as well as how well it aligns with their goals.

- Focus on the (societal) goal / problem to be solved

Intended outcomes of the framework

Beter understanding of what is the solution (concept), what are the (existing) alternatives, what flanking additional policies are present/needed, and what are the potential unintended and/or cascading impacts of the NMC.

- How well do we know this NMC?
- How much info do we need about this NMC?
- How to demarcate?
- When is this NMC a good idea to pursue or support? How to best do this?

Contextualisation

How this framework can be applied:

Problems

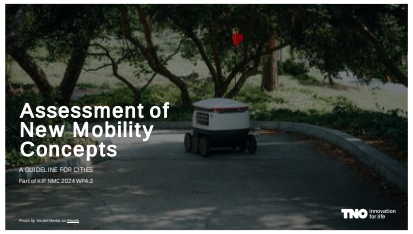
Existing (perceived) problem

Potential solutions

Is this (potential) NMC a good solution?

In reality this many times ends up being the starting point (not the underlying problem)

Assessment framework



Decision information

Opportunities to address goals

Challenges to address in implementation process

Decision

Actions and strategies

Implementation

Implementation process

Golden questions in the assessment of NMCs

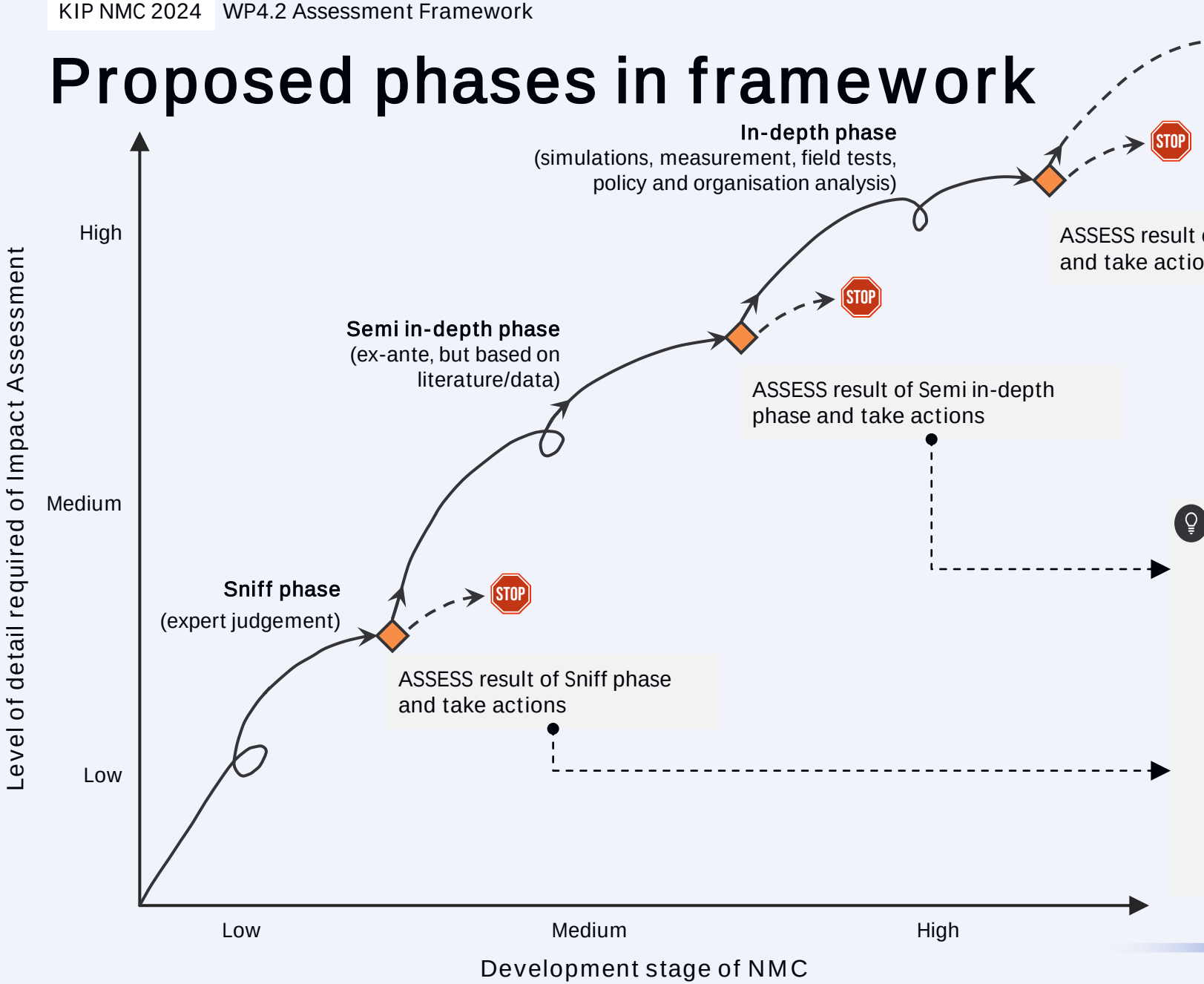
1. How close is this NMC to being functional as intended?
2. Does the NMC address or aim to solve a real and important problem?
3. Will there be (expected) uptake by users?
4. What are cascading impacts (intentional and unintentional) of this NMC?
5. How does this NMC compare to other alternatives to solve the challenge at hand?
6. Are the risks of the NMC proportional to the benefits?
7. Is there the needed support from key actors in society?
8. Is there a feasible business model and/or value case?
9. Is the organisation ready in terms of human, financial and institutional resources to be able to implement the NMC?
10. Are there any additional arguments/reasons for or against this NMC that should be considered?

There are different potential (combination of) actions and strategies that one might take as a result of answering the golden questions for a given NMC. These include but are not limited to:

- Support and accelerate deployment of NMC
- Shape deployment of NMC
- Wait and keep monitoring developments on the NMC
- Partially implement NMC
- Stop NMC completely (e.g., if concept is harmful)

Over time, stakeholders might need to (or want to) reassess the NMC and adjust strategies.

Proposed phases in framework



ASSESS result of Sniff phase and take actions

ASSESS result of Semi in-depth phase and take actions

ASSESS result of In-depth phase and take actions

After the assessment of the NMC at different phases, possible actions and strategies include (not all actions are applicable to all phases):

- Move to next phase (**if applicable**)
- Make (small) changes and redo phase(s), or some specific steps (iterate)
- Stop NMC deployment at given phase
- Wait and keep monitoring developments on the NMC
- Support and accelerate deployment of NMC
- Shape deployment of NMC
- Partially implement NMC.

Structure of the NMC assessment framework

The operationalisation of the NMC assessment framework takes place according to different proposed phases. Each phase is characterised by its required level of detail of the NMC impact assessment (low – high) and the development stage of the NMC being considered (low – high). The development stage of a NMC is given by its (perceived) technological maturity, costs, and potential benefits, as well as to what reasons one has to research this specific NMC (why should one pay attention to it?). The phases are mostly expected to be composed of ex-ante analyses [1].

Phase 0 (sniff phase):

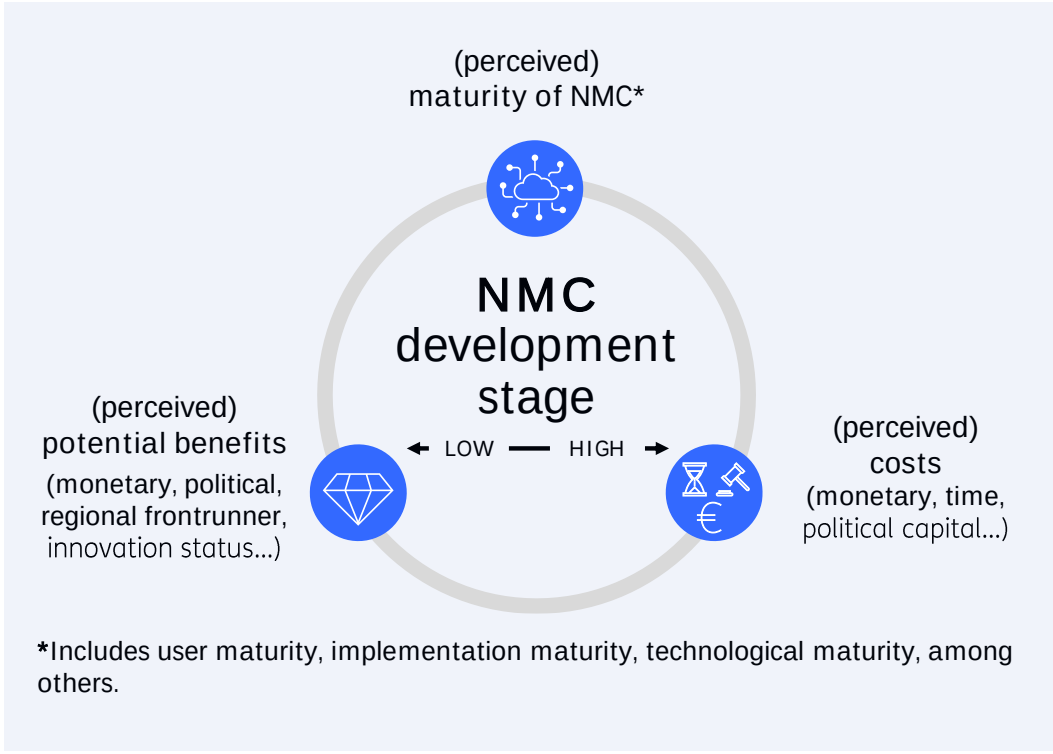
- Characterised by Low-Medium development stage of NMC and L-M level of detail required for the impact assessment.
- Comprises desk research, expert interviews and preliminary exploratory calculations
- Low estimated assessment expenditure

Phase 1 (Semi in-depth phase):

- Characterised by Medium development stage of NMC and Medium level of detail required for the impact assessment.
- Strongly based on literature/data and potentially some targeted simulation studies.
- Intermediate estimated assessment expenditure

Phase 2 (In-depth phase):

- Characterised by M-H development stage of NMC and high level of detail required for the impact assessment.
- Comprises e.g., simulation models, measurements and field tests.
- High estimated assessment expenditure



*Includes user maturity, implementation maturity, technological maturity, among others.

[1] Ex-ante refers analyses that are performed when an initiative is under consideration, but has not yet started (i.e., performed prior to investing in an initiative).

Proposed steps and phases

ORDER OF PROGRESSION

Step 1	Step 2	Step 3
Concept/ system description	Impact assessment	Implementation assessment

Phase 0 — Level of detail ●○○
Sniff phase

Phase 1 — Level of detail ●●○
Semi in-depth phase

Phase 2 — Level of detail ●●●
In-depth phase

Proposed steps and phases

ORDER OF PROGRESSION

	Step 1 Concept/ system description	Step 2 Impact assessment	Step 3 Implementation assessment
Phase 0 Sniff phase	Level of detail ●○○	All questions and steps are addressed in the sniff phase, but a low(er) level of detail is required from the impact assessment at this level	Actions and strategies at the sniff phase • Proceed to next phase • Stop development of NMC • Make (small) changes and redo phase • Among others
Phase 1 Semi in-depth phase	Level of detail ●●○	All questions and steps are addressed in the semi in-depth phase, but an intermediate level of detail is required from the impact assessment at this level	Actions and strategies at the semi in-depth phase • Proceed to next phase • Stop development of NMC • Make (small) changes and redo phase • Among others
Phase 2 In-depth phase	Level of detail ●●●	All questions and steps are addressed in the in-depth phase, but a high(er) level of detail is required from the impact assessment at this level	Actions and strategies at the in-depth phase • Proceed to implementation • Stop development of NMC • Make (small) changes and redo phase • Among others

Proposed steps and phases

ORDER OF PROGRESSION

Phase 0
Sniff phase

Level of detail ●○○

Phase 1
Semi in-depth phase

Level of detail ●●○

Phase 2
In-depth phase

Level of detail ●●●

Step 1
Concept/ system description

The goal of this step is to obtain a better understanding of the concept/system related to the NMC:

- Define 'it' – system description (see FAME framework for details).
- Define what type of problem to be solved (the concept under consideration). Is it a clear, complicated, complex, or wicked problem?
- Determine the nature/scope of the impact assessment (e.g., vehicle/user-traffic-societal level, expert judgment, in-depth impact assessment...)

Step 2
Impact assessment

The goal of this step is to perform an impact assessment of the NMC under consideration, addressing:

- What is the expected effect of the NMC (e.g., long versus short term, intended vs unintended consequences, impact on equity...)?
- What is the quantity and quality of available data/information?
- What is (un)certain?
- What is the maturity level of the concept?

Step 3
Implementation assessment

The goal of this step is to perform an implementation assessment of the NMC under consideration, addressing:

- What is the perception of key societal actors regarding this NMC?
- How strong is the business case for this NMC?
- Is there a feasible business model for the (widespread) deployment of this NMC?
- How is the organisation/ecosystem support for this NMC?

Proposed steps and phases

ORDER OF PROGRESSION

Phase 0
Sniff phase

Level of detail ●○○

Phase 1
Semi in-depth phase

Level of detail ●●○

Phase 2
In-depth phase

Level of detail ●●●

Step 1
Concept/system description

Q1. How close is this NMC to being functional?

Q2. Does the NMC address or aim to solve a real and important problem?

Step 2
Impact assessment

Q3. Will there be (expected) uptake by users?

Q4. What are cascading impacts (intentional and unintentional)?

Q5. How does this NMC compare to other alternatives to solve the challenge at hand?

Q6. Are the risks of the NMC proportional to the benefits?

Step 3
Implementation assessment

Q7. Is there the needed support from key actors in society?

Q8. Is there a feasible business model and/or value case?

Q9. Is the organisation ready in terms of human, financial and institutional resources to be able to implement the NMC?

Q10. Are there any additional arguments/reasons for or against this NMC that should be considered?

Q1 Concept/system description

How close is this NMC to being functional as intended?

Description: This question aims to explore the current state of the NMC in terms of functionality, maturity and innovation levels, and expected added value. After going through this question, sub-questions and key considerations, one should be able to have a better understanding of the system in which the NMC is embedded in order to perform an impact assessment.

Key sub-questions and considerations:

- How well does the NMC function (considering hardware, software, orgware)?
- Does the new mobility concept function as intended (intended tasks or functions)?
- Determine the functions of the system/NMC (hardware, software, orgware) that are in scope of the impact assessment – vehicle/user-traffic-societal level, expert judgment vs in-depth impact assessment, etc.
- What is the expected added value? Are there (un)expected side effects?
- How mature is this concept? How innovative/disruptive is it?
- Keep the additional questions that come up, they may become future research questions.

Supporting references

- Impact Assessment Framework for Disruptive Innovations in transport
- EU Common Evaluation Methodology for CCAM (system description, technical evaluation)
- FESTA Handbook for Field Operational Tests (FESTA V) (Description of functions)

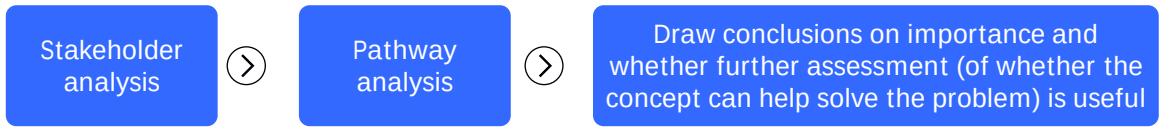
Q2 Concept/system description

Does the NMC address a real and important problem?

Description: This question aims to explore the challenges, problems or opportunities that the NMC aims to address, as well as how important and real they are perceived by key stakeholders.

Key sub-questions and considerations:

- Do we have confidence that the concept addresses the problem at hand? What do the stakeholders say? Does this NMC address opportunities to make things better?
- "Existing" can also be problems or opportunities that we can see coming (even if not here yet), as long as the impact assessment team or the stakeholders deem them to be a real and important issues.
- Whose perspective are we considering (to build transparency and accountability)?
- End result can be a theory of change describing impact pathways from an intervention through the real world to the indicators for impact (e.g. using causal diagrams)
- Steps:



- Are there showstoppers that say "don't spend any more resources on it"?

Supporting references

- Equitable AV Development Framework
- Strategic city documents (strategic plan, mobility plan, resilience strategy...)

Q3 Impact assessment

Will there be (expected) uptake by users?

Description: This question aims to explore the (potential) market uptake for the NMC, including potential user group segmentations, main motivations for interest in NMC, barriers and risks associated with the NMC uptake.

Key sub-questions and considerations:

- Which user groups do we want to distinguish (also including innovation adoption attitudes, e.g., early adopters vs general population)?
- Overuse: can it be expected that (certain groups of) users will want to use the NMC excessively (potentially leading to external or equity problems)? Are there better alternatives? (see Question 5 – "How does this NMC compare to other alternatives to solve the challenge at hand?")
- What issues might impact the uptake of this NMC? Is there risk of underuse?
- What are the main barriers for the uptake of this NMC (e.g., price, ease of use, health/safety, cultural, market competition, entry barriers…) ?
- What are main motivations to use the NMC?
- Are benefits and burdens distributed in an equitable way? (see Question 4 – "What are cascading impacts (intentional and unintentional)?")
- What are the results of user acceptance surveys?

Supporting references

- Equitable AV Development Framework
- Public Mobility – Role of Government Framework
- EU Common Evaluation Methodology for CCAM (user impact areas)
- FESTA Handbook for Field Operational Tests (FESTA V) (user acceptance)

Q4 Impact assessment

What are cascading impacts (intentional and unintentional) of this NMC?

Description: This question aims to explore secondary effects that a NMC can have, both intentional or unintentional, and desired or undesired.

Key sub-questions and considerations:

- Cascading effects refers to first, second, third etc. impacts of something (usually called direct and indirect impacts). Cascading effects can be intended or unintended, and desirable or undesirable.
- Considerations regarding the time horizon of cascading effects is important because you will want to know the longer-term impacts of a NMC, once the system has stabilised (but it is hard to know the moment it has stabilised, also because of external impacts).
- Consider Broad Welfare (BW) “here and now”, “later”, and “elsewhere” perspectives: different time horizons and geographical regions, distribution effects over user groups, regions and generations, various dimensions of BW, objective and subjective indicators (perception). Consider interactions between indicators (trade-offs and synergies).
- Are there win-win situations or synergies?
- Are there lose-lose situations or downward spirals?
- Is it competing with other solutions? From what is it taking resources away from?

Supporting references

- EU Common Evaluation Methodology for CCAM
- Broad Welfare in the mobility domain
- Urbanism Next Framework
- Sustainable Urban Design Framework
- M&E Raamwerk (e.g. causal diagrams)

Q5 Impact assessment

How does this NMC compare to other alternatives to solve the challenge at hand?

Description: This question aims to explore other alternatives that are (can be) available to address the current challenge in order to assess if the NMC is indeed the preferred alternative.

Key sub-questions and considerations:

- What would be relevant alternatives? (mobility system or outside mobility system).
- What are relevant assessment criteria for comparing the alternatives?
  - Cost in euros, effort involved, space involved, trust, feasibility etc.
  - From Balanced Spatial Choices: future-proof, area-based, integral, multi-level (in terms of government), inclusive, value driven (clarity about the underlying values), transparent.
- Are the efforts (expected to be) proportional to the outcome?

Supporting references

TBD

Q6 Impact assessment

Are the risks of the NMC proportional to the benefits?

Description: This question aims to explore the (perceived) risks and (perceived) benefits associated with the NMC in order to assess how they compare to each other.

Key sub-questions and considerations:

- What are the risks of the NMC, given its current level of maturity? E.g. safety, whether or not the system can go rogue (security), investment costs, etc.
- Are those risks reduced or eliminated with higher maturity levels?
- What are the benefits to weigh the risks against?
- What do we see as “just” when deciding a risk is acceptable? What ethical perspectives are being considered?

Supporting references

TBD

Q7 Implementation assessment

Is there the needed support from key actors in society?

Description: This question aims to explore the current level of support that the NMC would be expected to have from key societal actors. Having a clear understanding of the (expected) level of support from key actors towards a NMC is crucial from an implementation point of view, as it might highlight important forces/groups that may make or break the deployment of the NMC.

Key sub-questions and considerations:

- An innovation can work technically, but may be hard to embed in society for various reasons (political, economic, social, technological, legal and environmental factors – PESTLE – and local, national or global scales – LoNG)
- The aim of TNO's SEL methodology is to assess the societal embeddedness levels: is an innovation ready for implementation? This analysis framework helps to analyse four categories: 1) Market and resources, 2) Policy regulations, 3) Stakeholder involvement and 4) Environment. It support questions like: Is society ready for this? What is the legal and regulatory situation? And what about funding and the business case?
- Support and business model are very important but not sufficient for successful implementation. There is also the need for correct governance, legal framework, organisation structure, political/leadership support, skills, knowledge in place…
- There may be public support to solve the problem, but not for the solutions proposed
- Consider also:

The diversity of governmental stakeholders | Lobby groups | The media | The general public, including non-users of the concept

Supporting references

- Societal Embeddedness Level (SEL)
- LoNG PESTLE
- Impact Assessment Framework for Disruptive Innovations in transport (coherent value network)
- Tools and Levers to Achieve Equitable Outcomes Through AV Deployment
- Public Mobility – Role of Government Framework
- AVs: A Guide For Cities

Q8 Implementation assessment

Is there a feasible business model and/or value case?

Description: This question aims to explore what is the business case associated with the (large scale) deployment of the NMC. Topics related to the business model associated with the NMC are addressed in order to assess the feasibility of implementing the NMC.

Key sub-questions and considerations:

- The possibility to investigate this properly depends on the TRL and SEL. If very low, this can only be done in an explorative way.
- At higher TRL/SEL, the concept is more mature and business models and/or value cases can be described. How feasible is the business model/value case of this NMC (perceived to be)?
- Other topics to consider:
  - Market demand (audience, size, competition)
  - How easy/hard might adoption be (and how much investment will this require to build a market/demand)
  - Technical feasibility (how much investment will be needed to get the technology to a state it can be piloted, and then can be deployed at scale)
  - Are there any costly/difficult regulatory barriers (compliance, licensing, IP).
  - Production costs, operation costs, startup costs, insurance costs.
  - Complexity of operations (will this be difficult to organise, does it require any other (or many) partners).

Supporting references

- Impact Assessment Framework for Disruptive Innovations in transport
- Public Mobility – Role of Government Framework
- EU Common Evaluation Methodology for CCAM (e.g. socio-economics impact area)

Q9 Implementation assessment

Is the organisation ready in terms of human, financial and institutional resources to be able to implement the NMC?

Description: This question and corresponding considerations address the organisational readiness and ability to implement the innovation. Addressing complex societal challenges demands new ways of working and engagement of manifold stakeholders, in multiple sectors and favourable institutional frameworks to facilitate implementation and change. Innovation Capacity refers to the human, financial and institutional resources and skills that can catalyse, implement and promote innovative, collaborative, long-term solutions (OECD, 2019).

Key sub-questions and considerations:

- Consider the current status of Innovation Capacity in the organisation that is implementing the innovation through an assessment of Innovation Capacity Elements (Leadership, Organisation, Knowledge Management, Network and Learning).
- Consider where potential or necessity for improvement is regarding the organisations' Innovation Capacity, identifying and specifying challenges and barriers towards implementation of the NMC.
- Consider strategies for overcoming challenges, barriers or shortcomings regarding Innovation Capacity issues for implementation of NMC.
- Consider specific actions (could be preconditional for implementation, or nice to have) to improve Innovation Capacity towards better or successful implementation.
  - E.g.; What partners need to be involved? How to align leadership? Is mandate arranged? What resources are lacking?

Supporting references

- Innovation Capacity Elements Framework
- Overview of common challenges for Innovation Capacity

To be published (MOVE21):

- D6.7: MOVE21 guide on improving city's capacities for promoting sustainable mobility and logistics innovation
- Innovation Capacity Interview protocol
- Innovation Capacity Survey
- Innovation Capacity Canvas (workshop format)
- Inspiration list of Innovation Capacity strategies
- Action Plan Format for Innovation Capacity

Q10 Implementation assessment

Are there any additional arguments for or against this NMC that should be considered?

Description: This question aims to explore factors that are not explicitly/directly addressed in previous questions but that may nevertheless influence decision-making by key stakeholders. NMC exist within the complicated and interrelated world of economic prosperity, politics, and competitive marketplaces. The impacts and motivations of testing, development, and/or deployment of an NMC may focus on transportation and related outcomes but may also often extend beyond these topics. Engaging with an NMC might also simply allow for critical learning and increased staff experience that will be helpful for future endeavors. Governments should be clear-eyed and aware of these related realms to make better, more informed decisions about NMCs.

Key sub-questions and considerations:

- Considers situations in which e.g. there is high pressure from powerful groups towards a NMC. This could come from within city governments, from other levels of government, from the private sector, and/or from concerned advocacy groups.
- Considers situations in which there might be benefits beyond mobility or cost/efficiency-related (e.g., economic development, public perception, wellbeing/equity considerations, regional frontrunner or innovation status, etc.).
- Are there ethical arguments for or against this NMC (e.g., intergenerational justice, gender/racial biases/considerations)?
- Are there distinct, needed learnings that the public sector can acquire from engaging with this NMC that will be helpful to future endeavours?

Supporting references

TBD

Suggestions for next steps

- Investigate if there are useful frameworks for questions we haven't identified frameworks for yet ("*How does this NMC compare to other alternatives to solve the challenge at hand?*", "*Are the risks of the NMC proportional to the benefits?*", "*Are there any additional arguments for or against this NMC that should be considered?*")
- Make a short version of this framework so that cities can use it for themselves (e.g., as a "quick scan")
- Investigate the potential use of the framework starting from challenges in order to identify potential NMCs.

Interested in knowing more? We look forward to collaborating with you!

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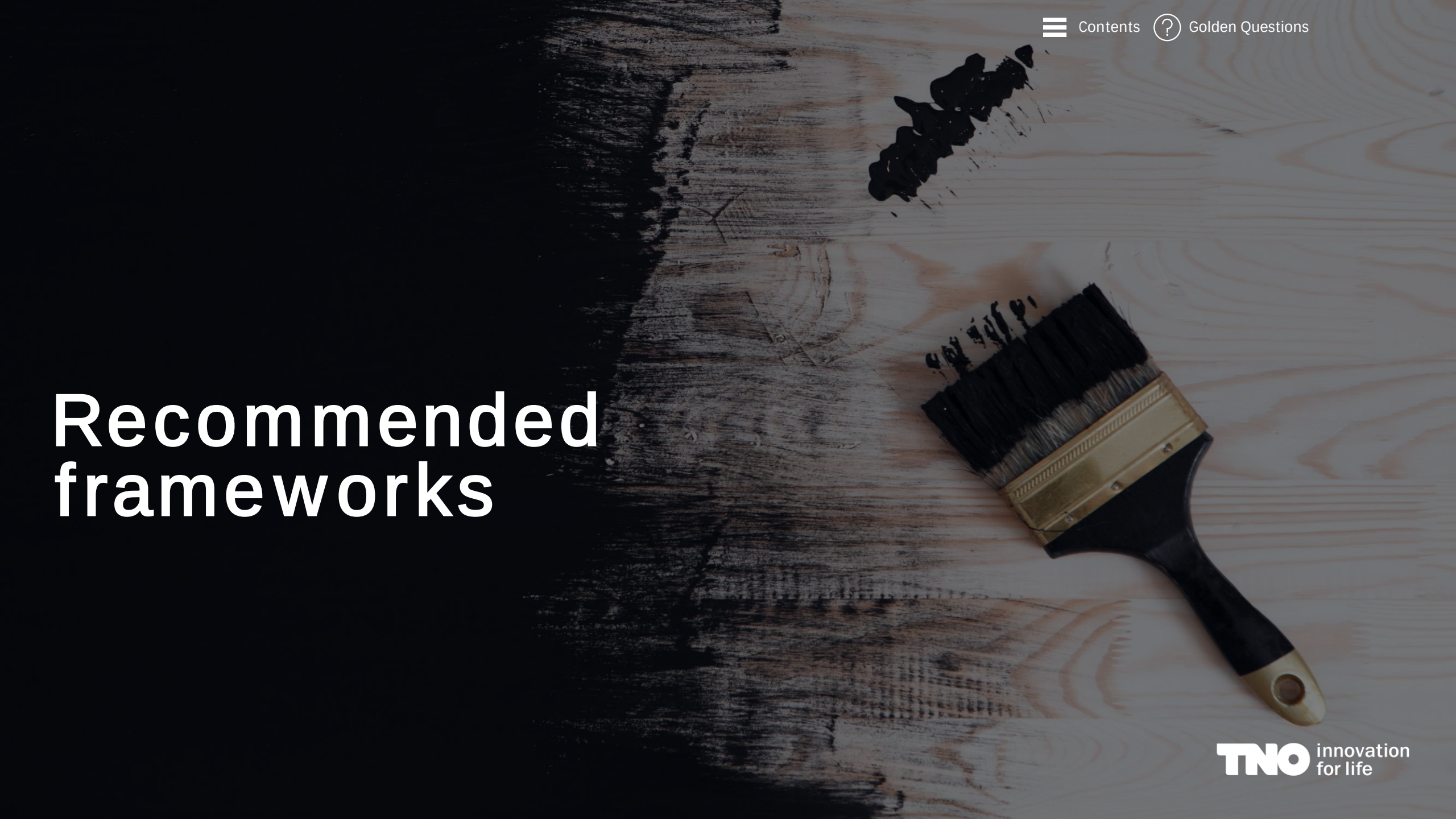
Recommended frameworks



Framework

Public Mobility – Role of Government Framework (TNO) (1/2)

- Aim:
  - Describe the various elements of public mobility, the barriers to success, and the role of government in addressing these barriers
- Highlights:
  - Covers various (sometimes unrelated) topics
    - Operational Needs
    - Infrastructural Needs
    - Technical Functionality
    - Organizational Leadership
    - Business Models
    - Increased Ridership
    - Evaluation and Steering
  - Focuses on Role of Government

Framework

Public Mobility – Role of Government Framework (TNO) (2/2)

Additional resources

- Public Mobility; The next evolution of MaaS. The roles of government (tno.nl)

4.1 – Operational needs

Operational needs are the basic functional building block of Public Mobility. Having TSPs providing services is an absolute necessity, however adding these services into a Public Mobility ecosystem faces some challenges such as market size, demographics, transit use and ridership, and government support. Next to services existing, there needs to be agreement on pricing which can vary largely within a single ecosystem and between different providers of mobility offerings. Lastly, there is a need for customer service, or at least customer oriented service provision. This requires clear division of responsibilities and incentives for complying with certain standards of operation and service quality.

Elements/needs	Barriers	Government Role
TSPs providing services	Varying interest from TSPs – largely dependent on market size, demographics, transit use, area prominence, government support, etc.	**Promotion of regions benefits for TSP use/growth (area prominence, market size/demographics, replicable model, etc.).**
		Prominent positioning of government as supportive of TSPs (willing partner, organizing of services, funding of Public Mobility – directly or indirectly).
		Acting as a trusted broker and partner for Public Mobility deployment (Smith et al., 2018).
		Marketing of TSP/Public Mobility services (Vij & Dühr, 2022).
		Organizing TSP and MSP (Mobility Service Provider) services (both digitally and physically).
Pricing	Large range in prices (even for same mode).	**Create standard pricing or at least standard means of describing pricing.**
Customer Service	Fragmented TSP and MSP (this includes problems of finger pointing (as to responsibility) and conversely, concerns about damage to TSP brands).	**Help create clear roadmap and assignment of responsibilities.**
		Create incentives/penalties to eliminate non-compliance or poor services.

Framework

Elements of innovation capacity and indicators (1/2)

Details

Below the Innovation Capacity Framework with it's corresponding elements of Innovation Capacity and indicators.

Element of innovation capacity	Explanation	Indicators
Leadership	Transformational, engaging leadership plays an important role in the realization and institutionalization of innovations.	• Presence of an innovation strategy • A leader (or management) with a clear vision • Inspiring, motivating and supporting its personnel • Presence of political support in favor of innovation
Organisation	An innovative organisational climate is important for developing innovation capacity.	• Staff is not afraid to take risks and make mistakes and is encouraged to experiment • Resources (funding, staff and time) are allocated specifically towards innovation • Proper internal communication between departments and organisational levels
Knowledge management	Municipalities that have an unrestricted flow of knowledge and data are better able to increase their innovation capacity.	• Ideas and knowledge are shared across organisational boundaries • There is a system present in which knowledge is structurally disseminated
Network	The presence of strong internal and external networks has a positive impact on innovation capacity.	• Collaboration takes place with various actors and stakeholders outside the public sector (e.g. knowledge institutions, companies, citizens' initiatives and NGOs) • A participatory approach is used in the innovation process • The presence of social capital (informal social structures and trust)
Learning	Innovation cannot take place without learning. Embedding new ideas takes place in an ongoing process of action and reflection.	• A learning environment suitable for idea sharing and discussions that generate ideas is established • Presence of a reflective attitude of staff • Staff is open to change and new experiences

Framework

Elements of innovation capacity and indicators (2/2)

Questions addressed

- Relates mostly to the questions regarding implementation.
- Innovation Capacity is about the set of (pre)conditions and skills for innovation activities to take place (in public organisations).
- This is relevant for the NMC framework with regards to the implementation step because:
  - It lists potential barriers in leadership, the organisation structure or culture, highlights issues regarding the ecosystem, knowledge management and learning
  - It addresses the aspects that are needed for facilitating and realising implementation, other than the technical functionality and its potential contributions (beyond conceptual implementation, it addresses organisational readiness for uptake and implementation)

Additional resources

- MOVE21 D6.1 – Reflective Monitoring Guide (https://move21.eu/wp-content/uploads/2022/03/MOVE21-WP6-D6.1-Reflective-Monitoring-Guide_compressed.pdf)
- MOVE21 D6.6 – Reflective Monitoring interim report (https://move21.eu/wp-content/uploads/2023/11/D6.6-Reflective-Monitoring-Interim-Report.pdf)
- MOVE21 D6.7 – MOVE21 GUIDE ON IMPROVING CITY'S CAPACITIES FOR PROMOTING SUSTAINABLE MOBILITY AND LOGISTICS INNOVATION (after October 2024)

For D6.1 and D6.6 – focus on Innovation Capacity chapters.

Framework

Challenges for innovation capacity (Move 21 H2020) (1/2)

Details

Based on research in different European cities we've derived a list of common challenges that cities come across when engaging in innovative work/projects/processes. Working on new concepts, regardless of the domain, brings challenges. These are the 15 most-often recognized challenges regarding working on new concepts and innovation in general (*full sentences in notes below slide*).

Translating vision to operation	Lacking vision on innovation	Lacking backing from leadership	Changing political climate and scope	Siloed organisations, lacking integration
Bureaucratic and inflexible culture	No learning and knowledge systems	Innovation & BaU are different worlds	Lacking feedback and –forward loops	High employee turnover and project-based hires
Risk-averse culture, no room for failure	Involving citizens and co-creation	Private party collab. (long term)	Lacking strategy & stimulation for networking	Sustaining innovation beyond projects

Framework

Challenges for innovation capacity (Move 21 H2020) (2/2)

Questions addressed

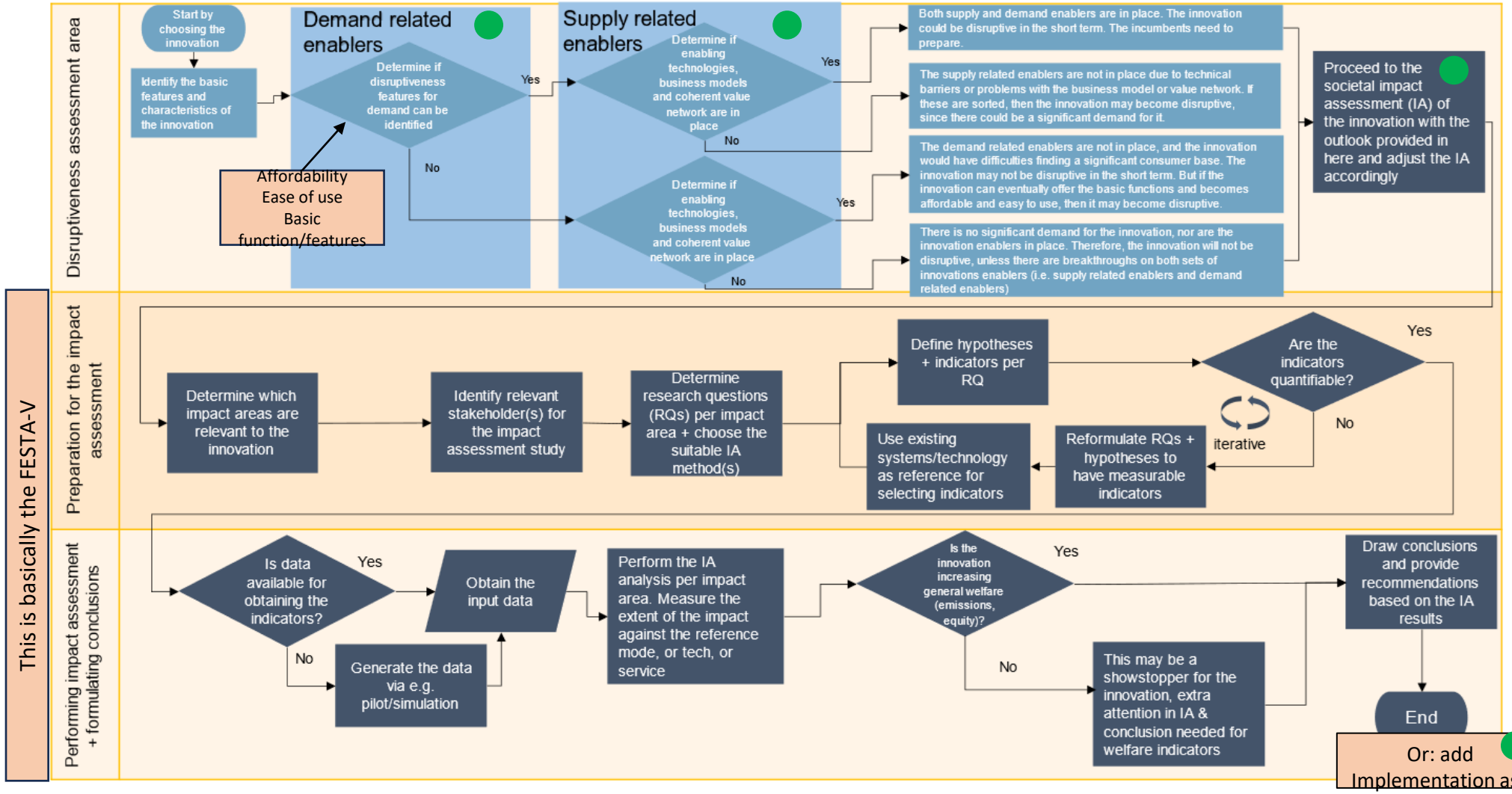
- Relates mostly to the questions regarding implementation.
- Innovation Capacity is about the set of (pre)conditions and skills for innovation activities to take place (in public organisations).
- This is relevant for the NMC framework with regards to the implementation step because:
  - It lists potential barriers in leadership, the organisation structure or culture, highlights issues regarding the ecosystem, knowledge management and learning
  - It addresses the aspects that are needed for facilitating and realising implementation, other than the technical functionality and its potential contributions (beyond conceptual implementation, it addresses organisational readiness for uptake and implementation)

Additional resources

- MOVE21 D6.6 – Reflective Monitoring interim report (https://move21.eu/wp-content/uploads/2023/11/D6.6-Reflective-Monitoring-Interim-Report.pdf)
- MOVE21 D6.7 – MOVE21 GUIDE ON IMPROVING CITY'S CAPACITIES FOR PROMOTING SUSTAINABLE MOBILITY AND LOGISTICS INNOVATION (after October 2024)

Framework

Impact Assessment Framework for Disruptive Innovations in transport (TNO) (1/2)



Framework

Impact Assessment Framework for Disruptive Innovations in transport (TNO) (2/2)

Additional resources

- Innovations in Transport – Success, Failure and Societal Impacts | Elgar Online: The online content platform for Edward Elgar Publishing
- TNO-2022-R10648.pdf (might not be available to people outside TNO)

Framework

EU Common Evaluation Methodology for CCAM (EU-CEM - FAME project) (1/2)

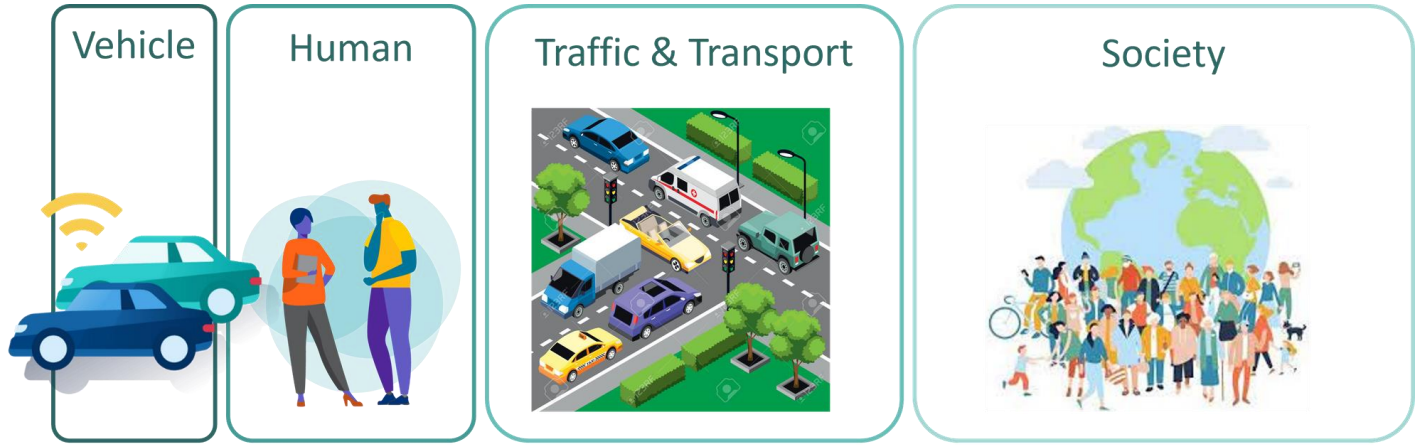
- Focuses on assessing the broader implications of CCAM (L3+)
- Gives guidance on setting up and executing large-scale field and virtual experiments of CCAM systems, and doing the evaluation
- For the framework, the guidance given on how to assess various impact areas is interesting (probably applicable to many NMC)
- Is linked to a CCAM taxonomy (for shared language, to avoid confusion)
- Includes proposal for (K)PIs and impact pathways, as well as approaches how to obtain Pis
- EU-CEM addresses wide range of impact areas (covering most of what we consider BW)
- Focuses on CCAM so may not consider some impacts that can be relevant for some NMCs

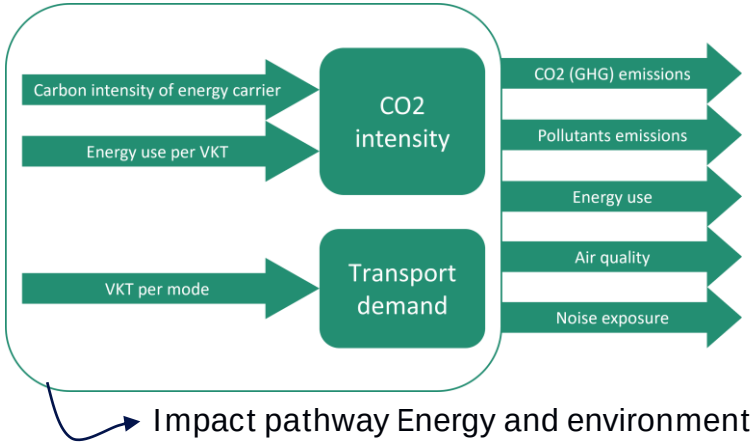
Framework

EU Common Evaluation Methodology for CCAM (EU-CEM - FAME project) (2/2)

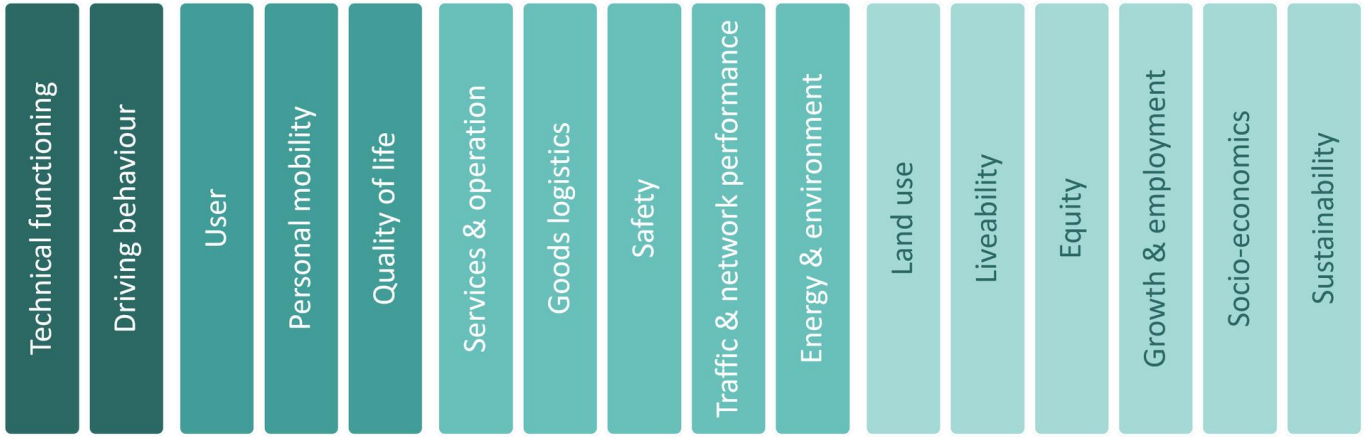
Additional resources

- Common Evaluation Methodology - Connected Automated Driving





Impact pathway Energy and environment



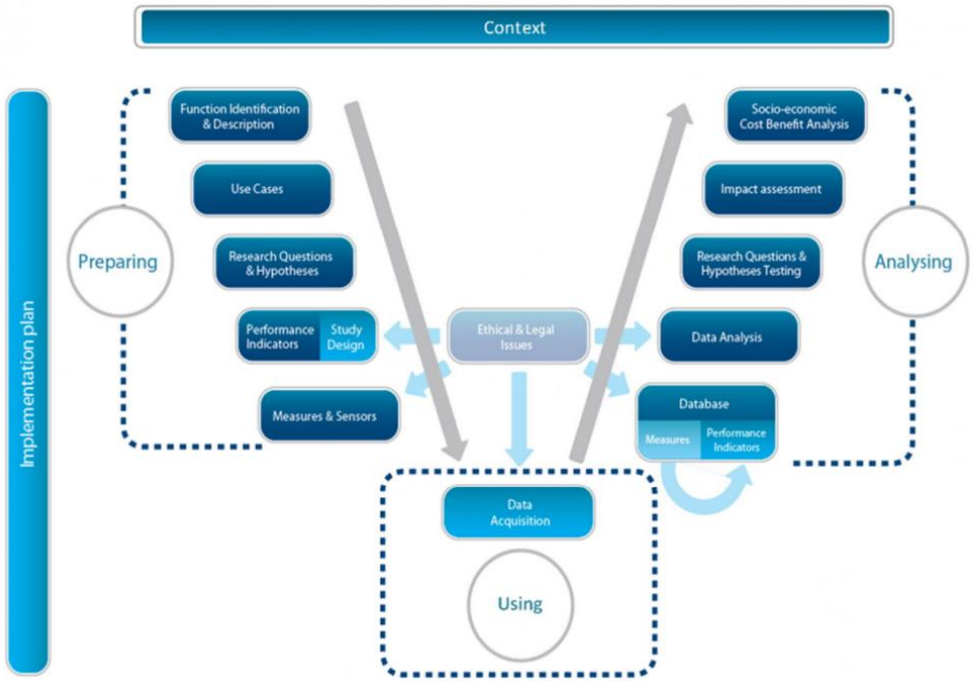
Framework

FESTA Handbook for Field Operational Tests (FESTA V) (1/2)

FESTA is the definitive source for Field Operational Test methodology, applicable for also other type of field tests. Field Operational Tests (FOT) are defined as: ”A study undertaken to evaluate a function, or functions, under normal operating conditions in road traffic environments typically encountered by the participants using study design so as to identify real-world effects and benefits”.

Also available is Micro-FESTA, a condensed evaluation methodology to support small pilot projects of Connected, Cooperative, and Automated Mobility (CCAM). This document gives an overview of the main steps in the FESTA methodology and comments their role in small-scale testing. This document can also be used as a first introduction to the full FESTA methodology and available materials.

- Evaluation method for driver support systems and functions
- For planning Field Operational Test
- Micro-FESTA is for smaller CCAM tests/pilots



Framework

FESTA Handbook for Field Operational Tests (FESTA V) (2/2)

Additional resources

- FESTA-Handbook-Version-8.pdf (connectedautomateddriving.eu)
- Microsoft Word - Micro-FESTA v2.docx (connectedautomateddriving.eu)
- The FESTA Methodology - Connected Automated Driving

Framework

Equitable AV Development Framework (Urbanism Next Center) (1/2)

- Aim:
  - Identify range of equity-related topics impacted by AVs
- Highlights:
  - Organized by Individual vs Societal Level Factors, then subfactors within this

Framework

Equitable AV Development Framework (Urbanism Next Center) (2/2)

Additional resources

- A Framework for Shaping the Deployment of Autonomous Vehicles and Advancing Equity Outcomes - Urbanism Next

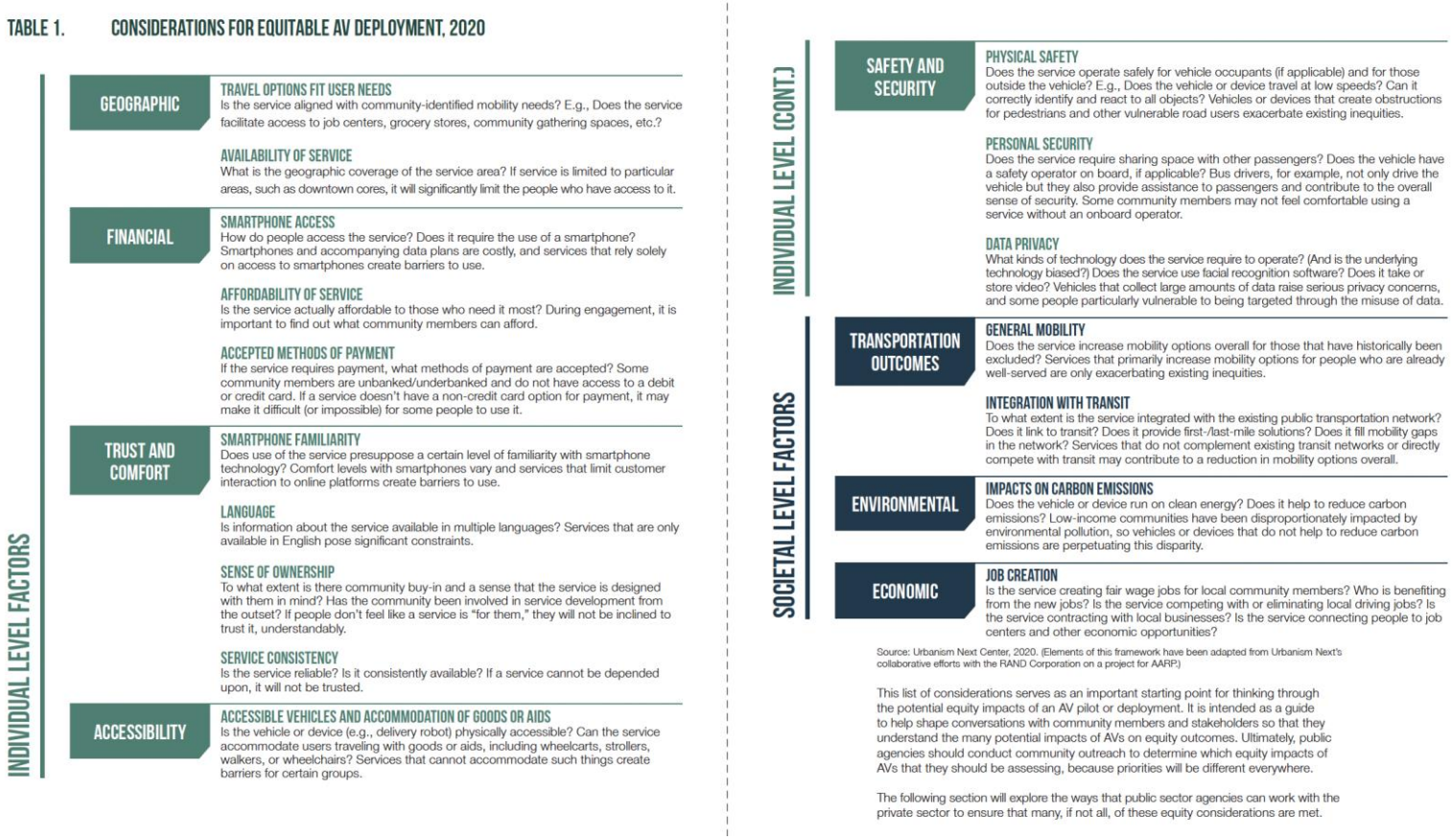


TABLE 1. CONSIDERATIONS FOR EQUITABLE AV DEPLOYMENT, 2020

INDIVIDUAL LEVEL FACTORS	GEOGRAPHIC	TRAVEL OPTIONS FIT USER NEEDS Is the service aligned with community-identified mobility needs? E.g., Does the service facilitate access to job centers, grocery stores, community gathering spaces, etc.?
		AVAILABILITY OF SERVICE What is the geographic coverage of the service area? If service is limited to particular areas, such as downtown cores, it will significantly limit the people who have access to it.
	FINANCIAL	SMARTPHONE ACCESS How do people access the service? Does it require the use of a smartphone? Smartphones and accompanying data plans are costly, and services that rely solely on access to smartphones create barriers to use.
		AFFORDABILITY OF SERVICE Is the service actually affordable to those who need it most? During engagement, it is important to find out what community members can afford.
		ACCEPTED METHODS OF PAYMENT If the service requires payment, what methods of payment are accepted? Some community members are unbanked/underbanked and do not have access to a debit or credit card. If a service doesn't have a non-credit card option for payment, it may make it difficult (or impossible) for some people to use it.
	TRUST AND COMFORT	SMARTPHONE FAMILIARITY Does use of the service presuppose a certain level of familiarity with smartphone technology? Comfort levels with smartphones vary and services that limit customer interaction to online platforms create barriers to use.
		LANGUAGE Is information about the service available in multiple languages? Services that are only available in English pose significant constraints.
		SENSE OF OWNERSHIP To what extent is there community buy-in and a sense that the service is designed with them in mind? Has the community been involved in service development from the outset? If people don't feel like a service is "for them," they will not be inclined to trust it, understandably.
		SERVICE CONSISTENCY Is the service reliable? Is it consistently available? If a service cannot be depended upon, it will not be trusted.
	ACCESSIBILITY	ACCESSIBLE VEHICLES AND ACCOMMODATION OF GOODS OR AIDS Is the vehicle or device (e.g., delivery robot) physically accessible? Can the service accommodate users traveling with goods or aids, including wheelcarts, strollers, walkers, or wheelchairs? Services that cannot accommodate such things create barriers for certain groups.
INDIVIDUAL LEVEL (CONT.)	SAFETY AND SECURITY	PHYSICAL SAFETY Does the service operate safely for vehicle occupants (if applicable) and for those outside the vehicle? E.g., Does the vehicle or device travel at low speeds? Can it correctly identify and react to all objects? Vehicles or devices that create obstructions for pedestrians and other vulnerable road users exacerbate existing inequities.
		PERSONAL SECURITY Does the service require sharing space with other passengers? Does the vehicle have a safety operator on board, if applicable? Bus drivers, for example, not only drive the vehicle but they also provide assistance to passengers and contribute to the overall sense of security. Some community members may not feel comfortable using a service without an onboard operator.
		DATA PRIVACY What kinds of technology does the service require to operate? (And is the underlying technology biased?) Does the service use facial recognition software? Does it take or store video? Vehicles that collect large amounts of data raise serious privacy concerns, and some people particularly vulnerable to being targeted through the misuse of data.
SOCIETAL LEVEL FACTORS	TRANSPORTATION OUTCOMES	GENERAL MOBILITY Does the service increase mobility options overall for those that have historically been excluded? Services that primarily increase mobility options for people who are already well-served are only exacerbating existing inequities.
		INTEGRATION WITH TRANSIT To what extent is the service integrated with the existing public transportation network? Does it link to transit? Does it provide first-/last-mile solutions? Does it fill mobility gaps in the network? Services that do not complement existing transit networks or directly compete with transit may contribute to a reduction in mobility options overall.
	ENVIRONMENTAL	IMPACTS ON CARBON EMISSIONS Does the vehicle or device run on clean energy? Does it help to reduce carbon emissions? Low-income communities have been disproportionately impacted by environmental pollution, so vehicles or devices that do not help to reduce carbon emissions are perpetuating this disparity.
	ECONOMIC	JOB CREATION Is the service creating fair wage jobs for local community members? Who is benefiting from the new jobs? Is the service competing with or eliminating local driving jobs? Is the service contracting with local businesses? Is the service connecting people to job centers and other economic opportunities?

Source: Urbanism Next Center, 2020. (Elements of this framework have been adapted from Urbanism Next's collaborative efforts with the RAND Corporation on a project for AARP.)

This list of considerations serves as an important starting point for thinking through the potential equity impacts of an AV pilot or deployment. It is intended as a guide to help shape conversations with community members and stakeholders so that they understand the many potential impacts of AVs on equity outcomes. Ultimately, public agencies should conduct community outreach to determine which equity impacts of AVs that they should be assessing, because priorities will be different everywhere.

The following section will explore the ways that public sector agencies can work with the private sector to ensure that many, if not all, of these equity considerations are met.

Framework

Tools and Levers for Equitable Outcomes Through AV Deployment (Urbanism Next Center) (1/2)

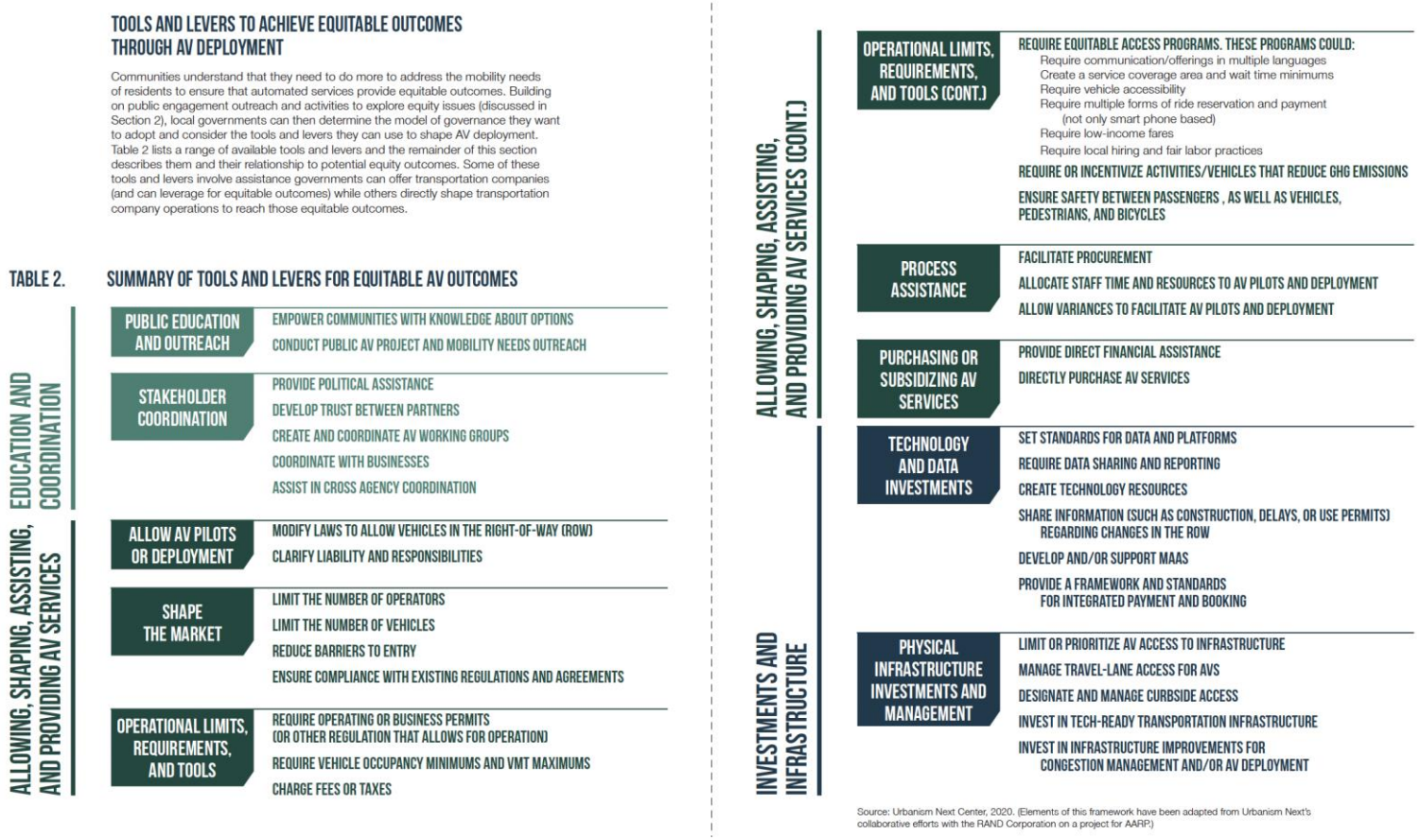
- Aim:
  - Identify tools and levers (beyond simply funding) that govt entities can employ to help shape AV/emerging tech deployment.
- Highlights:
  - Organized around three main areas of govt action:
    - Educ. and Coord.
    - Allowing/shaping/ assisting/providing/ AV services
    - Investment and Infrastructure
  - Translates 'laundry list' into coherent categories of action

Framework

Tools and Levers for Equitable Outcomes Through AV Deployment (Urbanism Next Center) (2/2)

Additional resources

- A Framework for Shaping the Deployment of Autonomous Vehicles and Advancing Equity Outcomes - Urbanism Next



TOOLS AND LEVERS TO ACHIEVE EQUITABLE OUTCOMES THROUGH AV DEPLOYMENT

Communities understand that they need to do more to address the mobility needs of residents to ensure that automated services provide equitable outcomes. Building on public engagement outreach and activities to explore equity issues (discussed in Section 2), local governments can then determine the model of governance they want to adopt and consider the tools and levers they can use to shape AV deployment. Table 2 lists a range of available tools and levers and the remainder of this section describes them and their relationship to potential equity outcomes. Some of these tools and levers involve assistance governments can offer transportation companies (and can leverage for equitable outcomes) while others directly shape transportation company operations to reach those equitable outcomes.

TABLE 2. SUMMARY OF TOOLS AND LEVERS FOR EQUITABLE AV OUTCOMES

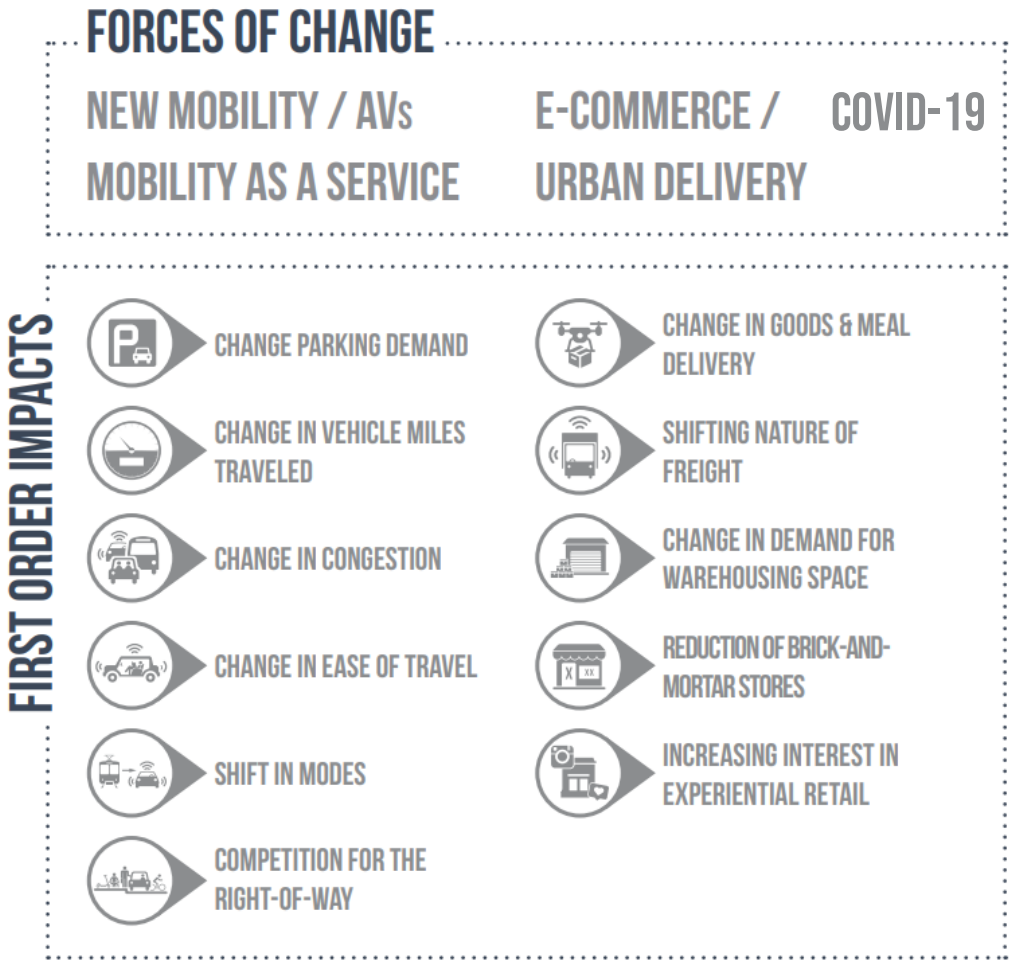
EDUCATION AND COORDINATION	PUBLIC EDUCATION AND OUTREACH	EMPOWER COMMUNITIES WITH KNOWLEDGE ABOUT OPTIONS CONDUCT PUBLIC AV PROJECT AND MOBILITY NEEDS OUTREACH
	STAKEHOLDER COORDINATION	PROVIDE POLITICAL ASSISTANCE DEVELOP TRUST BETWEEN PARTNERS CREATE AND COORDINATE AV WORKING GROUPS COORDINATE WITH BUSINESSES ASSIST IN CROSS AGENCY COORDINATION
ALLOWING, SHAPING, ASSISTING, AND PROVIDING AV SERVICES	ALLOW AV PILOTS OR DEPLOYMENT	MODIFY LAWS TO ALLOW VEHICLES IN THE RIGHT-OF-WAY (ROW) CLARIFY LIABILITY AND RESPONSIBILITIES
	SHAPE THE MARKET	LIMIT THE NUMBER OF OPERATORS LIMIT THE NUMBER OF VEHICLES REDUCE BARRIERS TO ENTRY ENSURE COMPLIANCE WITH EXISTING REGULATIONS AND AGREEMENTS
	OPERATIONAL LIMITS, REQUIREMENTS, AND TOOLS	REQUIRE OPERATING OR BUSINESS PERMITS (OR OTHER REGULATION THAT ALLOWS FOR OPERATION) REQUIRE VEHICLE OCCUPANCY MINIMUMS AND VMT MAXIMUMS CHARGE FEES OR TAXES
ALLOWING, SHAPING, ASSISTING, AND PROVIDING AV SERVICES (CONT.)	OPERATIONAL LIMITS, REQUIREMENTS, AND TOOLS (CONT.)	REQUIRE EQUITABLE ACCESS PROGRAMS. THESE PROGRAMS COULD: Require communication/offerings in multiple languages Create a service coverage area and wait time minimums Require vehicle accessibility Require multiple forms of ride reservation and payment (not only smart phone based) Require low-income fares Require local hiring and fair labor practices REQUIRE OR INCENTIVIZE ACTIVITIES/VEHICLES THAT REDUCE GHG EMISSIONS ENSURE SAFETY BETWEEN PASSENGERS , AS WELL AS VEHICLES, PEDESTRIANS, AND BICYCLES
	PROCESS ASSISTANCE	FACILITATE PROCUREMENT ALLOCATE STAFF TIME AND RESOURCES TO AV PILOTS AND DEPLOYMENT ALLOW VARIANCES TO FACILITATE AV PILOTS AND DEPLOYMENT
	PURCHASING OR SUBSIDIZING AV SERVICES	PROVIDE DIRECT FINANCIAL ASSISTANCE DIRECTLY PURCHASE AV SERVICES
INVESTMENTS AND INFRASTRUCTURE	TECHNOLOGY AND DATA INVESTMENTS	SET STANDARDS FOR DATA AND PLATFORMS REQUIRE DATA SHARING AND REPORTING CREATE TECHNOLOGY RESOURCES SHARE INFORMATION (SUCH AS CONSTRUCTION, DELAYS, OR USE PERMITS) REGARDING CHANGES IN THE ROW DEVELOP AND/OR SUPPORT MAAS PROVIDE A FRAMEWORK AND STANDARDS FOR INTEGRATED PAYMENT AND BOOKING
	PHYSICAL INFRASTRUCTURE INVESTMENTS AND MANAGEMENT	LIMIT OR PRIORITIZE AV ACCESS TO INFRASTRUCTURE MANAGE TRAVEL-LANE ACCESS FOR AVS DESIGNATE AND MANAGE CURBSIDE ACCESS INVEST IN TECH-READY TRANSPORTATION INFRASTRUCTURE INVEST IN INFRASTRUCTURE IMPROVEMENTS FOR CONGESTION MANAGEMENT AND/OR AV DEPLOYMENT

Source: Urbanism Next Center, 2020. (Elements of this framework have been adapted from Urbanism Next's collaborative efforts with the RAND Corporation on a project for AARP.)

Framework

Urbanism Next Framework (Urbanism Next Center) (1/2)

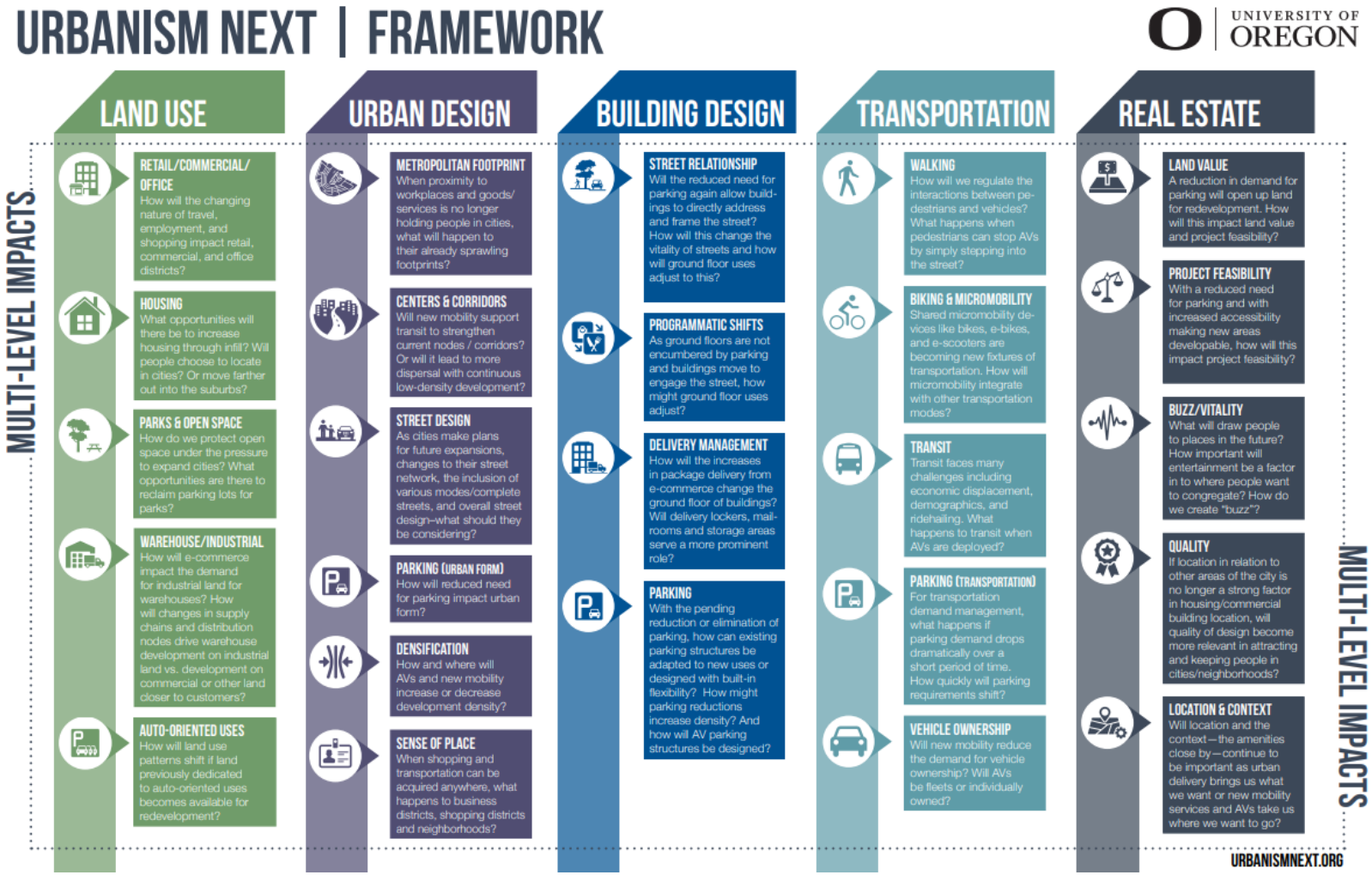
- Aim/Highlights:
  - Relate force to change (instigator) to topic areas (also disciplines/depts) to broader societal implications
  - Organize major category areas of emerging tech impact (across disciplines)



Framework

Urbanism Next Framework (Urbanism Next Center) (2/2)

- Additional resources
  - Urbanism Next Framework - Urbanism Next



Framework

Sustainable Urban Design Framework (Nico Larco) (1/2)

- Aim:
  - Organize the disparate aspects of sustainability as it relates to urban design.
- Highlights:
  - Organized by Outcome Goals and Scale
  - Translates goals to specific actions/elements (helpful for stakeholders)
  - Represents a range of goals (everyone can see themselves here, and understands relationships to other areas)
  - Clarifies questions to be asked of work at any one scale
  - Assists with understanding synergies and trade-offs between goals.

Framework

Sustainable Urban Design Framework (Nico Larco) (2/2)

Additional resources

- Sustainable Urban Design Framework – Nico Larco (uoregon.edu)

SUSTAINABLE URBAN DESIGN FRAMEWORK

TOPIC AREAS IN URBAN DESIGN Organized by Scale	REGION & CITY	DISTRICT & NEIGHBORHOOD	BLOCK & STREET	PROJECT & PARCEL
1 Energy Use & Greenhouse Gas *(Transportation & Land Use)*	**1.10** Compact Development *(For Density & Proximity)* **1.11** Robust Transit Networks **1.12** Robust Bicycle Networks **1.13** Balanced Vehicular Networks **1.14** Regional Land Use Mix	**1.20** Robust Pedestrian Networks **1.201** Small & Defined Blocks **1.202** Street Network Connectivity **1.21** High-Density Zoning & Platting **1.22** District-Scale Parking Mgt & Design **1.23** High District Land Use Mix	**1.30** Multimodal Street Design **1.301** Pedestrian-Friendly Streets **1.302** Bicycle-Friendly Streets **1.303** Transit-Friendly Streets **1.304** Limiting Motor Vehicle Impact **1.31** Dense & Street-Activating Bldgs **1.32** Site-Scale Parking Design	**1.40** Active Street Edges **1.41** High Internal Connectivity 1.31 Dense & Street-Activating Buildings 1.32 Site-Scale Parking Design
2 Water	**2.10** Compact Development *(For Limited Impact on Natural Systems)* **2.11** Avoid Flood Prone Areas	**2.20** Robust Stormwater Networks **2.21** Daylight & Restore Waterways	**2.30** High Surface Permeability **2.31** Robust Urban Forest **2.32** Green Stormwater Infrastructure	**2.40** Rainwater Capture & Reuse 2.30 High Surface Permeability 2.31 Robust Urban Forest 2.32 Green Stormwater Infrastructure
3 Ecology & Habitat	**3.10** Compact Development *(For Limited Impact on Natural Systems)* **3.11** Avoid Ecologically Sensitive Areas **3.12** Robust Ecological Networks	**3.20** Ecological Corridors & Patches **3.21** Daylight & Restore Waterways 3.11 Avoid Ecologically Sensitive Areas	**3.30** High Surface Permeability **3.31** Robust Urban Forest **3.32** Microhabitat Creation **3.321** High Vertical Complexity **3.322** Native Vegetation **3.33** Wildlife Crossings **3.34** Robust Ecological Area Buffers **3.35** Limited Light Pollution	3.30 High Surface Permeability 3.31 Robust Urban Forest 3.32 Microhabitat Creation 3.321 High Vertical Complexity 3.322 Native Vegetation 3.33 Wildlife Crossings 3.34 Robust Ecological Area Buffers 3.35 Limited Light Pollution
4 Energy Use & Production *(Non-Transportation)*	**4.10** Compact Development *(For Limited Embodied Energy in Infrastructure)*	**4.20** Street & Block Orientation **4.21** High-Density Zoning & Platting	**4.30** Dense & Energy-Efficient Building Types **4.31** Urban Microclimates **4.311** Cool & Green Surfaces **4.312** Robust Urban Forest **4.313** Street Ht-to-Width Ratio	**4.40** Infill Development 4.30 Dense & Energy-Efficient Building Types
5 Equity & Health	+ See Energy Use & Greenhouse Gas (1.10 - 1.41): To Maximize Access, Affordability, Activity, Safety, and Social Mobility **5.10** Compact Development *(For Proximity, Access & Reduced Infrastructure Cost)* **5.11** Equitable Distribution of Uses & Services	**5.20** Balanced Block Size **5.21** High-Density Zoning & Platting **5.22** Limited Location of Point Source Pollution **5.23** Mix of Housing Unit Types 5.11 Equitable Distribution of Uses & Services	**5.30** Active & Attractive Open Space **5.31** Robust Urban Forest **5.32** Affordable Housing Typologies **5.33** Site Design For Community Safety & Inclusion 5.23 Mix of Housing Unit Types	**5.40** Infill Development 5.23 Mix of Housing Unit Types 5.30 Active & Attractive Open Space 5.32 Affordable Housing Typologies 5.33 Site Design For Community Safety & Inclusion

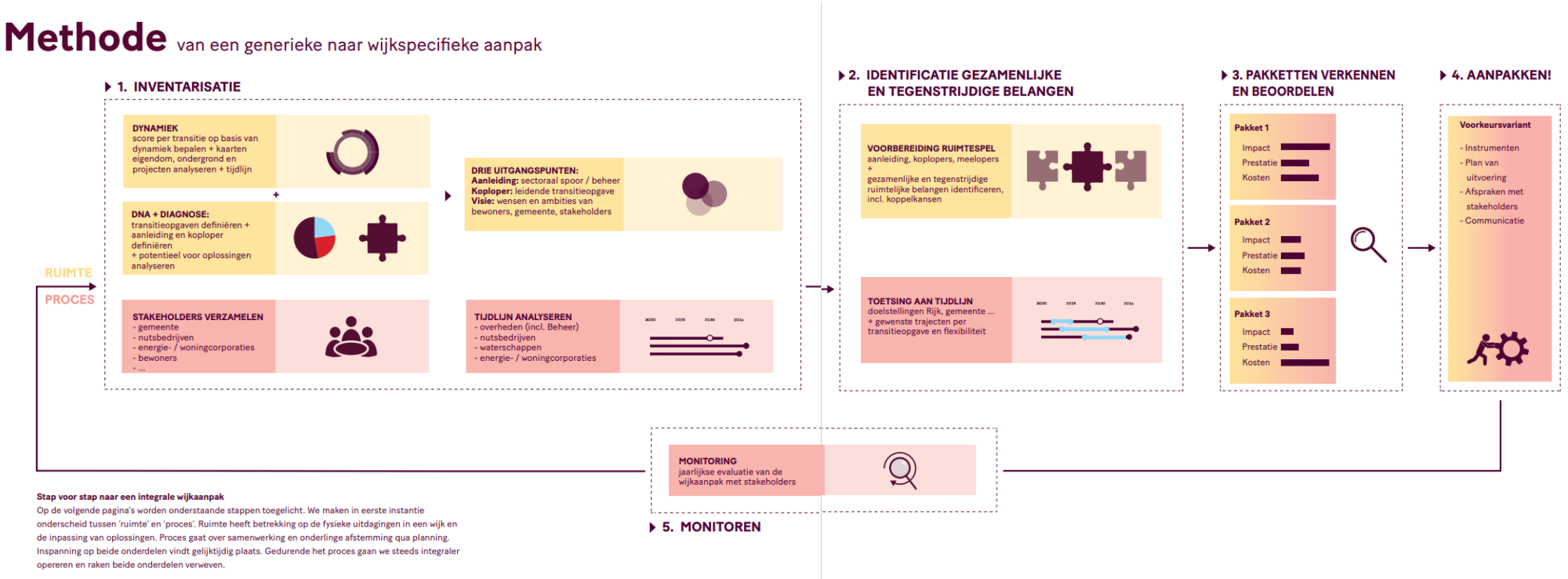
Framework

Integrated district approach (TNO) (1/2)

Details

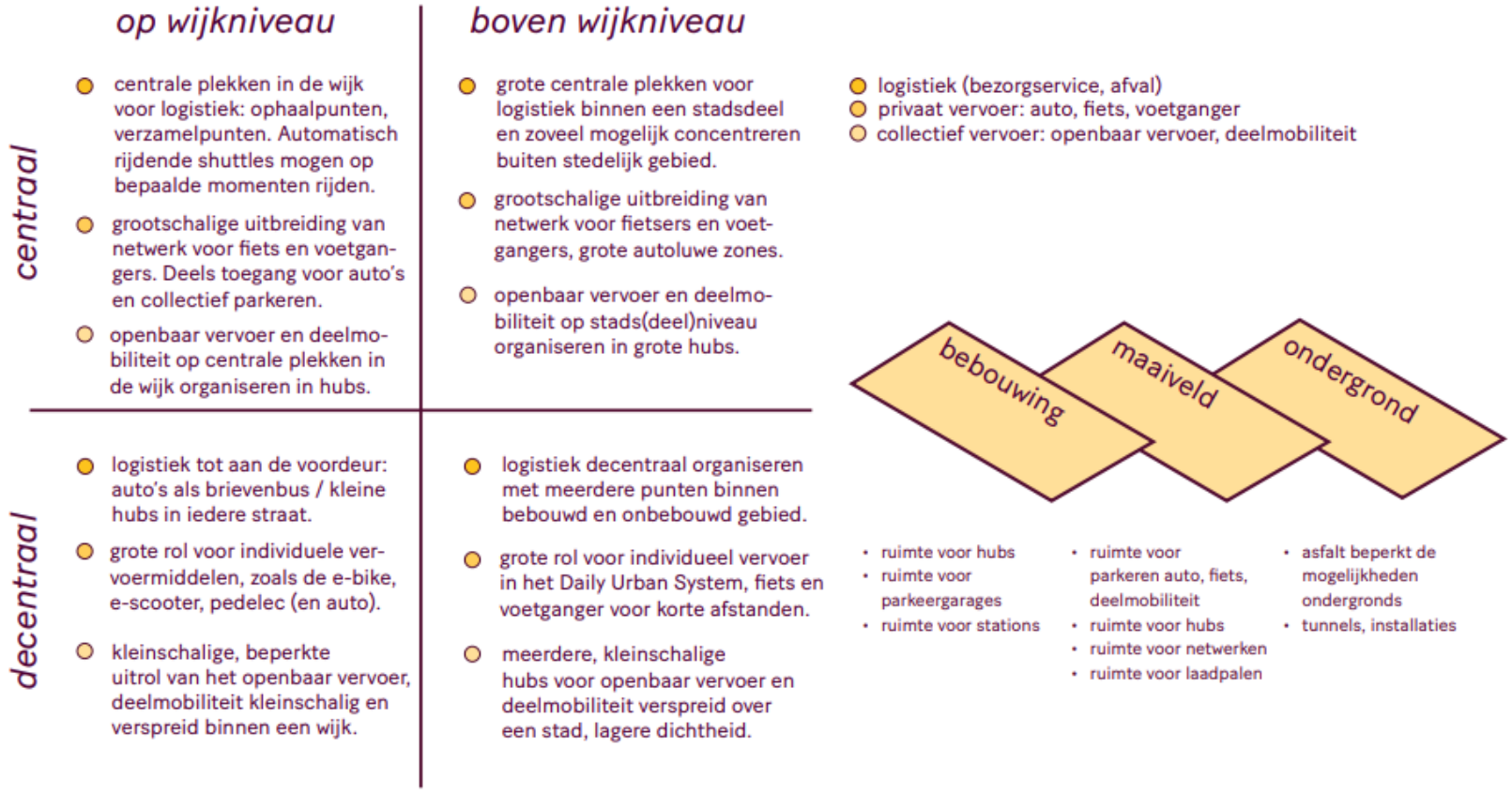
For the wider policy process or as part of the finale assessment: Integrated district approach (TNO). This approach focusses on districts and support integral spatial decision making where decision makers need to weight different interventions from different domains/ transitions. The NMC concept could be one of the interventions.

- Distinction between central and decentral policy approach, between district and region, and between spatial levels



Framework

Integrated district approach (TNO) (2/2)



Framework

Participatory Value Evalution (TU Delft) (1/2)

Details

Participatory value evaluation helps policy makers understand the policy preferences of the general public. Participants are asked to advise policy makers on a policy decisions.

- Beleidsopties evalueren, participatie van grote groepen burgers te faciliteren (TU Delft)
- Doel: laagdrempelig advies van burgers over keuzevraagstuk overheid. (vooral COVID-19 als voorbeeld)

Framework

Participatory Value Evalution (TU Delft) (2/2)

Additional resources

- Participatory Value Evaluation (tudelft.nl)

Framework

Broad Welfare in the mobility domain (TNO) (1/2)

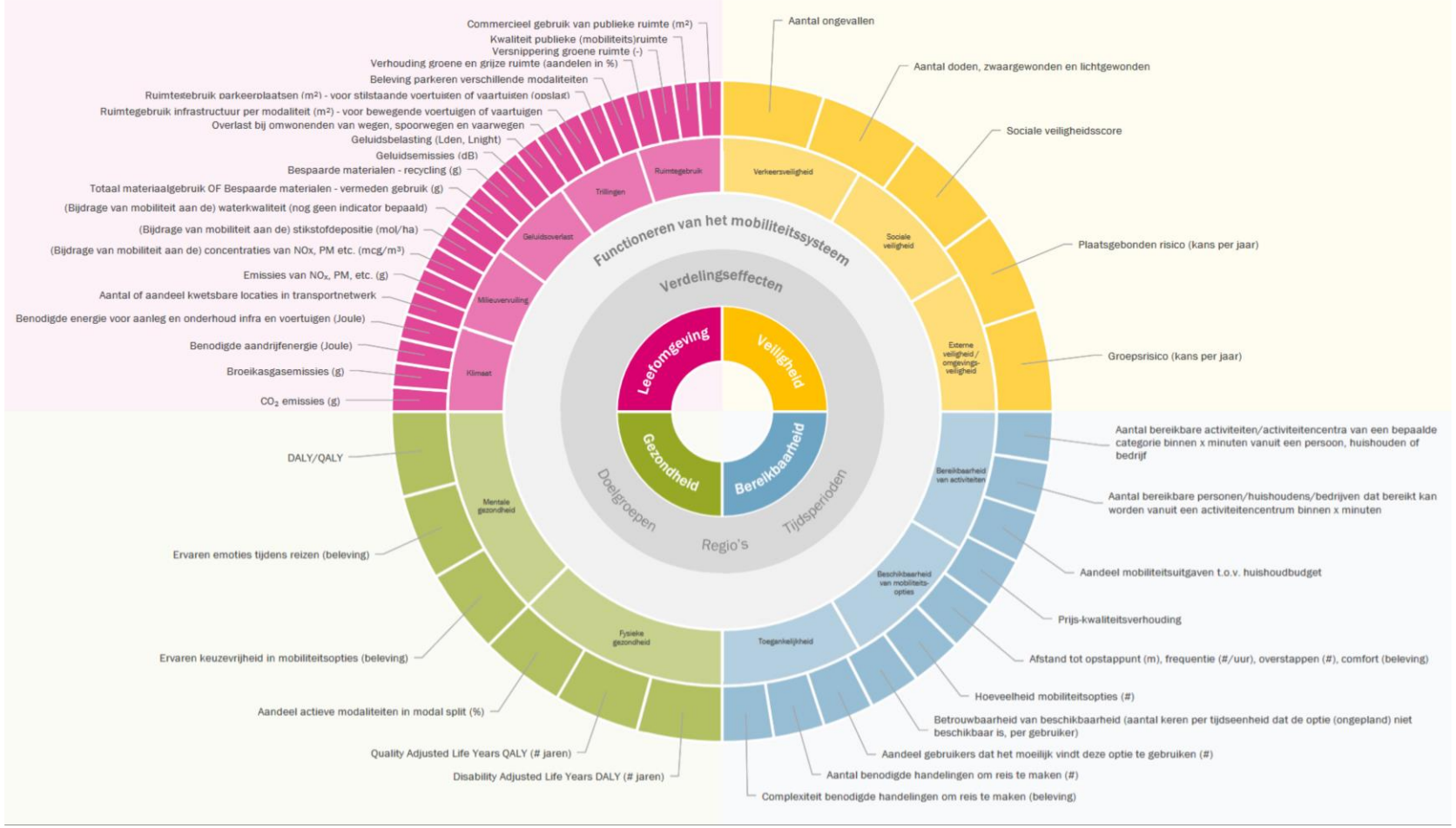
- For determining a broad range of impact the TNO study on Welfare beyond GDP can be used. The study list indicators to assess impacts of mobility policies subdivided into the categories living environment, safety, accessibility & health.
- Furthermore it emphasises importance of user groups, regions, time period and distribution effects. It also explains the relevance of the current mobility system as context: the effectiveness of a NMC (or mobility policy) depends on how the current mobility system looks like.
- Aim: to assess impacts of mobility policies
- Highlights:
  - Welfare beyond GDP for mobility= Living environment, safety, accessibility & health
  - Emphasises importance of user groups, regions, time period and distribution effects
  - Explains the relevance of the current mobility system as context: effectiveness depends on how the current mobility system looks like

Framework

Broad Welfare in the mobility domain (TNO) (2/2)

Additional resources

- Indicators for well-being in the mobility domain – a starting point for discussion based on a quick scan | Report | Rijksoverheid.nl



Framework

Adoption of innovations (Feitelson & Salomon) (1/2)

Details

The framework from Feitelson and Salomon is on the adoption of innovations. The first three questions can be supported by this framework as it supports the analyses of the technical, social and political feasibility. It highlights the importance of stakeholder perceptions and discourse and considers the influence of various stakeholders.

- Field: transport innovation, political economic framework
- Aim: to analyse the adoption of innovations in a complex public–private context involving many actor categories.
- Distinction in technical/ social/ political feasibility
- Importance of perceptions & discourse
- Considers the influence of various stakeholders

Framework

Adoption of innovations (Feitelson & Salomon) (2/2)

- Additional resources
  - The Political Economy of Transport Innovations

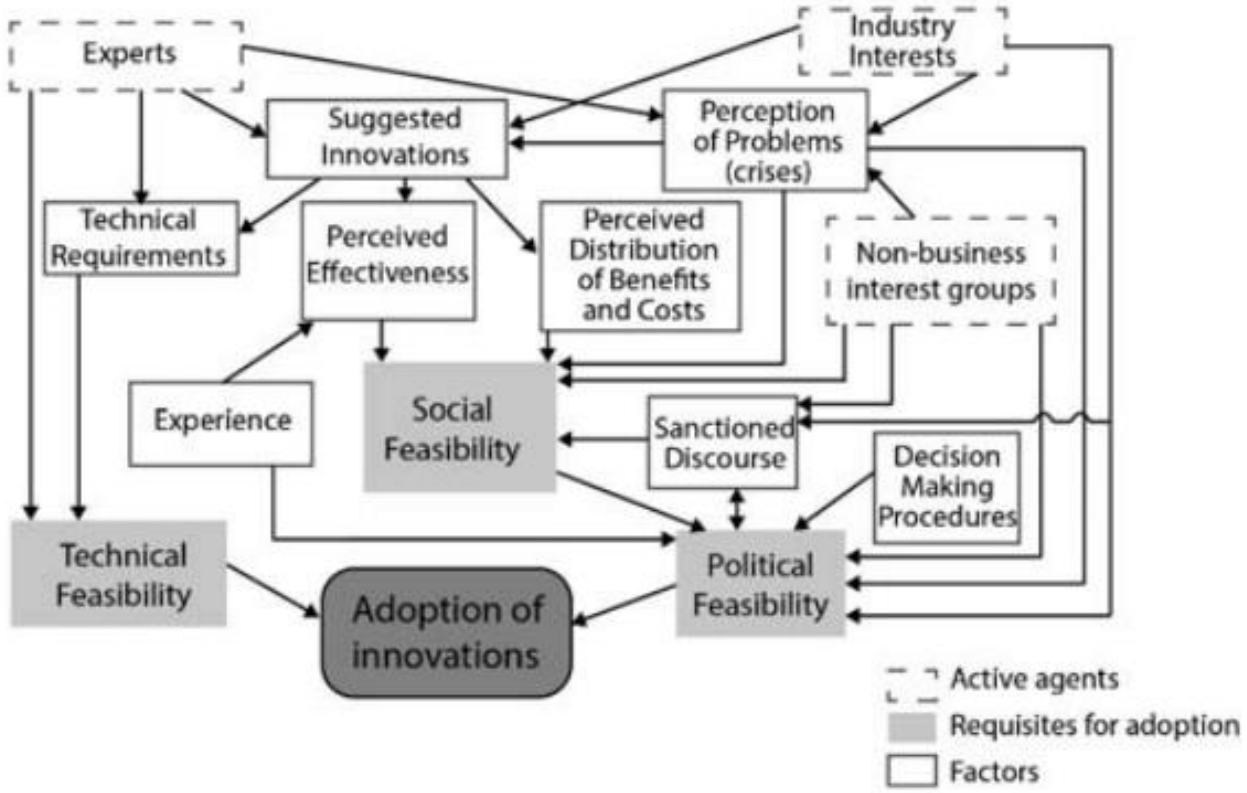


Figure 1. Feitelson and Salomon's feasibility framework.

Framework

NET ZERO CITIES (1/2)

Details

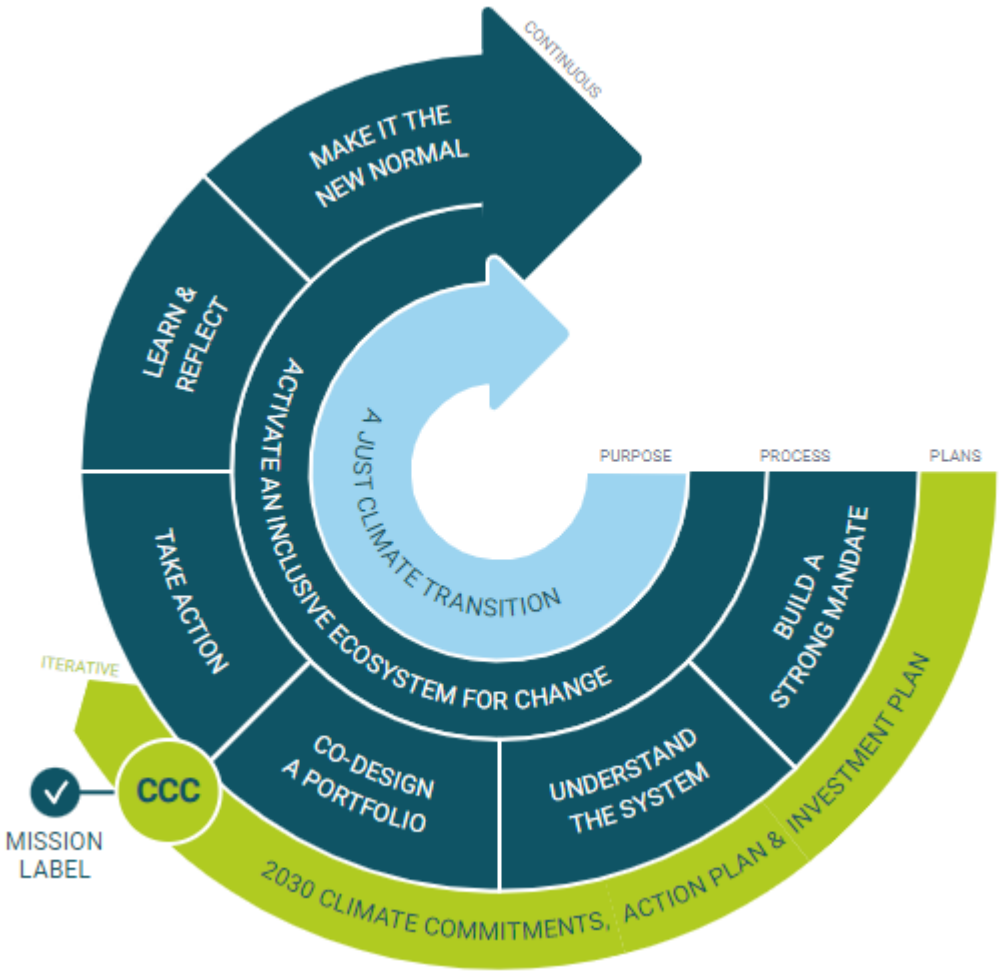
For the implementation phase: If the NMC is related to decarbonization, the NetZeroCities framework can be of help. The NetZeroCities initiative supports cities in putting their climate ambitions into action. It offers a transformative approach for accelerating decarbonization. In this approach a link is made between between purpose/ process/ plans in an iterative process.

- NetZeroCities supports cities in putting their climate ambitions into action
- Aim: a transformative approach accelerating decarbonisation
- Highlights:
  - Link between purpose/ process/ plans
  - Iterative process
  - Acknowledges the implementation process

Framework

NET ZERO CITIES (2/2)

- Additional resources
  - NetZeroCities



NET ZERO CITIES

Framework

Societal Embeddedness Levels (TNO) (1/2)

- Aim: to assess the societal embeddedness levels: is an innovation ready for implementation?
- Methodology:
  - Is society ready for this?
  - What is the legal and regulatory situation?
  - And what about funding and the business case?

Framework

Societal Embeddedness Levels (TNO) (2/2)

- Additional resources
  - Societal Embeddedness Level: public support for transitions - TNO Vector EN
  - SEL Method: Assessing the societal readiness of innovation (tno.nl)

Framework

Autonomous Vehicles: A Guide For Cities (Cityfi & Urbanism Next) (1/2)

Details

While autonomous vehicles are still experimental and nascent in many corners of the U.S., the same kind of unguided tectonic shift seen with the introduction of the automobile nearly a century ago is possible. Autonomous Vehicles: A Guidebook for Cities was created in response to cities seeking to manage and influence autonomous vehicle (AV) pilots and deployments happening on their streets, as well as cities trying to prepare for these pilots. The Guidebook offers considerations, tools, and examples of various ways to manage effectively autonomous vehicle deployments.

- Cities need to align their motivations/goals with the technology state of readiness and pilot design.
- Community engagement needs to start early and needs to meet the community where they are at (both in terms of knowledge and in terms of locations).
- Cities have a number of tools and levers at their disposal to help shape AV pilots and deployment.

Framework

Autonomous Vehicles: A Guide For Cities (Cityfi & Urbanism Next) (2/2)

- Additional resources
  - Autonomous Vehicles: A Guide For Cities - Urbanism Next

A pilot should have:

Clear Scope: with clear goals and objectives.

Defined Success Metrics: with specific data points to measure against public policies.

Limited Duration: that defines when and how the pilot will end.

Point Person: with decision-making capabilities to determine when to end or scale the deployment.