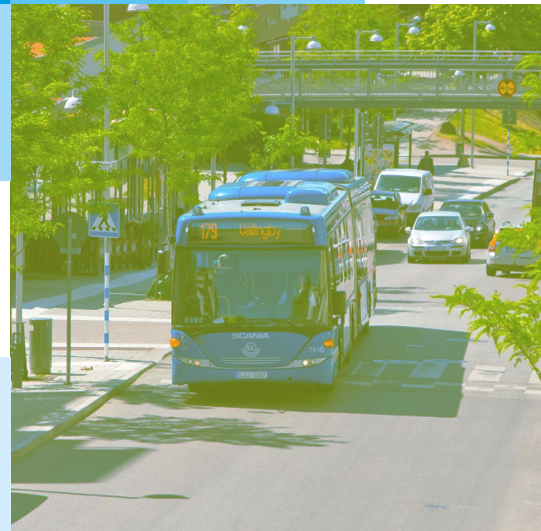
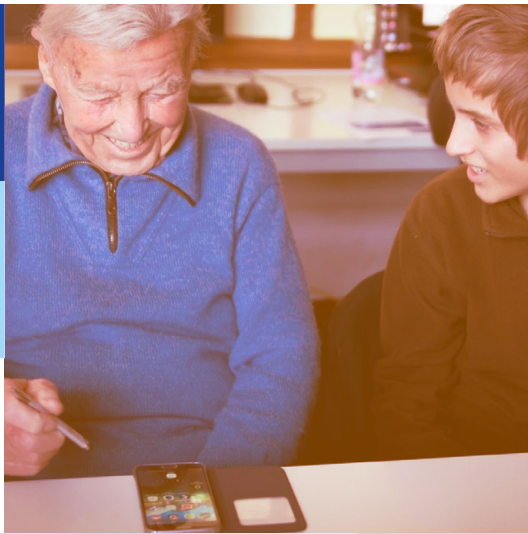
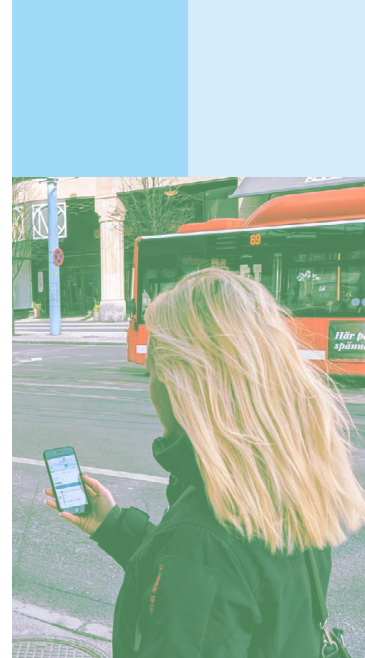


Final report

ECCENTRIC

new mobility for all
beyond the urban centres



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ECCENTRIC – New Mobility for all beyond the urban centres

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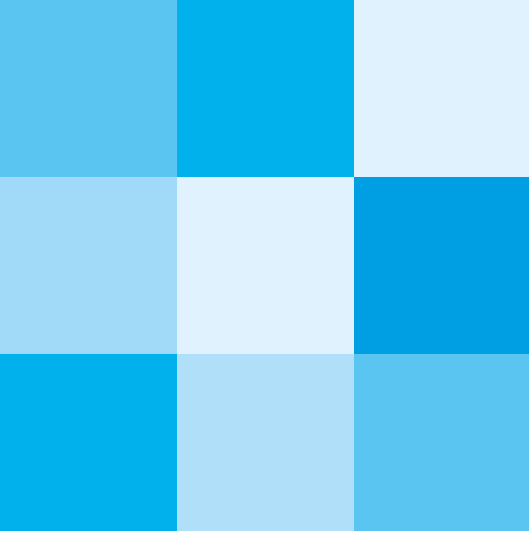
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About CIVITAS ECCENTRIC

Cooperation in CIVITAS ECCENTRIC.
Illustration: Salla Lehtipuu

CIVITAS ECCENTRIC: Collaboration between cities in two relevant challenges

Fostering the transition to sustainable mobility, one that introduces a new hierarchy of priorities and addresses social and environmental issues in new urban contexts, is a necessary challenge for all urban areas. It has to be accomplished in the urban context as a whole to be effective. In fact, in these moments of transition, when analysing recent urban developments, it can be seen how interventions tend to favour the city centres rather than surrounding urban areas developed mainly during the mid-twentieth century.

In these **peripheral neighbourhoods**, crisscrossed by urban highways, we usually find car-centred design, with residual pedestrian spaces, poor adaptation to the use of the bicycle and fewer public transport services and facilities than in central areas. Most of the population in European cities, and especially the younger and less affluent, live in these large and dense peripheral neighbourhoods.

Solutions that promote the necessary transition to sustainable mobility cannot be the same as those used in city centres. In a four-year cooperation, the European project CIVITAS ECCENTRIC has tackled this challenge.

The second challenge the project addressed concerns **inner-city logistics and freight**. Blooming urban logistics is an important trend responsible for the enormous impact of motorisation on urban areas. The CIVITAS ECCENTRIC project has jointly worked on integrating sustainable logistics and freight in urban and mobility planning.

ECCENTRIC has relied on the commitment of **five large European cities** to foster the change towards a more sustainable urban mobility. Innovative measures, as well as initiatives and methods, have been tested and evaluated to obtain guidelines for their replication in all European cities. In the

pursuit of this goal, local consortia were formed in each city, integrating a variety of stakeholders from administrations, private companies, universities and civil society.

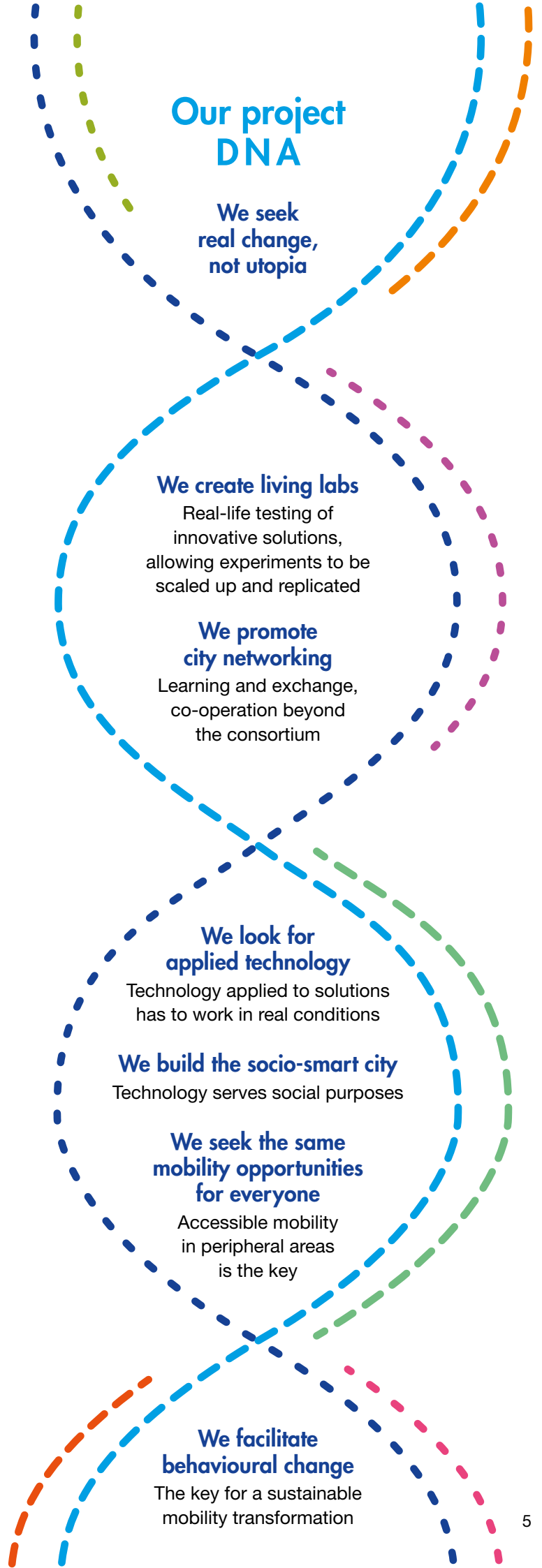
Many are the results and the lessons learned during this collaboration, which involved more than a hundred experts working in an excellent climate of exchange and technical cooperation to address six themes and to test more than fifty complex measures in the real-life context of the cities' living laboratories.

This final report provides a summary of this entire process. We hope it will be of the greatest interest to the entire CIVITAS community and to all those urban stakeholders who are working for **a shift towards sustainable urban mobility**, facing the enormous challenges of an ever-changing environment in which collaboration between cities is not only recommended, but absolutely necessary.



Francisco José López Carmona
Project Coordinator
City of Madrid

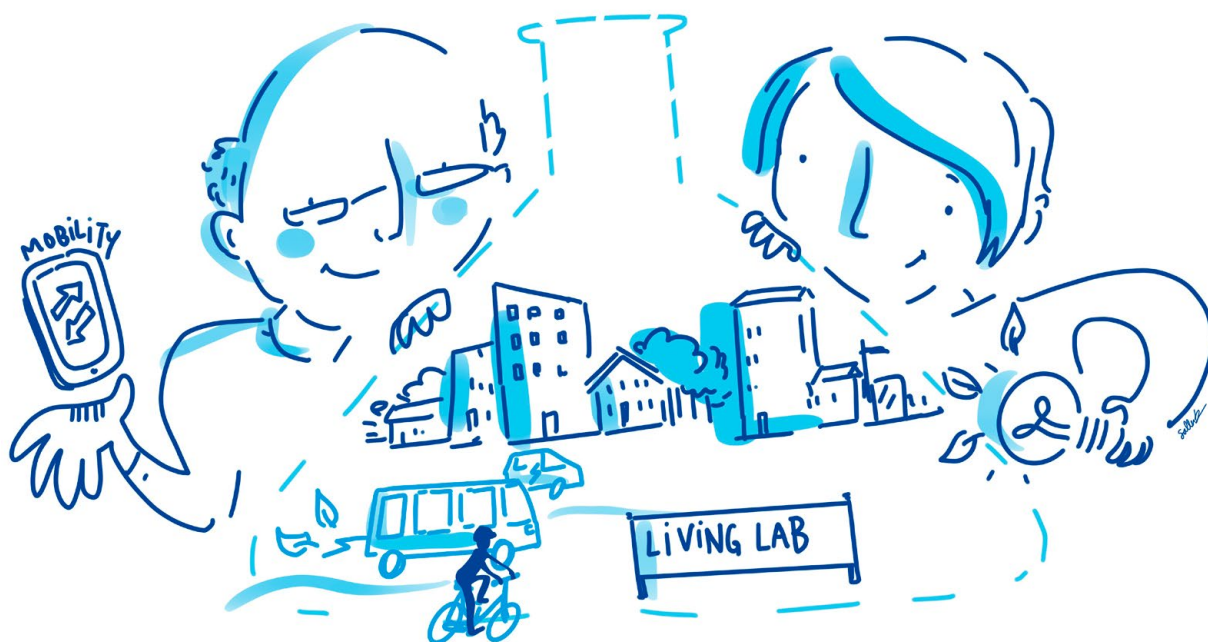
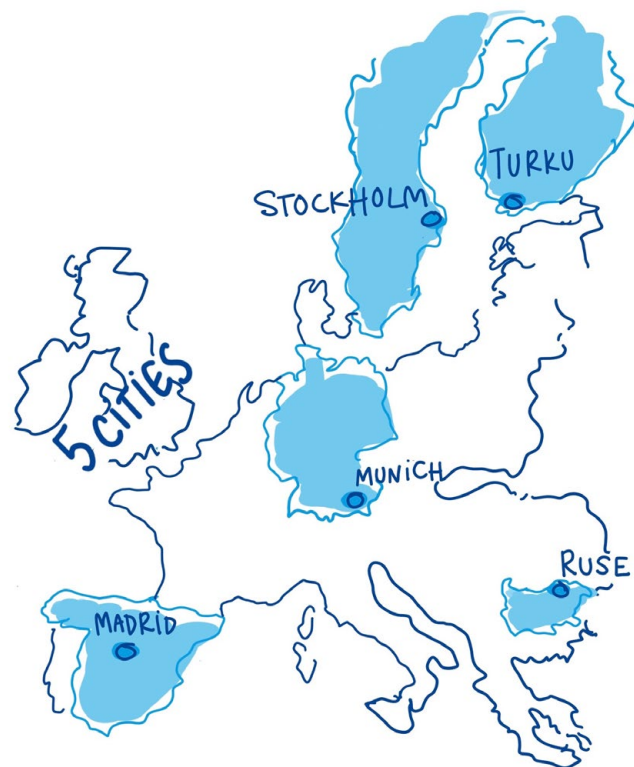
All detailed information about the project:
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The CIVITAS ECCENTRIC living labs – testing innovations in real-life

ECCENTRIC's innovative measures were tested in living labs in the five European partner cities. But what is a living lab in practice?

Based on the definition of the European Network of Living Labs (ENoLL), a living lab is a real-life test environment, where different actors co-develop innovative solutions with a new form of public-private-people partnership. It is a shared arena in which services, processes and new ways of working can be developed and tested directly with the users and authorities and citizens actively co-operate in the innovation process. Each ECCENTRIC partner city defined an area outside of the city centre where the innovative solutions were tested and implemented.



Living Labs in CIVITAS ECCENTRIC.
Illustrations: Salla Lehtipuu

Vallecas in Madrid, Spain

The living lab in Madrid includes 328,000 inhabitants in two districts, Puente de Vallecas and Villa de Vallecas. Compared to the central districts, the living lab's population is younger and shows lower incomes and labour occupancy rate. The urban structure is characterised by dense neighbourhoods as well as poorly connected spaces. The most attractive areas are the original, old village areas. In contrast, the recent urbanisation areas are less dense and are based on car-oriented urban planning. Both districts are surrounded and intersected by large metropolitan infrastructures. Public transport connects the area efficiently with the city centre, but it is difficult to reach other neighbourhoods or peripheral areas in the outskirts. Pedestrians and cyclists face a public space occupied by cars, and public transport offers few direct services. The percentage of non-motorised journeys is 22% in Puente de Vallecas and 15% in Villa de Vallecas, significantly lower than the city centre (32.3%). The use of car is higher than in Madrid's large centre area.

www.civitas.eu/eccentric/madrid

Domagkpark and Parkstadt Schwabing in Munich, Germany

Like other major cities in Europe, Munich is facing serious challenges in terms of population growth, transport demand and lack of space. With around 8,000 new inhabitants and 12,000 new employees within the next years, the transport system in the Domagkpark and Parkstadt Schwabing area needs an integrative and innovative approach to ensure a functioning and sustainable mobility supply. The main project objective was to increase quality of life in the district through a substantial roll-out of innovative mobility solutions that reduce the use of private cars. With the implementation of various solutions in the field of sustainable and shared mobility, mobility management, city logistics and road safety, a new model quarter for sustainable urban development and compatible mobility was developed. It is aimed to implement successful research findings in future newly built quarters of Munich and replicate them in other European cities.

www.civitas.eu/eccentric/munich



Picture: Carlos Roca

Main achievements through CIVITAS ECCENTRIC

- Involvement of citizens in decision-making through a co-creation process targeted at children, teenagers and elderly people focusing on active modes.
- Promotion of inclusive and active mobility through improvements of public space, awareness campaigns, new regulation and road safety strategy.
- Clean and efficient public transport.



Picture: City of Munich

Main achievements through CIVITAS ECCENTRIC

- Increased offer and use of sustainable means of transport in the living lab area.
- Clear impacts on policies, urban mobility strategies and development projects in Munich.
- The City of Munich, especially the living lab and other new development areas, highly benefited from testing the solutions – independent of the achievement of all initial measure objectives.

Druzhba district in Ruse, Bulgaria

The “Druzhba” (Friendship) district is situated in the southern part of Ruse, which is Bulgaria’s largest city on the Danube River and the fifth largest city in the country. Druzhba’s population is about 27,000, or around a fifth of that of Ruse. The district was built in the 1970s according to typical socialist urban planning, with uniform 8–12-floor condominiums shaping the named “living complexes”, narrow streets without pavements and empty spaces in between blocks. Nowadays the pedestrian infrastructure is very run-down and nearly 70% of the public space is used for parking of private cars. Transport links with the city centre are slow and unreliable and most of the locals travel by car or taxi to reach their workplace or travelling to leisure activities.

www.civitas.eu/eccentric/ruse



Picture: City of Ruse

Main achievements through CIVITAS ECCENTRIC

- Local decision-makers support the mobility management and SUMP in Ruse – the city joined the CIVITAS network.
- Increased safety for pedestrians and especially for people with disabilities through secure crossings, sidewalks and safety infrastructure.
- Increased share of walking and cycling in the living lab area.

Central and peripheral districts of Stockholm, Sweden

CIVITAS ECCENTRIC in Stockholm addresses objectives contained within the City’s Climate and Mobility Strategies, including targets to reduce greenhouse gas emissions, to reduce use of private vehicles and to increase the share of sustainable modes of transport. The project also contributes to implementation of the regional public transport strategy, facilitates partnerships with neighbouring municipalities and engagement of other stakeholders, and supports implementation of the city’s strategy for international cooperation. The focus is on peripheral zones, with several measures focusing on the southern inner suburbs around Årsta and Hammarby Sjöstad, public transport in the north-western periphery, and some measures addressing city-wide action. The demonstration of new processes, technologies and services enables the city and other stakeholders to identify impacts and assess the potential for upscaling.

www.civitas.eu/eccentric/stockholm



Picture: Par Olsson

Main achievements through CIVITAS ECCENTRIC

- Development of innovative approaches including new mobility services and new logistics concepts have been adopted by users.
- Wide regional impact, e.g. accelerated adoption of electric vehicle charging infrastructure, through communication campaign.
- Positive impacts on Stockholm’s work for sustainable mobility through mutual learning and sharing of experiences with other cities - this was recognized as Stockholm won the CIVITAS Legacy Award in 2019.

Kupittaa in Turku, Finland

Kupittaa is located in the eastern part of the city centre. The area extending from the university campuses to Kupittaa and further to Itäharju is the most significant centre of growth for knowledge and high-tech jobs in the urban region of Turku. Therefore, the area is closely connected with the three extensive spearhead projects derived from the city strategy, which is aiming for a dynamic carbon neutral city with innovative development of jobs, services, housing, transport, and operational models in a way that actively involves citizens, clients, and stakeholders in the change. In addition to diverse types of housing, a university hospital, a train station with a railway connection to the capital city Helsinki and a large urban park, the area houses a Science Park and all central campuses of the city's 5 universities. Around 12 600 residents, 35 000 students, 400 businesses and 17 500 employees occupy the area. Kupittaa has offered a fruitful environment for promoting mobility solutions together with stakeholders aiming for a more attractive and cleaner city.

www.civitas.eu/eccentric/turku



Illustration: Salla Lehtipuu



Main achievements through CIVITAS ECCENTRIC

- Awareness raising of sustainable urban mobility and bringing mobility into the core of the city's future planning and decision making.
- Speeding up the process towards carbon neutrality by carrying out bold and agile experiments.
- Introduction of a new local MaaS ecosystem, integrated a completely new city bike system, advanced winter cycling maintenance and development of an electric bus line alongside experimenting with electric vehicles.



Theme 1

Inclusive urban planning, new parking policies and mobility management

To improve the quality of life and promote sustainable mobility, a wide variety of approaches were pursued in the ECCENTRIC cities. The partner cities were demonstrating and testing new concepts and services in the areas of urban planning, parking and mobility management; in other words, the part of the mobility system that citizens use and depend on every day. New technologies and social networks have changed everyday life considerably. This opens completely new possibilities for planning as well as

for mobility itself. There is a strong need for joint planning, because society is diverse, and these aspects need to be considered. This is also reflected in mobility behaviour: which means of transport are used by certain groups, when do they use them and for what purpose? Our mobility system must meet all these requirements to be attractive for all citizens. Cities need to jointly plan the mobility system with everyone involved – shaping the mobility of tomorrow together.

Make space for people

Many European cities struggle with the same problems and challenges: scarce liveable public space, congestion, high levels of pollution, competition for land use and dangerous traffic situations. Also, individual user-needs and digitalisation must be considered when planning for sustainable urban mobility systems.

One focus of CIVITAS ECCENTRIC relates to the involvement of citizens and stakeholders in the planning and decision-making processes. Ultimately, users can make a significant contribution to the exchange of knowledge by embedding their experience of the mobility system, but also by changing their mobility behaviour. This interactive approach was applied concretely in three clusters, focusing on “inclusive urban planning”, “new parking policies” and “mobility management”, showing the manifold possibilities and potentials that arise.

Interactive and co-creative processes were applied in each city in order to address all target groups. New concepts were developed to incorporate their knowledge into political strategies: creative surveys (e.g. Mobility Barometer in Southwest Finland, Dialogue marketing in Munich) interactive websites (the Kulje -information platform in Southwest Finland or face-to-face meetings (participative workshops in Ruse and co-creation P2P activities in Madrid) encouraged citizens to get involved in the planning process.

It has been shown that tailor-made offers, combined with a digital or appealing approach (social media, gamification, incentives), have an enormous impact because they encourage participation. A major success factor is the formation of working and steering groups and the assignment of clear responsibilities. Particular attention was paid to

vulnerable groups who are often neglected in planning processes, such as children, elderly or people with disabilities. In all cities, meetings were held with these groups to include their points of view and discuss their requirements for a socially fair accessible and safe mobility system. For instance, joint city walks, debates, participative workshops and training sessions were organised with overwhelming success.

As a result, the roads in the partner cities have not only become more attractive and safer for pedestrians and cyclists, but a common vision of future mobility has been created together.

In the case of infrastructure-based projects, innovative project design is very important in addition to active involvement of the residents. Now that the mobility system is increasingly connected with digital services, these can be used to a greater extent to facilitate use and provide new incentives. At the same time, there is an increased need for data protection regulations, technical support and user-friendliness, which must be considered in. For example, the parking app developed in Stockholm shows great added value for drivers looking for a parking space and also results in more effective space management with positive effects on the environment and traffic system.



Campaign to promote sustainable mobility among older people.
Picture: City of Madrid



Pedestrians and cyclists at the Aura river in Turku, Finland.
Picture: City of Turku, Arto Takala

Lessons learned

In terms of participatory projects, the cities attached importance to involving the citizens in the planning process from the very beginning. By communicating effectively about the objectives and the functionality of each measure, all projects could be implemented smoothly. It should be noted that a target group-specific approach, a continuous support of the actions and an adapted continuation are required. In all participating cities, the active exchange with users has led to an enormous increase in awareness and acceptance of the sustainable mobility solutions. It should be noted that changing mobility behaviour remains a long-term and complex process, but good results in short term have been achieved.

The exciting part of innovative projects is that new aspects or challenges sometimes arise during implementation, but it is precisely this trial and error principle that leads to the constant adjustment of a measure. This is exactly why transparent planning and the stakeholders' engagement in these projects is so promising. Thus, a change in mobility systems can be achieved.

Successful E C C E N T R I C solutions

The Mobility Barometer in Turku

The City of Turku and the Regional Council of Southwest Finland developed new planning approaches and tested the possibilities made available by new technologies and social networks (mobile apps, social media) for interactive and participatory planning. The aim was to enhance smart intermodal solutions in public transport planning, particularly Park & Ride. The Regional Council of Southwest Finland created a plan for Park & Ride also considering cyclists, so a modern and intermodal concept was developed, with great potential to be transferred to other regions and cities. To increase the knowledge of citizen's satisfaction of sustainable mobility infrastructure and mobility service, a "mobility barometer" was

developed and established. According to the barometer, 61% of the citizens indicated that they had little opportunity to participate in mobility planning yet they would have liked to take part in it. In addition, as many as 85% of respondents considered electronic surveys to be the best way to increase the role of residents in the planning. The results indicate that municipalities should be activated in making surveys and demonstrates the importance of transparent communication in mobility planning. To this end, the Regional Council of Southwest Finland has launched the Kulje-website (www.kulje.fi), which provides information about all projects and processes on regional traffic planning.

Intergenerational training on digital mobility services in Munich

Due to the demographic change in society, the proportion of older people will increase in Europe. In order to make it easier for the older population to use transport facilities and to remain mobile, Munich offered inter-generational trainings where teenagers coach senior citizens in workshops on how to use the internet, smartphones and apps for organising their daily mobility. The background to this is that our mobility system is becoming more and more digital. As a result of this measure, senior citizens have become more literate in modern technologies and devices and have learned to use them for travel planning. Furthermore, it has motivated seniors to intensify walking, cycling, using public transport and even car-sharing models instead of using their own car or taxi services. These days, young people in general are very familiar with digital devices. In school lessons they were prepared to pass on their knowledge to senior citizens. About 330 senior participants and 230 pupils have been reached within this action. Combined with the playful



Inter-generational training about digital mobility services in Munich. Picture: Green City e.V. Sebastian Henkes

approach of the so-called "age suit", the students learned what it can feel like to be older and what challenges might arise. This created an interesting and great exchange between the generations and the participants started to reflect on their own mobility behaviour. The project was met with such a great response that it will be continued and transferred to other cities.

Spotlight on sustainable mobility and co-creation in Ruse

The City of Ruse pursued the goal of raising awareness of sustainable mobility in general and to improve the quality of life for its citizens. For this purpose, new co-operation and an intensive exchange between different actors was established, because mobility is shaped by society – whether politicians, planners, engineers or the citizens as users of the services. Capturing this diversity is a great challenge that Ruse successfully accepted. More than 400 people became intensively involved through the project alone.

Through thematic workshops with local organisations, the transport industry or citizens, the topic of future mobility in Ruse was discussed and planned. The aim was to encourage all actors to embrace sustainable mobility habits to increase the use of public transport. A special focus was put on traffic safety, with the aim of sensitising citizens to reduce the risk of road accidents. This measure especially shows that not only innovative infrastructure projects are necessary



Conference in Sofia.
Picture: City of Ruse

to achieve a change in mobility, but also a change of mindset. And this, in turn, shows that suitable solutions must be considered for all target groups, including disadvantaged groups, youth, academia or schoolchildren. As a result, a shift towards a sustainable way of moving was done – and it will continue.

Co-creating campaigns for a safer active mobility and inclusive public space in Madrid

Madrid has developed a co-creation process to design and implement P2P campaigns for increasing active mobility, co-created by the children, teens and senior persons through activities in schools and municipal elderly centres and to promote a public space adapted to the needs of these vulnerable groups. Based on a fruitful debate about their daily mobility, more than 200 activities have been created to foster active mobility through innovative ideas: walkshops, cycle rides, P2P campaigns, intergenerational activities, gender workshops, videos, radio and TV programmes, etc. These activities have mobilized thousands of people. In

addition to having fun and discussing mobility, the aim was to identify barriers in the public space that affect active modes. The renovation of a central public square, for example, has been guided by the participants of the ECCENTRIC workshops. Improvements in the accessibility of public space have resulted in a greater proportion of walking trips. Madrid shows that there are many creative ways to reshape cities and mobility by engaging the population in this bottom up approach. The project has managed to increase the perception of safety and autonomy among children and seniors.

More info about these and more ECCENTRIC solutions can be found at:
www.civitas.eu/eccentric



Theme 2

Mobility as a Service for and by all

The CIVITAS ECCENTRIC project was one of the first projects in Europe to focus on a new concept called Mobility as a Service (MaaS). The core idea of MaaS is to integrate different modes of transport into one service for the customers. It is an approach that is used to facilitate a shift towards sustainable mobility by improving the availability of high-quality alternatives to private cars. MaaS includes the creation of business models that enable cooperation

with different existing service providers. At the same time, it attracts new MaaS operators to cities by creating different service packages and marketing them through a variety of communication channels. In ECCENTRIC, seven measures tackled the topic of MaaS from different angles and highlighted that the service approach to mobility requires a new way of thinking and co-operating with companies.

Success factors for MaaS implementation

To successfully implement MaaS measures, the involvement of and communication with stakeholders is crucial. This requires that cities focus on adequate resources and the skill sets needed for multilevel stakeholder engagement. So far, MaaS as a concept is often not yet well understood by the different key institutions. The lack of know-how on how to deal with the technology and new market players affects the support given. It is important to clarify the legal framework and engage institutions in the development of MaaS.

The complexity, perceived uncertainty and rapidly changing market affects the way the new services can position themselves and create the required partnerships to operate. Also, the high competition

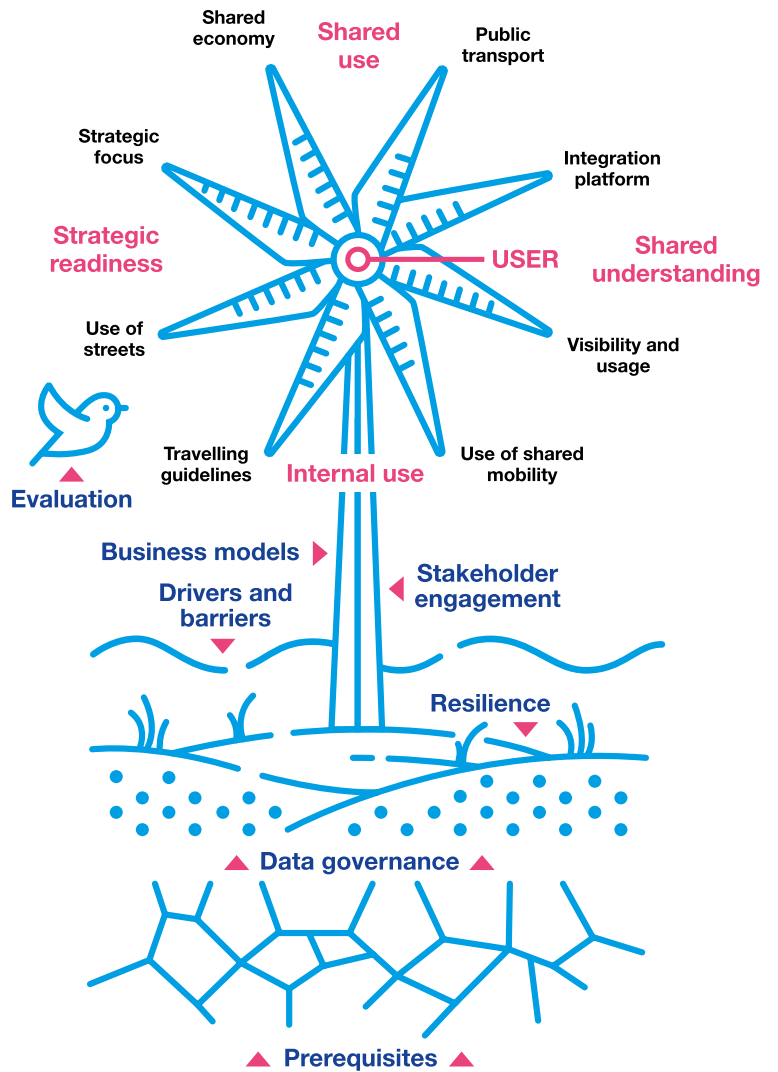
between partners affects the way they participate in platforms that are not run by themselves. The MaaS actions are naturally aligned with environmental goals, regulatory frameworks, and a Sustainable Urban Mobility Plan (SUMP). In some cases, these are translated into favourable regulatory frameworks, strong support from regional policy makers and key stakeholders, as well as interest and commitment towards co-operation. For MaaS actions to succeed, solid planning is needed for the design, leadership and flexibility/adaptability within the actions. A strong business culture in the ICT sector that supports these actions (i.e. IT infrastructure, high level of interest, high smartphone penetration etc.) is enabling the process.

Lessons learned

The development of MaaS requires systematic work on creating the preconditions for it to work in the local context. This includes ensuring the prerequisites, data governance, resilience of the system and being aware of drivers and barriers. After that, the focus should be on strong stakeholder engagement and enabling the MaaS business models to flourish.

At the centre of the work are the user needs and how to enable the creation of interconnected, sustainable and seamless services to meet these needs. The focus should be on how to facilitate the behavioural change.

Local authorities can support MaaS with several focus areas that have different MaaS readiness levels. These levels were developed in the project and offer a good framework for future work on MaaS. The different measures implemented in ECCENTRIC showcase well the different dimensions and approaches needed to develop MaaS. It does not matter where you start the process, as long as you think holistically about the development and keep an open and flexible mind while focusing on services for the users.



The windmill of Mobility as a Service.
Illustration: Guidelines on developing MaaS on local context, Laura Sarlin

Recommendations

- To create the basic conditions for MaaS and its further development, the focus should be on open data and open application programming interfaces (API).
- Strong public transportation is one of the core elements of MaaS.
- Create partnerships systematically and put the focus on an ecosystem approach.
- Focus on user needs as the technology is there to serve people. A strong focus on communicating the possibilities to the users is needed to support MaaS actions.

Read more in the **MaaS Readiness Level Indicators for local authorities (2017)** and the **Guidelines on How to implement MaaS in local context (2020)** (see page 42 for further resources)

Successful E C C E N T R I C solutions

An Open Platform for Multimodal Mobility Information and Services in Madrid

In the Madrid region, the public transport authority, CRTM, has developed a mobility portal where information from the region's different modes of transport have been integrated; not only information about public transport services (more than 40 operators in the whole region) but also information about shared mobility, accurate mobility information from different municipalities and other information relevant for mobility management. Thanks to this portal, the citizens have access to a huge amount of information about the mobility in the whole region. Also, in those cases when the information is in an open format, the portal will be an access point for developers who want to make their own applications. Since its publication in 2018, the number of queries to the new open data portal (with substantial improvement in terms of real-time information) has increased by 11%. The portal has been successful also in mobilising the developers' community and in supporting the development or improvement of more than 18 mobile apps and 9 websites providing information on the mobility



New Mobility Portal in Madrid.
Picture: Public Transport Management Centre

system in Madrid. The creation of a common strategy and a shared vision of the future between all the agents involved in mobility management is crucial for the optimization of any MaaS solution. They must see themselves as part of a common framework, in which they provide mobility services to all users, more than as competitors; all the public transport operators integrated in a common system have experienced the advantages of the coordinated work.

Smart Mobility services in Stockholm

In the city of Stockholm, the smart mobility services were developed through creating the circumstances for different operators to co-exist and learn from each other while trying to explore ways to find win-win solutions. This illustrates the large stakeholder engagement needed to create the climate in which the MaaS operators can flourish. The MaaS services of UbiGo-Stockholm were launched in 2019. UbiGo offered a mobility package or monthly subscription to families who agreed to test the service. The package included public transport,

car-sharing, car rental and taxi services, which the customer could book through the UbiGo app. Family members could share the package and unused tickets were transferred to the following month. In parallel, the companies Snappcar and GoMore developed their platforms for P2P-car-sharing and ridesharing and increased their presence in Stockholm, to complement UbiGo and other already existing mobility services in Stockholm. All these platforms were promoted through an active awareness campaign that focused on living without

a private car. The campaign and its website aimed at guiding citizens to find alternatives that work as a complement to public transport, walking and cycling. The site especially emphasises the available car-sharing and MaaS services. It contains market overviews providing direct help to find and use the services available in Stockholm. The campaign also focused on how to use bikes and cargo bikes also for transporting kids, as well as groceries and other heavy items. Stories told by citizens served as an inspiration for others to follow.

Integrated Ticketing and Information System for Mobility in Turku

The City of Turku and the public transport authority in the Turku region Föli, have created a harmonised public transportation authority ticketing system in Turku. The new open data interface and platform into which the public transport ticketing system is incorporated, enables the integration of local service providers into the system and a variety of combination tickets: when buying a ticket to an event, a bus ticket can be included. When buying a bus ticket, the same ticket is valid in the entire Föli region (incl. 6 municipalities). One ticket can be used for a total of four trips, i.e. one change can be used for both directions, if necessary, and this applies also to the combined tickets. For example, when buying a ticket to a Turku City Theatre performance, the ticket can be used to travel on Föli buses and water buses 3 hours before and 2 hours after the event. In addition, the ticket includes the cloakroom fee at the theatre. The barcode of the theatre ticket is shown to the card reader when boarding the bus or the ticket can be read electronically when delivered by



Smart mobility app in Stockholm.
Picture: UbiGo



Föli combination ticket to the Turku City Theatre.
Picture: Hannu Aaltonen

e-mail or via Föli's application. The Föli combination ticket can be easily included in any event ticket sold through a variety of ticket sales channels. Since the launch of the combination ticket with the Turku City Theatre, the same model has been replicated by a variety of theatre and concert operators. In addition to the combination tickets, the bike-sharing system of the City of Turku is fully integrated into public transportation ticketing services.

More info about these and more ECCENTRIC solutions can be found at:
www.civitas.eu/eccentric



Theme 3

Enabling safe walking and cycling

Increasing levels of active mobility is essential for sustainable urban mobility and an urgent challenge for cities around the world. CIVITAS ECCENTRIC worked to enable active mobility through the demonstration of multiple approaches and measures. Cities introduced a range of physical

interventions and policy alternatives that can improve the safety of pedestrians, cyclists and other road users. In addition, measures including improvements to the design and maintenance of infrastructure, along with a fleet enabling citizens to test e-bikes were implemented.

Safe walking and cycling is the key for sustainable mobility

Each of the ECCENTRIC cities sees safe walking and cycling as critical to sustainable mobility and transportation and the development of an attractive urban environment. Achieving increased levels of active mobility can have not only positive impacts on transport systems, urban space and the environment, but also wider effects in terms of e.g. improved public health and increased revenues for retailers. In particular, the cities were keen to identify ways to increase levels of walking and cycling in all parts of their cities and especially in peripheral districts. Furthermore, cities aimed to increase safety – both actual and perceived – in all parts of their cities.

Local conditions always create context-specific drivers and barriers, yet some common drivers and barriers were identified by the five cities. These included the role of politics and strategic or institutional processes, and the importance

of ensuring alignment between visions, policies and demonstration projects. This is a two-way process, as even demonstration projects that are well-aligned and integrated into strategic visions and policies may suffer if budgets are cut, or important stakeholders are unaware of the topic or any possible role they may be required to play. Overcoming such barriers is both a challenge for projects and, in some cases, a reason for them.

Similarly, public opinion – which shapes the political context of cities – can also influence implementation and outcomes. Cities have the opportunity to involve citizens in planning and work closely with them to ensure their local needs are addressed and their expectations are met. The work of, for example, Madrid, Munich and Ruse on road safety in ECCENTRIC has included adoption of innovative approaches to harness citizens' knowledge and improve planning. Achieving successful outcomes requires good planning including ex-ante analysis, design and technical planning, as well as post-ante evaluation. The experiences of CIVITAS ECCENTRIC illustrate clear pathways on how to address these points.



Pedestrian club “Walk with us” for seniors.
Picture: City of Madrid

Lessons learned

CIVITAS ECCENTRIC has demonstrated a range of actions cities can implement to increase the safety, quality and levels of walking and cycling. There are many more possibilities, and cities should try to adapt and adopt a wide range of measures to enable walking and cycling. Some key lessons include the need to:

- actively and continually involve local stakeholders, using mixed methods and a wide range of tools;
- clearly define the scope, content and level of ambition for projects; break down complex strategies into manageable parts;
- make sure the strategy and budget are aligned and understood; anticipate financial risks; integrate relevant non-monetary requirements into tenders;
- acquire good baseline data and pursue active monitoring and follow-up;
- communicate with citizens;
- use walking and cycling as a tool to manage public spaces;
- work systematically for long-term change; avoid trade-offs that weaken walking and cycling.

Recommendations

CIVITAS ECCENTRIC aimed to increase levels of walking and cycling in the five demonstration cities, and to increase actual and perceived safety. The cities have successfully demonstrated nine actions and achieved notable wider impacts. One example is the upscaling and roll-out of a road safety concept across the city of Munich. The demonstrated actions can be adapted and replicated by other cities.

For transformative impacts, cities must reorient their strategies and plans to prioritise walking and cycling (and public transport). Increasing the space for walking and cycling, proactively addressing barriers and reducing street space for private motor vehicles are key steps. Developing a Sustainable Urban Mobility Plan (SUMP) and integrating it into city master plans is another key step that may support the reallocation of budgets to reflect new priorities and enable investments in improved infrastructure and supporting measures to promote walking and cycling.

Successful ECCENTRIC solutions

New safety management systems to identify and mitigate actual and perceived risks in Madrid and Munich

In Madrid and Munich, the cities have implemented new safety management systems that include spatial, modal, temporal and social analysis of accidents to identify real and perceived risks. In Madrid, the system synthesises continuous information gathered from the police records and citizens through social networks, as well as automatic measurement to illustrate both reported and unreported incidents, enabling geo-referencing with GIS and being a useful tool for planning new urban interventions. In Munich, inventories of traffic data and incidents have been analysed to develop a programme for actions that can improve road safety. Interventions at hotspots are being

made and monitored to assess outcomes, and the City administration has continuously involved stakeholders, such as residents' associations and schools, in the process. This approach informs and complements the wider Vision Zero programme for Munich approved by the City Council in April 2018. Lessons learned during CIVITAS ECCENTRIC will be integrated into ongoing road safety work across the city. Common challenges for these actions have included the issue of data quality and management (including staff competencies), and the difficulty of balancing different perspectives (e.g. concerning impact versus costs or feasibility).

Provision of high-quality infrastructure to enable safe walking and cycling in the Druzhba district in Ruse

The safety of pedestrians and cyclists is a major concern in Druzhba, a peripheral area of Ruse. The general quality of pavements is poor and many residents, particularly people with disabilities, avoid walking. This results in higher use of motorised transport than is necessary, resulting in conflicts between road users that worsens the situation.

In CIVITAS ECCENTRIC, the quality of pedestrian crossings in Druzhba has been analysed and improvements made, including the use of LED lighting and elevated pedestrian crossings, along with surveillance cameras to monitor performance and increase citizens' perceptions of safety. In addition, Ruse is investing in improving the quality of footpaths and introducing designated bike lanes



Secure pedestrian crosswalks in Ruse.
Picture: City of Ruse

alongside several main roads. These actions are supported with wide-ranging capacity-building and dissemination activities involving stakeholder groups such as citizens, non-governmental organisations, urban planners and transport professionals.

Ensuring accessibility to high-quality infrastructure during temporary roadworks in Stockholm

Stockholm has developed guidelines and conducted product tests to improve safety around construction sites. Temporary diversions due to works create disruption for pedestrians, cyclists and other road users, often resulting in conflicts and, in the worst case, accidents. This measure aims to increase safety for unprotected road users and enforce the “order of priorities” for sustainable mobility by ensuring seamless travel for pedestrians and cyclists (as opposed to motor vehicles, which have often in the past received priority during diversions). As a result, guidelines for construction companies concerning road layout, signage, lighting, safety equipment, etc were developed and implemented. The work also involved collaboration with a business association, the Swedish Standards Institute and two other cities to test, evaluate and develop standards for innovative



Re-routing cyclists.
Picture: Lennart Johannson

safety products. This includes, for example, use of soft materials and protective nets adapted from ski slopes instead of metal or concrete barriers.

Turku: Maintaining service quality throughout the seasons

The provision of safe and reliable infrastructure throughout the seasons is an issue relevant to many European cities, with winter cycling a topic of particular interest to communities across Scandinavia. The City of Turku has adopted sweep-salting methods that were pioneered in Sweden for the maintenance of pedestrian and cycle paths in winter to enable all-year cycling. The demonstration involved consultations with the public about winter cycling, gathering of best practices, tendering and the launch of the new maintenance scheme in October 2017. The action generated high levels of user satisfaction and has also supported the launch of a year-round bike-sharing system in Turku.



Winter cycling test route.
Picture: Juha Jokela

More info about these and more ECCENTRIC solutions can be found at:
www.civitas.eu/eccentric

Theme 4

Efficient and clean public transport and new shared mobility solutions

With the aim of European cities to decrease CO₂ emissions and congestion, improve air quality and reduce noise pollution, a new integrated approach is required to streamline transport policy with urban planning as well as air quality and vehicle emissions regulations needed. A new urban mobility culture and shift towards cleaner and more efficient urban mobility system is needed urgently. For urban areas, this implies a modal shift to public transport modes

as well as to active modes (walking and cycling), the use of clean vehicles in public transport fleets (renewable or alternative fuels or electric buses) and the introduction and deployment of new shared mobility services desirably integrated into public transport to add value to the system. In combination with applied mobility management a transition to more sustainable mobility is possible.

Clean public transport as the backbone of a sustainable mobility system

New mobility concepts need to be feasible and based on viable financing. Sometimes their implementation may imply redefining urban planning and mobility schemes. The shared mobility systems (car, bicycle and motorbike) offer a transport alternative tailored to the new citizens' needs. However, several barriers to the adoption of a more sustainable and clean transport system can be recognised. Firstly, financing the high costs of electric and hybrid buses (up to twice the price of a diesel bus) and the fear of adopting a new and different technology (technological reliability, charging options). Secondly, the existing regulatory framework which in many cases does not take into account electric vehicles or shared mobility systems.

Finally, the reluctance of shared mobility operators to be integrated into a common digital mobility service app or mobility platform.

This needs to be addressed through a different political and administrative process in which the municipalities have to adopt the role of a leader to overcome these barriers, and upgrading the transport systems to make them cleaner, more energy efficient and more sustainable.

When new technologies and mobility services are included into the portfolio, the user should be in the focus, by assessing the potential impact on satisfaction levels, mobility behaviour, and ridership.

Lessons learned

- Political will and commitment is needed to implement clean and sustainable public transport systems and for winning trust in the long-term functioning of the system despite (possible) initial setbacks
- The early involvement of decision makers in discussing measures that include physical interventions with relative high investments is necessary. This helps to get their view on the content and potential impacts as well as may facilitate financing and prioritising the measure in the decision-making process.
- Aligning investments with city strategies is also crucial to get political support.
- When implementing policy actions that require significant public investment, it is good to identify a group of clear beneficiaries at an early stage. This can help to gain public support for the process and facilitate political acceptance of the action.
- The importance of planning should not be underestimated. Early involvement of local stakeholders and city planners is crucial for the success when actions for public transport network reorganisation as well as adoption of new mobility sharing systems and clean and silent public transport fleets are being planned.
- A broader range of technologies should be compared, if possible, when shifting to clean public transport fleets (renewable or alternative fuels or electric buses).
- When there are measures with a similar goals, synergy effects can be used and the projects can benefit from each other.
- Active communication and marketing about the project, as well as the feedback gained from the participatory processes, are key points for the project's success.



(E-)mobility station in Domagapark.
Picture: City of Munich



Bike sharing system launch event on May1st 2018.
Picture: Jutta Mäkinen

Recommendations

The role played by the city councils regarding the provision of financing, regulation and policy instruments, public land and necessary recharging infrastructure to support electric vehicles is crucial. The main challenge for local decision makers is to get the necessary citizens' acceptance for new mobility measures. Therefore, the involvement of different interested groups and stakeholders in the planning process and implementation of communication campaigns is important for the success. Since the Covid-19 pandemic, public health and safety of passengers needs to be taken into account when planning the improvement of public transport.

Successful E C C E N T R I C solutions

Speeding up core bus routes in Stockholm

Stockholm is a growing city and, despite a high public transport modal split of almost 80% during the extreme peak, more people need to change to public transport to prevent the increase of rising congestion levels. Although many inner-city residents already use public transport or walk, most car users come from outside the inner city.

To increase the speed and attractiveness of public transport, Stockholm implemented a measure to test the effectiveness of physical modifications to the roadway, with a focus on corridors where fully segregated bus lanes are not feasible. In this measure, road design improvements have been made along two trunk bus lines through the northern suburban districts of the City of Stockholm. Improvements included, for example, adding stretches of bus-only lanes, relocating and lengthening bus stop areas, and improving curbs for boarding and alighting. The measure works with two of the core bus routes in the outer urban area, bus

New bike-sharing scheme in Turku

Bike-sharing schemes, offering affordable short-term rentals in a predefined geographical area have sprung up in many cities. In Finland, Turku was the first city to introduce an all around the year system in 2018. The bike-sharing system called Föli bikes consist of 300 bikes and 41 stations (39 stations at fixed locations and two pop-up stations). The user can pick up and drop off a bike at any station. The number of actors involved in creating the scheme was quite significant, as the system has many unique aspects to it: the bike sharing system is fully integrated to the public transport system and the IT-platform, providing a quick and easy way of getting around the city centre includes a possibility to connect other vehicles to it. Moreover, the



StockholmBus route 179.
Picture: City of Stockholm

lines 178 and 179 There is a clear upscaling option by extending to the full lengths of both bus routes and by expanding to other bus routes that have not yet been improved in this way.

The political support and interest given by the City Council and Stockholm Public Transport to the actions and the good collaboration between all partners (Stockholm Public Transport, Swedish National Transport Administration, Bus Operators, and neighbouring municipalities) have been important drivers for the measure.

system can also easily be expanded to surrounding municipalities, it has a strong visual brand and in the wintertime the bikes are equipped with studded winter tyres.

According to a user survey conducted in 2019, 25% of the respondents say they have used their own car less thanks to the city bikes. Also, user satisfaction with the system is high although the city bikes are not attracting users to the degree hoped for. Ongoing massive construction works in Turku city centre as well as problems with the user interface can explain the lower system usage. Nevertheless, other cities have already adopted the example of Turku's way of building a city bike system.

Electric and hybrid buses for Public Transport in Madrid

EMT, the municipal company in charge of bus services in the city of Madrid aimed at increasing the efficiency and environmental performance of their public transport fleet. Nine new hybrid buses were added to the EMT fleet and monitored for one year while operating on route 140, a tangential line close to the ECCENTRIC living lab in Madrid. By reducing energy consumption, CO₂ emissions and noise, the company has contributed in achieving the city's climate goals as well as improved the service provided to citizens.

The experience will be used to better understand the performance of these types of buses and therefore to help better define EMT Madrid's own strategy on fleet renewal. New hybrid diesel buses are included in the EMT fleet for the first time. The research

and technology developments of hybrid buses are well known. The models chosen from IVECO (Hybrid Urbanway) and from MAN (Lions City) – both 12 m long – have been available on the market for some time. The main challenge was to assess the performance of buses to check their reliability compared to traditional diesel ones, including the total life cycle cost, maintenance needs and environmental performance. Hybrid buses provide an effective alternative for the replacement of diesel buses, as they provide CO₂ emission and fuel savings reductions of more than 20%, a reduction in NO_x and PM emissions, and significant customer satisfaction. Hybrid buses are also economically efficient, as the additional costs can be recovered in less than five years, due to fuel and maintenance savings.

Intermodal (E-)Mobility Stations in Munich

As a new multimodal mobility service, the City of Munich piloted (e-)mobility stations in a new housing area. Mobility stations offer diverse mobility services, including various shared electric vehicles, which complement public transport for the citizens. The residents can choose the most convenient vehicle for travelling to work, for leisure or to organise their (family) everyday life. The aim is to increase the quality of life for the residents and provide them with the maximum mobility without the need for owning a car. Four mobility stations were installed across the living lab of Domagkpark and Parkstadt Schwabing that address the individual mobility needs of resident as well as employees or customers who visit the area.

All mobility stations provided by the city are equipped with free-floating and stationary car-sharing spaces, on-street markings and signage for car-sharing, an information pillar, AC charging infrastructure and a stationary bike-sharing station. The stations are easily accessible in locations close to public transport services and they are combined with new regulations

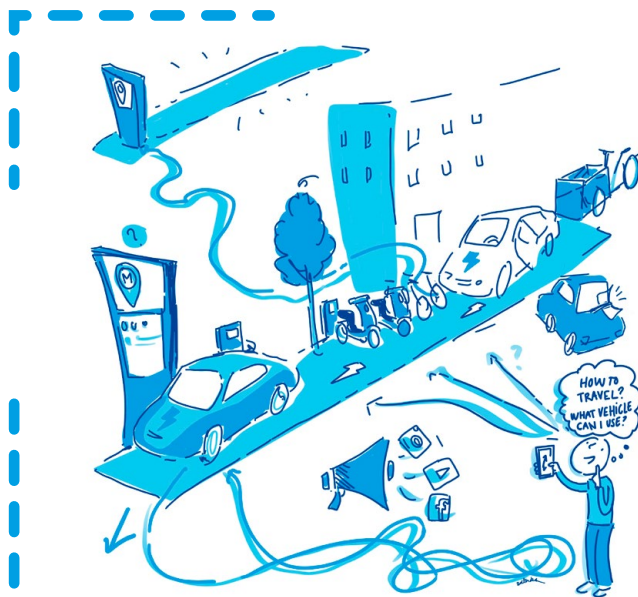


Illustration: Salla Lehtipuu

that enable the reservation of parking spaces only for car-sharing vehicles. The essential “backbone” of the mobility station services is a common booking service integrating all sharing services. Consequently, the aim is to collect all relevant stakeholders within the existing mobility app of MVG (Munich public mobility provider) in order to allow an easy way to provide online booking from everywhere.

Theme 5

Promoting the uptake of clean vehicles

Clean fuels and vehicles are, together with other urban mobility actions, the key in achieving good air quality in the city and its periphery. Although a variety of electric vehicles are market available across Europe, electric vehicles (EVs) are still not as widely deployed. Charging infrastructure, knowledge and costs are some common barriers. The cities of Stockholm, Madrid, Munich and Turku have

therefore offered test fleets of electric vehicles (EVs), light electric vehicles (LEVs) and light commercial vehicles (LCVs) to selected target groups and facilitated installation of new charging infrastructure. User groups included private persons, businesses and civil servants in the city administration. Lessons learned highlight a variety of needs and ways a city can work to promote electric mobility.

E-mobility for urban areas

Electric vehicles appropriate for business uses (e.g. city employees, tradesmen and delivery services) are the key for wide-scale fleet electrification. In the era of sharing economy, organisations and companies increasingly opt for leased or shared vehicles in order to maximise efficiency and reduce costs and administration. Therefore, availability of EVs and services that go beyond ownership are important drivers for the EV uptake.

However, the purchase price of EVs is still a barrier for many business users and private persons in the choice of vehicle. Vehicle purchase bonus, incentives for setup of charging infrastructure, or procurement criteria are examples of additional drivers for investing in e-mobility.

While home charging is indispensable for the EV uptake, publicly available infrastructure serves as opportunity charging and a communication tool to curb range anxiety. The majority of EV users charge overnight. In places where people share facilities, such as in multi-family houses, services that enable billing and cost distribution make the investment transparent and easier to justify.

Despite a growing offer of EVs in all segments, market available EVs today might not be a universal solution for all types of businesses and user groups. Reluctance for EVs and new concepts is still prevalent among organisations and individuals. Grid capacity, connection works, different standards and compatibility issues between systems are the most common causes of delay in the deployment of charging infrastructure. Moreover, on-street infrastructure for opportunity charging is particularly challenging as it has a direct impact on public space, which is limited and contested in most cities around Europe. Parking ordinances, land use regulations and urban design norms and rules come into play, making it a sensitive topic politically and technically.

Wide-scale electrification requires a co-ordinated approach where political commitment is the key in developing a long-term master plan for charging infrastructure, supporting pilots and innovative procurement. Political support is also important when new business models require new ways of doing things and necessitate updating existing regulations at local or national level.



Charging streets Stockholm.
Picture: City of Stockholm

Lessons learned

Users are curious and there is a favourable environment in Europe for testing and evaluating the potential of EVs. Test-driving is crucial for new users to become acquainted with EVs in real life and to overcome range anxiety. At the same time, cities have an excellent tool in their hands to gather input for their mobility planning and to initiate change. However, despite the plethora of tests, data collection is still challenging, and more pilots are necessary to understand the needs and charging patterns of various business groups.

New vehicles and technologies, such as light EVs, multi-purpose vehicles and swapping battery systems, are emerging to solve issues like underused vehicle capacity and charging times. Since these concepts are new, they often fall out of existing regulation frameworks, impeding even testing in real-life conditions. The same regulations slow down new business models for charging infrastructure, especially when public space is involved.

Recommendations

Planning for electric mobility will have an impact on public space and mobility patterns for decades to come. Cities seeing electrification as part of the solution for a better urban environment need to promote EVs in a co-ordinated approach with urban mobility planning. Fleet electrification and deployment of charging infrastructure requires cross-disciplinary competencies, from mobility planning to procurement expertise, and stakeholder involvement is crucial for getting acceptance and the right people on board. Local authorities must take an enabling role by clarifying, and when necessary, adjusting the legal framework and collaborate with the private sector in order to achieve an uptake of clean and electric vehicles.

Successful ECCENTRIC solutions

Tradesmen and delivery services testing electric vehicles in Stockholm

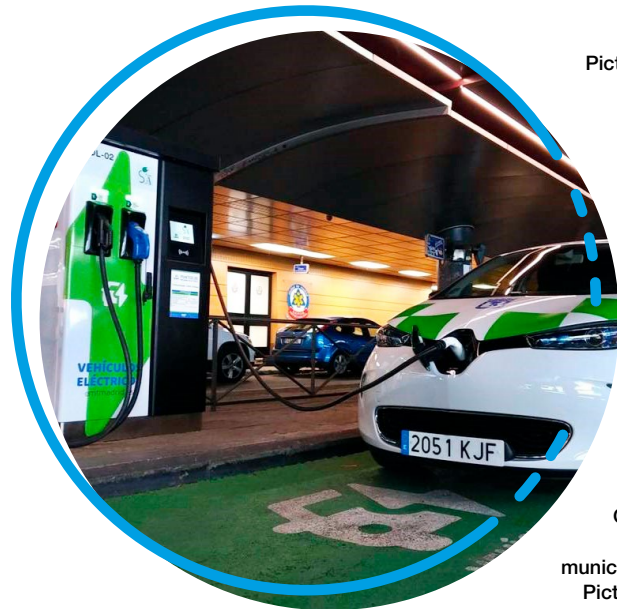
Craftsmen and delivery services contribute to a substantial part of daytime traffic in the city of Stockholm. With an expected increase of e-commerce in the coming years, electric vehicles for these business users are becoming important to test and improve. Fifteen companies were selected through competition and have tested electric vans for two years in Stockholm. 70% of the drivers were satisfied with the electric van and would recommend others in their sector to invest in one. Experiences from the test fleet pointed out the necessity of home charging infrastructure and the varying needs for opportunity charging among different businesses. The majority of the participating companies have an environmental profile and sustainability is at the core of their business idea.

Procurement of EVs in the municipal fleet and public charging infrastructure in Madrid

Working with electric mobility has been a long-term race since 2009, and during ECCENTRIC, Madrid has focused on electrification of the municipal fleet and optimising the city charging infrastructure network. Madrid has renewed its municipal fleet by replacing over one third of it with EVs and evaluated performance in Inspection Services, Municipal Police and Mobility Agents. The Environment and Mobility Area was responsible for the procurement strategy, which was based on a fleet analysis in order to identify needs and possible limitations for EVs. EV providers received more points in the procurement and the winning providers signed a leasing agreement for four years with each city department. During the project, the public charging infrastructure



One of the companies testing an electric van, Stockholm.
Picture: Mikael Röhr



Charging Electric vehicles in the municipal fleet, Madrid
Picture: EMT Madrid

network was improved by increasing the number of fast charging stations and paying special attention to the quality of the service and setting new models of public-private collaboration. However, Madrid does not promote on-street charging due to legal, administrative and technical difficulties as well as an explicit aim to recover public space for citizens, according to Plan A.

Madrid has also promoted the use of EVs in private fleets through new regulation and strategies on air quality, climate change and sustainable mobility, such as 'Madrid Central' ULEZ or the new Urban Sustainable Ordinance, approved during the CIVITAS Eccentric project.

Multipurpose vehicle with swappable battery system in Munich

Munich has tested a prototype of a lightweight EV with a swappable battery to assess and develop a business model for combined uses of both goods and people. Shared usage and the swapping battery system have the potential to reduce car ownership, maximise the capacity of existing vehicles and avoid long charging times. Green City Experience (GCX) has recruited a number of target groups, such as inner-city delivery and courier services, eco-taxis, business fleets with corporate car sharing and hotels who have voluntarily tested the vehicle and shared ideas on its functionality and possible improvements. Originally, the idea was to integrate the vehicle into mobility stations and a booking app in Domagkpark



Electric lightweight vehicle for car sharing and logistics.
Picture: Green City Experience GmbH

and Parkstadt Schwabing. However, due to licensing issues and the homologation process, the prototype could at least be tested in special events in the living lab area.

Home charging and “charging streets” in Stockholm

Charging facilities are essential for anyone considering buying an electric vehicle and overnight charging at or close to home has proven to be the number one choice for the majority of EV drivers. To facilitate home charging, Stockholm has led an information campaign through seminars, guidelines and information material for single- and multi-family houses. The aim was to inspire, and assist interested citizens and owners of parking facilities with practical advice on how to install EV charging facilities in their premises. The City has organised over 30 seminars and at least 5,000 charging units have been installed as a result of the campaign.

In parallel, Stockholm has developed a Master Plan for public charging in the inner city in order to achieve 2,000 spots on the so-called “charging streets” until 2022. The plan is based on mapping of appropriate locations in the inner city and access rights agreements between the municipality and private utility companies who set up and operate charging. Charging solutions comply with international standards on fast charging and the City’s standards on design, data and payment methods.

More info about these and more ECCENTRIC solutions can be found at:
www.civitas.eu/eccentric

Theme 6

Towards better and cleaner urban freight logistics

Freight transport is expected to grow by 60% by 2050 - a crucial issue for cities to address in order to create sustainable and low-emission mobility systems. It's a complex topic: social, economic, legislative and technical aspects must be considered as well as conflicting interests of various stakeholders. The CIVITAS ECCENTRIC measures addressing the challenges of urban logistics have analysed economically viable and efficient supply

chains, innovative consolidation solutions and clean technologies for freight vehicles, thus reducing heavy and light duty traffic, energy consumption and emissions. Despite its significant impact on traffic and emissions, freight is typically a neglected field for municipal authorities. The project has integrated urban logistics as a key point of sustainable mobility at the local level, which demands urgent attention and a better knowledge basis.

Focus on urban freight

The demonstration and testing of innovative solutions in urban centres has been identified as a main need that remains unattended even in cities that have developed actions and policies on sustainable mobility. City administrations have co-operated with different stakeholders to explore innovative measures for better and cleaner urban freight logistics. Freight companies face emerging challenges to design efficient supply chain schemes to respond to the disruptive change in customers' behaviour due to e-commerce, whilst the tolerance for noise, safety and pollution leads to more demanding requisites in the city centres, leading to an increasing conflict in the use of public space.

Efficient supply chains

The dramatic increase of delivery points in the urban context explains why last-mile logistics the least efficient stage is. It is responsible for a significant portion of supply chain costs and a significant contributor to urban congestion and air pollution: an inefficient situation where multiple, half-empty vehicles, from different suppliers, send goods separately to a destination using similar routes. Most of the measures aimed to improve the efficiency of supply chains are therefore based on consolidation schemes under the principle of 'connecting individual sender and receiver via efficient hubs', even more now, when the evolution of economies and technologies makes the origins and destinations of production and consumption more scattered.

The five CIVITAS ECCENTRIC cities tested different approaches and provided useful experiences in the implementation of solutions to mitigate undesirable side effects of logistics.

- Consolidation centres on the periphery: consolidation centres with electric vehicles and local regulations for clean urban freight logistics and waste logistics from urban civil works
- Consolidation solutions in the inner city: micro-depots combined with cargo-bike deliveries and a neighbourhood-oriented concierge system as a collection point
- Off-peak deliveries: night delivery with clean and silent vehicles

Cleaner freight vehicles

The use of clean freight vehicles contributes to a sustainable urban logistics but there is a wide scope in terms of size, type and traction technology. Different available clean vehicles, such as mopeds, cargo bikes, e-scooters, quadricycles or light and heavy-duty vehicles, play an important role in cutting emissions for the last-mile delivery.

Within the CIVITAS ECCENTRIC project, the measures have targeted mainly heavy-duty vehicles

because clean trucks are one of the main unresolved technological challenges in achieving low-emission urban freight, with a relevant lack of commercial availability. Regarding technologies, the heavy-duty trucks tested have been the fully electric truck in Madrid, the plug-in hybrid electric vehicle in Stockholm and the biomethane fuelled vehicle in Turku. The technologies tested are on the edge of market maturity, so they are likely to present better conditions for upscaling and replication.



ECCENTRIC heavy-duty freight vehicles in real life operations. Picture: City of Madrid

Conclusions

Cities need to integrate urban logistics into the overall city transport policies. Besides, the progressive digitalisation involves a paradigm shift in consumer behaviour and delivery patterns, also constrained by increasingly restrictive environmental rules and the scarcity of public space to satisfy the demand for new uses. The different measures tested in ECCENTRIC cover a variety of fields to contribute jointly to the goals of this work:

- To promote regulations and innovative policy tools to foster clean and efficient urban distribution and reduce conflicts with other modes, acknowledging freight transport as a key factor for the shift to sustainable mobility.
- To integrate freight within the municipal vision and organisational chart are previous steps that enable designing and delivering innovative planning and regulation tools (Freight Plans, integrative SUMPs, SULPs, Ordinances, Access Restrictions Zones, use and pricing of load/unload zones...etc.).
- The development of city-specific co-ordination and collaboration channels for involvement of stakeholders as an essential pre-requisite for policy formulation from municipalities and source of data and information to improve operational efficiency and long-term planning.

Successful ECENTRIC solutions

Consolidation centre with electric vehicles and local regulations for clean urban freight logistics in Madrid

In Madrid, the implementation of associated access regulations to the city centre looks for ways to cover the extra cost for the trans-shipment at consolidation centres or micro-hubs. Madrid has promoted a pilot consolidation centre on the periphery to facilitate electric delivery in the new Low Emissions Zone, Madrid Central.

The measure consists of a freight consolidation centre to develop a more efficient goods distribution scheme through a logistics platform to use electric vehicles for last-mile delivery. One aim was to analyse how the authorities, through innovative policy tools, can change the socio-economic framework, so that it takes societal costs and value creation into consideration.

The challenge addressed is the intense goods distribution flow in the city centre. This activity represents a relevant emissions rate within the transport sector (14% of nitrogen oxides, NO_x) and causes congestion, illegal parking, or nuisance to neighbours. Currently, a lot of these journeys are carried out by heavy and inefficient pollutant vehicles. The measure proposes a specific solution that is framed in a sustainable mobility scenario for urban freight distribution. Through the consolidation centre it is possible to develop a new scheme to improve the efficiency of trips and to facilitate the use of clean vehicles. The results of the measure will show how this kind of facility can improve the supply system and give some clues as to how to replicate it in other parts of the city.

Last-mile innovative solutions- Cargo bikes and neighbourhood concierge services in Munich

The City of Munich has tested two approaches of consolidation centres in the living lab area: combining cargo bike delivery with a flexible package system and a neighbourhood-oriented concierge system. The principle of these centres is the same as that of consolidation centres outside the urban area, but they are smaller and located closer to the end of the supply chain. Both measures have the added value of emission-free last-mile delivery by cargo bikes. The delivery of goods by (cargo) bikes has a great potential to keep the city accessible for freight transport and to improve road safety. Compared to ordinary bicycles, cargo bikes have a higher load capacity and facilitate the bundling of deliveries.

In the innovative “neighbourhood-oriented” design of the concierge, it not only functions as the central



Micro depot and cargo bike.
Picture: Nicholas Duesberg

point of contact for parcel pick-up/drop off and final delivery in the residential district but also serves as a neighbourhood centre for residents by offering a variety of additional services of interest to residents.

Night delivery with clean and silent vehicles in Stockholm

Off-peak delivery is one of the recognised solutions to mitigate the impact of freight, decreasing congestion and emissions and improving the efficiency of the supply chain. Cities can determine time windows during the day, when delivery vehicles are not allowed to enter certain areas. Another strategy is based on extending the allowed period for delivery outside peak hours. In this respect, night-time deliveries with silent vehicles offer the opportunity to reduce traffic congestion in daytime without causing a nuisance to citizens during the night. This approach has been tested within the ECCENTRIC project, using a plug-in hybrid electric truck and a biogas truck.

Bringing different perspectives together at an early stage to predict challenges and obstacles was a successful part of the planning. A group of representatives from all parties inspected the loading zones early in the planning phase to identify



Night delivery with plug-in electric lorry in Stockholm.
Picture: Scania

necessary changes in the loading zone, regulations and design, which could be dealt with directly. The project team also inspected the different sites to identify suitable locations for charging infrastructure.

The main results show that the transport efficiency evaluations compared off-peak travel time to peak travel time. Both evaluations indicate a time saving of roughly 30% shorter travel time during the off peak, while no complaints from residents have been registered.

Introduction of biogas heavy-duty freight vehicles in Turku

The City of Turku has supported the growth of a biogas ecosystem in the Turku region by introducing Liquefied Biogas (LBG) to reduce emissions. In the framework of the ECCENTRIC project, the company Gasum Ltd. has replaced two diesel trucks with two LBG trucks. One LBG truck runs between the Turku wastewater treatment plant and Gasum's biogas production plant, transporting sludge that will be processed into biogas. The other truck delivers nutrition waste from the biogas plant to local farmers. The vehicles have been specifically designed or modified to be operated in real-life conditions as part of current urban supply chains.

It has not only been proven that LBG trucks constitute a viable and cost-efficient alternative in

heavy-duty transport, but it has also contributed to the promotion of biogas as an alternative to fossil fuels for passenger cars and the City of Turku's own fleet. Although the usage of LBG is technically not challenging, as the same engines can use biofuel without any large technical changes, the potential impact and scalability of this type of solution is constrained by external factors, because the LBG filling infrastructure is still quite limited. As a conclusion for policy makers, it's most important to promote the replacement of fossil fuels giving incentives and specific procurement criteria to low-carbon deliveries in public tenders and supporting the construction of LBG filling station infrastructure by providing good locations.

More info about these and more ECCENTRIC solutions can be found at:
www.civitas.eu/eccentric



Learning for the future – Evaluation of CIVITAS ECCENTRIC

Thorough evaluation of impacts and processes is an important part in all successful projects. The evaluation was designed to not only provide information about the effectiveness of the measures tested in the project, but also about the feasibility of their implementation. Impact and process evaluation activities were carried out for every single measure. Self-standing reports have been produced for those interested in looking into the details of what the ECCENTRIC measures can achieve and the complexity of the implementation. The lessons are not expected to inform only the partners of the project, but also a wide range of stakeholders within the European Community. For this reason, through project-level activities and a systemic approach, ECCENTRIC has synthesised all the knowledge generated during the four years of co-operation into recommendations applicable to a broader range of contexts.

Impact Evaluation

A set of Key Performance Indicators (KPI) was agreed from the very beginning within ECCENTRIC, to make sure the results were comparable to the maximum extent. The measures' own nature determined which of the following topics were relevant and feasible for the planned research:

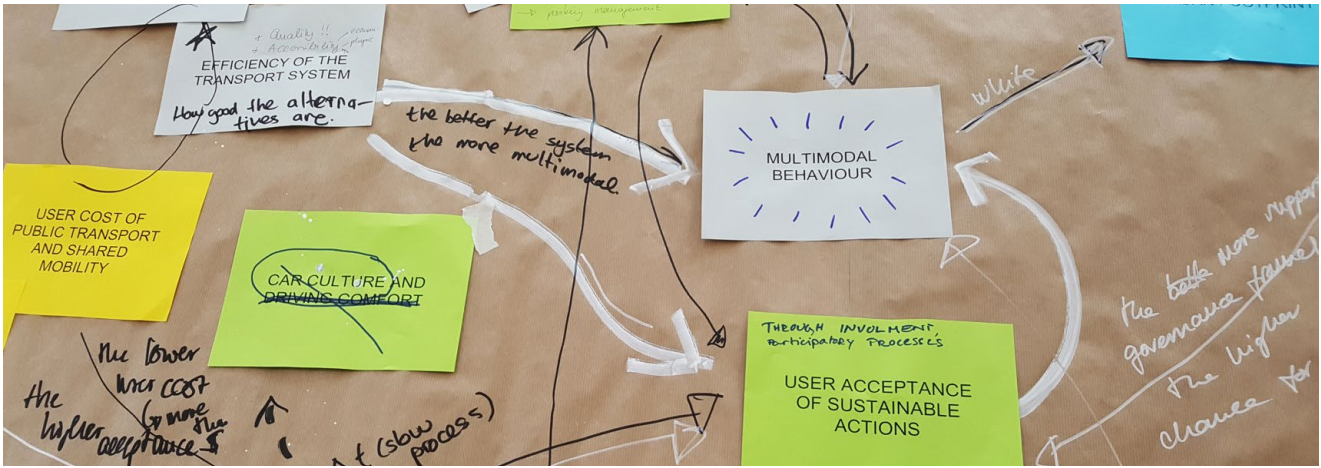
- Impact and reception by citizens
- Mobility patterns and behaviour
- Environmental impacts
- Impacts in urban space
- Multi-dimensional accessibility
- Travel costs
- Investment and operational costs

Following traditional scientific methodology, local teams established baselines and business-as-usual considering the status quo in 2016 and the forecasted developments even without the ECCENTRIC measures. Follow-up measurements enabled evaluators to determine the actual impact of each measure, validating (or not) the initial assumptions.

Process Evaluation

Evaluators engaged the stakeholders of each measure in a series of activities to recreate the planning and implementation process. With an evaluation structure that allowed individual inputs and plenary discussions, local teams were able to identify drivers and barriers for each measure. Surveys, interviews and workshops formed part of the activities carried out for this component of the evaluation.

A few measures were selected for a detailed process evaluation, to follow up the testing phase of ECCENTRIC and to go deeper into the process evaluation. Learning histories workshops and a second round of surveys, interviews and workshops deepened the details of the initial findings and generated valuable information for policy recommendations across each thematic field addressed by ECCENTRIC.



Evaluation workshop in Munich 2018.
Picture: Esther Kreutz

Project-level evaluation

In order to summarise the impacts on each living lab, compare the impacts of the measures across ECCENTRIC, and synthesise all the knowledge generated during the project, project-level evaluation was based on three components:

- An impact-based site evaluation
- A cost-benefit-based comparative analysis
- A systemic evaluation of selected policy fields.

The latter component made the consolidation of all sources of information possible – from the data generated from the impact analysis, to all interviews

and workshops held during the project. The method for this challenging task was a system thinking approach tailored to each one of the policy fields addressed by ECCENTRIC.

The result is a comprehensive evaluation, including variables beyond the scope of mobility. For each policy field ECCENTRIC identified the levers and cycles that determine the outcome of the actions to improve mobility and quality of life in cities, considering secondary effects often overlooked by traditional policy analysis methodologies.

Conclusions

With a growing number of experiences across Europe, the impacts of innovations in mobility are becoming clearer. It is important today more than ever to focus on the impact that pilots and demonstration projects have on users and in fostering the cooperation between private and public stakeholders. The latter is key to ensure more and enduring implementations.

Traditional KPIs can and should be still measured. Nevertheless, there is a need for focusing on the actual impacts and avoiding unsubstantiated claims. The expression ‘less is more’ is valid here.

ECCENTRIC recognises the importance of process evaluation and can only recommend investing much more than today in understanding the success and failure factors in the implementation of mobility solutions. Finally, positioning actions in the field of urban mobility as small pieces within a complex system of interrelationships between economy, society, politics, behaviour, built and natural environment, and many other variables, is key to understanding the actual impact and long-lasting effects of the decisions that planners and decision-makers take.

Inspiring cities beyond ECCENTRIC – cross-fertilisation, transferability and replication

Cities across Europe and beyond are struggling with similar challenges regarding sustainable mobility and transport. Yet many innovative policies, processes, and technologies are available to assist planners in the transition towards more sustainable and inclusive urban mobility. Therefore, it is crucial to pilot, test and evaluate measures that utilise these and to pass on this experience to others. To ensure that others could learn from the experiences of the ECCENTRIC cities, a group of Observer Cities joined the project. They have benefitted from privileged access to the partner cities' project teams and activities, including strategic placement in working groups of interest and access to events and training relating to Sustainable Urban Mobility Plans. Through their direct involvement and exchange with the project cities, the Observer Cities were able to develop plans to replicate several measures tested in ECCENTRIC.

What is replication?

Supporting cities in reapplying successful approaches in new settings is at the core of ECCENTRIC's replication work. Innovating and testing new approaches, processes, technologies or policies is an important step in creating long-lasting change. During pilot projects, cities collect valuable experience with new and possibly challenging approaches; this is vital knowledge that they can pass on. At the same time, cities are looking for practical examples to replicate, rather than reinventing the wheel each time.



Replication workshop in Stockholm September 2018.
Picture: Marko Horvat

How has replication been organised in ECCENTRIC?

At the start of the project, a call for applications was published, encouraging cities of all sizes from across Europe and China to apply to follow the project as Observer Cities. The group consisted of 18 cities from Albania, Bulgaria, China, Croatia, Germany, Hungary, Portugal, Romania, Spain and Sweden.

The observers were involved in the project in several ways:

- during project meetings, they were invited to join site visits, experiencing the measures first-hand, and could exchange with the staff in charge of measure implementation.
- a series of topical webinars focusing on thematic areas covered in ECCENTRIC's work was organised. Experts from ECCENTRIC's project cities presented their experiences and engaged with the Observers.
- workshop series to support the cities in selecting measures for replication in their own cities. These workshops built on the methodology for measure selection put forth in the EU SUMP Guidelines, with cities encouraged to link measures to their own political contexts and priorities.
- support in developing a replication plan in which they explain how they will replicate measures from the ECCENTRIC project.



Observer cities in CIVITAS ECCENTRIC.
Illustration: Salla Lehtipuu

Examples of replication activities in Observer Cities

Budapest, Hungary

Budapest had a particular interest in following Madrid's activities related to purchasing and rolling out an electric bus fleet. This measure is closely linked to Budapest's SUMP, which was approved in May 2019. This document describes the strategic objectives of the city's mobility system, which includes clean vehicles and creating a liveable urban environment, meaning new public transport vehicles should be environmentally friendly. The SUMP also sets out the need to purchase zero-emission vehicles, which means – besides new metro and tram rolling stock – that future procurement for the trolleybus and bus fleet must bear this in mind. Therefore, Budapest was in close contact with Madrid in order to understand how they went about tendering their new bus fleet and bringing it into service in the city.

Uppsala, Sweden

The municipality of Uppsala is a strong supporter of the Swedish national approach to road safety, which is called Vision Zero. Its central principle is that no one should be killed or suffer a lifelong injury as the result of a road accident. Uppsala is growing, and increased traffic risks are having a negative effect on traffic safety. Therefore, there is a need for the municipality to intensify its work in this area. At the same time, a central goal for mobility in Uppsala is to increase the numbers of people who walk, cycle or use public transport. For these reasons, Uppsala has decided to work on making walking and cycling safer. With inspiration from the headline of Madrid's measure "innovative and participative approach to traffic safety", Uppsala will invite different kinds of actors to work together on traffic safety. The plan is to establish a meeting platform and online environment where different actors outline what type of activities, they will work on over the coming years in order to increase road safety within the municipality.

How to make replication a success

Repetition is not enough

Replication is more than just copying and pasting measures or technologies. Effective replication requires a good understanding of the conditions under which a measure has been tested and the reasons for its success. It includes the general public's support for and political willingness to back a measure, as well as the local demand for mobility solutions, the financial situation, the size of a city, etc. The more a city has in common with another, the more applicable and replicable the approach will be.

Know thyself

A key factor to successful replication is to understand one's own goals and priorities – this is the basis for sound measure selection.

In ECCENTRIC, several workshops were offered to Observer Cities that focused on measure selection. Only with this knowledge have they been able to choose relevant and feasible measures for replication.

Personal exchange enhances learning

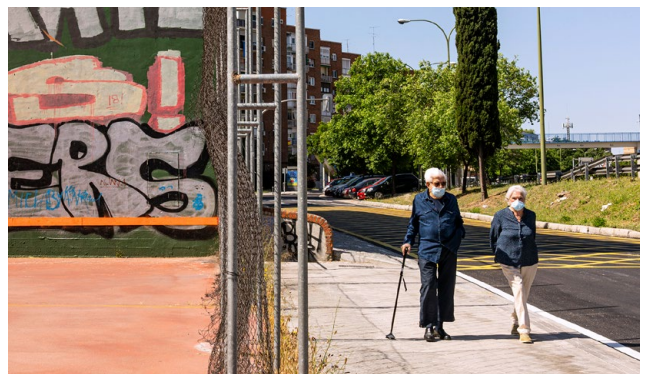
The learning process applied in ECCENTRIC was successful because it allowed Observer Cities to be in direct personal contact with the ECCENTRIC project cities. Site visits were a key tool for illustrating how a measure had been implemented and what its benefits were. This was also a great way to discuss potential lessons learned during implementation and what to avoid when replicating a measure.

6 lessons learned in CIVITAS ECCENTRIC cities during the pandemic

CIVITAS ECCENTRIC had to change its plans during the last year of the project. The outbreak of Covid-19 forced people to pause – not only in their movement but also life, re-thinking lifestyle choices and travel behaviour. Commuting decreased because of distance work, e-commerce increased with an impact on urban freight logistics, citizens preferred walking and cycling over public transport if they could. CIVITAS ECCENTRIC cities were differently affected by restrictions and lockdown measures, but all experienced a tremendous change in urban mobility. These are our lessons learned:

- 1. Cities need to put a focus on health in all policies** – active modes of mobility combined with zero-emissions transport need to be boosted; healthy patterns, and individual control of itineraries need to be encouraged.
- 2. Placemaking is needed more than ever** public space in peripheral neighborhoods needs to be planned to enable vibrant urban life – while keeping safe distances. The quality of their public space must be equated to those in city centres.
- 3. Walking is the best solution for short distances.** Pedestrians need to be prioritized in the planning of urban mobility through signalisation, urban design (including nature-based solutions), wide space and safety.
- 4. Citizens have opted for cycling** in the urban areas in the critical period of the pandemic and continue to use this vehicle afterwards. Bikes and specially e-bikes have a high potential to cover medium distances and to be the key in a multimodality strategy, that combines a less pressed public transport and other shared services.

- 5. Walkability and cyclability** of the urban areas in the periphery must be reviewed and improved through clear priority in urban planning, new justice in space distribution, safe and attractive itineraries, ad-hoc signalisation and mobility management to support these sustainable mobility personal options.
- 6. Public transport** has suffered a severe loss of competitiveness due to the pandemic. Nevertheless, it must be kept as the backbone of urban mobility, so this loss of patronage (users) must be offset through measures such as increase of frequencies and hygienic measures inside the vehicles, among others, to recover the trust in the collective travels.



Madrid during the Covid-19 pandemic.
Picture: City of Madrid

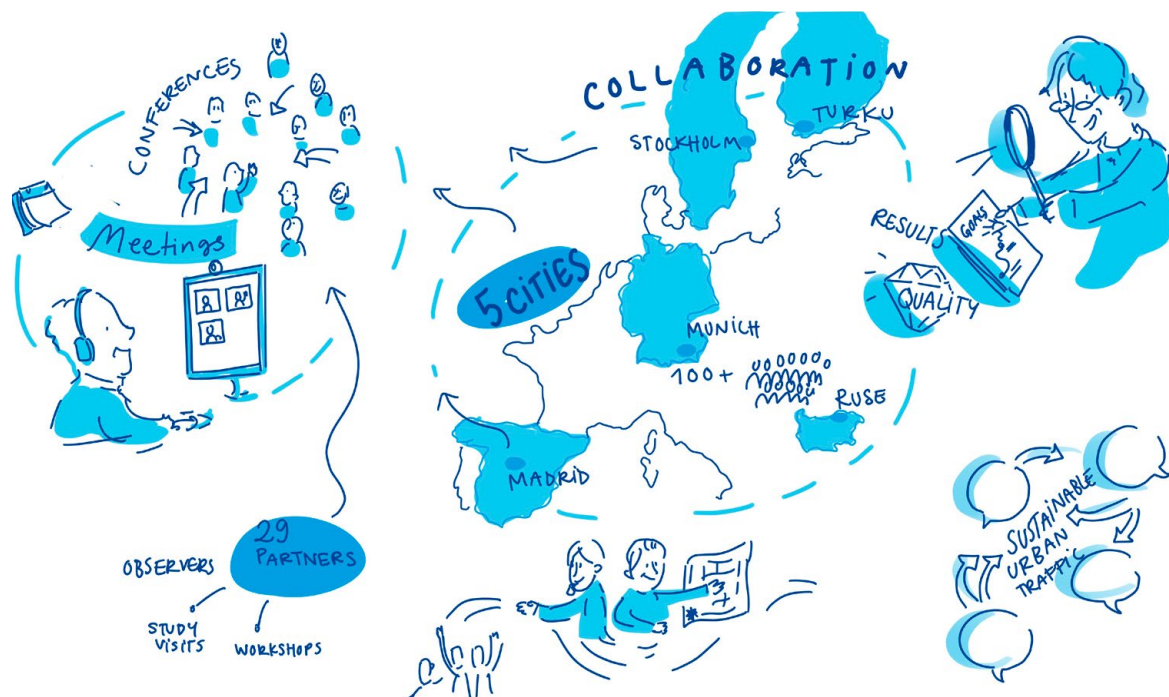
CIVITAS ECCENTRIC: an outlook

The intense work of the CIVITAS ECCENTRIC consortium during these 4 years of cooperation, experimentation and evaluation has generated interesting and replicable solutions for sustainable mobility in the dense peripheral districts of European cities. The project has advanced public strategies and business models for multimodality, electromobility, MaaS, improvement of road safety, active modes and for clean and efficient urban freight.

Innovative real-life tests in the Living Labs have proved a rich valuable experience and resulted in important lessons for urban mobility practitioners, city and policy decision-makers in other cities. Our 51 measures have addressed key topics and challenges in the ever-changing urban contexts, and can help to prepare cities for the future, as

well as paving the way to answer the European commitments about relevant themes, such as air quality, use of energy, healthy and vital urban environment, inclusive and equitable services for all, safety in our streets and roads, and the adaptation to and mitigation of climate change. Furthermore, they have provided insights for the challenges of post-COVID-19 city.

One of the main questions highlighted by the project is the scarcity of public space in peripheral areas to host all the needs related with the newly identified priorities: more room for safe active modes, for greening of public space, as well as for shared services, for the revolution of freight due to e-commerce, and for the new micromobility. The old distribution of public space has to evolve to enable a more people-focused urban landscape fit for a multimodal mix of modes.



ECCENTRIC Summary.
Illustration: Salla Lehtipuu



General Assembly Stockholm.
Picture: City of Stockholm

As a general conclusion, the role of city administrations has been identified as paramount for the management of all the innovative policies, as there is a need to plan and reserve public space for new mobility. This must run in parallel with a continuous dialogue with all the stakeholders involved (businesses, research, etc., and in particular residents, especially the vulnerable groups, carers, essential workers), as well as the set-up of permanent arenas for formal or informal partnerships with such groups.

It is also necessary to have a shared vision of the future: participation, inclusive approaches and even co-creation are necessary to make possible a change without negative impacts and strong reactions by the people affected by the shift. Mobility management, segmented campaigns, even the use of clever marketing and, above all, information and transparency are key issues in all the topics and measures undertaken.

On the other hand, innovation requires performance tests and trial and error procedures as well as carefully analysed and evaluated results to be useful for other colleagues with same challenges. The Sustainable Urban Mobility Plan (SUMP) is undoubtedly a valuable consolidated tool to address the complexity of urban mobility through a common future vision and a structured set of objectives, measures and indicators. However, the lessons learnt in this project show that more focus on the integration of passengers and freight transport, more attention to the dense periphery of the city in contrast to the city centres, more attention to the more vulnerable parts of society and especially a greater integration of urban and mobility planning from the beginning is necessary to get the foreseen, and essential, shift to sustainable urban mobility in European cities.

This experience will be a valuable reference to boost the green urban mobility and address the EU commitment to be climate neutral by 2050, under the Green Deal framework.



FURTHER PROJECT RESOURCES

Detailed information about the project, the project partners, all 51 measures, results and achievements are available at

www.civitas.eu/eccentric

For a visual impression, project videos are available at the CIVITAS ECCENTRIC YouTube channel

<http://bit.ly/civitaseccentric>



CIVITAS ECCENTRIC Thematic reports
all available at www.civitas.eu/eccentric

Theme 1 Inclusive urban planning, new parking policies and mobility management

- Implementation guide: Inclusive urban planning
- Implementation guide: Mobility management
- Implementation guide: New parking policies
- Replication package: Inclusive urban planning
- Replication package: Mobility management
- Replication package: New parking policies

Theme 2 Mobility as Service for and by all

- Guidelines on How to implement MaaS in local context
- MaaS readiness level indicator for local authorities

Theme 3 Enabling safe walking and cycling

- Implementation measures to increase the share of walking and cycling
- Implementation of measures to make walking and cycling safer
- Replication package: Measures to increase the share of walking and cycling
- Replication package: Measures to make walking and cycling safer

Theme 4 Efficient and clean public transport and new shared mobility services

- Implementation guide: Testing and operating clean and silent vehicles
- Implementation guide: Reorganising public transport network
- Replication package: Testing and operating clean and silent vehicles
- Replication package: Reorganising public transport network

Theme 5 Promoting the uptake of clean vehicles

- Implementation guide: EV charging infrastructure
- Implementation guide: Testing of EV and FCEV vehicles
- Replication package: EV charging infrastructure
- Replication package: Testing of EV and FCEV vehicles

Theme 6 Towards better and cleaner urban freight logistics

- Implementing efficient supply chains
- Implementing clean vehicle technology
- Replication package: efficient supply chains
- Replication package: clean vehicle technology
- Replication package: innovative policy tools for freight logistics

Evaluation reports

- Process evaluation report
- Impact evaluation report on measures
- Project Evaluation Report

Thematic guides

- Guide on the financing, procurement and contracting of SUMP measures
- Guide on the inclusion of suburban districts in SUMP
- Guide on addressing vulnerable groups and gender issues

Promotional material

- CIVITAS ECCENTRIC in a nutshell
- CIVITAS ECCENTRIC: Innovative solutions for suburban mobility and emission-free freight in urban centres
- CIVITAS ECCENTRIC: Examples of measures



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