

Checklist



European Sustainable Mobility Challenges

Project financed by EIT Urban Mobility, an initiative of the European Institute of Innovation and Technology (EIT), a body of the European Union

Checklist for European Sustainable Mobility Challenges

Sustainable Mobility and Challenges in Europe

Sustainable development is one of the most important global goals of our time. Preserving life in the broadest sense, is therefore a major challenge for everyone. Not only developing, but also industrialized countries, such as European countries, are shown the path of sustainable development.

A division of sustainability challenges into three sustainability dimensions is considered as advisable for developing challenge indicators for European cities. Ecologic sustainability is defined as the preservation of the ecological system with regard to the conservation of nature and renewable resources (Zimmermann, 2016). Economic sustainability focuses on sustainable management and aims, for example, to maintain and increase efficiency, to promote the common good on the basis of a balance of individual preferences and to constantly improve economic efficiency (Corsten & Roth, 2012).

Social sustainability is a matter of ensuring motivation, e.g., through equitable distribution keys. Also, it is about the institutional safeguarding of basic needs and efficient care, which are constitutive for the development of people (Opielka & Renn, 2017).

Achieving global climate goals will depend on progress in mobility, and sustainable mobility can thus be of great benefit in all three sustainability dimensions. Desirable and actual indicators are thereby of great advantage for the achievement of sustainable mobility goals but have not been fully developed yet.

Checklist for European Sustainable Mobility Challenges

Value of the checklist

This checklist is intended to help European cities, including governments and companies, to gain a structured overview of their sustainable mobility challenges in order to overcome them.

The checklist covers three sustainability dimensions in context of mobility challenges:

- 1. Ecologic Sustainability**
- 2. Economic Sustainability**
- 3. Social Sustainability**

The checklist can be used as a self-assessment tool for identification of mobility challenges and their need of action.

Checklist-Development

Systematic Literature Review

Challenge Identification

Categorisation



Checklist-Development

Systematic Literature Review

The identification of sustainable mobility challenges for developing our list is based on three sources. Generally, only data with focus on sustainability challenges of mobility was considered.

1. We searched for relevant studies or other scientific material in external, scientific open access databases or external mobility project websites. We identified the relevant sources using the keywords "*mobility sustainability challenges*", "*mobility challenges*", "*sustainable mobility challenges*", "*urban mobility challenge*", "*implementation mobility*", "*european mobility challenges*" in English and German. Only literature that included one of the keywords was considered as relevant for our analysis. If it was already clear in the title of the study that despite mentioning one of the keywords, the source cannot be seen as relevant for our indicators (e.g., mentioning a specific research area like organizational challenges or individual mobility) the study was not taken into consideration for further analysis steps.
2. We used relevant information from other Fraunhofer projects regarding mobility or sustainability challenges.
3. We included internal data from the EIT project.

Searched Databases			
Scientific Open Access Databases	External mobility project websites	Fraunhofer projects	EIT project
<ul style="list-style-type: none">• Google Scholar• Researchgate	<ul style="list-style-type: none">• Eltis• Intertraffic	<ul style="list-style-type: none">• City Lab	<ul style="list-style-type: none">• Projects of 2021 and 2022

How to work with the checklist

Step 1:

- Scan the challenges and determine the individual need for action for your city or company by clicking »yes« , »partly« or »no« on the box for each challenge. This will give you an overview of the relevant challenges and your need to overcome them. In the »Notes and Examples« column you will find helpful explanations of the challenges from our analysis. In the column »Remarks for action plan« you can take notes referring to your city or company and determine which further information is required.

Step 2:

- After identifying your sustainable mobility challenges you can list the challenges with need for action in your individual »Action Plan«. You can use the action plan to determine which activities are required for which challenge, in which order, with what effort, by whom, by when and with what results.



1. Ecologic Sustainability: Mobility Challenges

➤ Determine your need for action

No	Topic	Challenge	Notes/Examples/ Recommendations for action	Need for action			Remarks for action plan
				yes	partly	no	
1.1	Pollution	New technologies	<p>European cities need new technologies in order to overcome pollution. Examples of the challenge of new technologies mentioned in the literature are:</p> <ul style="list-style-type: none"> • Need to make all transport modes cleaner • Rarely advances in battery technology (especially in terms of power density), increasing vehicle efficiency needed • Lowering the carbon content of fuels is important • Reducing vehicle miles of travel needed • New technologies must be implemented • AV technology task is much harder in rural areas, requiring true autonomy for at least some parts of journeys where communication is lost • More integrated mobility needed (platforms) • Autonomous vehicle technology is relatively slow • Lack of technical expertise and capacities 				

1. Ecologic Sustainability: Mobility Challenges

➤ Determine your need for action

No	Topic	Challenge	Notes/Examples/ Recommendations for action	Need for action			Remarks for action plan
				yes	partly	no	
1.2	Pollution	Air quality	The literature review estimates that air pollution in the road transport sector of European cities poses one of the primary problems. Especially due to cars that lead to poor air quality.				
1.3	Pollution	Emissions	One challenge is that emissions are still rising. There is a need of increasing the efficiency of the transport system.				
1.4	Pollution	Energy consumption	There are controversial issues regarding the environmental friendliness of electric transport. For example, the production of car batteries is very energy intensive.				
1.5	Land	Land resources	Modern cities suffer from over utilization of land resources and densely built-up areas.				

2. Economic Sustainability: Mobility Challenges

➤ Determine your need for action

No	Topic	Challenge	Notes/Examples/ Recommendations for action	Need for action			Remarks for action plan
				yes	partly	no	
2.1	Business model	New business models	<p>To create sustainable mobility from an economic view, new business models are needed. The most mentioned challenges regarding current mobility business models are:</p> <ul style="list-style-type: none"> • High costs • Mobility solutions are highly dependent on automotive industry • Providing the investment • Lack of resources to support local communities to effectively participate in the planning process • Lack of integrated urban planning • Updating urban plans and local transport • Lack of alternative transport modes • Financing: innovative models of collaboration and funding models • Affordability of electric transport 				
2.2	Business model	Regulation	<p>Legal challenges arise because the new mobility ecosystem involves different players. In many European cities, governments are struggling to provide sustainable mobility solutions. Smart urban mobility will largely depend on how regulators deal with new technologies and their implementation. There is high need to upgrade the skills of the procurement workforce to deal with increased complexity. Also, laws and current standards must be updated.</p>				

2. Economic Sustainability: Mobility Challenges

➤ Determine your need for action

No	Topic	Challenge	Notes/Examples/ Recommendations for action	Need for action			Remarks for action plan
				yes	partly	no	
2.3	Business model	Responsibility	One problematic of mobility business models is, that local authority has limited control over the use of the land and limited decision-making power. Also, there is lack of co-operation and communication between metropolitan – in some cases regional - and local urban planning authorities.				
2.4	Infra-structure	Efficiency	European cities need to expand their urban infrastructure and adapt their transport networks. The addition of new infrastructure (e.g., for e-bikes or charging infrastructure) is currently too slow which leads to a high travel time.				
2.5	Infra-structure	Congestion	Most European cities are suffering from heavy congestion. Especially in peak hours, public transportation systems are overcrowded.				
2.6	Infra-structure	Parking issues	Parking issues are common in many European cities. Private vehicles are parked most of the time, so there are only few free parking places. Also, safe and secured bicycle parking with the possibility of charging e-bikes is often missing.				

2. Economic Sustainability: Mobility Challenges

➤ Determine your need for action

No	Topic	Challenge	Notes/Examples/ Recommendations for action	Need for action			Remarks for action plan
				yes	partly	no	
2.7	Research	Data generation & management	In the current status of sustainable mobility, the data available is very limited. There is a need of data management to go from traffic management to mobility management. Regarding the model of smart mobility, cloud computing and the communication between smart devices needs to be developed. Data collection and the creation of an open transport data and their evaluation and validation is a central point for sustainable mobility.				
2.8	Research	Tools	For a successful analysis in order to improve sustainable mobility, measurement systems must be developed and analyses must be replicated.				

3. Social Sustainability: Mobility Challenges

➤ Determine your need for action

No	Topic	Challenge	Notes/Examples/ Recommendations for action	Need for action			Remarks for action plan
				yes	partly	no	
3.1	User-centricity	Mobility preferences	In order to establish sustainable mobility solutions, it is important to change people's behavior and travel habits towards adopting transportation that should rely more on the use of public transportation, bicycles and walking and less on private vehicles.				
3.2		Guarantee Accessibility	<p>Mobility policies and urban mobility regulation must allow for accessible transport modes (regardless of time or day) for citizens regardless of their:</p> <ul style="list-style-type: none"> • Social and economic status • Residential area (urban centers or rural areas) • Age (challenges for typically older, groups of people without to skills or confidence to use digital mobility services or with reduced physical activity) • Gender (ensure safe shared mobility solutions especially for women) • Health (ensure inclusion) 				
3.3		Increasing acceptance	Public acceptance has become a key issue to encourage the adoption of sustainable mobility. Non-car mobility must be made more attractive, while individual car traffic must be made socially and economically less attractive. Also, citizens should be able to understand the options available and their workability.				

3. Social Sustainability: Mobility Challenges

➤ Determine your need for action

No	Topic	Challenge	Notes/Examples/ Recommendations for action	Need for action			Remarks for action plan
				yes	partly	no	
3.4	User-centricity	Increasing awareness	Two main factors can be identified: <ul style="list-style-type: none"> • Increasing travelers' awareness of the environmental impact of travel mode choices. • Arouse interest for sustainable mobility solutions. 				
3.5	Society's Eco-system	Accidents	It is necessary to eliminate the number of collisions between vehicles and accidents between pedestrians and vehicles.				
3.6		Population characteristics	Digitalization, growing population and the rising urban population are big challenges regarding sustainable mobility. Also, new mobility forms trigger a new wave of suburbanization into rural areas.				
3.7		Employment	Due to self-driving vehicles, there is a threat to employment opportunities for human beings. On the consumer side, new and flexible working style changes the mobility behavior of people and therefore challenges sustainable mobility.				

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Action Plan – Ecologic Sustainability

 Create your individual action plan

No	Challenge	Measure (How to overcome challenge)	Responsible Actor	Expected Results	Timing

Action Plan – Economic Sustainability

 Create your individual action plan

No	Challenge	Measure (How to overcome challenge)	Responsible Actor	Expected Results	Timing

Literature



Corsten, Hans & Roth, Stefan (2012). Nachhaltigkeit als integriertes Konzept, in: Hans Corsten & Stefan Roth (Hrsg.). Nachhaltigkeit. Wiesbaden: Springer-Gabler.
https://doi.org/10.1007/978-3-8349-3746-9_1.

Opielka, Michael & Renn, Ortwin (2017, 02. November). Symposium: Soziale Nachhaltigkeit. [Conference Paper]. ISÖ, Siegburg, Germany.

Zimmermann, Friedrich M. (2016). Was ist Nachhaltigkeit – eine Perspektivenfrage?, in: Friedrich M. Zimmermann (Hrsg.). Nachhaltigkeit wofür? Berlin & Heidelberg: Springer Spektrum, 1-24. https://doi.org/10.1007/978-3-662-48191-2_1.

Contact

Nicolaj Motzer
Center for Mobility and Innovation Systems
Team Mobility Ecosystems

nicolaj.motzer@iao.fraunhofer.de