

Guideline

for responsible, multilevel governance
of transformative innovation
(D1.2.1)

Phase

Date

Final version

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Introduction

Technologies - especially digital technologies like 5G mobile networks, Big Data, etc. - are transforming urban development, with fairly equal potential to either address today's social and environmental challenges and regional disparities *or* become socio-economic and political disasters.

Autonomous vehicles (AVs) are one innovation that will dramatically change our way of life. For their optimal deployment, local authorities must anticipate and reflect on how transformative innovations like these can lead to a safe, sustainable, citizen-friendly future in cities. Stakeholders and the citizens themselves *must* have a say, and this necessitates the establishment of radically new governance models.

Therefore, GINEVRA's aim is to strengthen small/medium-sized cities' capacities in the responsible, multi-level governance of transformative innovations, using AVs as a case study - helping them to reap the benefits, avoid the pitfalls, and ensure wide, cross-sector engagement.



**A BETTER INTERREG
GOVERNANCE**



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**11 ERDF &
3 ASSOCIATED PARTNERS**



2 536 965.4 €

The project consists of 3 thematic Work Packages (WPs):

-  WP1 is based on transnational exchange about responsible innovation, governance and AV tech in the form of master-classes and study visits, leading to the establishment of a state-of-the-art and practical guidelines.
-  WP2 revolves around the question of how to involve and engage stakeholders and citizens in AV deployment - methods will be co-developed and tested.
-  WP3 includes an actual AV demo on 3 sites, but also smaller pilot actions - overall, 5 cities will be involved: Cesena (IT), Ptuj (SI), Nyíregyháza (HU), Varaždin (HR), and Bad Schönborn (DE).

This document is part of WP1 and provides **practical suggestions for the deployment of a functional multi-level governance system that can guide transformative innovations** (including the AV case) **responsibly** - theoretical background (where necessary), good practices, pilot action ideas, etc. After **examining the main governance aspects**, the guide closes with a **list of steps** small/medium-sized cities can take to develop their local, regional, and even national governance system.

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Chapter 1

Multi-level governance framework

- How does governance relate to innovation?
- What are the main elements of a functional governance framework?

THE ROLE OF GOVERNANCE IN INNOVATION



What's your favourite tech innovation?

- 🚗 Illegal cab company*
- 🚗 Illegal hotel chain*
- 🚗 Fake money for criminals*
- 🚗 Plagiarism machine*

This was a poll shared on Twitter almost a year ago, making fun of the consequences of innovative ideas that have emerged and developed rapidly in the last few years. It might seem like a joke, but it's hard not to see the truth in what the question and offered answers imply.

- 🚗 Uber* sidestepped a lot of regulations aimed at taxi companies by identifying as a "tech company", not to mention its role as a competitor to public transport instead of individual car use.
- 🚗 Airbnb* is credited with revolutionizing the tourism industry, while also being the subject of intense criticism for enabling an unaffordable increase in rents in many cities.
- 🚗* Even forgetting for a minute that cryptocurrency is bad for the environment (which isn't easy because its negative effects are substantial), a lot of its core benefits - e.g., anonymity, lack of regulatory oversight - make it ideal for criminal activities: it has become the preferred payment method of the dark web.

- 🚗* AI models basing their results on scraping the web for content often use these works without crediting or rewarding the owners (writers, artists, etc.).

Could these consequences have been avoided with a more careful development approach and proper legislation? We'll never know for sure (probably yes), but it would have been smart to at least try.

Transformative innovations (with AVs among them) are expected to change the way we behave, to disrupt and influence several industries (most likely simultaneously) and to create new ones as well - overall **having a significant social, environmental, and economic impact**. Progress is important and it does not mean that new problems won't be created by it. Ironically enough, *new problems created by innovations are not (necessarily) the problem – not foreseeing and preventing (or at least mitigating) the most disruptive ones is.*

Preventing potential cons turning into actual threats to society is a matter of shared choice - and governance. The complexity of these innovations necessitate **establishing a functional governance system that can deal with and guide them successfully and responsibly.**

THE FRAMEWORK

The framework used in the GINEVRA Baseline Study and this guide can be seen on the right side, showing its main elements:

- 🚗 **Political and legal support** - decision-makers willing to give priority (in both words and deeds) to innovating responsibly;
- 🚗 Either **a dedicated organization or an internal group of people** who are tasked to manage the system of RRI (responsible research and innovation) in the city;
- 🚗 **Financial resources** allocated to maintaining the system and implementing actions (paying the staff, organizing participative/awareness-raising events, etc.);
- 🚗 People who have **relevant knowledge/expertise and experience** in RRI and/or the field of the given transformative innovation (like urban mobility in the case of AVs);
- 🚗 **Clear vision** of the required changes and a **roadmap** (strategy) that leads to them, co-developed and shared with stakeholders;
- 🚗 **Participation from** as many **stakeholders** as possible.

The next five chapters are dedicated to these elements (with two of them grouped into one), discussing them in detail in the context of the project topics (responsible innovation and AVs) - but first, the next few pages will give a preview of what they mean in general.





Political commitment & legislation

- Awareness of the issue at hand - benefits, risks, etc.
- Clear and public statements of support
- Priority given to related legislation (i.e., making it or lobbying for it)

Even a single project concept will only move toward successful development in a city - becoming sustainable - if there's **political backing** behind it and the **decision-makers** are **willing to give priority to the given policy area**. More complex approaches (like correctly handling transformative innovations in an urban context) require a **clearly and publicly expressed political commitment** even more, **backed up with legislative support**. However, this may be one of the most challenging components to "acquire".

Why? The amount of **time** decision-makers can devote to understanding the challenge, the importance of dealing with it, and possible solutions is very limited. Moreover, political officials are also averse to **risks**, often backing approaches which please their constituencies - even if those approaches have negative effects on the city (like many decisions supporting car dependency).

Reaching out to their top advisors first and providing a **clear, data-driven reasoning about how the city will benefit** are good ways to get their attention and give them the confidence/commitment to **follow through with local efforts and lobbying** on higher levels.

Dedicated team/organization

- People who handle daily implementation
- Clear tasks
- Capacity & motivation
- Empowerment based on mutual trust






Political commitment doesn't mean that there are people who actually implement actions - decision-makers cannot be expected to work on one issue day by day. A municipality needs either a **dedicated organization**, an **internal group of people**, or **at least one person** to handle any extra responsibilities that come with this new approach to innovation governance - responsibilities which the already overworked local staff simply won't be able to take on, at least not sustainably and not without reshuffling departments.




The person who **ensures a responsible approach to urban innovation** must have not just the **capacity** (available time and knowledge), but also **internal motivation** to succeed, complementing any external pressure. It's also important for them to be **able to make some decisions without continuously asking for permission** - this power will probably be limited, but without **mutual trust**, nothing can get done. **Tasks** should be **clearly expressed**, delineated from other municipality responsibilities to avoid double work - or embedded into other processes where applicable. **Internal relationships** must also be **straightforward**, so everyone always knows where to turn to in case of urgent issues and problems.



Financial resources




-  *Allocating the municipality budget effectively along clear priorities*
-  *Complementing the budget with EU funding (related thematic calls)*
-  *Utilizing public-private partnerships where appropriate*

The setup and maintenance of a functional governance system require financial resources irrespective of the urban development field it concerns:

-  People working on innovation projects and management will have corresponding staff costs;
-  Using a participative approach implies the existence of events where stakeholders can meet - these have their own costs (catering, inviting experts for facilitation, etc.);
-  Specific interventions based on a local strategy will also have to be financed somehow.




Fortunately, many of these can be - at least for shorter durations - easily connected to **direct or nationally distributed EU funding sources** - they are especially helpful **to kickstart a new process by starting a dialogue** (similarly to GINEVRA). There are other funding sources that can be utilized, too: **reallocated money from the city budget or even public-private partnerships**. The tighter the budget, the more important **clear focus areas and priorities** become.

Intellectual capital

-  *Soft skills (facilitation, problem-solving, etc.)*
-  *Relevant knowledge, expertise, and experience (internal and external)*
-  *Continuous learning*



Having the right people is also an important criteria - and by "right", we mean people who can (among others):

-  **Think holistically** when considering the effects of innovations and necessary actions to mitigate or enhance them;
-  **Facilitate the involvement of multiple stakeholders** from different fields **to serve a common goal**;
-  **Solve problems** as they occur - a key aspect of **delivering results on time and within budgetary limits**.

Municipalities would be wise to **employ experts** in specific fields (e.g., urban mobility), but these people won't necessarily be experts in every research area (like AVs), or even RRI. Internal capacities can be complemented by **building a network of external experts who can transfer their knowledge**. **Internal trainings** should also be considered to instil at least a basic knowledge about responsible innovation, but organizing **study visits**, examining **good - and bad - practices** and participating actively in **transnational projects** are all effective ways to increase the intellectual capital of the local governance framework.



Shared vision & strategy

- 🚗 *Clear vision statement, objectives, and roadmap - embedded in policies*
- 🚗 *Stakeholders must be aware of (and share) it*
- 🚗 *Sense of responsibility towards tasks and feeling of ownership towards results*

"Strategy without tactics is the slowest route to victory. Tactics without strategy is the noise before defeat."

Sun Tsu wrote this as a military strategist - defining "tactics" as directing military actions -, but the general idea behind his statement is true in urban development as well. The best plan in the world won't achieve anything if it isn't followed by actual implementation but taking action without knowing the current situation and how we would like to change it can rarely be more than an energy - and time and money - sink. *"Failing to plan is planning to fail"* paraphrases the above: it's simply **easier to work in a coordinated way successfully if there's a plan and the stakeholders know it**. The strategy must be sound, of course, including:

- 🚗 **Up-to-date data** about the challenges it addresses;
- 🚗 **SMART objectives** that can be measured; and
- 🚗 **Corresponding interventions** that can be expected to achieve the specified objectives.

Participative approach

- 🚗 *Wide coverage*
- 🚗 *Identifying problems & devising and implementing solutions together*
- 🚗 *Utilizing a wide range of tools, depending on the stage and its goal*



Urban challenges cannot be addressed by a municipality alone. Mobility in general affects a lot of other fields and various stakeholders - and vice versa:

- 🚗 Free parking in a city centre will increase car traffic, causing more air and noise pollution while occupying valuable public space;
- 🚗 Having a regulatory system in which parents are not obligated to select a school for their children based on their location will likely result in increased car traffic in the morning and afternoon hours because the selected schools might not be in a walking distance from their home, necessitating private car use.

Therefore, the municipality must **work together with various stakeholders to have** enough - accurate - **information** about the situation, **involving affected citizens in particular**. Participation should be **representative** and **follow the whole process**: identifying problems and coming up with solutions jointly, and even sharing tasks in implementation when possible.



Chapter 2

Political commitment & legislation

- What should decision-makers know about AV adaptation?
- How does the current regulatory framework look like?
- What can a city do?

Content provided by KIT-ITAS

TOWARDS POLITICAL - AND SOCIETAL - COMMITMENT

It has been shown that expectations of the benefits of innovations are important for the motivation and coordination of actors in the innovation system¹ and thus ultimately also for the practical implementation and dissemination of technologies.

Support for and resistance to new technologies are often closely linked to different expectations of their potential.

In order to better classify arguments for and against different variants of autonomous driving, **it is helpful to clarify what expectations exist in the current social discourse.** As the table on the right demonstrates, the development and implementation of AVs is well triggered by a range of expectations on AVs and their possible applications that have been repeatedly expressed by various social groups for some time.

EXPECTATIONS	OPPORTUNITIES	RISKS
Safety	Automation is safer than a human driver (policy goal: Vision Zero)	<ul style="list-style-type: none"> 🚗 Hacking, data security, lack of redundancy 🚗 Equity? Safety for whom?
More efficient mobility	<ul style="list-style-type: none"> 🚗 Optimized traffic flow, reduction of congestion, increased infrastructure capacity 🚗 No need to search for a parking space 🚗 Reduction of physical infrastructure 🚗 Elimination of the driver reduces costs 	<ul style="list-style-type: none"> 🚗 Attractiveness of driving increases → growth in demand and/or mileage 🚗 Without the search for a parking space, car travel becomes more attractive 🚗 Costs for intelligent infrastructure
Enabling mobility	<ul style="list-style-type: none"> 🚗 Independent mobility for people with restricted mobility and/or people without a driver's license (children) 🚗 Accessibility of rural regions increases 	<ul style="list-style-type: none"> 🚗 Increase in traffic volume/induced demand 🚗 Digital divide 🚗 Affordability? Too expensive?
New forms of time use during the journey	Travel time can be used more productively without the need to drive	<ul style="list-style-type: none"> 🚗 Longer journeys/traffic jams are accepted → more/longer car trips 🚗 Urban sprawl
Strengthening sustainable mobility	New forms of flexible, effective, affordable mobility as an alternative to private cars	<ul style="list-style-type: none"> 🚗 Empty runs when picking up/dropping off people 🚗 Urban sprawl?

Source: Opportunities and risks associated with AVs (Fleischer, Schippl 2023)²

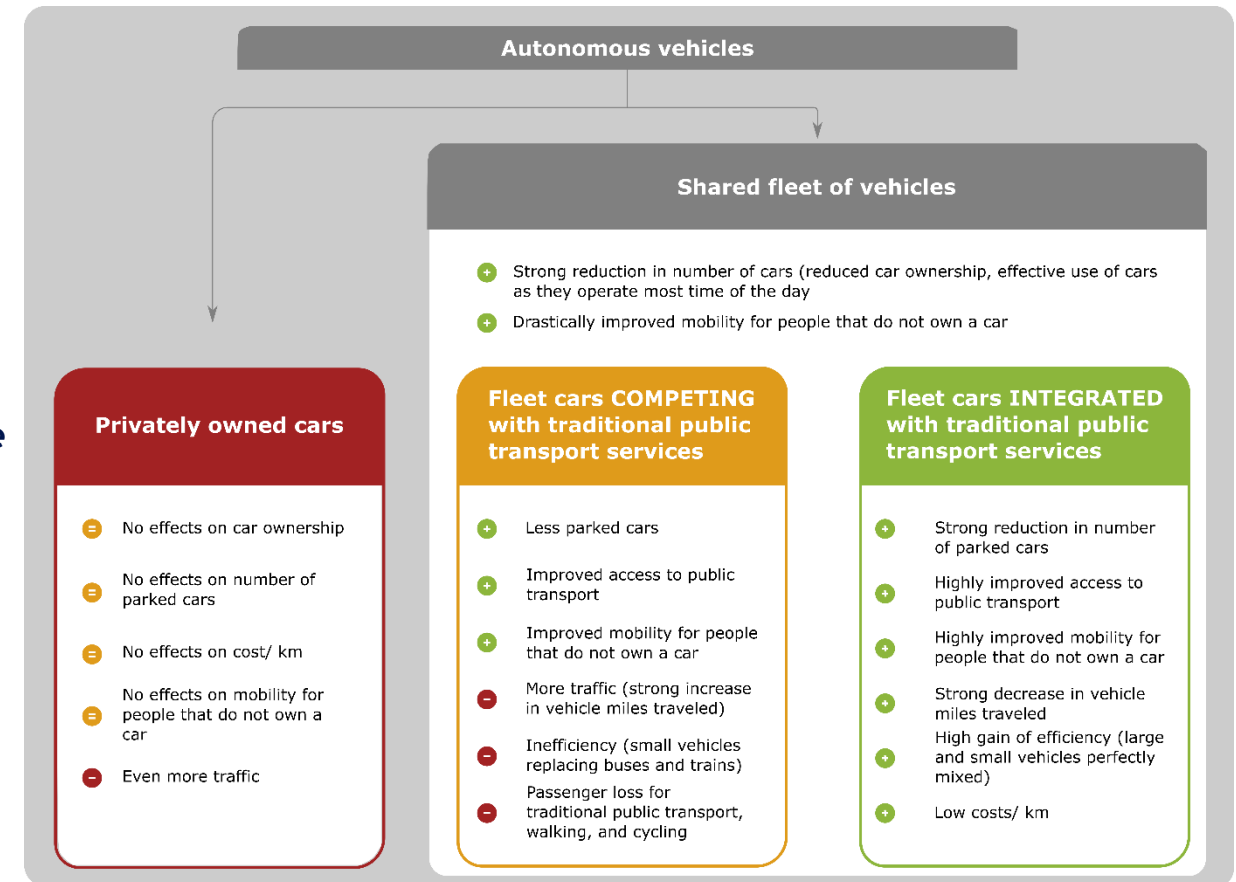
TOWARDS POLITICAL - AND SOCIETAL - COMMITMENT

Many studies have already shown that the manifestation of the advantages and disadvantages of automated driving depends very much on the form in which automated driving is realized. In particular, the degree of occupancy of the vehicles is decisive. It is therefore repeatedly emphasized that it is extremely important for the responsible governance of AVs to **ensure at an early stage that the technology develops in a socially desirable direction**^{3,4}.

In communication with decision-makers, it is crucial to **link automated driving needs to locally recognized objectives for municipal development**. Automated driving must be related to transport planning objectives and **integrated into existing or future sustainable mobility planning** in order to maximize the benefits (see *Chapter 5*). If automated driving was only used in private transport and thus made car use more attractive, no major sustainability effects are to be expected.⁵

Transport companies and municipalities should view AVs in public transport as a strategic goal and pursue their introduction in regular operations.

As organizers of the mobility of the future, **municipalities should take a stand as guarantors of a development oriented towards the common good** and thus actively shape modern services of general interest and quality of life for their citizens.



Source: Three scenarios of the UITP International Association of Public Transport for the introduction of autonomous vehicles (adapted from UITP 2021, modifications based on Driel van et al. 2024)⁶

TOWARDS POLITICAL - AND SOCIETAL - COMMITMENT

If automated driving can be effectively integrated into public transport, the advantages mentioned before can be realized very well and the disadvantages largely suppressed (highlighted also by the figure on the previous page). The UITP recommends using autonomous vehicles in urban areas as part of an overall concept consisting of various components^{6,7}:

- 🚗 **The main public transport (PT) lines remain in place and are being expanded.** They are the **"backbone" of the urban mobility system** and serve to maximise the efficiency of peak demand, especially in the mornings and evenings.
- 🚗 **Automated minibus systems** are replacing part of today's bus services. They serve, on demand and in scheduled services, **as a feeder to the main public transport lines.**
- 🚗 **Automated minibuses in ride-sharing mode** satisfy the demand for direct inner-city connections outside peak times.
- 🚗 **Automated car-sharing taxis** provide the option of travelling individually **for individual journeys.**

Getting commitment for AVs cannot be reduced to the political realm but must include the citizens as well (see **Chapter 6**).

Transport policy, particularly on the local level, is strongly influenced by public opinion. *"Public acceptability drives political acceptability."*⁸ A certain degree of societal commitment is crucial for the responsible governance of AVs, therefore, factors for this acceptance need to be considered.

Reference is often made to a Eurobarometer study conducted in 2020⁹ (with 27,000 people polled in face-to-face interviews) which shows a rather **sceptical public opinion towards the introduction and use of AVs in all EU Member States.**

76% of respondents say they would not feel comfortable in a fully automated vehicle without the supervision of a human operator. They were also asked how comfortable they would feel in the presence of fully automated vehicles on the roads when travelling in various circumstances. Here too, a clear majority of respondents said that they would not feel comfortable in any situation with AVs. Interestingly, two thirds of the respondents say they would feel comfortable in an automated vehicle if they could take back control at any point. In general, men under 45 with higher education are more open to AVs and its use than other social groups.

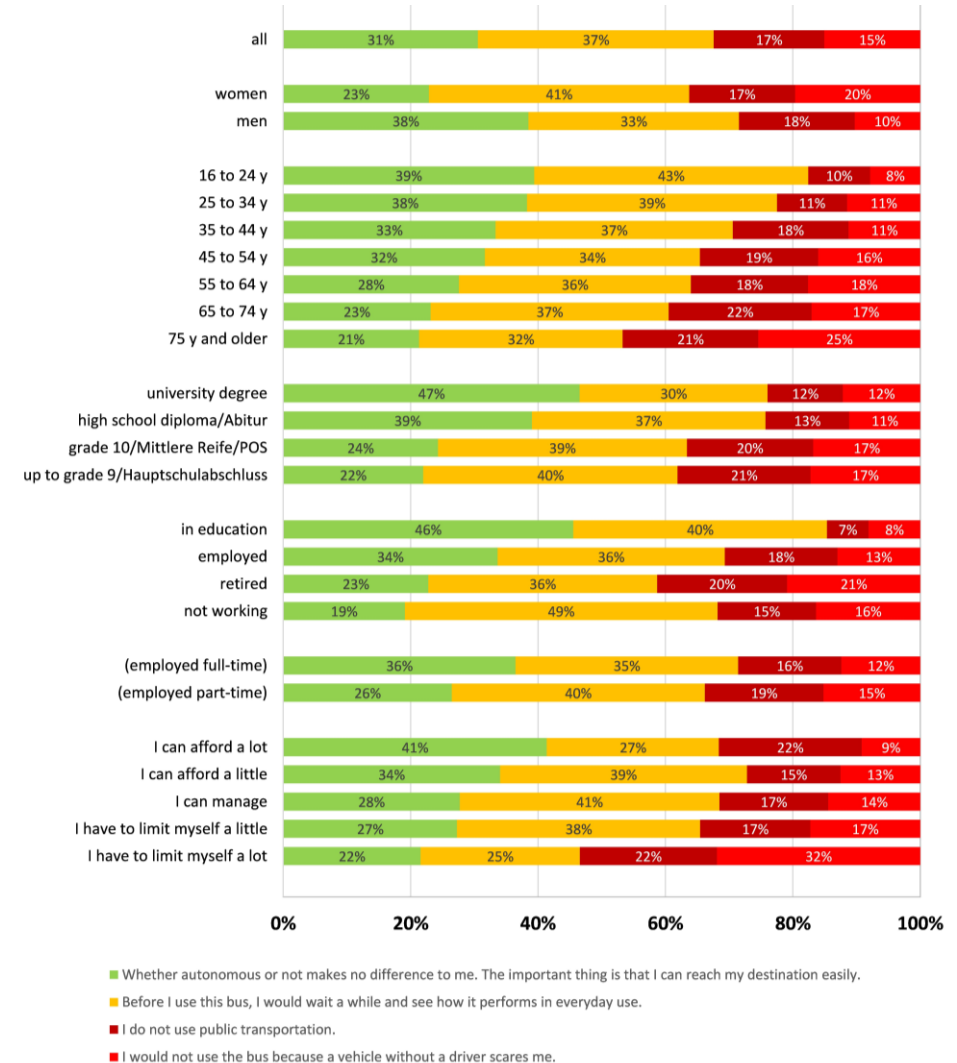
The full report and its summary is available **HERE**.

TOWARDS POLITICAL - AND SOCIETAL - COMMITMENT

Several studies^{10,11} identify **the perceived usefulness of AV-service as a decisive factor** for the willingness to use it. A **high-quality service** is crucial for the acceptance of AVs and can help to mitigate safety concerns. These findings suggest that not only the characteristics of the vehicles are important, but **the whole “service package”** (booking, flexibility, reliability, area of operation, etc.). The simple but key conclusion is that when communicating and demonstrating automated driving to both the public and political decision-makers, *the advantages of automated services must be clearly and explicitly shown and linked with objectives and concepts which exist, and which are shared by a broad range of relevant actors.*

The figure on the right shows the results of a recent survey conducted in Germany about automated driving.

- 🚌 On average, only 15% would not use an automated mini-bus because it does not have a driver - for almost a third, it makes no difference: usefulness emerges as a key factor in the decision to use it, rather than the degree of automation.
- 🚌 There are significant differences in response behaviour between socio-demographic groups.
- 🚌 A wait-and-see attitude dominates. It is quite possible that most respondents assume that they will get used to the new technology sooner or later, implying the value of tech demonstrations.¹²











Source: Answers to the question: "Now imagine that a transport company in your area offers a new local bus route on which autonomous mini-buses are used. Which of the following statements is most likely to apply to you?" - representative population survey (N=1,507) conducted in 2022 in Germany; Fleischer, Puhse, Schippl 2024)¹²

REGULATORY FRAMEWORKS: TOWARDS VEHICLE TYPE APPROVAL (VTA) FOR AVs

In order to be able to test AVs or take them into consideration in future planning processes early on, regulatory frameworks must be considered. Regulations for the authorisation of AVs in public traffic are not yet fully developed and established in any EU country or at European level - Germany is the most advanced (*see page 17*).

In principle, cars and other vehicles are approved in the EU in a so-called **"type approval procedure"**. Manufacturers can apply for it and if it's granted, the vehicle is authorised to be driven in all EU countries. It is intended to enable such a procedure for autonomous driving in the future, however, this is currently not the case, or - at most - only partially the case: **AVs currently in operation** in the tests and pilot trials in the EU **drive with exemptions based on special regulations** in the respective country. A legal basis - which in principle enables type approval - was passed in Germany some time ago. In Switzerland, for example, the introduction of comparable regulations is currently being prepared. The figure on the right provides an overview of the corresponding status in the GINEVRA countries.

COUNTRY	Regulatory framework for regular operations (type approval)	Regulatory framework for field trials (case-by-case authorization)
Austria	Implemented - small production series (1500 vehicles/year) or exceptional (one-by-one) approval	Since 2016, revised in 2019 and 2022; only allowed for certain application on public roads, not vehicle testing: automatic bus, parking service, utility/ construction machines, etc.  Many field trials with different shuttles
Croatia	The Ministry of Transport is working on amending the Road Transport Act to legally enable the introduction of autonomous taxi vehicles into daily use.	Available for testing up to Level 3 only  No field trials for Level 4 and 5 so far
Germany	Implemented (some specifications are not clarified yet, no completed approval procedure so far)	Exists and is still applied, but can be time-consuming and expansive for applicants  AV shuttles tested in over 50 test fields
Hungary	Not implemented - self-driving cars can only be registered for field tests based on the 5/1990. (IV. 12.) KöHÉM decree on the technical inspection of road vehicles and the 6/1990. (IV. 12.) KöHÉM decree on the technical conditions for putting road vehicles into service and keeping them in service	AVs can be registered for testing on a closed test track, a closed-off road, or in road traffic. Testing Levels 3-5 AVs on public roads is permitted with a prior authorisation obtained from the Ministry of Construction and Transport.  ZalaZone test track  No field trials on public roads
Italy	Ministerial Decree 70/2018 "Smart Road" allows authorization for the use of new tech on the road for testing - there is a national Technical Support Observatory for Smart Roads and for connected and self-driving vehicles	 Shuttle experiment in Torino - a 3-month pilot will run again in 2024  "1000 MAD" - a car developed by the Polytechnic University of Milan was tested on the A26 Genoa-Gravellona Toce
Slovenia	Not implemented yet - in a related note, the Ministry of Justice has started to prepare a legal framework for general AI use	AV-regulation introduced in 2021 in the Road Traffic Rules Act - permits testing up to Level 3 on public roads under certain conditions  Short testing periods in Ljubljana (BTC)

REGULATORY FRAMEWORKS: TOWARDS VEHICLE TYPE APPROVAL (VTA) FOR AVs

If vehicle manufacturers want to obtain a **type approval for an AV** to be able to offer it as a series vehicle all over Europe, this is **currently possible only for a limited number - 1,500 units**. The reason for this is that the Regulation (EU) 2018/858 - which determines the harmonised technical requirements for large series throughout Europe - has not yet been adapted to automated driving (although it is expected soon). This means that the authorised annual number of units in each of the relevant vehicle classes (M1, M2, M3) is 1,500 units.¹³

Alternatively, a national type-approval for small series vehicles can be applied for, which is only valid for the respective country. Deviations from the EU requirements are permitted if alternative requirements are defined at national level, like the recently implemented “AFGBV” directive in Germany, where the authorised annual number of units is 250 in each vehicle class.

It should be noted that AVs are only to be approved for operation under certain conditions. The so-called **operational design domain (ODD) defines the operating conditions under which an automated driving system can be used** - based on criteria such as road features, traffic, weather, time of day, etc.

On the main difference between Europe and the US

VTA means that the vehicle’s regulatory compliance is checked and certified by a third party, which in turn assumes responsibility for the accuracy of this certification, guided by transparent criteria. In a **self-certification system** (like in the US), vehicle manufacturers certify that their products meet applicable standards. Regulators can choose vehicles from the fleet to test and pursue enforcement actions when they find a risk to safety, but they do not pre-approve new motor vehicles or their technologies - liability for failures leading to accidents rests solely on the manufacturers.

This difference impacts the way in which innovations can be tested in real traffic, or even commercialised. In the US, **companies can act quickly, but always with** the knowledge that accidents are associated with high material and immaterial (reputational) **risks** - the speed of innovation is essentially dependent on the willingness of companies to bear these risks. **VTA regimes are structurally slower** because test criteria and procedures must be developed and established first, **however, the test results are** typically **more robust** and lead to a different distribution of responsibility between economic and state actors. It is also assumed that **social acceptance is easier to achieve** under these conditions than under a system dominated by companies.

THE EXAMPLE OF GERMANY

The following is a brief description of the newly established regulatory framework for AVs in **Germany** (based on information from the Federal Motor Transport Authority - KBA - and Leonetti 2024), illustrating how the procedure can be organised.^{14,15} With the AFGBV directive's entry into force, the KBA has been enabled to issue national type approvals for motor vehicles with a fully automated driving function (Level 4). The legal framework regulates a **three-stage approval and authorisation procedure** and is highly congruent with the previous approval practice for autonomous "people movers".¹⁵

Step 1: Operating licence for the motor vehicle

The KBA checks compliance with the technical requirements for the vehicle and its autonomous driving functions based on the documents and declarations submitted by the manufacturer - they can make use of an officially authorised expert and consult technical services during the assessment. By summarising the specifications and requirements, the technical capability of the vehicle is determined and the conditions and requirements relevant for the operation area are described (ODD).

Step 2: Procedure for determining the operating range

The operating area is the locally defined public road space in which the motor vehicle with autonomous driving may be operated.

The approval procedure for it is generally determined by the locally responsible state authorities. Based on the vehicle's capabilities, as defined in the operating licence, they check whether it can actually perform the driving task in the spatially defined area and whether the operating area meets all the requirements for this.

Step 3: Regular approval

The final stage is the regular authorisation for road traffic.

In addition, the regulations in Germany require that a **technical supervisor** (TS) constantly monitors the operation of AVs - **one can monitor several vehicles at the same time, accommodating public transport companies that already have corresponding control centres**. The TS is a natural person in the vehicle or supervises the driving function remotely. They must be able to deactivate the autonomous driving functions at any time and suggest manoeuvres to the vehicle, ensuring a "risk-minimized state" as soon as it is no longer possible to continue driving safely or the vehicle itself is unable to make a decision. Constant data connection ensures that the TS receives real-time videos of driving operations and can communicate with the passengers - this **requires a 5G mobile network**. The TS's workplace also includes a screen monitoring system for the vehicles and technology for transmitting driving manoeuvres.

THE EXAMPLE OF GERMANY

If authorised automated vehicles are now to be used as a public transport service, they must be adapted to the requirements of the **Passenger Transport Act** (PBefG) of Germany - the table on the right illustrates how automated services could relate to the existing system according to the Act.

Up to now in Germany, no vehicle has been approved in accordance with this procedure. One of the crucial points is certainly a lack of precision in evaluation criteria (e.g., regarding safety issues). It also remains to be seen to what extent and when other European countries will introduce comparable regulations. Despite these uncertainties,

the new regulatory framework should significantly accelerate the introduction of AVs in the future, particularly in public transport.

Source: Allocation of mobility services to types of transport in accordance with the German Passenger Transportation Act "PBefG" (Yen and Krenn 2024)¹⁶

German Passenger Transport Act (PBefG)	AV services in public transport	Explanations of the services offered by an automated public transport system
Scheduled services (PBefG §42)	Scheduled services with shuttles or buses	Passenger transport from A to B on a fixed route with several defined or demand-based stops, according to a specific timetable/frequency
Special form of scheduled transport (PBefG §44)	Commuter traffic, school transport, market trips, or trips for theatre visitors with shuttle/bus	Regular passenger transport from A to B excluding other passengers, with a destination that determines the group of passengers and a return journey to the starting point
Regular on-demand transport (PBefG §45)	On-demand shuttle	Passenger transport between two fixed locations, from A to B without a fixed route, on-demand
Transport by taxi (PBefG §47)	Taxi, ride-hailing	Taxi = individual passenger transport by order, for which the passenger determines the pick-up location, destination, and time, by a licensed company Ride-hailing = the same but by a non-licensed company (not permitted in Germany, for example)
Bundled on-demand transport (PBefG §48)	Ride-pooling, ridesharing	Ride-pooling = passenger transport by order, for which the passenger specifies the pick-up location and destination, the system sends him an approximate time of pick-up and bundles several orders based on the route Ridesharing = passenger transport by private individuals who share a journey from A to B and make an arrangement to do so

PRO-ACTIVE INTEGRATION OF AUTOMATED DRIVING IN LOCAL/REGIONAL MOBILITY

The traditional approach to transport planning has been to project historical and current data into the future to determine new infrastructure needs - “predict-and-provide”. This led to a steady expansion of road infrastructure, inadvertently fostering car-dependent societies and economies.¹⁷ The detrimental impacts - and limitations - inspired scholars to propose a “decide-and-provide” approach¹⁸:

rather than simply reacting to projected demands, decision-makers are encouraged to think about longer-term developments, including questions of possible, plausible, and desirable outcomes.¹⁹

In the context of small and medium-sized cities, integrating automated vehicles introduces both opportunities and challenges, making the need to envision these outcomes even more apparent. **While AVs promise to transform today's mobility system with potential benefits** such as increased safety, efficiency, and accessibility, **their introduction requires careful consideration - the role and responsibility of urban planners and decision-makers in this process cannot be overstated.**

Navigating the complexities of introducing automated vehicles can be made easier by **focusing on 8 questions that need to be asked before making any financial or political commitments.**²⁰

These questions (*see the next page*) are related to the **spatial and infrastructural context** in which autonomous driving is introduced, as well as the **primary objectives and envisioned business models** - in this case, they are presented together with relevant answers, but neither the list of questions nor the list of answers claim to be exhaustive.

However, the list emphasises again that

it is initially very important to be clear about the motivation and objectives of AV introduction,

while the last two points highlight different options in the area of mobility services and business models. Consideration should therefore be given at an early stage to the **purpose for which pilot projects are to be implemented.** It is equally important to **link the development of AVs very early and consequently with the existing objectives** for mobility development in the municipality/region.

What is the main motivation for introducing automated driving?

- 🚗 Reduction in overall traffic volumes
- 🚗 CO₂ emission reduction
- 🚗 Providing attractive, cost-efficient transport services for individuals as a business case
- 🚗 Providing a premium service for motorized private transport
- 🚗 Providing a cost-efficient service for elderlies, people with disabilities, and/or people with reduced mobility

What spatial changes are envisioned?

- 🚗 Expanding parking infrastructure
- 🚗 Reducing parking infrastructure
- 🚗 Developing compact and mixed-use districts and residential areas
- 🚗 Transforming car-dominated areas into areas for residents to meet and linger, or for expanding bicycle or PT infrastructure
- 🚗 Developing new residential or industrial areas

What kind of digital infrastructures can be provided?

- 🚗 Roadside infrastructure (e.g., traffic lights) for AVs to receive information
- 🚗 Roadside infrastructure is not designed to provide information for AVs
- 🚗 Three-dimensional, high-resolution, and up-to-date maps
- 🚗 Up-to-date traffic data
- 🚗 Digital infrastructures at complicated road layouts or complex bends to support AVs

What conditions must be met by the vehicles?

- 🚗 SAE-Level 3 with limited ODD
- 🚗 SAE-Level 4 with limited ODD
- 🚗 SAE-Level 5
- 🚗 AVs can communicate with roadside infrastructure
- 🚗 AVs don't need to communicate with roadside infrastructure

What organizational prerequisites must be implemented?

- 🚗 None
- 🚗 "Technical operator" who assists the vehicle in certain situations
- 🚗 Business model

Which legal & technical-regulative prerequisites must be implemented?

- 🚗 Regulation on the implementation of pilot projects on public roads
- 🚗 Adjustments to road traffic legislation to allow automated driving in regular operation
- 🚗 Guidelines for the authorization of AVs in regular operation on public roads
- 🚗 Adjustments to legislation on the carriage of passengers in public and private transport to enable new mobility services

What mobility services are envisioned?

- 🚗 Route-based public transport with buses or shuttles
- 🚗 A special form of route-based public transport
- 🚗 On-demand shuttles
- 🚗 Taxi services
- 🚗 Ride-hailing services
- 🚗 Ride-pooling services
- 🚗 Ridesharing services

What business model is envisioned?

- 🚗 PT operator owns, maintains and operates AVs
- 🚗 PT operator purchases provision of vehicles, including maintenance - ticket sales and technical supervision remain with the transport operator
- 🚗 Private operator with concession offers its service directly to the users
- 🚗 Private operator without concession offers its service directly to users, without having a license

PRO-ACTIVE INTEGRATION OF AUTOMATED DRIVING IN LOCAL/REGIONAL MOBILITY

Looking at the partner cities in GINEVRA, it becomes clear that the respective motivations can lead to different priorities.

CESENA is very committed to refining its urban mobility system, especially through a **more efficient use of public transport**. Although the testing of AV tech is currently not mentioned in their SUMP, GINEVRA could be the vehicle of **integrating AVs into** the relevant **SUMP priorities** of the city.

AV technology can be used not just for public transport, but also for logistics, therefore, **PTUJ** can use the GINEVRA project to investigate the potential of AVs in the **delivery of goods** and how their introduction might **contribute to achieve the goals set out in their SUMP**.



NYÍREGYHÁZA aims to develop a more sustainable, digital, and environmentally friendly urban mobility system - AV tech could be used for **public carpooling** (a SUMP priority) but also **connecting the city centre and outlying areas** (with autonomous minibuses).

Although **VARAŽDIN**'s SUMP and other strategic documents do not mention AVs as defining elements in the future of mobility, the **AV test pilot** carried out within the framework of GINEVRA should play a significant role in **drawing more attention to AVs in the city**.

At local level, the integration of self-driving vehicles into the urban transport system is part of **BAD SCHÖNBORN**'s Smart City Strategy - AVs would **improve the mobility conditions of many people who are currently unable to use public transport**.

PRO-ACTIVE INTEGRATION OF AUTOMATED DRIVING IN LOCAL/REGIONAL MOBILITY

The implementation of AVs depends on local regulations and circumstances, which can vary greatly between European countries. However, there are general areas - particularly concerning infrastructure and data - that need to be considered in every case.

The operation of driverless vehicles is only possible if it is **made feasible by the road infrastructure**. At Level 4, the vehicle can drive on public roads and cope with normal traffic situations, however, because it does not (yet) have all the capabilities of a human driver, it is limited in its possible uses. This means that **only traffic conditions that driverless buses can cope with can be mastered**. To enable smooth operation, the following non-exhaustive list of requirements should be considered²¹:

- 🚗 **Road widths** allow problem-free encounters with oncoming traffic.
- 🚗 **Clear sight triangles** ensure visibility of junctions and enable the sensors to function.
- 🚗 **Road damage** must be kept to a minimum so as not to interfere with the location of vehicles.
- 🚗 **Road markings** are clear and help with detection.
- 🚗 **Roadside units** could transmit the status of traffic lights, variable message signs, level crossings, etc. to the vehicles via radio (5G) in the form of V2X communication.

- 🚗 **Digital maps** (with lane demarcation, speed limits, traffic signs, etc.) are up-to-date, legally compliant and available, and may even be updated with information from networked vehicles. Changes to traffic regulations and lanes in the event of roadworks, accidents, and other cases are immediately incorporated into the digital map.

In addition, the following list^{15,22} has proven to be a practical checklist for pilot operations with autonomous shuttle bus concepts:

- 🚗 Development of an **operating concept**
- 🚗 Inspection, selection and risk analysis of possible **route options**
- 🚗 Development of specifications with subsequent AV **procurement**
- 🚗 Identification and implementation of necessary **route measures**
- 🚗 Commissioning a **technical expert opinion** for a special permit
- 🚗 **Programming of the route** (HD map, mapping)
- 🚗 **Vehicle registration** process (individual operating permit, exemption permit, motor vehicle liability, license plate)
- 🚗 Compliance with **regulations for passenger transport** (maybe an exemption from transportation obligation in field trials)
- 🚗 **Staff training**, preparation of operating manual and operating instructions
- 🚗 **Technical integration** into operations control systems and passenger information systems (if necessary)

EXAMPLE OF AN AV TEST

Location: Karlsruhe, Germany

Time of operation: Spring 2021

Funding source: Federal Ministry for Digital and Transport

Main actors:

- 🚗 FZI Research Center for Information Technology (*coordinator*)
- 🚗 Robert Bosch GmbH
- 🚗 Karlsruhe public transport company
- 🚗 TÜV Süd GmbH
- 🚗 Deutsche Bahn AG (ioki)

Motivation: The aim of the pilot project was to close the mobility chain by combining conventional public transport with a fleet of autonomous electric vehicles, the EVA shuttles.

Regulatory framework: individual operating licence for the vehicle/ODD, evaluation by an officially recognised expert

Operating details: Three easymile10 (second generation) were running in a quiet residential area on public roads with a maximum speed of 20 km/h for a period of three months - the idea was to connect the residential area with the tramways. A security driver was on board (Level 3) who could take over control (via joystick). An important W-E link road was not authorised for the shuttle.

Character of service: Free - it could be used by anyone. However, users had to download an app and register once: rides had to be booked in advance - the bus operated on-demand on a fixed route.

Changes to infrastructure: It was important that plants do not intrude into the road space, otherwise the vehicle would stop - the vegetation had to be maintained accordingly during the field test. There was no vehicle-to-X equipment installed.

Lessons learnt: The service is feasible. In principle, the new offer met with broad approval, even if many people in the neighbourhood did not see a direct benefit for themselves personally - rather for people with mobility impairments which was repeatedly pointed out. In the initial phase (when the shuttle was travelling at 12.5 km/h), it was often described as a traffic obstruction. Therefore, increasing the maximum speed to 20 km/h proved to be a very important step - with that, the shuttle was perceived more favourably, able to flow much more smoothly through traffic.

Prospects: The test area was quite well supplied with transport options. It would be important to carry out similar tests in cities that offer significantly fewer mobility options due to a lower population density in order to investigate the extent to which such shuttles can close gaps in public transport services.



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Chapter 3

Dedicated team & Intellectual capital

- Examples of functional governance and responsible transformative innovation management
- Practical steps a municipality can take for effective HR management

Content provided by HÁRFA

A CASE STUDY OF FUNCTIONAL GOVERNANCE

This chapter connects two elements of the governance framework *Chapter 1* describes: **Dedicated team/organization** (see *page 7*) and **Intellectual capital** (see *page 8*) - both are aspects of **human resource management**.

An example from one of the associated partners of GINEVRA demonstrates not just how these two elements are connected but also how the whole framework works in practice - or breaks down if one of the elements is missing.

The associated partner - Nyíregyháza - had a brownfield area, used as a military outpost in the past. It was in a bad condition, but the city managed to secure some funds to build something in its place. They drew up the plans but didn't really have a clear idea of what they want to use the building for - they were talking about co-working offices but with no specifics on their management.

Then, an opportunity has emerged: two consecutive **URBACT projects** - the city was part of both. *TechTown* explored how small- and medium-sized cities can maximise their job creation potential of the digital economy and how business clusters, hubs can work at city level, and *TechRevolution* went one step further and introduced the specific example of Barnsley (UK) and its Digital Media Centre, a hub for creative and digital business in the town centre, and the highly successful business support programme they offer there.

The people from Nyíregyháza who participated in these projects were inspired and wanted to adapt as much of what they've seen as possible, but they needed time and money to do that. The project manager invited representatives from Barnsley to visit Nyíregyháza and **meet with the mayor** - these visitors were prepared with slides, showing numbers of how creating a business hub in the city affected their local economy. The mayor saw that this could be something Nyíregyháza might benefit from as well, therefore, he appointed the project manager to **create an action plan** for how this would work - local investment promotion and business development in general but also the new building as a hub. After the plan was ready, the project manager has started to implement it by using **dedicated municipality and some EU funds**. Over time, as the successes multiplied and more investors have come to the city, he even got permission to **hire a whole team**, and now 5 people are working together in a **municipality-owned but separate organization**, tasked to handle every issue which concerns the local economy - and they are located in the renovated building which replaced the former military barracks.

A CASE STUDY OF FUNCTIONAL GOVERNANCE

This story from Nyíregyháza highlights how the different aspects of governance must align to achieve something sustainable. People working at the municipality:

- 🚗 Learned something new in a project, gaining **experience and knowledge** in the topic;
- 🚗 Managed to get **political support** and **funds** to continue their work after the project ended;
- 🚗 Created a **strategy** with specific steps that can be implemented, monitored, and evaluated; and
- 🚗 Had a clear mandate to act in the given issue - people were assigned to a **team**, and they worked together to implement the strategy.

Naturally, not everything went perfectly - over time, it has become clear that they should have put more focus on **citizen participation** because now there is significant pushback against some of the investors from the locals. Experts have also noted that a lot of investors don't bring high value-added jobs to the city which is a problem if Nyíregyháza intends to keep the young talents who study at the local university.



In addition, they don't have a lot of capacities to focus on supporting local smaller businesses and new or aspiring entrepreneurs due to handling the issues of large companies and meetings with potential investors. Their solution to this is similar to how they tackled the original issue: they split into two departments just recently - one for investment support and another one with a heavier focus on local SMEs.

In hindsight, they could have gone into the process in an even more responsible way - thinking through and mitigating the consequences of relying heavily on specific industry investors, for example -, but they still managed to do a lot of things successfully because they had almost everything in place. Their example also showcases how

a dedicated team can only work effectively if they have the necessary knowledge and practical experience to act.

This is why **simply appointing a few people to work on a new issue** (like the use of AI in urban services, or the use of AVs in public transport) **won't be enough to govern innovation responsibly.**

THE "HUMAN COMPONENT" - WHY IS IT IMPORTANT?

Human resources mean the **local capacities of municipalities** to govern AV adaptation, sustainable mobility, innovation, but also anything else in general - the two framework components they encompass are not that different in the case of AV tech than in the case of local investment promotion and business support (which the example of Nyíregyháza relates to), only **the stakes are higher when the issue on the table is something that can have an even larger impact on urban living and society**.

Why do we need these two elements - a *Dedicated team* and *Intellectual capital*?



Political commitment can only be realized if there are **people working on the given priority** day by day, strategizing and implementing actions. This can be an organization, a department, an internal group of people, or just one person - the larger the issue is, the more likely that an already overworked staff won't be able to take it on.

Tasks can be reshuffled, however, in some cases - for example, AV adaptation is clearly something that concerns urban mobility and it's very likely that most municipalities have either one person or an internal team working on that already, so **a new approach** - like responsible innovation - **can be embedded into this existing structure** where applicable.



Time is not the only factor, of course - **knowledge and expertise** is also important. Intellectual capital is **not just internal**, however: a city might have an expert in a specific field (like urban mobility), but they won't necessarily be experts in every research area (like AVs), or even RRI. This is why **internal capacities should always be complemented by building a network of external experts who can transfer their knowledge**.

This know-how guarantees that **adapting new innovations is based on actionable intelligence** (lessons from best practices and failed experiments), **not first impressions and uninformed opinions**.

A CASE STUDY OF INNOVATION GOVERNANCE

The following is another example - one that is a bit closer to the topic of responsible and **transformative innovation**, concerning **digitalization** in particular.

The municipality of Gävle from Sweden participated in an Interreg Europe project - **BETTER** - between 2019 and 2023. The topic of the project was digital processes in government: how to design useful and safe e-services for citizens. The participants from Gävle introduced **their approach to digital transition**.

In a related project, they created a **Digital Renewal Programme** to introduce and develop e-services in their city, and they appointed a **Digitalisation unit** to implement it. Their mandate was to review their current working methods (how they handle the processes where citizens are involved) and to see how they can change and improve their service with the help of digital solutions.

When they look at a service, they use a **participative approach** by **job shadowing** the people who work in the given department, asking questions about what makes their everyday job harder and how they can offer a solution, but they also use tools to involve the citizens who use the services through **surveys** and **interviews** - they even do something called **service safari** when they go through a whole process to test its usability and effectiveness.

Sometimes, the problems they find are not connected to digitalization - **in some cases, they found that it would even be detrimental to replace steps with digital solutions** because people would prefer a more personal connection (this was the case with many social services). In the first 4 years of their operation, they had almost 200 projects related to municipality services.

They realized at the beginning that going through city services one by one would take a lifetime so had a plan for this as well: they designed an **in-house 2-day crash course** - in 4 years, they conducted this training to more than 200 employees working in different municipality-owned institutions.

Their aim was to **ensure that everyone working for the city has a basic knowledge in the topic**, so while doing their everyday work, they are more likely to notice possibilities for improvement. This is in fact what happened: they made it clear to everyone that if someone comes to them with a service that needs work, they can help, so people actually did that - coming up with their own solutions and ideas and then working together with the Digitalisation unit to validate and realize them.

WHAT CAN MUNICIPALITIES DO?

How can a city benefit from this and the previous example?

In both cases, the first step was **participating in projects to expand capacities, learn new things and get inspired** by others' example.

This means

making a concentrated effort to find relevant projects and then actively involving people from the municipality who can benefit the most.

These projects are also a way to **connect with the transnational community**, creating long-lasting and effective relationships.

Many GINEVRA partners - Nyíregyháza and Ptuj, for example - have already worked together in the wider topic of mobility in the **Interreg Danube CityWalk** project 5 years ago. Based on expert presentations and data, they were introduced to concepts like induced demand in mobility. They understood that once a city expands people's ability to travel by car, they will do it more - so now they respond sceptically to the idea of adding a lane to a congested road (instead of welcoming it), and they have the knowledge to explain why. This exchange also led them to the GINEVRA project and - as one of its lessons - made it easier to accept that leaving AVs for personal use could only mean more car travel and pollution later.

These experiences are not always enough but when there are embedded misconceptions and uncertainties, it's a good start to weed them out.



Photos from a GINEVRA meeting where urban mobility experts and municipalities interacted in many ways, the former helping the latter to understand the possible implications of AVs to urban mobility

WHAT CAN MUNICIPALITIES DO?

Naturally, not every municipality employee can participate in every relevant project, but **internal capacity-building events** could also help. These can take many forms:

- 🚗 **Organizing a WORKSHOP/TRAINING** about responsible innovation (how it works, what are its dimensions, etc.) or a specific innovation (like AVs) is a good way **to share knowledge with many people quickly**. Materials from GINEVRA can help in both topics - **these** MasterClasses about RRI (for theoretical background) and AVs in urban mobility (for practical adaptation) summarize the key learnings of the project. In any case, **bringing together municipality employees and decision-makers to present them the state-of-the-art in emerging urban challenges** is a good idea. In fact, organizing events like this **during or after relevant projects** extends their impact very effectively.
- 🚗 Going a bit further, a city can **organize a STUDY VISIT** for a few people from the municipality. Involve **external experts**, looking around for options, **testing actions** (like AV demos nearby), and **organizations that might be contacted** - by **inviting** them as part of an event (like a workshop mentioned above) **or visiting them**, a municipality can not only **secure their expertise** but also **showcase an interest in collaboration**.

Projects and internal events are useful for building *Intellectual capital*, but it's crucial to think of ways of **making them sustainable and even more impactful**. *"What happens after a project ends? Where does this event fit into the municipality's everyday operations? Is it needed to train people or assign them a new task to succeed in the long term? What's the institutional framework the city can use to follow up on this project/event?"* These are questions that need to be asked before every action.

As an example (and related to the AV case), if the city has mobility-related events (like a Mobility Week), the municipality can capitalize on that - as mentioned before, **it's more effective to use an existing structure/process as a first step** than assigning someone to lead a task force responsible for preparing the city for AV adaptation and for organizing related events (especially if no one has the necessary knowledge yet to understand what that actually means). Instead of a new task force, **naming someone as the "ambassador" of the given topic** is a good way of showing intentions even if there's not much actual implementation yet. Moreover, if there's a department for urban development, **working groups** can be formed based on different topics - and one of them might be **responsible for sustainable urban mobility, exploring the adaptation of AVs** (among others).



Chapter 4

Financial resources

- Funding mechanisms to support responsible innovation in the context of AV adaptation
- Focus areas of preparing the way
- What can local authorities do?

Content provided by CISE

EU FUNDING PROGRAMMES

The rise of AVs represents a transformative shift in urban mobility, offering to European cities an opportunity to reduce congestion, improve safety, and mitigate environmental impact. However, realising this potential requires **substantial funding** and **strategic allocation of resources**.

In Pillar II of **Horizon Europe** - considered as the most ambitious Research and Innovation programme, with €95.5 billion for 2020-2027 -

AVs have been identified as one of the global challenges impacting Europe's industrial competitiveness.

The European Commission has committed around €500 million in a **public-private partnership on AVs** with the non-profit Connected Cooperative and Automated Mobility (CCAM), which has been topped up by private members with the same amount. Since 2021, €159 million has been invested in R&I activities to **support 19 European projects to deliver on AVs**. An amendment recently adopted by the Commission mobilises previously unallocated research and innovation funding for green and digital transition, increasing the 2024 budget by nearly €1.4 billion - this includes an investment of nearly €650 million in the EU Missions to support local and regional authorities facing climate-related challenges.

Among other initiatives, a budget of €76 million aims to foster young researchers to focus their work on a subject of their choice within Horizon Europe Clusters, including addressing “*Climate, energy and mobility*”. One notable call under this cluster is “*AI for advanced and collective perception and decision-making for CCAM applications*”, which focuses on **increased user acceptability and societal benefit of AV solutions**, based on **explainable, trustworthy, and human-centric AI**.

Another relevant call related to AVs is “*Robust knowledge and know-how transfer for key-deployment pathways and implementation of the EU-CEM*”, which is closely tied to the principle of multilevel governance as it seeks to encourage **strong collaboration and cooperation** between all stakeholders, fostering **exchanges of results** from projects in terms of practices, experiences, tools, and methodologies supporting the transition to large-scale deployment, as well as to **spread a good level of understanding and awareness of AVs among citizens, decision-, and policy-makers in Europe**.

EU FUNDING PROGRAMMES

Horizon Europe has a new level of ambition: to maximise the impact of the EU's R&I funding for the European economy, science, and the whole society, moving to an **impact-driven programme**. This ambition aligns strategically with the 2020 relaunch of the European Research Area (ERA) and its integration across Horizon Europe's clusters and programs, particularly within the framework of **“Widening participation and Strengthening the European Research Area”** (WIDERA). This cross-cutting programme of Horizon Europe addresses the need for regulation to (1) foster innovation in rapidly evolving fields, (2) bridge the innovation gap between regions and Member States, and (3) harness the potential of all innovation ecosystem players.

The **European Innovation Ecosystems** initiative is also part of the Horizon Europe programme, representing a fundamental pillar to encourage the growth and development of innovation networks in synergy with the EIC (European Innovation Council) and EIT (European Institute of Innovation and Technology). Actions under the destination **“CONNECT”** focus on building interconnected and inclusive innovation ecosystems across Europe, leveraging the strengths of existing ecosystems at all levels and encouraging the involvement of all actors and territories to **define, undertake and implement ambitious, challenge-addressing collective actions for the benefit of society**.

One example of a project about AVs funded under CONNECT is the *“Continuous and Efficient Cooperative Trust Management for Resilient CCAM”* project, started in 2022 with the aim to enhance trust and end-user adoption of CCAM solutions by facilitating **cyber-secure data-sharing** between data sources in the CCAM ecosystem. As citizens seem to be sceptical about the deployment of automated solutions, and their unfamiliarity with those technologies makes them more reluctant to use them (leading to low user acceptance),

ensuring safety and privacy are fundamental for the public acceptance of AVs.

In addition to the above, the **New European Bauhaus** (NEB) will receive €20 million from the amended Horizon Europe programme to prepare the ground for the implementation of a **new NEB facility**, which would bring multi-annual budget support for 2025-2027 through two pillars - an **R&I part** to develop new ideas and a **roll-out part** to scale-up such solutions.

EU FUNDING PROGRAMMES

The **Digital Europe Programme** (DIGITAL) is part of the long-term EU budget and covers a period from 2021 to 2027. It funds projects from 5 main areas, including €1.1 billion allocated for the wide use of digital technologies across the economy and society to **support high impact deployments in areas of public interest**, such as health (complemented by the EU4Health programme), Green Deal, smart communities, and the cultural sector. This could offer the possibility to receive funds for AV projects, including the use of autonomous vehicles for health care applications.

As one of the main issues in AV implementation is to **build a robust data infrastructure for AV communication and traffic management**, the Digital Europe Programme also grants €2.1 billion for artificial intelligence, among other objectives, in order to “*set up a true European data space and facilitate safe access to and storage of large datasets and trustworthy and energy efficient cloud infrastructure*”.

In addition to Horizon Europe and DIGITAL, the **Connecting Europe Facility** (CEF) Digital programme (2021-2027) also aims to support the development of digital infrastructure and services in Europe.

CEF Digital mainly provides funding to:

- 🚗 Improve digital interoperability across Member States,
- 🚗 Support the development of secure digital public services, and
- 🚗 Encourage the sharing and reuse of public sector data to drive innovation and economic growth.

In the context of automated vehicles, CEF Digital supports the **deployment of 5G corridors across Europe**, which ensure **proper solutions for service continuity when crossing borders**, with a planned budget of €780 million.

In addition to CEF Digital, there is also **CEF Transport** (2021-2027) which provides a budget of €25.8 billion to support innovation in the transport system to (1) improve the use of infrastructure, (2) reduce the environmental impact of transport, (3) improve energy efficiency, and (4) increase safety. This includes **projects that develop technologies based on automation, integrated infrastructure capacity, traffic management, and improved transport services**.




EU FUNDING PROGRAMMES

The strategic alignment of European funding serves a dual purpose: ensuring adequate resource availability and fostering knowledge exchange among various projects and stakeholders. This alignment helps to **minimise redundant efforts**, thus promoting innovation and efficiency in the research and innovation process, while also aiding in the achievement of EU targets. Moreover, by encouraging synergy between different EU funding instruments,

cross-sector collaboration is facilitated, enabling stakeholders from diverse domains like the automotive industry, telecommunications, information technology, infrastructure, and policy-making to collaborate.

This interdisciplinary collaboration is **essential for developing comprehensive automated driving solutions that are resilient and adaptable to future needs.**

European projects such as IN2CCAM, Ride2Autonomy, and SHOW underscore the tangible outcomes resulting from strategic financial allocation and cross-sectoral collaboration towards fostering innovation and adaptation in urban mobility.

-  **IN2CCAM**, funded under Cluster 5 (Climate, energy and mobility) of Horizon Europe and started in November 2022, aims to enhance the physical, digital, and operational infrastructures to enrich CCAM services, thereby increasing safety and traffic efficiency while facilitating the full integration of connected AVs into the transport system.
-  **Ride2Autonomy** (2021-2023) pursued two main goals: accelerating the adoption of automated shuttle solutions and enhancing public acceptance of them across Europe, where cities are grappling with congestion, pollution, and accessibility. The project has carried out rigorous testing and validation of the technology on 10 pilot sites, also providing guidelines, implementation models, and recommendations for other cities to replicate the experience.
-  **SHOW** aims to be the largest initiative piloting AVs in urban environments, conducting real-life demonstrations in 20 cities in Europe for 24 months, with real service on each site lasting at least 12 months. Its extensive partnership network - spanning 69 partners from 13 EU countries and collaborating with organisations from the US, South Korea, Australia and China - underscores its commitment to fostering international cooperation and driving innovation in urban mobility.

FOCUS AREAS

In an insightful report by the International Transport Forum titled *"Preparing Infrastructure for Automated Vehicles"*, critical issues surrounding the adoption of AVs are analysed.

Policy-makers and stakeholders must address three main areas: physical infrastructure, data and digital infrastructures, and institutional frameworks.

No matter how sophisticated automated vehicle technology becomes, it will always depend on **PHYSICAL INFRASTRUCTURE**. AVs utilise a mix of sensors and software to perceive their surroundings, rather than relying on other technological solutions such as guidance cables. **AVs leverage various road features** - including lane markings, curbs, signs, traffic signals, pavement edges, and natural landmarks - **to understand and navigate the environment**. An important question facing policy-makers and infrastructure operators is whether investments are needed to adapt existing practices and standards to facilitate safe and efficient AV travel on roads.

Additionally, there are several critical **INVISIBLE INFRASTRUCTURES** that support the operation of AVs. They need **accurate GPS and mapping data** to locate and decide their route, but also **facilities for charging and maintenance** to ensure they can run effectively.

A lot of data is produced and needed by AVs, and this data needs to be processed and stored in **secure data centres**. Vehicle communication is facilitated through wireless communication and information exchange between (1) vehicles and infrastructure, (2) different vehicles, and (3) vehicles and the broader internet, enhancing traffic safety and services for road users. Historically, efforts to connect road infrastructure to people and vehicles on the road network have centred on **Cooperative Intelligent Transport Systems** (C-ITS). The term covers a range of intelligent transport systems that are capable of communication and cooperation in line with a set of globally agreed standards, using a commonly agreed frequency band. C-ITS has been developed over many years, through a well-organised programme of international collaboration (European ITS Platform, 2022). Clear technical standards exist, as do the organisational structures to develop systems further. This makes C-ITS one of the most technically developed invisible infrastructures concerning AVs, and **they are particularly useful for immediate interventions in support of automation**.

In addition, automated transport and various new mobility services will create new requirements for mobile communication networks along main roads - this means that **5G's faster speed, greater capacity and smaller delays will become increasingly important**.

FOCUS AREAS

In terms of **INSTITUTIONAL FRAMEWORKS**, *governments and local authorities should continuously review and update their regulation framework to remain consistent, accessible and suited to the adoption of AVs.*

Assessing the safety of AVs requires far more data than current laboratory-based and test track approaches. While different countries and jurisdictions are carrying out research, setting policy and developing validation testing procedures for the safe operation of AVs on their roads, **integrating international experience into standardised testing procedures can help introduce AVs across jurisdictions faster**. In collaboration with industry, governments should work together to pursue complementary strategies to design, implement, and revise their measures, metrics, analytics, testing procedures, and data reporting methods.

Overall, the transition to an AV-enabled future requires significant investments in both physical and digital infrastructure development, but also legislative and institutional changes across European countries.

The most important funding opportunity in the next years will be the **Next Generation EU**, a great opportunity for EU Member States. As an example, the Italian Recovery and Resilience Plan translates this opportunity into action. The Plan mobilises over €300 billion - the €210 billion coming from the Next Generation EU programme is complemented by funds allocated within the 2021-2026 national budget planning. In addition to the €196.5 billion assigned to Italy by the Recovery and Resilience Facility, the Plan includes €13.5 billion from React EU and €1.2 billion from the Just Transition Fund. €26.55 billion have been allocated to the “*Digitisation, Innovation and Competitiveness component of the productive system*”, which include crucial projects for AV infrastructure, like the completion of the broadband project, the construction of ultra-fast fibre optic networks, 5G, and investments in satellite monitoring.

Besides focus areas that have a direct connection to AV adaptation, cities must look for **indirect connections** as well when considering the allocation of their resources. Projects increasing **citizen participation** in urban mobility planning, **developing the public transport system and curbing car dependency**, and facilitating the **creation of networks between the public and private sector** in general are endeavours that influence AV readiness.

REGIONAL SUPPORT

In addition to European-level funding mechanisms, regional initiatives play a crucial role in fostering digital innovation and ensuring local relevance and participation. Governments across Europe are increasingly recognizing the importance of investing in digital transformation to address specific challenges and seize opportunities in their local contexts.

A key element of successful regional initiatives lies in the implementation of participatory governance models which actively engage various stakeholders

- including local communities, businesses, research institutions, and public agencies - in the decision-making process.

For instance, the Emilia-Romagna region in Italy adopted a regional law in 2018 on *"Participation in the Development of Public Policies"* that promotes the participation of citizens and their organisations in the delineation of public policies and strengthens the sense of active citizenship, especially in the case of important and strategic choices for the territory. While the law provides a framework, its true strength lies in its implementation: **participation calls** - published annually by the region - serve as the engine driving this vision, transforming legal aspirations into a dynamic process of citizen involvement. These calls are open to a wide range of participants, such as public institutions (municipalities, public agencies, etc.).

Proposals are sought for participatory processes that align with strategic objectives outlined for the region, including fostering social cohesion by empowering civic engagement, involving younger generations and underrepresented groups in public decision-making processes, and encouraging initiatives that contribute to an inclusive digital transition.

Complementing the participation calls, the **Territorial Laboratories initiative** - launched in 2020 - aims to stimulate collaboration among businesses, local authorities, the innovation and research ecosystem, and other relevant stakeholders at local level to address local challenges by encouraging the development of innovative solutions. The initiative operates through a system of biannual participation calls, actively engaging a broad spectrum of local actors as eligible participants (including chambers of commerce, municipalities, unions of municipalities, provinces of Emilia-Romagna and the Metropolitan City of Bologna). **Collaboration** is a cornerstone of the programme: to ensure a systemic approach and to foster knowledge sharing, proposals must involve the **participation of at least one technical partner** selected from the Clust-ER clusters of Emilia-Romagna and the Innovation Centres of the High Technology Network.

LOCAL POINT OF VIEW

At local level, the financial challenges of the public sector combined with the need to innovate create a very difficult situation. There is an urgent need to devise effective, integrated, and scalable solutions. However,

the knowledge, technical expertise, and financial resources required for innovation or replication are often controlled by the private sector.

This is especially true when considering visible and invisible infrastructures that support AVs. Whereas most highways are funded by governments, the provision of communications infrastructure, high-quality mapping and operational data can be handled through a variety of channels. Across Europe, this infrastructure is often provided by private companies and a reliance on the market-led approach could be much slower than direct state action or a mix of public-private investments.

PPPs - public-private partnerships - can provide significant benefits, but **are very challenging for the public sector**, especially if not accustomed to and skilled in such arrangements. The European Investment Bank - with the collaboration of the Commission and the Member States - has created the **European PPP Expertise Centre** (EPEC) which can assist national and local authorities in setting up such arrangements.

Moreover, the Commission's *Business Innovation Observatory document on PPP's for Large Scale Demonstrators and Small-scale Testing Units* provides useful insights.

In conclusion, several funding opportunities exist at European level, and **cities are encouraged to look for regional support as well**. By ensuring the availability of appropriate **infrastructure** (physical and digital), promoting international **collaboration**, and updating **regulatory frameworks**, they can accelerate the transition towards AVs. However, initiatives aimed at **community digitalization** and **public awareness** are also crucial.

As the EU and its Member States address the complexities of AV implementation, the convergence of these efforts presents a significant opportunity to shape the future of urban mobility - **a chance to reimagine transportation systems**. By seizing it and working collaboratively across sectors and borders, Europe can become a global leader in leveraging the groundbreaking potential of automated vehicles by integrating them into urban landscapes in **a way that prioritises not just technological innovation but also social equity, environmental sustainability, and a positive impact** on the overall quality of life for citizens.



Chapter 5

Shared vision & strategy

- How did transport planning change in the 20th century?
- Integrating AVs into SUMP
- Selecting and implementing appropriate measures - paradoxes of urban mobility

Content provided by TUW

GOAL-ORIENTED PLANNING

Historical transport planning - especially between the 1950s and 1990s - has often been based on the concept of “**forecast and provide**” (or “predict-and-provide”, in [Chapter 2](#)): if a city is expected to grow, infrastructure is provided to support that growth. However, this method can lead to problems over the years, as extensive road infrastructure is built to attract traffic, thus, congestion starts, eventually creating the same problem again.

This way of planning has been changing since the 1980s, with the change becoming widespread in the last 10-15 years. The new way is oriented from **policy goals** (policy objectives) - they **are discussed and set** with stakeholders **first**. Following this, **measures** (policy instruments) **are combined** (packaged) **to achieve the agreed goals**. This process is often called “**goal-oriented planning**” and - in some specific cases - “**backcasting**”, a new paradigm of mobility planning. “Backcasting” has an affinity with sustainability goals - for example, **UN SDGs** (Sustainable Development Goals) are fully based on it, and the same applies to the **2050 Net Zero carbon neutrality goals**.

In the field of mobility, a goal can be a **future modal split**, for example. Many cities set a goal for 2030, 2040 or 2050 in their policy manifestation to increase public transport, walking and cycling, and decrease the share of cars - based on such goals, measures are selected as a coherent and logical “package”.

For goal-oriented mobility planning, a clear guideline has been established with an initiative by the European Union. This guideline - developed by more than 300 experts and consultants and published with the support of the European Union - is called **Sustainable Urban Mobility Planning** (SUMP). The first edition was published in 2013, and the current second edition was released in 2019. The **EU website** provides a comprehensive overview, and the SUMP guideline itself is available in 20 languages.

It's important to note that SUMP may not always be called so. For example, in Vienna, the plan is called STEP 2025 Urban Mobility Plan. In many cities, it is called Mobility Master Plan, Mobility Strategy, or alike. In France, it was historically known as PDU (Plan de déplacement urbain) and is now called PdM (Plan de mobilité), carrying the same meaning as Vienna's version.

In some countries, SUMP is already mandatory. France was an early adopter, making SUMP (PDU) mandatory in the 1990s for cities of a certain size. According to current policy development (May 2024),

SUMP is becoming mandatory for 424 Trans-European Network (TEN-T) node cities by 2027,

covering most cities in Europe, including all core cities of Functional Urban Areas (FUAs).


GOAL-ORIENTED PLANNING

The SUMP process is divided into 12 steps: the initial key step is to **analyse the current situation**, followed by **co-creating policy visions and objectives** for the future's mobility. It is crucial to make an agreement on the vision and the objectives *before* implementing specific measures - this principle is at the core of SUMP.


Key objectives should coincide with sustainable transport systems, liveable cities, less pollution, less congestion, and fewer accidents, for example. Interreg pilot actions can contribute to building this future vision, guiding the penetration of AVs to extract the benefits while avoiding negative impacts on the city.

Example: Mobility choices in the city tend to be sustainable - most people choose walking, cycling, and/or PT to travel. (vision)
→ *Change the travel behaviour of citizens (objective)*

After establishing a shared vision with objectives, this must be “translated” into more **specific priorities and targets**.

 **Priorities** define a direction for the future. For example, if the vision includes less pollution or fewer accidents, priorities should direct efforts toward achieving these outcomes. Similarly, priorities could focus on increasing the share of walking and cycling or maintaining a high quality of living.

Example: Generate citizen interest in public transport, increasing its modal share

 **Targets** are the translation of priorities into specific - **quantified and time-bound** - goals to make policy-making and governance operable. The “time-bound” factor is essential - e.g., increasing the share of PT to 50% and cycling to 10%, maintaining the share of walking at 20%, and decreasing the share of cars to 20% by 2040 within the modal split. Without a timeline, the target values do not make sense. Naturally, the targets must also be **based on the current situation** - decreasing the share of cars to 20% by 2040 from 35% in 2024, for example.

These priorities and targets must be in the SUMP in order to be effective - the latter form the basis of the selection of measures, i.e., **deciding what actions to take**.

In relation to AVs, if the goal is to increase the modal share of public transport or extend its coverage, measures (actions) could include *using autonomous vehicles to enhance public transport service by shortening intervals* or to increase the coverage to new areas or time of day. For example, *instead of every hour, public transport could run every 20 minutes with autonomous buses*, making it more attractive for citizens and visitors. AVs could also provide 24/7 PT services - at night as well when there is no staff available.

MEASURE SELECTION AND IMPLEMENTATION

Once visions, objectives, priorities, and targets are agreed, the next step is to select measures. Doing just one thing - like widening a road - will not solve any problems and may create future issues, therefore, **combining measures into packages is essential**.

Measures can be diverse, relating to infrastructure, rolling material (vehicles) for public transport, pricing, subsidies, ticketing, regulatory changes, new services, mobile apps, promotion activities, and many more. When packaging, hard and soft measures should be combined in a **push and pull** manner:

- 🚗 Push refers to **pushing cars out of the transport system**,
- 🚗 while pull means **attracting people to environmentally friendly modes of transport**, particularly public transport, walking, and cycling.



When it comes to autonomous vehicles, it is crucial to **look at the evidence and compare it to technology companies' advertisements**. Technology providers often paint a beautiful and attractive picture, solving all sustainability problems in theory, but there is no guarantee that this is the real case.

The full impact of AVs is still unknown. **Exchanging information among policy-makers** is important so that penetration into society is not only driven by the tech providers' interests but by **keeping the goals of SUMPs and broader sustainability goals in mind**. When considering disruptive innovations like AVs, it is important to check their effects against SUMP objectives, priorities, and targets.

To this end, every stakeholder should **consider how to extract the benefits from AVs**, such as providing more public transport at lower costs or shifting everyday travels from private cars to public transport. At the same time, **avoiding negative impacts** is also a key consideration - for example, having too many empty cars running in the city or reducing walkability and bikeability due to streets configured perfectly just for AVs.

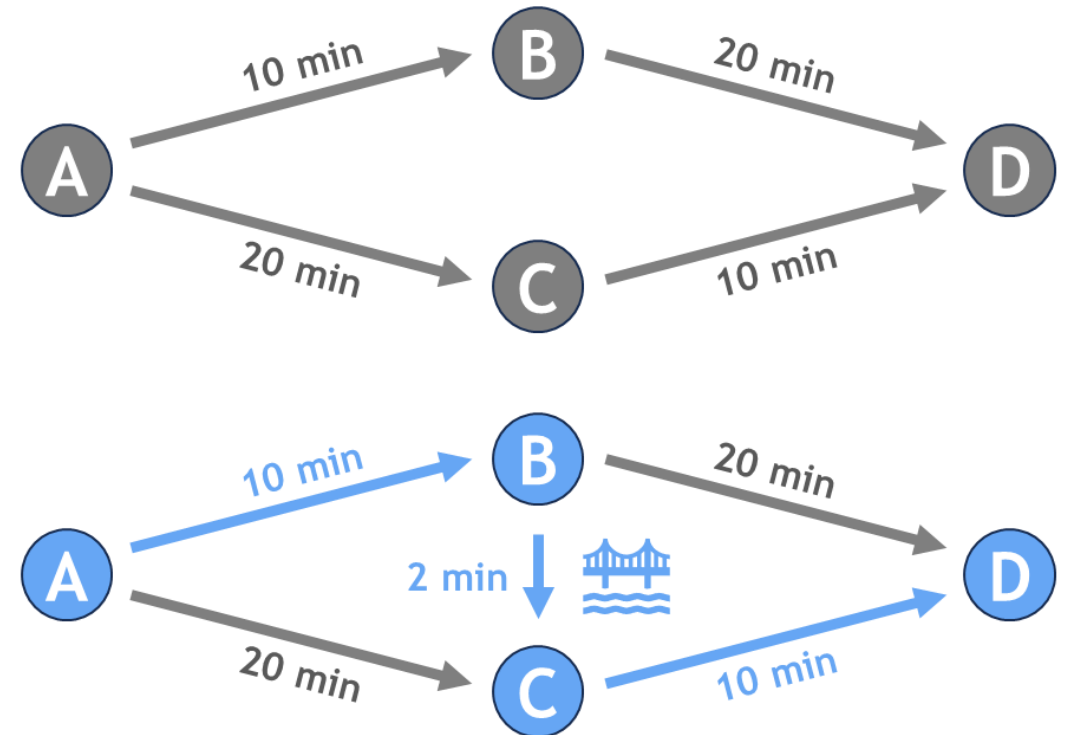
Source: P. Müller, F. Schleicher-Jester, M. P. Schmidt & H. H. Topp (1992):
Konzepte flächenhafter Verkehrsberuhigung in 16 Städten. Grüne Reihe des
Fachgebiets Verkehrswesen der Universität Kaiserslautern No. 24.
In M. Breithaupt: The Role of TDM in Urban Development

PARADOXES OF THE MOBILITY & TRANSPORT SYSTEM

When selecting measures for sustainable urban transport, it is crucial to remember certain paradoxes that can be observed often. One such paradox is **Braess' Paradox**, named after a German mathematician. It is a simple concept:

- 🚗 For travel from A to D, the chance of choosing the route via B or C is likely 50-50%, because both routes take 30 minutes overall.
- 🚗 Now, suppose that an improvement is made, such as building a new bridge between B and C to make a shortcut. This changes the travel times between A to D: A to B taking 10 minutes, B to C taking just 2 minutes, and C to D taking 10 minutes. With this improvement, everyone would likely choose the new route that is taking only 22 minutes overall.
- 🚗 However, this would create a problem: with traffic split 50/50 between the routes, the travellers were evenly distributed. In the new situation, the A-C and B-D routes are no longer attractive, and everyone would use A-B-C-D, leading to congestion.

Braess' Paradox is an important reminder that **any kind of improvement** (even a good one) **can create new problems** - this also explains induced traffic, where improvements can sometimes exacerbate problems instead of solving them.



PARADOXES OF THE MOBILITY & TRANSPORT SYSTEM

Another famous example is the so-called **Jevon's Paradox** - for transport planning (and more broadly in environmental economics), it is also known as the **"rebound effect"**. It was already known in the 19th century: when efficiency improves - e.g., the efficiency of a machine increases -, the use of the energy - e.g., coal - decrease at one site. However, more people or companies start to use the machine, and the energy, too, leading to an overall increase of energy consumption.

In mobility, improving roads can lead to increased car traffic. As per Braess' Paradox, they may reduce travel costs or time, and traffic jams can happen when more cars are running than the given road capacity. Typically, a single-lane road can carry about 1,800 to 2,000 cars per hour - if the number of cars exceeds this just by a few percent, congestion can occur. The traditional response is to build new roads. However, **building new roads can make the problem worse by attracting more cars and creating even more congestion**. This leads to a **vicious cycle**: more cars, more congestion, and more roads, creating a never-ending story. Louis Mumford famously said that *"building roads to solve congestion is like loosening your belt to prevent obesity"*, which highlights the flaw in this approach. Therefore, **it is important to consider long-term effects of every measure**, which can worsen the situation compared to the initial state.

AVs may seem far in the future, but they are coming closer and closer. In Stavanger (Norway), an AV bus (*on the right*) has been running for 2 years on a circular route of about 3 km, carrying passengers in the city centre. Stavanger is a small city with about 100,000 inhabitants - it has a walkable but technically complex centre with many pedestrians, ports, and narrow streets. Autonomous public transport has already been realized there to some extent. The PT authority of the region plans to reduce the running costs of buses by 40-50% and to use these savings to expand their PT offer. Their use of AVs is in line with the city's mobility master plan (SUMP), contributing to the goals set in it.

New challenges *will* emerge - it is important to think in advance about how to mitigate them and take the best actions early enough. **Small cities can start to prepare right now**: regional centres may consider **developing a SUMP** even if it's not mandatory yet, while cities that are part of a FUA should liaise continuously with the core cities since they will most likely have to do it later. Parallel to this, **a mobility strategy can be embedded into an "upper level" or wider plan, such as a municipal development master plan, spatial development concept, or energy concept.**





Chapter 6

Participative approach

- Connection between governance and stakeholder engagement
- Examples for participation tools
- Introducing the AUTREMENT project as a good practice

Content provided by EMFIE & ALDA+

GOVERNANCE AND STAKEHOLDER ENGAGEMENT

The *White Paper on European Governance* identifies **five principles** that underpin good governance: openness, **participation**, accountability, effectiveness, and coherence. In sustainable development, the concept of multilevel governance has emerged as a guiding principle, emphasising **collaborative decision-making and shared responsibility** across various levels of society. At the heart of it lies the **synergistic relationship between stakeholders** - ranging from local communities and NGOs to policy-makers and businesses - **and the decision-making process**.

Innovations wishing to align with societal needs and values require the collective intelligence of stakeholders, leading from theoretical advancements to tangible societal benefits.

Therefore, identifying and engaging with stakeholders, along with understanding their diverse roles and perspectives, are fundamental aspects that drive the success of any transformative innovation.

An effective stakeholder engagement process operates as a **continuous cycle**, allowing it to evolve and improve. This iterative approach ensures that **engagements are not isolated events**, but ongoing processes informed by continuous learning.

When executed effectively, stakeholder (including citizens) engagement can even drive innovation, leading to the creation of novel ideas. However, poorly managed engagements have the potential to cause mistrust.

One of the fundamental shifts in contemporary stakeholder engagement is the move toward **inclusivity and transparency** - demystifying the decision-making process, allowing stakeholders to understand the rationale behind decisions and get involved, actively shaping them.

The decision-making process itself also needed to evolve for this: **creating frameworks with iterative feedback loops** more open to revisiting decisions, adapting strategies, and incorporating new insights. This adaptability is especially crucial in dynamic sectors such as technology.

Stakeholder feedback has become an aspect of data-driven decision-making, alongside data analytics and market research.

This approach fosters **objectivity** but still leaves place for **subjective perspectives**, enhancing the legitimacy of outcomes.

GOVERNANCE AND STAKEHOLDER ENGAGEMENT

As detailed in the *GINEVRA Baseline Study (page 24)*, the principles of participatory *democracy* are showing remarkable similarities with the operational dimensions of RRI. When talking about the **participatory approach**, the main principles are:

- 🚗 **Right to participate** - Everyone has a right to influence the decisions impacting their lives.
- 🚗 **Hearing unheard voices** - creating safe environments for expression
- 🚗 **Seeking local knowledge and diversity** - Residents possess expert knowledge of their community, with each person offering unique experiences and viewpoints.
- 🚗 **Reversing learning** - Preconceptions should be abandoned to learn from the community members.
- 🚗 **Using diverse methods** - ensuring that a wide range of people can participate in learning and analysis equally
- 🚗 **Handing over the stick/pen** - experts or people with a higher status stepping back, remaining silent, and creating space for others to contribute
- 🚗 **Attitude and behaviour change** - especially in the case of those in power

All in all, the participatory approach means that we **involve those who are directly impacted by a problem and those who have the potential to influence it**, and ensure that **everyone has a say either in person or through representation**. It is more than just seeking opinions before proceeding with a pre-determined plan anyway - each participant must play a **significant role in the planning process**, their input valued and respected.


This is the ideal state; however, the reality can be quite different.

- 🚗 Some individuals might not want to get involved because they feel it takes too much **time**, or they lack the necessary **skills**.
- 🚗 Certain people/groups might feel **excluded or disrespected** if they are not invited (regardless of their relevance to the issue).
- 🚗 The process might serve only to **endorse pre-developed ideas**.
- 🚗 Some opinions might be **given more weight** than others.

Finding the right method of participation can help alleviate these potential problems - the following pages list and describe several. By **strategically combining them based on the specific objectives**, organizations can build sustainable relationships with stakeholders, resulting in informed, collaborative, and inclusive decision-making. Responsible multilevel governance is not a theoretical construct but a tangible outcome of **meaningful stakeholder engagement** - **not a mere tool but a cornerstone**.


STAKEHOLDER ENGAGEMENT TOOLS

Participatory tools provide **different engagement levels**. People who might balk at the idea of sharing their opinion in public events might be more interested in **methods that allow a less "personal" involvement**.

A close-up photograph of a person's hand holding a pen and writing on a survey form. The form has various checkboxes and text fields. A water bottle is visible in the background.

SURVEYS serve as powerful tools for **gathering quantitative data on preferences, and perceptions**. Through them, a wide array of stakeholders can express their views **anonymously**. They also provide a comprehensive overview, highlighting current **trends** within the community, enabling stakeholders' voices to be quantified and incorporated

systematically. Regarding AVs, targeted questions might capture the current perception of citizens and their perspectives on possible future scenarios (see **page 14**), including concerns about safety, privacy, and ethics. This provides valuable **insight into public acceptance, enabling policy-makers and technology developers to address specific worries effectively**. Surveys can also serve as **barometers of community readiness**, guiding the implementation strategy of autonomous vehicles.

A pair of black-rimmed glasses with a digital display on the left lens. The display shows various data points, charts, and text, resembling a futuristic or high-tech interface.

DIGITAL PLATFORMS (interactive websites & portals) serve as **dynamic hubs** where organizations and communities can interact, exchange ideas, and foster meaningful relationships. One of their key features is the ability to **facilitate ongoing communication** (forums, discussion threads, etc.) - for stakeholders to

voice their concerns and for organizations to respond promptly. **Polls, feedback forms, and surveys are commonly integrated into these platforms**, enabling data-driven decision-making.

Digital platforms also serve as **knowledge hubs**, offering stakeholders access to relevant resources, reports, and educational materials, including multimedia content (videos, infographics) which deliver necessary background information in engaging formats. Furthermore, these platforms act as **spaces for co-creation**.

STAKEHOLDER ENGAGEMENT TOOLS

Several participation methods are based on the idea of **a few stakeholders and/or decision-makers meeting face-to-face** (online or offline) to discuss issues and make joint decisions.



Informal **INTERVIEWS** - conducted **one-on-one** or in **small groups** - encourage candid conversations. They often happen in **familiar settings** (e.g., coffee shops), fostering **a sense of comfort and openness** among participants, leading to more honest responses and organic conversations. Participants can share personal stories,

concerns, and aspirations, shedding light on the societal frame that these conversations are woven into. Due to the less formal setting and the limited number of participants, stakeholders might be more willing to **discuss thoughts that would not have come up in a larger public event** (e.g., personal fears related to AV tech).

Interviewing every stakeholder who is affected by AV adaptation would be a drain on resources, but **interviews with stakeholders who have a high influence on the issue** (the mayor, an urban mobility planner of the city, etc.) is a good way **to get them interested, understanding - and influencing - their stance**.



FOCUS GROUPS bring together a small set of stakeholders for in-depth discussions on specific topics, offering **qualitative insight** (unlike most surveys, therefore, one often follows the other for thoroughness). Participants should come from varied backgrounds, ensuring a wide spectrum of perspectives. This **diversity** is valuable when

seeking feedback on products, services, or policies, as it captures the different needs and preferences of stakeholders. Regarding AVs, these sessions can provide a nuanced understanding of expectations, ethical concerns, and cultural implications, envisioning the impact of autonomous mobility on daily life. They can also be used to test the idea of new mobility services on citizens.

Focus groups are not limited to a physical setting - digital platforms enable **virtual discussions** and allow stakeholders to participate from diverse geographic locations, **ensuring inclusivity and expanding the reach of engagement efforts**.

STAKEHOLDER ENGAGEMENT TOOLS

WORKSHOPS are a common method of stakeholder engagement, embodying the essence of collaborative problem-solving. These **structured interactive sessions** bring together stakeholders to open dialogue, brainstorm, and co-create solutions - diverse perspectives collide, sparking innovative ideas that often transcend conventional boundaries.

In the context of AVs, workshops can facilitate envisioning smart mobility solutions, exploring AVs' potential applications and addressing ethical, social, and infrastructural challenges.

Workshops often incorporate **expert presentations, enriching the participants' knowledge in the given topic**. They also promote **active learning through interactive exercises that can vary** depending on the goal of the meeting (e.g., debates, simulations) - hands-on experience deepens the stakeholders' understanding of complex issues.

This and the next page detail a few **unique types of workshops**: *hackathons, site visits, and walkshops.*



HACKATHONS have emerged as powerful catalysts for fostering collaboration and innovation. These **intensive, time-bound events** - focused on creative problem-solving, **"hacking" problems**, so to speak - have grown beyond their tech-centric origin, finding applications in various sectors and societal challenges.

At the heart of hackathons lies the concept of **collective intelligence**. By bringing together diverse participants (developers, subject matter experts, end-users, etc.), hackathons leverage their collective knowledge, skills, and creativity. This convergence **sparks innovative solutions to complex problems**. In essence, hackathons exemplify the transformative power of collaborative innovation, **driving societal progress while also promoting entrepreneurship** through marketing the results.

Regarding AV adaptation, *hackathons are useful after identifying challenges: they can focus on solving AV- or mobility-related problems in the city, leading to novel solutions.*

STAKEHOLDER ENGAGEMENT TOOLS



By immersing participants in the physical context of an issue or project, **SITE VISITS** foster a deeper understanding. In the case of AV tech, **witnessing the innovation in action gives** stakeholders more **confidence in the technology** and its potential benefits - **transforming abstract concepts into viable solutions.**

Site visits - touring manufacturing facilities, project sites, research labs, community initiatives, etc. - also **facilitate discussions between designers** (engineers, operators, etc.) **and end-users**, allowing stakeholders to ask questions and engage in discussions with staff members of a service provider, project leaders, and so on. In vice versa, organizations can get in touch with the community and address concerns, **tuning the given innovation towards more practical and beneficial applications.** These experiences leave a lasting impression, fostering trust, transparency, and a deeper connection between the organization and its stakeholders.

This method is especially useful when dealing with a new technology that is unfamiliar to the average citizens - like AVs. It is usually **accompanied by a debrief session** to internalize the learnings.



WALKSHOPS - a dynamic fusion of *workshops* and *site visits* - capitalize on the kinetic nature of exploration. Participants embark on walking tours of the project area, **engaging in discussions, observations, and interactions while on the move.**

This mobile format infuses energy into the dialogue, breaking down formal barriers and **fostering spontaneous exchanges.**

Walkshops harness the power of movement, enhancing communication, building relationships, and promoting a sense of shared discovery among stakeholders. Due to the topic itself, **urban mobility issues are uniquely suited to explore** with the help of this engagement tool. In the case of AVs, walkshops enable stakeholders to visualize the practical implications of autonomous vehicles on urban infrastructure, traffic patterns, and pedestrian safety.

By grounding conversations in the physical environment, walkshops bridge the gap between theoretical advancements and tangible, context-specific solutions.

STAKEHOLDER ENGAGEMENT TOOLS

It is important to mention a few **advanced methods** as well - these are **highly specialized** (relating to specific steps of innovation, emerging issues, etc.) or just simply **need more expertise to facilitate**.

In **PARTICIPATORY ACTION RESEARCH** (PAR), stakeholders are not mere subjects of research - they actively participate as partners, shaping the process. They **collaborate in defining research questions, designing methods, and collecting & analysing data**. This active involvement ensures that the research is grounded in the priorities of those directly affected. Moreover, PAR is inherently **action-oriented**, going beyond theoretical research by encouraging stakeholders to **identify concrete actions based on the findings** (policy advocacy, awareness-raising campaigns, etc.).

ADVISORY BOARDS are **formal groups** providing strategic counsel and industry insight to organizational leaders. One of their core strengths lies in their **diversity of expertise** - members often hail from varying fields, ensuring a wide array of perspectives. They are also characterized by **long-term commitment** - members typically serve for extended periods, fostering continuity and institutional memory. Their **independence** allows for objective evaluations: by critically analysing proposals, they serve as a **robust quality control mechanism**, ensuring that decisions align with best practices and ethical standards.

The **DELPHI TECHNIQUE** is a structured approach where a **panel of experts responds to questionnaires iteratively**, aiming to **converge on a consensus** opinion or forecast. In each round, experts review the anonymized responses from previous rounds and reconsider their own opinions in light of the group's collective feedback. **Anonymous participation** ensures that the responses are unbiased and uninfluenced by standard group dynamics. The method is especially valuable in strategic planning, risk management, and technology forecasting.

CONFLICT RESOLUTION AND MEDIATION is used to **address tensions** that arise among stakeholders - one of the primary goals here is to **uncover the underlying issue**. Skilled mediators create a **safe space** where stakeholders can express their concerns openly. Through **active listening and impartial facilitation**, this process often reveals unmet needs or miscommunication, which, once identified, can be addressed collaboratively. By encouraging participants to see issues from each other's perspectives, **conflicts are humanized**, making it **easier to find common ground** and leading to **stronger stakeholder relationships**.

AUTREMENT - A GOOD PRACTICE

Project acronym: AUTREMENT

Project title: Urban Territorial Planning for Reinventing Mobility and Empowering Tunisians

Duration: Jun 1, 2020 - Nov 30, 2022

Lead Partner: Strasbourg Municipality

Partners:

- 🚗 Kairouan, Mahdia (*municipalities*)
- 🚗 European Association for Local Democracy (ALDA)
- 🚗 Centre for Studies and Expertise on Risks, the Environment, Mobility and Urban Planning (CEREMA)
- 🚗 Cooperation for Urban Mobility in the Developing World (CODATU)

Related SDGs:

- 🚗 SDG11 Sustainable Cities and Communities (main)
- 🚗 SDG12 Responsible Consumption and Production; SDG17 Partnerships for the Goals; SDG3 Good Health and Well-being; SDG4 Quality Education; SDG7 Affordable and Clean Energy; SDG8 Decent Work and Economic Growth



AUTREMENT is part of a **decentralized cooperation partnership established in 2015 between** the city of **Strasbourg** (the leading cycling city in France, committed to active mobility policies for over thirty years) **and** the city of **Kairouan** in Tunisia, both listed as UNESCO World Heritage Sites. **This project includes a new partner**, the city of **Mahdia**, thereby giving it an interregional dimension, broader scope, and greater impact, ensuring complementarity among partners facing similar challenges in different local contexts.

The project aims to promote sustainable urban development in Kairouan and Mahdia and enhance the quality of life of their residents as well as the economic and touristic attractiveness of the two Tunisian cities. The development of active mobility - primarily cycling - happens through the **implementation of dedicated urban infrastructures** and the **strengthening of citizen participation**: these are the **two cornerstones of the project**.

To do so, AUTREMENT works along the following main areas:

- 🚗 Capacity-building by providing the municipalities of both cities with training in the field of local governance;
- 🚗 Public space design and planning through several micro-projects (7 in Kairouan and 3 in Mahdia); and
- 🚗 Mobilization and awareness-raising activities among citizens.

Some of their methods are shared on the following pages.

AUTREMENT - CITIZEN CAFÉ






Citizen Cafés are spaces for discussion and debate open to all members of a community, animated by a neutral facilitator whose role is to encourage participation from everyone and ensure adherence to the rules of constructive dialogue.¹

A Citizen Café was organized in *Mahdia* on *4 January 2023*, aimed at **gathering the citizens' opinions on the development of two pedestrian paths in the city**. The event was designed to be a friendly consultation space, **taking place on a café terrace**. During the meeting, a **photo exhibition - along with proposed layouts** - was presented in collaboration with experts from the *Mobility for a Better Future* engineering centre. Citizens had the opportunity to exchange their needs, concerns, and ideas regarding the improvement of urban mobility and public spaces in Mahdia.

These conversations were of great importance in **shaping the execution plan**: the citizen contributions were carefully considered by the project's decision-makers, thus promoting a more **inclusive process aligned with the expectations of the locals**. Their active participation allowed their voices and needs to be integrated into the planning of forthcoming actions, thereby enhancing the legitimacy and relevance of the envisaged projects for the sustainable urban development of Mahdia.

¹ *Les Cafés Citoyens : Animer l'espace public par le débat et la réflexion collective*, Centre de recherche pour l'étude et l'observation des conditions de vie (CRÉDOC), 2017

IMPLEMENTATION STEPS

-  **Preparation:** Identify the **themes or questions** to be addressed during the Citizen Cafés, ensuring their relevance and interest to the community. Define the **format**, **frequency**, and **location** of the meetings.
-  **Invitation and mobilization:** Inform citizens of the Citizen Cafés through **communication campaigns** and open invitations to all members of the community. Ensure diverse mobilization to **encourage participation from different social groups**.
-  **Facilitation:** Appoint a **neutral and competent facilitator** to lead the Citizen Cafés. The facilitator's role is to create an inclusive and supportive environment, ensure balanced participation, and respect everyone's opinions.
-  **Conduct of meetings:** Organize the Citizen Cafés to allow for open and structured discussion on the chosen topics. Encourage exchanges, collective reflection, and the **formulation of concrete proposals**.
-  **Synthesis and follow-up:** Summarize the discussions held during the Citizen Cafés, highlighting **key points and emerging ideas**. Ensure follow-up on **proposals made and actions taken** in response to expressed concerns.

AUTREMENT - CITIZEN CONSULTATIONS

Citizen consultation is a democratic process aimed at actively involving citizens in decision-making and policy formulation by gathering their opinion to influence decisions made by local policy-makers.²

Citizen consultations within the AUTREMENT project took **various forms**, such as public meetings, participatory workshops, surveys, or the use of social networks. These different approaches allowed for reaching a broad range of participants and **collecting diverse perspectives**. The contributions were taken into account in the planning and implementation of several project actions, helping (1) to better understand the needs and priorities of citizens, (2) to identify potential barriers to active mobility, and (3) to propose appropriate solutions.

Certain elements were predefined, such as the location of the intervention in Kairouan or the nature of the envisaged development (namely securing school exits), but **others allowed for more choices by the citizens**, e.g., the consultation in Mahdia favoured an intervention on the corniche rather than the tourist area.

It is important to emphasize that during the design of the project, thorough consideration was given to **determine the most appropriate level of participation for both the objectives and the micro-projects**. Ideally, a level of consultation and co-construction would have been most desirable, allowing for the combination of both robust results and a collaborative process. However, given the time constraints and the unfavourable health conditions due to COVID-19, the partners made the decision to move towards an intermediate level of participation, situated between mere information and more in-depth consultation.

All in all, this approach is guided by a concern for adapting to the specific needs and preferences of each community, while taking into account the available resources and time.

An additional step would involve **evaluating** the developments carried out with the participation of the citizens, **further deepening their level of engagement** to maximize benefits for the community.

² John Gastil & Peter Levine (eds). *The Deliberative Democracy Handbook: Strategies for Effective Civic Engagement in the Twenty-First Century*. Jossey-Bass, 2005

AUTREMENT - CITIZEN CONSULTATIONS

IMPLEMENTATION STEPS³

STEP 1: SELECTION

- 🚗 Select a **representative target audience** from the population and the relevant area, possibly using **random sampling** based on various demographic data.
- 🚗 Appoint a **"chairman"**, a **secretary**, and/or key stakeholders to organize the entire consultation process.
- 🚗 Define the **territorial scale** on which the consultation will be conducted (e.g., local, municipal, regional).
- 🚗 Set a **timetable**.

In this step, it is essential to define the **specific objectives** of the citizen consultation. **Key stakeholders** should be identified, followed by the development of a **detailed plan** for collecting their opinions, determining the appropriate methods and tools.⁴

Within the AUTREMENT project, the specific objective was to improve urban development in the cities of Kairouan and Mahdia. Key stakeholders included residents, merchants, schoolchildren, parents, school administrations, community leaders, civil society organizations, and local authorities. The detailed plan included public meetings, participatory workshops, surveys, etc.

³ Linda White. Citizen Participation in Urban Planning. GSDRC Applied Knowledge Services. 2009

⁴ Plan-de-Préparation-de-la-Consultation-Citoyenne

STEP 2: COMMUNICATION AND LEARNING

- 🚗 Inform citizens about the upcoming consultation using various **communication channels**, such as local media, social networks, posters, and community meetings.
- 🚗 Provide **learning materials** (presentations, guides, summaries, etc.) to participants to familiarize themselves with the topic being addressed.
- 🚗 Organize **workshops led by specialists** on the subject of the consultation to allow participants to hear from experts related to the topic and enhance their understanding.
- 🚗 **Clarify and share** the **desired objectives** of the participatory approach for the project in question and establish the **roadmap**.

Within the AUTREMENT project, communication has been established to inform citizens about the citizen consultation. Announcements have been broadcasted in local media, posters were displayed in neighbourhoods, and social media posts were shared to raise awareness among the population about the importance of their participation.

AUTREMENT - CITIZEN CONSULTATIONS

STEP 3: CONSULTATIONS

- 🚗 Organize **consultations** to gather the citizens' opinions, using methods that encourage active participation.
- 🚗 Allow citizens to discuss and propose ideas **directly to policy-makers** and local authorities **AND/OR**
- 🚗 **Provide policy-makers with an overview** of public opinion on the issue at hand.

Within the AUTREMENT project, public meetings and participatory workshops were organized, but questionnaires were also distributed to gather the views of those who couldn't attend the meetings.

STEP 4: ANALYSIS AND SYNTHESIS

- 🚗 Conduct a **thorough analysis** by identifying the main trends, commonalities, and divergences in citizen opinions.
- 🚗 **Synthesize** the results in a clear and accessible manner, using graphs, tables, or other formats.

Within the AUTREMENT project, a team thoroughly examined the suggestions of citizens after data collection. The main trends and key learnings were summarized in an understandable way, utilizing visual aids.

STEP 5: DELIBERATION

- 🚗 Allow **policy-makers** to **draw conclusions** from what they have learned during/from the public consultations.
- 🚗 Use a **voting system or decision-making by consensus** to highlight points of agreement and disagreement.

At this stage, it is essential to **report back to citizens** on the results, ensuring that they feel heard, respected, and informed throughout the whole process - from the beginning to the very end.

Within the AUTREMENT project, the results of the citizen consultation were presented at public meetings, where participants could learn how their contributions have been taken into account.

STEP 6: FINAL REPORT

- 🚗 Produce a **final report**, with **recommendations**.
- 🚗 **Present** the report to relevant policy-makers or submit it to citizens in the form of a **referendum**.
- 🚗 Present the results to the supervisory authority or another public body for **review and decision-making**.

At this stage, it is important to continuously ensure that citizen opinions are considered and provide **clear feedback** about the final decisions and the **reasons** justifying them.



Chapter 7

What's next?

- Summary of key facts and practical first steps

FACTS TO KEEP IN MIND

The governance framework described in this document is **not specific to handling transformative innovations**, like AV tech - the chapters have repeatedly emphasized that its elements are crucial for upholding democratic values, ensuring transparency and public acceptance, and successfully managing any kind of urban development. However, **the AV case presents a unique opportunity to examine a municipality's readiness for responding to new technological developments** that significantly affect urban life (with or without the city's involvement). Previous examples show that **proper guidance is necessary to extract the benefits and avoid or at least mitigate the dangers** - a lot of new technologies and innovations could have benefited from an approach that focuses on the public good.

As for the elements themselves: **they are not steps or stages** of a process - working on them one by one will not bring the expected positive results. The example which **Chapter 3** starts with highlights how even one missing element can cause complications in a long term, even if not immediately. Therefore, **actions must be taken holistically to get closer to an ideal state of readiness**. It is not easy in practice but if successfully established and maintained, the framework has the potential of positively affecting every municipal action.

The following pages intend to **summarize** the previous chapters, **geared toward practical implementation** - the suggestions will focus on the AV case, but their core value remains universal, adaptable to any urban issue.



PRACTICAL ACTIONS A CITY CAN IMPLEMENT



When presenting the potential of AV technology to decision-makers, it is crucial to **link it with local urban development objectives** - but this is true for any new technology. **Showcasing what local challenges its implementation would solve and how** - especially when these challenges are widely reported on and shared by the citizens and stakeholders, influential or otherwise - **makes prioritization possible**: determining how much and what kind of effort the municipality needs to make to guide the process for the common good. It's also important to **highlight what could go wrong**. All of the above must be **based on current data** - simulated scenarios but also pilot tests already in progress. Hearing these facts **from highly recognized experts** would be even more useful, increasing the chances of successfully delivering the message. The **questions listed on page 20** can serve as a guideline to think through the motivations and objectives of AV testing in a city.

As an example (for a "sales pitch"): AVs are already here - very much in use in the US and under tests in Europe. Relying only on market forces to govern the tech's dispersal would be detrimental to urban life: AVs used in private transport and thus making car use more attractive would hinder sustainability goals and make current mobility challenges (i.e., lack of parking spaces, congestion, pollution) even worse. However, pursuing the introduction of AVs in public transport would solve some problems the system currently faces: lack of drivers, incomplete PT coverage, harder access for certain groups of people, etc.



Using the term "*Dedicated team OR organization*" is intentional - **depending on the issue at hand, establishing a completely new institution might be warranted**: that is what happened in Nyíregyháza when it became clear that local economic development needs an agency that is public but separate from the municipality. However, the example of Gävle shows that sometimes **an internal task force can work just as well** - especially if they are training people outside of it to spread their workload. AV tech is strongly related to urban mobility issues, therefore, setting up a new organization in a small or medium-sized city might not be a requirement to govern its responsible adaptation (unless there are additional circumstances like the city having a test track or a hub for related R&D). In most cases, **cities already have either a department or at least people who are responsible for urban mobility projects** - this can be **used as a basis** for AV adaptation and related actions. If there isn't one or mobility projects are handled by a different system or as part of another field, **a decision must be made: is it necessary to dedicate more human resources to this** (i.e., finding and hiring dedicated experts), **or is it enough - and possible - to train people who are already there** so they can seek out related information and experts and use them in their work?

As an example: Appointing and supporting one person to become an "ambassador" of the issue at the municipality is a good start.

PRACTICAL ACTIONS A CITY CAN IMPLEMENT



Lack of funding is often stated as a main challenge whenever development ideas come up. In many cases, however, the issue is less about the lack of funds than the lack of their proper, **strategic allocation** or appropriate **fundraising**. There are many **EU and national/regional programmes** which support various fields - including sustainable urban mobility, and sometimes even AV adaptation specifically. In addition, financial requirements are significantly higher when building physical/digital infrastructure (necessary road features, facilities for charging and maintenance, secure data centres, etc.), but it isn't necessary to start with projects like that: cities can **look for indirect connections** when considering the allocation of their resources - **increasing citizen participation in urban mobility planning or developing the public transport system** have major influence on a city's AV readiness. For more resource-intensive projects, it is worth to investigate the possibility of **public-private partnerships**.

As an example: A European city might join an Interreg Danube transnational project which is aimed at reducing GHG emissions through the introduction of alternative fuels and new technologies (incl. electric and/or autonomous vehicles). Using the knowledge gained therein, they can prepare an application for national funds to develop local public transport - integrating all services into one app, procuring zero-emission buses, and maybe including a short AV shuttle test on one city route.



Besides funding, **joining transnational projects** is also a good way to increase the city's capacity to handle innovations. **Actively involving people from the municipality** expands their knowledge and provides inspiration through other cities' example. However, it is crucial not to spread the resources too thin: if the local team has only capacity for participating in one or two projects like this, **proper selection is key** - looking at the city's objectives and **finding the right projects to join**. **Involving decision-makers** can increase their understanding of the issue and ensure their commitment for later actions (*see the previous page*). In addition, **internal trainings and workshops** can be planned, involving relevant experts in the field - broadening the horizons of the local team will influence how they plan future projects and what factors they consider. **Finding and connecting with relevant networks** (regional, national, and transnational) also helps - a city cannot always act alone.

As an example: The city involves most members of its urban mobility team in the project mentioned on the left but also invites the mayor to one of the partner meetings which will include a visit to a city where AV testing is under way. The team prepares a package about the visit - videos and written materials - which they share with those who couldn't participate but work in the field. The city also registers to a yearly national mobility conference and participates in the European Mobility Week to find partners for future cooperations.

PRACTICAL ACTIONS A CITY CAN IMPLEMENT







Instead of predicting people's behaviour and provide services accordingly, now it's more important to set sustainability goals and make plans in line with those - even if this necessitates convincing people to change their behaviour. It's clear that if left to their own devices - and with no changes in the way cities are structured and operated currently -, most people will use a car. However, **setting up goals with a timeline** (e.g., a modal split that favours public transport and active mobility) **and planning actions along a strategy to reach those goals** (making the city more walkable, building bike roads, streamlining the timing and routes of local PT to make it more competitive, etc.) will ensure that urban development leads to a desirable future. The guideline established by the EU for this is **Sustainable Urban Mobility Planning (SUMP)** - not every city has it, but adapting the methodology will become mandatory for 424 TEN-T node cities by 2027, covering most cities in Europe. Therefore, **starting to work on it now - or reviewing and modifying the plan** (or a similar one) **that already exist** - is the most urgent action in this area.

As an example: A city without a SUMP decides to study already existing SUMPs of other cities with a similar size and situation - they might also contact these fellow cities (mostly from their country) for information. After this, they set up a roadmap of creating their own plan with the involvement of local citizens & stakeholders.



Stakeholder and citizen engagement is a cornerstone of responsible multilevel governance and democracy as well. By **strategically combining different types of engagement tools** based on the given objectives, municipalities can build sustainable relationships and make informed, collaborative, and inclusive decisions. This approach means the involvement of **those who are directly impacted by a problem and those who have the potential to influence it** - not just asking for their opinion after preparing a plan but **planning with them and involving them in the implementation**, too, if possible.

As an example: The SUMP roadmap mentioned on the right includes several ways of working with the locals.

-  A survey inquires about the state of local urban mobility, including hypothetical scenarios like the use of AV buses in the future.
-  The city creates an interactive map on their website and provides access to edit it, asking for notations on problem areas (e.g., missing PT connections, unsafe conditions for pedestrians).
-  Based on the aggregated data, workshops are organized to discuss the problems and potential solutions. To ensure inclusive planning, walkshops are organized for certain groups (families with young children, people with visual impairment or mobility aids, etc.).
-  Urban mobility experts and service providers are invited to meetings to strategize about the city's future direction of development.