CIVITAS

Sustainable and smart mobility for all

2030

Action Points for each Local Affiliate

Deliverable No.:	D2.3
Project Acronym:	FastTrack
Full Title: Fostering the Acceleration of Sustainable Transport to Regions and Authorities through Capacity and Knowledge	
Grant Agreement No.:	101006853
Work Package No.:	WP 2
Work Package Title: Exchanges and Building Bridges to Innovation	
Responsible Author(s): Lucia Cristea, Iolanda Moldoveanu, Liliana Andrei (EIP)	
Responsible Co-Author(s): Anne-Charlotte Trapp, EUROCITIES	
Date:	01.02.2023
Status:	Final
Dissemination level:	Public

Document control page

Programme	Horizon 2020
Grant agreement no.	**101006853**
Project acronym	**FastTrack**
Coordinator	ICLEI
Website	www.fasttrackmobility.eu
Starting date	01.02.2021
Duration in months	30
Call identifier	H2020-MG-2020-SingleStage-INEA
Deliverable no. and title	D2.3 Action Points for Each Local Affiliate
Work package no. and title	WP2 I Exchanges and Building Bridges to Innovation
Status	Final
Date of issue	01.02.2022
Dissemination level	Public

Version	Date	Modified by	Status	Diss. level
V1	14.09.2022	Lucia Cristea, Liliana Denisa Andrei	Structure and main headings	WPL
V2	18.11.2022	Liliana Denisa Andrei	First draft of the analysis of the LAs documents received to date	WPL
V3	5.12.2022	Lucia Cristea	Comments on structure and content	WPL
V4	16.12.2022	Liliana Denisa Andrei	First full draft of the deliverable	WPL
V5	22.12.2022	Iolanda Moldoveanu	Final template of the glossy form	WPL
V6	22.12.2022	Lucia Cristea	Document sent to peer- review	WPL
V7	17.01.2023	Anne Charlotte Trapp, Anna Westerwelt	Comments on the structure, content and form of the document	WPL
V8	30.01.2023	Liliana Denisa Andrei, Iolanda Moldoveanu, Lucia Cristea	Final draft for submission	PC
V9	01.02.2023	Ana Dragutescu	Submission on the EC portal	PO

Abstract

This document represents the report which summarises a programme of actions to be undertaken by each Local Affiliate for the remainder of the project and after the project. It sets out how the deployment of their innovations will be achieved.

List of beneficiaries

No	Name	Short name	Country
1	ICLEI EUROPEAN SECRETARIAT GMBH	ICLEI	Germany
2	EUROCITIES ASBL	Eurocities	Belgium
3	MOBIEL 21 VZW	M21	Belgium
4	EUROPEAN INTEGRATED PROJECT SRL	EIP	Romania
5	VECTOS GMBH	Vectos	Germany
6	ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS	CERTH	Greece
7	STAD ANTWERPEN	Antwerp	Belgium
8	COMUNE DI BOLOGNA	COBO	Italy
9	BUDAPEST FOVAROS ONKORMANYZATA	MUNBUD	Hungary
10	STOCKHOLMS STAD	Stockholms Stad	Sweden

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ACTIONS TO DEPLOY INNOVATION IN EUROPEAN CITIES

January
2023

CIVITAS
Sustainable and smart mobility for all
2030

FastTrack

Fostering the **A**cceleration of **S**ustainable **T**ransport to **R**egions and **A**uthorities through **C**apacity and **K**nowledge

Actions to Deploy Innovation in European Cities

Authors
Lucia Cristea, Liliana Denisa Andrei (EIP)

Co-Authors
Teodora Stoica, Iolanda Moldoveanu (EIP)

Project Partners

More on the FastTrack project at:
www.fasttrackmobility.eu

Actions to Deploy Innovation in FastTrack Cities

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EXECUTIVE SUMMARY

This report summarises a programme of actions to be undertaken by each city involved in the FastTrack project for the remainder of the project and after the project. This actions' program is facilitated by the tools and methods developed and applied by the Fast Track project partners and provides cities with knowledge and tailored assistance on the effective deployment of their sustainable mobility innovation.

Cities across Europe and beyond established high-level objectives to tackle the climate change negative consequences. These new very ambitious objectives require a lot of effort and determination, but mainly an innovative approach. The innovation in implementing sustainable mobility solutions is at the core of the FastTrack project. It aims to increase the capacity of many cities across Europe and beyond to accelerate the implementation of sustainable measures that will impact achieving the local climate agenda.

FastTrack project established a programme of intensive capacity building for the representatives of city authorities. This programme has been created with the support of different research entities and city networks (technical partners); it aims to understand the significant needs of the cities to understand particular aspects that allow them to intensify the implementation of local sustainable mobility plans. The intensive nature of the capacity-building programme lies in creating platforms for discussion, interaction, and knowledge sharing between the city representatives. At the end of this intensive programme, cities will have defined it as a Deployment Plan; a plan that reflects how a chosen measure could be implemented taking into account all the requirements of staffing, funds, technology, etc. These Deployment Plans could become examples of how to shape future projects that will go beyond the current practice and organisational cultural barriers.

This Deployment Plan reunites a series of concrete actions that are presented in this document. The present document summarizes the actions that cities plan to undertake and which they have described and explained in their first deployment plans. The cities actively involved in the project provided a wealth of information in the meetings, interviews, and questionnaires that technical partners have designed and implemented to date. The results of the analysis of the information shared by cities in terms of actions done at the local level to implement innovative sustainable mobility solutions are the core part of this document.

The authors would like to thank the city representatives that have been actively involved in the exchange of experiences and provided the information presented in this document.

INTRODUCTION

Through the Capacity Building programme implemented within FastTrack, encompassing webinars, study visits, co-learning and co-creation workshops, peer review workshops and speed networking, complemented by time-flexible e-learning tools - Exchange Hub, e-courses, videos - Fast Track cities benefit from a pool of knowledge, enabling them to prepare for the rapid transfer and adoption of mobility innovation measures and strategies, in line with their needs and local specificities. This is further complemented by the FastTrack Fund, which offered cities support for preliminary studies, the organisation of further in-depth exchange activities, and access to tailored expert advice from the FastTrack Supplier Register.

The actions' program of the Fast Track Affiliated Cities sets out how the deployment of their chosen innovations will be achieved, and it is built on the identification and assessment of challenges that influence the implementation of the innovation in each city. It consists of a portfolio of 23 innovation measures, grouped in the four FastTrack thematic clusters which aim to enable cities to reach the stage of "shovel-ready" innovations, going further into the development of feasible deployment plans:

Cluster 1 – Urban Logistics and Clean Fuels

Cluster 2 – Cycling in the Urban & Functional Urban Area

Cluster 3 – Integrated public transport systems

Cluster 4 – Traffic & Demand Management

Because of the vast diversity of the cities' characteristics and of the innovations chosen, the presentation of their actions will be done along different dimensions. They range from the motivation and needs to deploy that particular innovation, to the area of implementation, who is the targeted group, what are the challenges foreseen for the implementation of the innovation chosen and the expected impact. These dimensions have been chosen to allow a better understanding of the cities' plans and respective actions to achieve these plans. An overview of the dimensions and the aspects analysed is presented in the tables below, following the information provided by cities in their First Deployment Plans. There are captured the main aspects approached by the cities classified into seven groups: motivation, coverage, implementing body, target audience, actions, impact and challenges. This overview offers the reader an understanding of how the analysis has been made. The presentation of the actions is done for each cluster and individual city involved in a particular cluster.

Motivation and needs	
EU, National, Local policies and regulations	Improve air quality, reduce noise
Regulate city-logistic	Micro-mobility and bike sharing dynamic
Integrate sustainable modes of transport	Increase the quality and attractivity of public transport services
Sustainable Urban Logistic Plans	Last-mile delivery dynamic
Mobility on demand	Regulate micromobility
e-ticketing	Create integrated platform for transport/traffic management
Parking management Access restriction	Integrate vulnerable groups

Coverage of innovation

(the geographic region where the innovation is planned to be applied)

City	Metropolitan	Regional

Who is implementing the innovation?

(entities that are participating in innovation implementation)

Local authority/ies	Public companies
Transport/Regional authority	Private companies

Target Audience

(a particular group at which the innovation is aimed)

Citizens	Inhabitants Commuters Tourists Students
Policy makers	City (Council) Departments Transport authorities Regional Authorities National Authorities Ministries
Transport providers	Logistics service providers Public transport service providers New mobility providers Rail operators
R&D community	Universities Research centres
Local and National associations	Road Energy Chamber of Commerce
Public companies	Parking companies Waste management and recycling companies
Energy companies	Energy providers Energy grid operators Charging system providers
Businesses	E-commerce Retailers Technology suppliers
Property owners	Landowners
Police	Traffic police Local police
Private association	Citizens associations Social organisation NGOs

Actions - are essential for moving things forward in implementation of innovation and represent a logical steps involved in bringing the innovation to a successful implementation.

- Needs
- Innovation idea
- Planning
- Stakeholders' engagement
- MoU agreements
- Procurement
- Testing
- Implementing
- Monitoring
- Adaptation

Challenges

(a new or difficult task or a demanding or stimulating situation that innovation has to overcome for its successful implementation)

Data:
- Data-sharing - reluctance
- Data integration – standardisation
- Privacy and security
- Digital cooperation

Users:
- Acceptance
- Attitudes

Stakeholders:
- Acceptance
- Engagement

Skills:
- Lack of specific skills
- Lack of specialised personnel

Bureaucracy:
- Decision-making process

Costs:
- Increasing energy cost – not predictable
- Cost of new service
- Land price

Legal framework:
- GDPR
- PPP
- Cybersecurity
- Frequent changes in legislation / technology are advancing more than the legislation
- New regulation related to access restriction

Business model:
- Coordination between public authority rights and private business

Technology:
- Technology advancement
- Technology integration
- Technology cost is dynamic

Policy:
- Political commitment

Finance and funds:
- Securitisation of funds

Co-operation:
- Inter-departmental cooperation
- Inter-organisational cooperation

Impact

(the effect or influence that innovation is expected to have on the city/metropolitan/regional area)

Environmental	Air and noise pollution More green area
Social	New jobs More services available for people with disability Increase accessibility and inclusion (adapted services and remote areas) Simplify the travel experience
Business	New business Increase number of businesses
Integration	Land-use and transport Transport modes Ticketing Information
Costs	Better management of revenues Easy collection of allocated revenues
Transport	Traffic management Flexible schedule Adaptation to the demand Reduction of public transport service expenditure

CLUSTER 1 - URBAN LOGISTICS AND CLEAN FUELS

Logistic planning is a topic that all local authorities, whether urban, metropolitan, or regional, increasingly must deal with. Although this can be challenging, it also provides the opportunity to implement well-researched solutions into practice, which shall lead to significant improvements in the development of a more sustainable transportation system. FastTrack cities are exchanging information to assess their particular potential as well as methods for accelerating the adoption of innovative solutions, such as new IT tools, creative approaches to logistics and delivery, and public procurement policies to guarantee fleets operate on clean fuels. Cities can increase the sustainability of urban transportation, including vehicles and clean fuels, while also enhancing local air quality, cutting down on noise pollution, and enhancing the well-being of local citizens, all with the fast deployment of locally appropriate solutions.

The innovation approached by the seven cities in this cluster is various, starting from the elaboration of plans for city logistics, small-scale projects focusing on last-mile delivery, or large-scale projects aiming acceleration for the implementation of charging infrastructure for heavy vehicles.

The general actions that cities in Cluster 1 foreseen to carry out for the successful implementation of their innovations are aiming in engaging with stakeholders, especially with those in the logistic sector, for cooperation, agreement on the innovation measures and data exchange, analysing and planning for most suitable solutions, securing the budget and organising tenders for equipment and service operations. For those cities that are developing sustainable urban logistic plans, engagement and continuous cooperation with stakeholders represent as well the most important action for the deployment of their plans.

City	Innovation	Type of Organisation				Motivation and needs	Coverage			Implementation			
		Municipality	Transport authority	Regional authority	Transport operator		City	Metropolitan	Regional	Local authority	Transport / regional authority	Public companies	Private companies
Stockholm	Introduction of charging infrastructure for heavy vehicles	✓				• Accelerate the installation of charging infrastructure for heavy vehicles along with other vehicles operating in the service and logistics sectors • Significant opportunities to use multiple sources of information to address specific data gaps, improve planning and better inform decision-making in the both the public and private sectors	✓	✓	✓	✓			✓
Antwerp	Development of a SULP	✓				• Alignment with the EU, National and Local policies • Accessible and viable city for all stakeholders • Optimizing the use of road infrastructure • Local policy framework to optimize last-mile logistics	✓			✓			✓
Murcia	RoadMap focus on Last Mile Delivery	✓				• Creation of the Low Emission Zone • Dynamics of last-mile delivery and e-commerce market • Installation of new electric vehicle charging points • Construction of new bike lanes • Reorganization of public transport	✓			✓			
Riga	Sustainable urban logistics system development	✓				• Developing an action plan for sustainable urban logistics • Prioritizing walking and cycling • High air pollution because of cargo traffic • Infringement launched by the European Commission	✓			✓			
Brno	City logistic strategy with using cargo bikes and developing micro-depot	✓				• Organise city-logistic in the city centre for decreasing the number of vehicles delivering supplies for commercial activities with respect of residents, shop owners and supplying companies	✓			✓			✓
Gdynia	E-vehicle microhub for small deliveries in the city centre	✓				• SUMP updating • Dynamic development of city logistics • Improve the quality of public space • More efficient city-logistic • Increased level of road safety • Improved air quality	✓			✓			✓
Munich	Neighbourhood logistics in residential areas - microdepot and cargo bikes as a solution	✓				• Demand in the parcel industry, which is characterised by online trade, has grown very strongly • Reduce the impact of conventional parcel logistics • Replace diesel-powered vehicles with cargo bikes in the project area	✓			✓			✓

CLUSTER 1 - URBAN LOGISTICS AND CLEAN FUELS

City	Innovation	Target Audience	Challenges	Actions	Impact
Stockholm	Accelerating introduction of charging infrastructure for heavy vehicles	• **Transport sector (services, logistic)** • **Grid operator** • **Charging system providers** • **Citizens** • **Local and National authorities/ associations** • **City Departments and companies** • **Private companies**	• Lack of City's planning capacity (Lack of reliable data concerning traffic movements of heavy vehicles) • Willingness of stakeholders to engage in a collaborative process • Reluctancy to data-sharing • Uncertainty over investments • Grid capacity • Willingness to adopt EV by transport companies	• Dialogues with the stakeholders • Studies and pilot projects • Establishing a working method • Update City logistic Plan • Increase grid capacity • Install technical equipment	• Attractive public spaces • Increase traffic safety • Reduce air pollution • Increase the number of electric vans/trucks • Reduction in km driven in the urban area
Antwerp	Development of a SULP	• **City of Antwerp** • **Private business with in logistics activities sector**	• Political support • Potential relocation of local businesses/lack of logistics service providers willing to deliver goods in Antwerp • No willingness to share data or cooperate with the city to achieve more sustainable goals • Need to determine which data is most useful • Baseline measurement • Setting reasonable, realistic yet ambitious KPIs	• Kick-off • Scope and vision • Scenario's rating criteria • Set-up consultation and decision-making structure • Mapping logistic flows • Mapping of the logistic ecosystem in Antwerp • Setting clear ambitions and definitions • Strategy development • Monitoring, KPI development • Establish measures	• Modal split of 50/50 • Reduction in motorised vehicle movements • Reduction in traffic accidents • Reduction in emissions • Optimized use of public space
Murcia	RoadMap focus on Last Mile Delivery	• **City Council** • **Road Transport Business Association** • **Local Energy and Climate Change Agency** • **Citizens** • **State and Local governments** • **Retailers** • **Delivery companies** • **Chamber of Commerce** • **Local businesses** • **E-commerce businesses**	• Stakeholder engagement and acceptance • Financing the Roadmap implementation • Political commitment	**Develop the roadmap** • Drafting of the initial version of the roadmap • Welcome Pack for Microhubs • Meeting with stakeholders • Drafting of the final version of the roadmap **Roadmap implementation** • Roadmap monitoring • Adaptation of possible variations of the roadmap **Consolidation phase**	• Generate new local jobs • Reduce Reduction on greenhouse gas emissions and noise • Increase bicycle delivery
Riga	Sustainable urban logistics system development	• **City Council and its departments** • **Logistic operators** • **NGOs** • **Citizens** • **Decision-makers** • **Planners**	• Improvement of inter-departmental and inter-organisational cooperation • Uncertainty of public acceptance for such large-scale initiatives as sustainable urban logistics system development	• Put together a plan of actions from the actions • Set up a working cooperation structure between city, logistics operator associations and other involved NGOs • Establish a working data collection/monitoring system • Incorporate planned traffic organisation changes into a traffic simulation model of Riga and update the model • Using the results of the modelling identify the gaps and problems in the current transportation system and adjust the actions accordingly • Develop an 'operations-information-planning' system, which will respond to the necessities of operators, users and planners, providing the data-based feedback, which can be used in strategic planning and regulation development	• Decrease noise pollution, and greenhouse gas emissions and lower general flows of traffic in the city • Alternative street space use (i.e., more streets dedicated to pedestrians/cyclists/micro-mobility, more street-level activity centres – cafes, restaurants, squares etc.) • Improving the quality of life for citizens • Increase the number of electric cargo vehicles registered • Decrease cargo transport intensity on magistral street

CLUSTER 1 - URBAN LOGISTICS AND CLEAN FUELS

City	Innovation	Target Audience	Challenges	Actions	Impact
Brno	City logistic strategy with using cargo bikes and developing micro-depot	• **Municipality** • **Businesses** • **Suppliers**	• New rules of vehicle restriction to the city centre affected mainly the residents, not the delivery vehicles	• Project documentation • Tender for realisation for microdepot • Tender Operator for microdepot • Operation of microdepot	• Increase the number of covered km via cargo bikes • Improve walking in the city centre • Reduce the number of cars in the city centre
Gdynia	E-vehicle microhub for small deliveries in the city centre	• **City Departments** • **District Council** • **Logistic operators**	• Logistics operators don't want to share data, • Legislation is not adapted to the very dynamic market with several actors and new solutions (technical, IT, etc.) • The cost of electric energy increased very much the last time (about 500%) and the majority of electric energy comes from coal in Poland.	• Set regular cooperation between city and logistics operators to get familiar with activities and plans for the future. • Collect data from the logistics operator • Logistics traffic measures incl. quality and quantity of flows. • Implement collected data to Gdynia's traffic model and prepare traffic simulations and scenarios based on the final localisation of microhub and available infrastructure. • Choice the appropriate scenario and start to prepare the needed elements of road infrastructure (loading bays, traffic lights, cycling infrastructure, etc.) • Integrate other solutions in the city like LEZ(ZEZ), UVAR if exist. • Set (in cooperation with the logistic operators) microhub features and functions incl. projects, cost of investment, building and maintenance, etc. • Microhub in operation	• Better quality of public space – no parking on pavements, cycling infrastructure or green areas • Reduce the number of diesel vehicles used for logistics in the city centre. • Limit noise and improve quality of air – change (part of diesel) vans into e-vehicles. • Increase the level of road safety. • More efficient city logistics
Munich	Neighbourhood logistics in residential areas - microdepot and cargo bikes as a solution	• **City Departments** • **Landowners** • **Public companies** • **Logistic service providers**	• The cost of the service • Choosing the right place for microdepot	• Planning of the micro-hub • Inspection of the identified open space with the project participants and interested logistics companies. determine the needs of the companies • Initial infrastructural requirements draw up an initial concept for the micro-hub. • Draw up the operating concept and a contract of use • Clarifying the procedure • Allocating the budget to the operator for the infrastructure tendering • Preparing the tender • Approving the overall concept by the shareholders • Construction and operation of the micro-hub	• Shift from conventional delivery vehicles to delivery vans and to electric delivery bicycles • Improve the quality of stay in the public space in the model neighbourhoods • Reduce CO_2 and noise emissions, • Reduce vehicle kilometres • Reduce the cumulative energy consumption of logistics traffic

CLUSTER 2 - CYCLING IN THE URBAN & FUNCTIONAL URBAN AREA

The transition towards sustainable urban mobility systems requires to consider mobility innovation in all mobility fields. Public transport and electrification alone, is unlikely to allow cities to reach climate neutrality unless it is accompanied by a shift toward active modes of transportation. Hence, this cluster investigates innovative methods that will ensure that biking and walking are safe and convenient for everyone. This requires ensuring that the necessary infrastructure, security measures, and behavioural changes will promote a shift away from personal vehicles and toward active modes of travel.

The innovation solutions discussed in this cluster addressed the development of bike sharing scheme (2 cities) and integration of cycling urban mobility data into the data-driven governance model for innovative and smart city solutions. It is worth mentioning that the bike-sharing innovative solutions proposed to go beyond the city border into the functional urban area and at the regional level.

The actions proposed by the Cluster 2 cities focus on planning the cycling network, assessment of the most suitable technological feature of the bike-sharing system, collaboration with public/private operators for operating and maintenance of the system, and data-driven evidence for decision-makers.

CLUSTER 2 - CYCLING IN THE URBAN & FUNCTIONAL URBAN AREA

City	Innovation	Type of Organisation				Motivation and needs	Coverage			Implementation			
		Municipality	Transport authority	Regional authority	Transport operator		City	Metropolitan	Regional	Local authority	Transport / regional authority	Public companies	Private companies
Ljubljana	Innovative regional e-bike sharing scheme			✅		• To align with SUMP • To implement regional e-bike sharing scheme in 25 municipalities in Ljubljana urban region • To develop infrastructure and to introduce modern technology of e-bike sharing system in region • Usage of e-bikes in combination with other modes of transport for commuting and reaching long distances		✅	✅	✅	✅	✅	✅
Brasov	Bike sharing scheme		✅			• To initiate a functional bike-sharing scheme, as a prerequisite for sustainable urban mobility behaviour • Improve the quality of citizens' lives by reducing air pollution, stress and sedentary.		✅		✅		✅	✅
Lviv	Data-driven governance model for smart mobility development	✅				• Build a strategic framework to meet the 2030 goals that will become a good basis for the climate-neutral city development towards 2050 • To secure the current share of public transport use and increase the share of cycling and other light mobility modes	✅			✅		✅	✅

City	Innovation	Target Audience	Challenges	Actions	Impact
Ljubljana	Innovative regional e-bike sharing scheme	• **Citizens** • **Commuters** • **Local authorities** • **Bike sharing service providers** • **Mobility operators (including railway and bus operators)**	• Time for implementing the system, the decision being taken by each municipality in the region • Engaging stakeholders for collaboration and financing (e.g., bike-sharing providers) • High dependency on car use • Reluctancy to shift from car to e-bike	• Definition of the activities and general observation of the process for potential implementation of micro-mobility hubs, where e-bike sharing stations would be positioned, including potential for multimodal-hubs connectivity. • Allocation of main elements of micro-mobility hubs based on selected criteria's (e.g., number of active population or migration flows, standards of accessibility, current and planned infrastructure, current level of public transport service at proposed locations, …). • Selection of standards and components of the proposed regional micro-mobility services on multiple corridors, technical parameters, potential mobile applications, compatibility with other MaaS or micro-mobility providers or systems. • Identification of main IT requirements and parameters for establishing a micro-mobility hubs. • State-of-the-art presentation on the users experience of micro-mobility hubs (e.g., processes of registration, renting, paying, parking, inter-connectivity). • General observation of description of operation and maintenance of the micromobility hubs. • Additional innovative elements and potential for promotion of the multi-modality. • Development of a guidance tool for the municipalities.	• Reduce car usage • Increase the number of bike-sharing users • Decrease air pollution
Brasov	Bike sharing scheme	• **Citizens (inhabitants and commuters)** • **Tourists** • **Administration** • **Public transport operators** • **Bike-sharing service providers** • **NGOs**	• Bureaucracy • Lack of knowledge and experience in operating a bike-sharing scheme • Change of behaviour	• Elaborate on a bike sharing Master Plan • Elaborate on the tender documents for bikes and parking stations • Exploring the possibilities of tendering the management of the bike-sharing system to a private operator • Run an internal evaluation of the public transport operator regarding its capacity to run bike sharing scheme	• Reduce car dependency • Increase the number of citizens using bike-sharing
Lviv	Data-driven governance model for smart mobility development	• **City Council departments** • **Mobility providers** • **Public companies** • **Private businesses** • **Universities** • **NGOs** • **Citizens**	• Data collection • Lack of financial resources because of special circumstances (war) • Lack of a control over mobility development because of special circumstances (war)	**Development of a data-driven platform:** • raw data collection and data storage. • services / interfaces to access data from the different data storages/legacy systems. • access control to the data. • data transfer protocols for communication data outside. • interoperability with relevant APIs. • applications for mapping data. • shared services based on the data visualisation framework (service) to access data from the common information model to allow for the development of specific applications. • user-specific interaction layers with dashboards containing different visualisations, comparative analyses, feasibility studies and recommendations for decision-making.	• Secure the current share of public transport use • Increase the share of cycling and other light mobility modes

CLUSTER 3 INTEGRATED MULTI-MODAL MOBILITY SOLUTIONS

To provide citizens a practical alternative to the private car, public transportation systems that are safe, affordable, accessible, and well-connected are essential. There are several innovative interventions in this area that may be used in local contexts, including those related to transport fleets, ticketing systems, service integration and intermodality, accessibility for people with reduced mobility, and new management and funding schemes. FastTrack Cities engaged in this cluster investigate the development of an integrated platform for public transport management, development of an application that allows integration of mobility services and payment, multimodal hubs that accommodate public transport and micro-mobility services, less logistic traffic as well as parking management and access restriction. , integrated e-ticketing systems, multi-modal hubs, integrated network services, and mobility as a service (MaaS) to combine innovative solutions The innovation measures proposed are various and some cities choose to implement small-scale projects that will further allow refinement and large-scale deployment.

The actions to follow depend on the type of innovation measure chosen. As a common feature is that all measures are built on collaboration with different stakeholders. Other important actions observed relate to gaining political support, securing the necessary budget to implement the innovation and developing a business model that is beneficial for both the local authority and the service provider. Moreover, procurement actions are carefully considered.

City	Innovation	Type of Organisation				Motivation and needs	Coverage			Implementation			
		Municipality	Transport authority	Regional authority	Transport operator		City	Metropolitan	Regional	Local authority	Transport / regional authority	Public companies	Private companies
Budapest	Development of a MaaS system (BudapestGO)	✓	✓			• To provide high-quality, customer-centric services to their users and provide an easy-to-access system • To regulate the usage of vehicles to eliminate conflicts • To integrate different transport companies/operators • Emerging popularity of micromobility services • Rapidly emerging cycling • Vulnerable road users have limited opportunities	✓			✓	✓	✓	✓
Hengelo	Connecting twin cities Hengelo and Enschede	✓				• To become one of the top technological regions of the Netherlands with state-of-the-art facilities on mobility, housing, culture, working and living lab spaces • To develop new and innovative mobility connections between the two train stations		✓	✓	✓			
Kadıköy	Enhancing LTZs and active travel in the Kadıköy Historic City Centre	✓				• To create feasible alternatives to the ever-increasing traffic problems, and therefore, create more space for pedestrians • To create a more functional and eco-friendly urban area • To create the guidelines and make them transparent for all the stakeholders for a participatory decision-making process on all aspects of mobility	✓			✓		✓	✓
Debrecen	Creating integrated mobility hubs in Debrecen				✓	• To reduce the city's car traffic and allow space for sustainable and alternative modes of transport through sustainable and innovative methods • To renew the SUMP • To provide an alternative to the city's habitants for their journeys, as to reduce the city's vehicle traffic, air and noise pollution, fewer accidents and overall, a more liveable life.	✓			✓		✓	✓
Groningen	City wide network of Neighbourhood hubs	✓				• To create smart and sustainable ways of transport that move our residents and visitors comfortably and efficiently towards and through the city • To facilitate chain transport with the (further) development of high-quality transfer points: mobility hubs • To contribute to the ambition of our SUMP: An easily accessible and attractive municipality	✓			✓			✓
Bucharest	Integrated mobility centre		✓			• To increase the attractiveness of public transport at the same time as reducing its operational cost • To integrate all the components into one Integrated Mobility Centre • To reduce the existing economic and social imbalances, stimulate balanced development and accelerate the recovery of the delays		✓		✓	✓	✓	✓

City	Innovation	Type of Organisation				Motivation and needs	Coverage			Implementation			
		Municipality	Transport authority	Regional authority	Transport operator		City	Metropolitan	Regional	Local authority	Transport / regional authority	Public companies	Private companies
Malmo	Mobility hubs	✓				• To develop a concept, targets and a system for Multimodality hubs • To update SUMP • To facilitate an easy transition from car to sustainable modes • Continuous rising of micromobility	✓			✓	✓	✓	✓
Kruševac	Improvement of public transport service	✓				• To implement the SUMP vision "City accessible to all" with a target "80:20" (sustainable modes vs. private car) • To improve the public transport service • To introduce of bike share system	✓			✓		✓	
Tampere	Development of Urban Mini Hubs to Support New and Shared Mobility Services	✓				• To be Carbon Neutral in 2030	✓			✓			

City	Innovation	Target Audience	Challenges	Actions	Impact
Budapest	Development of a MaaS system (BudapestGO)	• **Citizens** • **Municipality** • **Transport Authority** • **Mobility service providers** • **Ministry of Industry and Technology**	• Reluctance of private companies to integrate their services/data into the transport planning platform • Secured funds • Technological developments	• Improvement of the MaaS application by integrating ticket purchasing function • The integration of all service providers to the system in Budapest • The operation of the first mobility hub system	• Increased number of sustainable transportation mode user • Increased number of ticket purchases via the application per month • Increased number of downloaders of the application per month • Increased number of active users within the application • Changes in modal split in favour of public transport and sustainable transportation modes • Increase social inclusion
Hengelo	Connecting twin cities Hengelo and Enschede	• **Inhabitants (existing and new)** • **Students** • **Businesses** • **Local/Regional authorities**	• Political support • Stakeholders' engagement	• Decision on the master plan SHE by both cities • Plan development on the mobility part/ mobility innovation • Start of technical design for the innovation • Implementation of the innovation	• Change the functionality of the area into an urban node • Modal shift from private cars to public transport • A better living climate because of CO2 reduction • Increase the number of inhabitants and businesses in the area
Kadiköy	Enhancing LTZs and active travel in the Kadiköy Historic City Centre	• **Municipality departments** • **Citizens** • **Service providers**	• User habits • Cooperation between public authorities and industry • Mindshift in the participatory process • Inter-organisational cooperation (public bodies) • Reluctancy of NGOs to cooperate with public bodies	**Launch: SMART ON-STREET PARKING SYSTEM / PEDESTRIAN SAFETY SYSTEM** • Identification of the pilot area • Interviews with all stakeholders • Stakeholder and Risk Analysis **Implementation: SMART ON-SCREEN PARKING SYSTEM AND PAYMENT SUPERVISION SYSTEM** • Data aggregation, pre-processing and user requirements • System architecture • First release of the platform **Implementation: PEDESTRIAN SAFETY SYSTEM** • System Development & Installation • Collecting and Analysing Mobility Data • Integration to Policies and Developing Smart Mobility Solutions • App Development	• Decrease in occupancy rates, parking violations and vehicle traffic • Increased availability of parking spaces for residents • Shift from car to PT/Active mobility/micro-mobility • Cumulative Travel time savings • Developments in business and shopping • Consistent parking prices, clear regulations • Easy collection of allocated revenues • Less pollution and noise • Integrating land use / transportation - Traceability of vehicle traffic • Avoiding over-staffed parking service • Reducing the employment required for paid parking

City	Innovation	Target Audience	Challenges	Actions	Impact
Debrecen	Creating integrated mobility hubs in Debrecen	• **Citizens** • **Mobility service providers** • **Municipality Departments** • **Public transport operator** • **Public companies** • **Ministry of Industry and Technology** • **Communication specialists**	• Public acceptance • Business model development/availability • Decision-makers support • Lack of experience in operating integrated mobility service	• Create a suitable business model and a business plan • Choosing the necessary stakeholders and partners to involve in the project • Planning of the micro-mobility point network • Application development/adaptation • Implementation (Hub establishment, application development, network redesign and dissemination) • Public testing (Phase to collect data and feedbacks) • Optimization after the test period	• Increased accessibility to the public transport network • Modal shift from private cars to public transport • Coordination of shared mobility service with public transport • Changes in the urban landscape (more green spaces) • Less air and noise pollution
Groningen	City wide network of Neighbourhood hubs	• **Inhabitants** • **Social organisations** • **Logistic operators** • **Mobility service providers** • **Local/Regional Authorities** • **Private companies** • **Public transport companies**	• Political decision-making • Behavioural changes • Cooperation with private parties • Lack of specialised personnel	• Define the task • Meetings with 'area teams'. These are multi-disciplined teams that have a close connection with their neighbourhood. Therefore, they exactly know the necessities of their neighbourhood. For example less logistic traffic in their street, more parking regulation for sharing mobility, et cetera • Determine our development direction • Assessing the needs for a successful implementation of mobility hubs. • Meeting with internal and external partners, and organisation of several workshops in order to determine the right direction for our hub strategy. • Drawing up an implementation program • Write the implementation plan. • Political decision making	• Creates more public space • Increased % of consumers who choose delivery at a neighbourhood hub • Increased % of parcels transported by bike or foot at their last meter (hub-to-home) • Increase % of neighbourhood hubs combining logistics services with other facilities • Increased quality of life for inhabitants through neighbourhoods' hubs they cocreate
Kruševac	Improvement of public transport service	• **Citizens** • **Local and National Authorities** • **Public parking companies** • **Public transport company** • **Tourist office**	• Public-private cooperation/partnership • Data sharing • Lack of experience in the implementation and management of bike-sharing schemes • Little interest in using bike sharing system	• Set up the project team structure • Set up the legal structure • Public procurement • Implementation of equipment and App • Establishment of bike sharing system • Promotional campaign • Monitoring and evaluation	• Changes in the modal shift in favour of public transport and cycling • Reduction of pollutant emissions • Increased traffic safety • Creation of new jobs • Changes in the urban landscape (more green space)

City	Innovation	Target Audience	Challenges	Actions	Impact
Bucharest	Integrated mobility centre	• **Public transport operators** • **Municipalities** • **Traffic Police** • **Local Police** • **Inter-community Development Associations**	• Coordination of the ITS apps and system at the metropolitan level • Integration of the system components, including data standards • Legislative changes • Securing the funds • Political support	• Preparation of the technical-economic documentation supporting the financing • Preparation of documentation and launch of procurement for equipment and software, including installation and commissioning, for the components of each of the 3 subsystems: • Strategic management: BI/ERP platform, CMS, asset management software, E-learning, Strategic planning, and integration with transport model. • Public transport management: central software application for planning, monitoring, and dispatching, on-board equipment for vehicles (including ensuring connectivity with passenger info and BTMS), etc. • Commercial management: introduction of new technologies for a modern fare collection and control system. • Execution of physical works (equipment, installations, etc.) and development of software elements. • Acceptance of equipment and commissioning, i.e., testing of system functionality and handover between the developer (contractor) and the dedicated team. • Ongoing maintenance and updating for the life of the system.	• Adaptation of the public transport system to demand • Improving the management of revenue collection and increasing integration • Reduction of public transport service expenditure • Integration and interoperability at the level of the public transport system between services and operators at the regional level; • Reduction of carbon emissions and other pollutant emissions by making the operation of public transport services more efficient
Malmo	Mobility hubs	• **Inhabitants** • **Commuters** • **Visitors** • **Companies (public and private)** • **Local and National authorities** • **Property owners (municipal housing company, etc.)** • **Public transport Authority** • **Public companies** • **Mobility services providers**	• Availability of public space	**Set up goal, system, and concept** • Development of a visual concept • Conditions public space • Definition of mobility hub, types, range, and location • Suitable locations for mobility hubs • Routines and guidelines in the planning work • Ownership and operation of mobility hubs • Compilation into a decision document - concept, recommendations, goal of system **Pilot 1** • Location selection • The site-specific concept for pilot 1 • Website Mobility Hubs and communications • Conducting pilot events - demonstration and dialogue • Evaluation **Pilot 2** • Pilot location selection • The site-specific concept for pilot 2 • Procurement for construction and services of the hub • Construction hub • Implementation and evaluation **Collaboration & dialogue – continuous action** • Dialogue mobility providers • Dialogue with property owners - information and exchange on user needs	• Decarbonisation of urban road transport • Increased choice and better-distributed accessibility for all to different means of transport • Reduced area for parking vehicles per person • Increased share of walking, cycling and public transport in line with the city's goals in the Traffic and Mobility Plan • Reduced dependence on privately owned cars
Tampere	Development of Urban Mini Hubs to Support New and Shared Mobility Services	• **Citizens** • **Public Transport operators** • **Local companies and service providers (private)** • **Mobility service companies (private)** • **Universities and research centres** • **City Departments**	• Political decision-making • Land pricing policy • Securing funds • Digital cooperation	Information not provided	Information not provided

CLUSTER 4 - TRAFFIC & DEMAND MANAGEMENT

Cities and metropolitan areas have been designed more for cars and less for people. This has led over time to traffic congestion, with negative effects on the environment and human health, and with the consequent increasing costs of externalities. Traffic must therefore be managed in such a way as to favour public transport and alternative modes of transport in order to ensure sustainable urban, metropolitan and regional transport networks. The FastTrack Cities involved in this cluster are investigating innovative methods for multi-modal traffic control, such as integrated platforms using digital travel, routing and navigation data as well. Also is being investigated innovative means to regulate access to reroute and reduce auto traffic and the development of on-demand transport by the use of advanced booking platforms.

The actions that Cluster 4 cities envisaged integration of data from multiple sources aiming in developing traffic management platform. These need agreements with mobility operators in some cases, defining terms of references for the big data platform, data management (data sharing, privacy, etc.) implementation and operating of platforms.

City	Innovation	Type of Organisation				Motivation and needs	Coverage			Implementation			
		Municipality	Transport authority	Regional authority	Transport operator		City	Metropolitan	Regional	Local authority	Transport / regional authority	Public companies	Private companies
Bologna	Big data management and Dynamic Traffic Light System	✓				• City's streets are frequently congested with traffic and air pollution is a significant health problem • The city has a large share of citizens aged 65+ and persons with mobility limitations. • To provide real-time infomobility and interactive maps that allow end-users (including those with special needs) to plan their route and mode of travel • To customise all-inclusive mobility subscriptions to facilitate movement between different services,	✓	✓		✓		✓	✓
Belgrade	Integration of different traffic data sets	✓				• The traditional approach to traffic management and mobility planning is losing its ability to make long-lasting positive changes • To fulfil the SUMP objectives	✓			✓			
Braga	Data integration for traffic information/Roadmap to effective traffic control centre	✓				• To support the implementation of the 40% greenhouse gas reduction target by 2030, the reduction of energy poverty and the creation of a long-term vision to achieve climate neutrality by 2050 • To elaborate an efficient strategy for traffic system management and implement this strategy to improve the current situation by combining all existing and new information sources	✓			✓	✓	✓	✓
Sofia	Public transport on demand		✓			• To respond to changes in the growing city and in parallel to the requirements and needs of passengers • To increase the quality of the transport service • To enable users to plan their transport quickly, easily and comfortably in the city and not using their cars		✓			✓	✓	

City	Innovation	Target Audience	Challenges	Actions	Impact
Bologna	Big data management and Dynamic Traffic Light System	• **Citizens** • **Municipalities** • **Public transport operators** • **Mobility service providers**	• Integration of different service providers • Data sharing • Legal (PPP, GDPR, cybersecurity • Limited user skills • User attitudes • Engagement of private mobility providers – data sharing • Lack of specialised personnel	• Planning • Agreements with mobility operators • Digitalisation of TPL systems • Pilot testing and integration • Full integration • Commercial Agreements with mobility operators in the follower cities • Monitoring and evaluation	• Reducing private vehicle use in favour of public transportation and all forms of sustainable mobility • Increase the use of public transport by making the services more user-oriented, simplifying the travel experience • Improve social inclusion by facilitating access to mobility services for fragile and disadvantaged groups • New business model by creating an integrated system allowing local mobility providers and other operators to work together • Improved availability of mobility data
Belgrade	Integration of different traffic data sets	• **Municipality Departments**	• Data sharing • Lack of specific skills (data-driven decision-making process)	• Needs assessment • Market research • Choosing the business model • Including the procurement for big data platform in annual financial plan and annual procurement plan of the Secretariat for Transport • Writing the Terms of Reference for the Procurement • Drafting the Contract • Start the public tendering • Installation of the software • Audit on Contract implementation • Training for data analysis	• Improved traffic management • Less time spent in traffic • Less pollution
Braga	Data integration for traffic information	• **Citizens** • **City Departments** • **Transport Authority** • **Association of municipalities** • **National authorities** • **Commercial associations** • **Private companies**	• Resistance of services to adopt data sharing • Technological and technical integration • Lack of skills in implementing traffic control centre • Create a new interdependency structure between different services • Overcoming bureaucracy	• Review of international related best practices • Initial internal consultation about available data and potential use cases for data sharing • Create a traffic data catalogue, including descriptions of all available datasets (type, contents, format, standards used, quality, update frequency, descriptive metadata etc.) • Create an online platform for data sharing (e.g., CKAN) • Publish open or restricted access datasets on data sharing platform • Monitor and assess data sharing platform actual usage • Second internal consultation with other departments for additional processed datasets to be published and added value use cases (i.e. services to be developed using shared datasets a) for internal use and b) for use by the citizens)	• Improve the information, • Improve the availability of different mobility options, • Improve the traffic flow, • Improve the comfort of mobility
Sofia	Public transport on demand	• **Citizens** • **Public transport operators** • **Transport Authority** • **Universities** • **Municipality** • **Development Association**	• Bureaucracy • Technological development • Legislation modification	• Development of digital tools with incentives for switching to public transport or active transport. • Mapping and testing low-emission geospatial zones. • Mapping Green corridors for active transport. • Development of congestion charging model. • Delivery of A series of 12 "Beat Air Pollution" citizen challenges. • Establishing green transportation on demand service.	• Number of passengers carried/ Sales of transport documents • Improved air quality • Reduction in private car use/ownership • Increased Modal Share of Public transport, Active and Shared Mobility • Increase Social inclusion (remote areas)

CONCLUSIONS

Cities are the main actors in tackling the negative impacts of climate change. The mobility systems contribute to these negative impacts and thus push cities to be more innovative in the mobility solutions chosen to meet the need for sustainable travel on their territory and beyond. These innovative solutions need new approaches, new models of governance and engagement and new in-house skills to understand the new needs. The pressure that city authorities face nowadays to generate immediate solutions requires them to be prepared, and flexible, and to adapt their current practices to the new challenges. During FastTrack, the Affiliated Cities have discussed these aspects that allowed them to design new ways to implement their chosen innovation. The action programme of the FastTrack Affiliated cities led to the identification of specific challenges for each cluster and also common challenges across the clusters, which are necessary to be addressed for the successful implementation of innovative mobility measures.

Inter-departmental and inter-institutional cooperation is particularly important. This needs to be supported by a variety of skills (urban and mobility planning, sociology, design, data analysis, communication - with users and stakeholders, project management, business analysis system operation and maintenance, etc.) which are not always available to the local authority. It was also observed that regional/metropolitan authorities do not always have the legislative framework to implement innovative measures, their role is limited to creating strategies, supporting local authorities in planning, or just operating traffic and mobility platforms. Therefore, continuous dialogue and the involvement of all stakeholders, in the context of rapid technological development, the emergence of new mobility forms, the need to move towards sustainable integrated transport, and increased social inclusion, play an important role in innovation deployment.

Traffic management platforms - the part less seen by citizens - are at the core of the creation of innovative MaaS platforms to guide citizens towards sustainable transport. Real-time data input is crucial for the successful operation of these systems.

It is therefore imperative that authorities can create partnerships with private companies, such as providers of mobility services, systems integration, operations, marketing, etc. In this respect, it has often been observed that the legislative framework is not always adapted to technological developments, digital cooperation and data sharing (open data).The setup of public-private partnerships and procurement can often be delayed because of existing legislative procedures. This can lead to delays in implementing innovations.
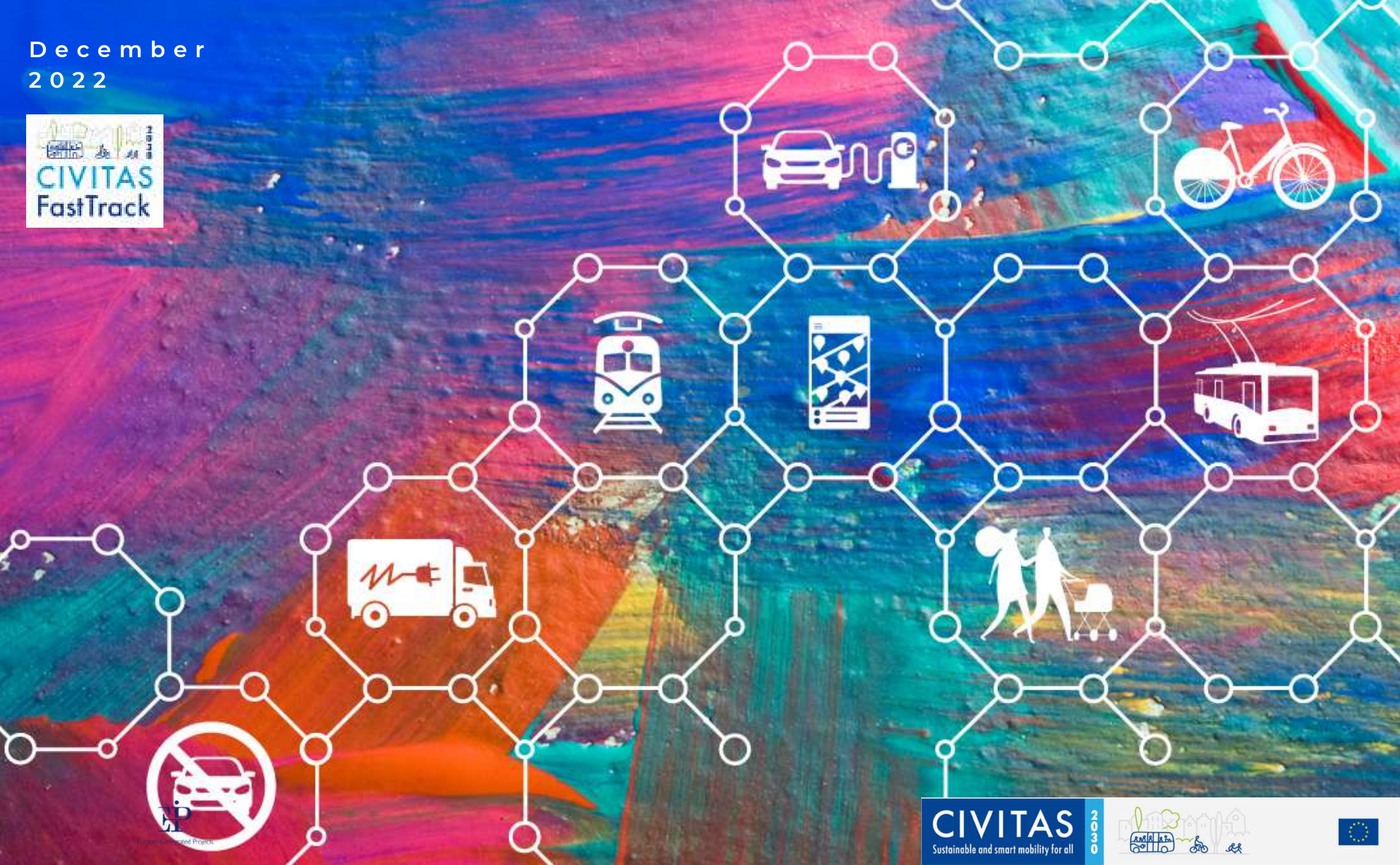
An important challenge for cities is also the cost of implementing and operating innovative measures. In the current context there is a high degree of uncertainty in this respect. This stems from the fact that state-of-the-art technological solutions are very expensive, which will also be reflected in the operating costs, and which may ultimately make the difference in the acceptance or not of the implemented measures.

Last but not least, the political factor and the decision-making process play a crucial role in the development and implementation of innovations. Policy- and decision-makers frequently lack knowledge of interpreting transport and mobility data. These important actors cannot successfully transform evidence into policy or initiatives if they do not know how to interpret this data. That's why the local authorities are aware the data-analysis and communication specialist would help to streamline the innovation process and provide policy- and decision-makers with data-driven evidence for successful innovation deployment plans.