2020 CiViTAS
Cleaner and better transport in cities

CIVITAS RESEARCH PROJECTS

LESSONS LEARNED 2015-2018

2020 CiViTAS
Cleaner and better transport in cities

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About

Since 2002, the CIVITAS Initiative has bringing cleaner, better urban transport to cities across and beyond Europe. Over 300 cities belong to the CIVITAS network, whilst close to 800 measures and urban transport solutions have been tested and implemented under demonstration projects in more than 80 Living Lab cities Europe-wide.

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CREATE LESSONS LEARNED

Reducing traffic to create place-based cities

PROJECT OVERVIEW

CREATE (Congestion Reduction in Europe: Advancing Transport Efficiency) studied how five cities in Western Europe tackled growing car use and congestion over 50-60 years.

The lessons they learned were then used to support five cities in Eastern Europe and around the Mediterranean to reduce congestion and car use, and move towards the use of sustainable transport modes.

Research was based on the CREATE development model, which outlines three stages of transport policy development in cities:

1. **Stage 1 Cities**: Car-oriented - prioritise major road building and new car parking.
2. **Stage 2 Cities:** Sustainable mobility focus - introduce policies to provide better public transport (PT) alternatives and reallocate road space from cars to public transport and cycling.
3. **Stage 3 Cities:** Cities of places that seek to become "liveable" - encourage street activities, reduce car use and promote active mobility.

Project snapshot

Project length - June 2015 - May 2018
Who was involved? - 10 cities from Europe and the Middle East
Thematic area - Integrated planning
Website - www.create-mobility.eu

MOVING TOWARDS SUSTAINABLE MOBILITY

The project provides stakeholders with concrete guidelines that can be used by various kinds of mobility practitioners: "CREATE guidelines: pathways to tackling current congestion and reducing levels of car use in European cities".

Certain actions can help stage 1 cities jump straight to stage 3: achieve a minimum level of land use density and activity; concentrate on making PT and walking/cycling more attractive options; achieve an 'equilibrium' between average door-to-door speeds for cars and PT or walking/cycling; impose strict limits on car use; and create high-quality places.

Road traffic congestion levels should also not be the defining progress indicator - most economically vibrant cities experience it. Indeed, people travelling by rail or bus, or on foot or by bike, generally avoid traffic congestion – so, overall, fewer travellers experience delays as more adopt sustainable modes. Although speeds may be lower overall, journey times are more reliable and may be shorter where destinations are closer together.

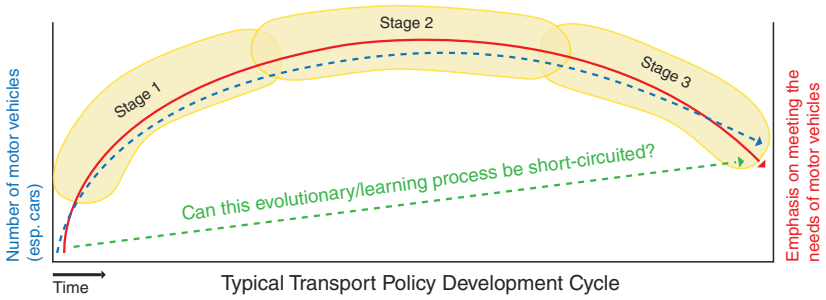

Figure: CREATE model of transport policy development in cities

CREATE's research led to a better understanding of: how to measure congestion and network performance; changing urban transport policy priorities and their consequences; and triggers for change and consequences of car use. Furthermore, the project analysed quantitative trends in car use, scheme funding, modelling and appraisal methods.

Looking to the future, CREATE recommended that the SUMP concept place a greater emphasis on 'Cities as Places' and looks towards stage 4 - the 'Integrated City'. Early signs of this are Mobility as a Service (MaaS), accessibility planning, and the sharing economy.

On a technical level, CREATE recommended to:

- Ensure key professional and technical groups are in planning and delivery teams.
- Integrate transport and land-use planning processes.
- Introduce policies as packages, e.g. reducing parking and road space when opening a metro line.
- Push for stakeholder and citizen engagement in policy development and delivery.
- Prioritise data collection and regular monitoring of system performance.
- Measure key place-based indicators to assess the wider success of policies.
- Use models to support strategy development designed to realise the city vision – 'vision and validate', not 'predict and provide'.
- Ensure that business cases reflect the full benefits of transport investment – not just the transport-related benefits – and take a balanced approach.

City politicians are recommended to:

- Develop a wider city vision in which sustainable transport plays a key role.
- Ensure full integration of transport and land use planning at the metropolitan level.
- Foster cross-sector, multi-level governance for better policymaking and delivery.
- For effective policy delivery and a stronger evidence base, invest in institutional capacity and enhanced data collection and data analytics.
- Be bold: today's radical policy can become tomorrow's orthodoxy, but only with strong leadership.
- Introduce trials and demonstrations – 'seeing is believing'.
- Run awareness raising, marketing and behavioural change campaigns.

"The CREATE approach has provided a useful framing for urban transport policy debates among national governments and city mayors, and through the evidence provided has encouraged cities to be more ambitious in adopting sustainable, place-based mobility policies."

Peter Jones
CREATE Project Coordinator
Centre for Transport Studies, University College London

EVALUATION METHODS

The indicators for measuring successful transport policies were originally developed to design and justify car-based (stage 1) and (to a lesser extent) sustainable urban mobility based (stage 2) policies; they are not yet well adapted to the needs of cities taking a place-based (stage 3) policy perspective.

Having existed for less time than stage 1 and 2, success indicators for stage 3 policies are much more limited. This means that currently there can be a gap between what cities want to do – their vision for the future – and being able to make a clear economic case to funders to support place-based measures.

CREATE also developed its own framework to analyse travel trends quantitatively. It explains travel behaviour at traveller and trip levels and aggregate system effects resulting from this individual behaviour.

Measures for promoting alternative modes and place-based policies are classified under four Es: Engineering, Enforcement, Economy and Education. Eight M 'success factors' are also identified: Mood, Motivation, Mass, Momentum, Mechanisms, Measures, Methods, and Money.

Read the CREATE Cross-City Comparison Report for further interesting evaluation concepts.

TOOLS AND RESOURCES

- CREATE Project Summary and Recommendations for Cities - link here.
- CREATE Guidelines: Pathways to Tackling Current Congestion and Reducing Levels of Car Use in European Cities – link here.
- Urban Governance Leaflet - link here.
- Cross-City Comparison for CREATE Stage 3 Cities - link here.
- CREATE Technical Notes - link here.
- Urban Congestion and Network Operation: Towards a Broader Set of Metrics for Assessing Performance - link here.

PHOTO CREDITS

Image: EUROCITIES

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EMPOWER LESSONS LEARNED

Rewarding change in travel behaviour

PROJECT OVERVIEW

EMPOWER researched how positive incentives can encourage members of the public to reconsider their travel choices and reduce the extent to which they travel using conventionally fuelled vehicles.

For this, EMPOWER tested various apps across Europe, including five living lab locations; Enschede (the Netherlands); Gothenburg (Sweden); Helsinki (Finland); Milton Keynes (UK) and parts of Scotland (UK).

They utilised incentives such as information, points, discounts, rewards, community support and games. Whilst such schemes are not a magic wand for instigating fundamental mobility behavioural change, they can help attract new users to use sustainable modes.

Aside from implementation, EMPOWER also examined businesses cases for the creation and methodologies for the evaluation of such schemes.

Project snapshot

Project length - May 2015 - April 2018
Who was involved? - Five Living Lab locations tested various apps
Thematic area - Car-independent lifestyles
Website - www.empowerproject.eu

IMPLEMENTATION

Each of the five Living Labs engaged in different activities.

Enschede looked at reducing car usage by promoting bicycle trips. By doing challenges, users could earn points to convert into reward vouchers at local retailers using the already implemented SMART app.

Gothenburg focused on having commuters switch from cars to public transport for longer trips. This first concentrated on two local communities, with the scope of activities later broadened to all of Gothenburg and parts of Stockholm. Like

in Enschede, the SMART App was utilised for an incentive scheme in partnership with local businesses.

In **Helsinki**, activities concentrated on structures and processes for enabling innovative collaboration with local stakeholders, particularly employers. This experimental work involved a series of small-scale tests with two employers. Intense interest in the subject led to a (self-organised) interest group focused on positive incentives in an employer setting.

The **Milton Keynes** Living Lab covered the whole city and implemented two schemes to encourage cycling and electric bus use. Using the Love to Ride and *zwitch apps, users could obtain vouchers for local shops by travelling sustainably. The campaigns reached over 70 organisations.

The focus in **Scotland** was on decision-making around private vehicle purchasing decisions and changing to Ultra-Low Emission Vehicles (ULEVs). Participants received information and financial incentives via dedicated web tools, with employers acting as a proxy between the living lab operator and end-user.

More information on the apps utilised in EMPOWER can be found at **www.mobility-apps.eu**.

DESIGN

The following functionalities were popular among users:

- Traffic information;
- Travel statistics based on tracked trips;
- Basis incentive schemes like the points per kilometre for charity and points per kilometre for active modes

Ensure the product is technically sound - bugs and malfunctioning trip detection deter users. It must also compete with commercial apps, of which users have high expectations.

BUSINESS CASES

EMPOWER created a four-step approach for developing business models related to incentive-based public transport schemes:

1. **Strategic alignment** – Ensure all organisations in your coalition share a vision for sustainable transportation driven by an incentive-based scheme.
2. **Governing principles** – Develop principles for implementing and operating your scheme.
3. **Business modelling** – Models vary according to lead beneficiary. Examples are transport operators, cities, trade organisations, private companies, or public organisations.
4. **Implementation and operation** – Following deployment.

A guidance note and EMPOWER Toolkit section give more advice, including example business models.

RECRUITMENT AND UPTAKE

- Choose champions in selected target groups to promote measures or products. They act as both initial catalysts and drivers of change, boosting longevity and sustainability of measures or products through their commitment to it.
- Communicate clearly the benefits of using such apps to each user - what is in it for them? Refer to associated economic, environmental, and health benefits.
- Personalise incentives by tailoring them to a user's preferences, personal goals and needs at time of use. The most effective incentivisation models are:
  - **User-driven** challenges that give people the flexibility to choose their own objectives and help keep the change process relatable to their own behaviour. However, people might not be ambitious in the goals they set.
  - An app-driven approach, where it suggests challenges based on **previous user travel behaviour**. Whilst technically more complex, it creates personalised, achievable objectives.
- Fixed rewards upon challenge completion is more effective for incentive schemes.
- When users start using sustainable transport, continuous challenges with rewards are advised. Once they do so regularly, adopt partial rewarding, but give higher rewards.
- To embed change, have users learn about sustainable travel and its benefits.
- In general, goods are just as effective if not more

effective than money when the reward is presented as a gift and/or when people can choose between goods.

- Companies can easily deploy monetary incentives as financial schemes for employees.
- Promote on social media and online network, and consider targeted advertising.
- Use employers as a proxy to provide apps to the end user. Such formalised structures help bring your app into contact with potential users.
- Take advantage of informal word-of-mouth networks. Presence at community events can raise awareness within a specific location.
- Reward those who recruit for you as well. EMPOWER found that people who liked the system inspired their friends to join, so reward them for it!
- Have a proof of concept, like a demo version or working system in another location. This reduces the perception of risk among stakeholders. Ideally, involve test users in your proof.
- Get trustworthy partners with strong reputations on board: this builds trust around the product (even if not technically proven) and differentiates it in the market.
- Make it easy for users and providers to understand the added value of participating and easy for them to do so. For stakeholders like shopkeepers or public transport operators, incentive schemes are not their core business.

EVALUATION METHODS

Some key tips for in-app data collection and evaluation are:

- Due to the wide variety of different and data collection and evaluation methods that exist, it can be hard to establish general trends. A unified typology is required.
- Integrate data systems and input into a single platform, i.e. questionnaires and tracking functions.

A vulnerability index and definition were formulated based on transport accessibility. These could be useful for other projects working on transport inclusion.

EMPOWER also produced short guidance on evaluating incentive measure with tips:

- Be aware of the privacy risks when coupling data sources.
- Agree on data collection early on and formulate distinct cases and boundaries.
- Record when and how the scheme is altered (e.g. incentive change) - new questionnaires may be needed.
- The evidence provided by the evaluation is only as good as the data upon which it is based. A clear definition of the before, after and control cases is therefore necessary.

TOOLS AND RESOURCES:

- EMPOWER Toolkit - link here
- EMPOWER Guidance Note - Tips for Building Viable Business Models - link here
- Advice on designing positive incentives - link here
- These apps can be found on www.mobility-apps.eu

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FLOW LESSONS LEARNED

Walking and cycling as tools to take on congestion

PROJECT OVERVIEW

The FLOW project aimed to put walking and cycling on an equal footing with motorised transport modes as a way to tackle urban congestion. It developed a user-friendly methodology, involving transport modelling, to assess the effectiveness of walking and cycling measures.

The project was guided by the following objectives:

- Define the role of walking and cycling in congestion reduction;
- Develop and apply tools for assessing the congestion-reducing potential of walking and cycling;
- Increase awareness of and communicate facts related to walking and cycling's ability to reduce congestion;
- Support the uptake of walking and cycling measures as ways to tackle congestion among public administrations;
- Foster the market for new walking and cycling products and services for congestion reduction.

Project snapshot

Project length - May 2015 - April 2018
Who was involved? - Six cities from across Europe tested the modelling tools
Thematic area - Car-independent lifestyles
Website - www.h2020-flow.eu

The project worked with six partner cities: Budapest (Hungary), Dublin (Ireland), Gdynia (Poland), Lisbon (Portugal), Munich (Germany), and Sofia (Bulgaria).

IMPLEMENTATION

Each partner city employed the tools and methodology produced by the project to assess the potential for walking and/or cycling measures to manage congestion in their cities. Within this context, each city prepared a local implementation scenario.

Modelling: Dublin, Gdynia, Lisbon and Munich undertook microscopic modelling using PTV VISSIM/PTV VISWALK (advanced transport modelling software) to test and visualise options to improve conditions for pedestrians and cyclists and predict how that would impact on congestion.

Budapest and Gdynia developed their macroscopic cycling modelling capability within FLOW. Both cities had developed existing macroscopic highway and public transport models in PTV VISUM.

Budapest became one of the first cities in Europe to incorporate its bike sharing system into its public transport model – this was done to assess the impacts of expanding the system beyond the city centre.

Gdynia integrated cycling into its macroscopic model to analyse the potential impact of expanding its cycle path network on congestion management.

All cities that undertook modelling then tested the FLOW Multimodal Calculation Procedures and the assessment methods contained within the FLOW Impact Assessment Tool (see below).

The case studies range from city-wide packages of measures to schemes at individual intersections and to non-infrastructure projects. Sofia used the Impact Assessment Tool to determine the impact of cycle to work campaigns conducted with five major employers in the Bulgarian capital.

"Transport system performance, and particularly congestion, is one of the many challenges that cities face. It should be placed within the larger context of urban liveability, economic viability, safety and health, and not above it."

Bonnie Fenton
FLOW Project Coordinator, Rupprecht Consult

Local Forums: Each FLOW partner city had the chance to organise and host an interactive Local Forum with a format and audience of their choice. These allowed the cities to share local FLOW activities and address and interact with important local stakeholder groups.

Crucially, FLOW showed how the conclusions drawn from walking and cycling data might influence policy decisions regarding transport space allocation. Find a number of convincing facts and figures in the FLOW Quick Facts for Cities.

FOSTERING UPTAKE

FLOW devised key recommendations to improve the perception and adoption of cycling and walking measures as ways to cut down on congestion:

1. Fully consider walking and cycling when developing plans and policies to improve transport system performance, as well as through the impact analysis and implementation processes.

2. Improve existing transport analysis techniques and models to include all modes and to account for the interaction among modes.

3. Improve communication on multimodal transport analysis and increase transparency in the transport planning process.

4. Improve data collection for walking and cycling to better understand the movements of these modes.

5. Place transport system performance (including congestion) within the larger context of urban liveability, economic viability, safety and health, not above it.

For more details and audience-specific recommendations, see the FLOW project summary and recommendations.

BUSINESS CASES

The FLOW Marketplace was created to stimulate the market for new walking and cycling products and services for congestion reduction.

This online catalogue lists companies that can support cities in planning walking and cycling measures to reduce congestion and includes good practice case studies. This is complemented by the FLOW Market Forerunners and Associates.

EVALUATION METHODS

FLOW used a variety of tools for evaluation.

FLOW's **Multimodal Transport Analysis Methodology** of Urban Road Transport Network Performance evaluates the impacts of cycling and walking measures on transport network performance and congestion.

The **FLOW Multimodal Transport Analysis Methodology** uses Key Performance Indicators (KPIs) to operationalise its multimodal definition of transport network performance and congestion in terms of travel time and the relationship between the demand for and supply of road space. The KPIs are:

- Delay: the additional travel time experienced by a traffic participant compared to the minimum travel time from origin to destination.
- Density: a measure of the number of people or vehicles using a given space.
- Level of service: a measure reflecting the quality of service experienced by traffic participants at different levels of infrastructure use (i.e. more or fewer people travelling).

These indicators can be used for local (e.g. a road segment or a junction) or network level analysis and calculated separately for each transport mode.

The **FLOW Impact Assessment Tool** reflects the mobility impacts, the environmental, societal and economic effects of a measure, and the impacts of the measure on public financing.

Currently, transport project assessments vary from city to city and many cities have no predefined guidelines or regulations at all. Qualitative data that arises from measures is often neglected due to the difficulties in assessing it.

However, such data could significantly influence the value of some policies and measures – particularly of walking and/or cycling measures.

FLOW offered different multimodal approaches in its Impact Assessment Tool to assess socio-economic impact indicators and aggregate the impacts of walking and cycling measures. They include multi-criteria analysis (MCA); weighted benefit analysis (WBA); cost-benefit analysis (CBA); and qualitative appraisal (as an add-on to CBA).

TOOLS AND RESOURCES

- FLOW Quick Facts for Cities* – link here.
- Walking and Cycling: A Multimodal Approach to Congestion Management - FLOW project summary and recommendations** – link here.
- Walking, Cycling and Congestion: Implementer's Guide to Using the FLOW Tools for Multimodal Assessments – link here.
- Using FLOW's Multimodal Transport Analysis Techniques in the Transport Planning Profession – link here.
- FLOW Impact Assessment Tool – link here.
- Guidelines to the FLOW Impact Assessment Tool – link here.
- FLOW Portfolio of Measures on the Role of Walking and Cycling in Reducing Congestion***– link here.

** Available in Bulgarian, Gaelic, German, Hungarian, Polish, Portuguese, Spanish, French, Italian, Russian, and Ukrainian.*
*** Available in Bulgarian, Gaelic, German, Hungarian, Polish and Portuguese.*
**** Available in Ukrainian.*

PHOTO CREDITS

Image: BKK

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TRACE
WALKING AND CYCLING TRACKING SERVICES

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TRACE LESSONS LEARNED

Using tracking tools to encourage active mobility

PROJECT OVERVIEW

The TRACE project assessed the potential of movement tracking services to better plan and promote walking and cycling in cities, and developed tracking tools to drive the uptake of walking and cycling measures.

The project looked at measures to promote cycling and walking to the workplace and school, for shopping purposes, and simply for leisure. More specifically, TRACE assessed the potential of ICT-based tracking services to optimise the planning and implementation of such measures and enhance their attractiveness and potential impact.

TRACE tested its tools in eight pilot sites: Agueda (Portugal), Belgrade (Serbia), Breda (The Netherlands), Esch (Luxembourg), Flanders (Belgium), Plovdiv (Bulgaria), and Southend-on-Sea (United Kingdom). Their impact, the associated user benefits, and success factors were analysed in preparation of commercial exploitation.

The end results were common, flexible and open access tools that can be developed into tracking service products tailored to the needs of specific measures.

Project snapshot

Project length - June 2015 - May 2018
Who was involved? - Seven different cities tested TRACE's tracking tools
Thematic area - Car-independent lifestyles
Website - www.h2020-trace.eu

IMPLEMENTATION

TRACE utilised two sets of tools – three behavioural change tools and a tool to analyse the data produced. The three behavioural change tools were the Traffic Snake Game (adapted for TRACE with tracking elements), Positive Drive, and Biklio. They were used in 17 campaigns across the project sites.

TRACE outlined three main pathways to use tracking apps to facilitate behaviour change.

1. Tracking data used in a behaviour change app – the data is immediately fed back to the user to influence behaviour.

2. Tracking to measure user needs (e.g. streets avoided by cyclists) – data is given to policymakers who use it for evidence-based policymaking.

3. Tracking for learning and evaluating other initiatives, such as other behaviour change campaigns, or changes to the built environment.

The data produced in these campaigns was then analysed by the TaTOO tracking tool to see how it might be used in urban mobility planning and policymaking. Based on its work, TRACE developed a 13-step process for running a tracking campaign.

Planning

- Step 1: Choose the pathway for your campaign.
- Step 2: Set objectives and identify target group(s).
- Step 3: Campaign for the campaign – gain stakeholder support.
- Step 4: Determine a strategy to change travel behaviour.
- Step 5: Conduct baseline measurements (and segmentation) of the target group.
- Step 6: Define your messages and communication channels, tools, and materials.
- Step 7: Choose the tracking tool for your campaign.

Implementation

- Step 8: Test out tool & campaign and adapt.
- Step 9: Delivering the tool and campaign.
- Steps 10 and 11: Monitor, evaluate, adapt and document the campaign.

Pilot site	Traffic Snake Game	Biklio	Positive Drive
Hasselt / Belgium	X		X
Belgrade	X		X
Luxembourg City		X	X
Breda		X	X
Águeda	X		X
Plovdiv	X	X	
Bologna	X	X	
Southend-On-Sea	X	X	

Post-campaign activities

- Step 12: Post-campaign evaluation activities may relate to surveys, the tracking data and other data collection strategies.
- Step 13: The campaign and tool legacy – extend your campaign or hold a new one.

In terms of **timing**, avoid competing with other similar campaigns. Keep to a minimum duration of four weeks to ensure sufficient engagement and data collection and a maximum of two to three months to prevent user fatigue.

TOOL DESIGN

Although each behavioural change tool sought to encourage the same sustainable mobility travel habits, they each did so in a very different way.

Traffic Snake Game (TSG) – The campaign encourages primary school children to travel more sustainably to school, for instance walking, cycling, or with public transport. Each day they do so, the children put a sticker on a snake banner. TRACE adapted the already existing campaign to integrate a tracking element.

Positive Drive (PD) – This app utilises gamification and gives users direct feedback. Based on "doing and rewarding the right transport choice", participants receive rewards if they show the "right behaviour", e.g. using a bike instead of a car. These can then be shared through social media. PD uses only positive nudges.

Biklio (Cycle2Shop – C2S) – The app detects if customers travel to (local) businesses by bicycle. If they do, they receive a reward for doing so. Users can see on a map which businesses are participating in Biklio and the incentives they offer.

TAToo - Tracking for Planning Tool was evaluated on all pilot sites. It analyses tracking data for urban mobility planning and policymaking and can be used in conjunction with any commercial app that tracks trips.

Getting **data access and privacy** right is crucial. Whilst campaign managers can use participant data to adapt communications or incentives, compliance with the **General Data Protection Regulation** is necessary. Campaign organisers must understand their responsibilities. For instance, users must be able to request that their data is erased.

RECRUITMENT AND UPTAKE

When communicating your campaign, base it on a strong and compelling narrative. An effective angle is that participation enables users to shape mobility policy in their favour.

Once decided on, convey this narrative using a multichannel approach tailored to your audience. Face-to-face discussions can be efficient, whilst the chance to share achievements or activities on social media has proven to be popular.

For campaigns involving discounts, TRACE recommends choosing **local businesses** instead of national or international one due to generally customer stronger identification. The type of shop selected should also be compatible with the idea of sustainability.

Moving the app's focus beyond the gamification element can also increase user engagement. This can be achieved by:

- Integrating **additional services** into the app, such as Mobility as a Service, and the benefits systems with other systems, like bike sharing.
- Adding the possibility for users to **provide in-app feedback** on travelled routes. This means users can positively influence their own local environment and know they have contributed to wider policymaking.

Once the apps were trialled, TRACE produced the TRACE Toolkit. Local authorities should refer to this for practical recommendations and guidelines to using the project's approach, as well as advice on how they can benefit from tracking movements in their city.

BUSINESS CASES

A business model canvas was developed for each tool. These can be seen in the annex of the Toolkit. For the rewards function of some of the apps to be successful, a significant number of local businesses need to participate.

Biklio's target is to engage 20-100 shops/cafes (20 businesses per 100,000 inhabitants) and to involve at least 3% of the cycling population.

"TRACE provided strong evidence that new and exciting applications based on mobile tracking have an enormous potential to affect mobility behavior and improve urban planning. However, exploiting such potential depends on how well we can overcome some fundamental ICT challenges."

João Barreto
TRACE Project Coordinator,
Instituto Superior Técnico, University of Lisbon

EVALUATION METHODS

TRACE also had a number of recommendations related to evaluation.

- Avoid using incentives if you track data to see how infrastructure can be optimised in line with user needs. This makes the data biased.
- TRACE's approach was not suitable to see if such apps can bring about behavioural change – it has been questioned if short campaigns can induce behavioural change.
- Focus groups are difficult to set up and might require incentives. Interviews are easier to carry out (e.g. via phone), but are more expensive if they need to be transcribed. They also lack the element of group discussion.

It must be noted that the evaluation was not about:

- Assessing the potential of the tools to evaluate policy measures or infrastructure developments. There is too much bias through the incentive to win prizes.

TOOLS AND RESOURCES

- TRACE Toolkit - link here
- Evaluation plan – link here
- Guidelines & recommendations on tracking walking & cycling for mobility planning and behaviour change – link here
- Biklio app - link here
- Positive Drive app - link here
- TaToo Tracking Planning Tool - link here
- Traffic Snake Game Tracking Device - link here

PHOTO CREDITS

Image: EUROPEANMOBILITYWEEK

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CIPTEC LESSONS LEARNED

Using collective innovation to improve public transport

PROJECT OVERVIEW

CIPTEC sought to increase the modal share of public transport (PT) by being able to better understand and attract new users at as low a cost as possible. It sought to do so by developing and utilising modern marketing techniques, and promoting creativity and innovation to encourage the desired modal shift. Two main processes sat behind this:

1. **Market research of user groups**
2. **Collective innovation**

CIPTEC also examined PT from the supply perspective, shedding light on the challenges faced by PT providers. To tackle these, it produced the CIPTEC Toolbox for Public Transport Innovation. This helped operators and policymakers understand their situation, identify applicable solutions, and implement these.

Project snapshot

Project length - May 2015 - April 2018
Who was involved? - Four cities conducted crowdfunding campaigns
Thematic area - Collective passenger transport
Website - ciptec.eu

IMPLEMENTATION

Market research of user groups looked to ascertain what constitutes a good PT offer, such as the services to include, whom to target, and how to promote it. This revealed seven 'hidden' user groups (more details here) who have different public transport requirements.

Introducing complementary packages of innovations can have a multiplier effect on increasing PT's modal share when measures are chosen in order to fulfil identified user needs. This is far more effective than introducing measures assumed to be the right ones.

Collective innovation: ideas were gathered and chosen via crowdsourcing and co-creation workshops. CIPTEC developed an online platform used in five campaigns. These were held in Frankfurt (Germany), Rotterdam (the Netherlands), Southern Tuscany (Italy), and Thessaloniki (Greece), with one also Europe wide.

In total, 486 ideas were submitted and 8863 users visited the campaign websites. An open source version of the platform is available.

The CIPTEC crowdsourcing campaigns followed a six-step process:

1. **Describe the campaign:** Clearly outline what campaign objectives are. Crowdsourcing also comes in several forms, e.g. contests, voting, creation, and funding. Make sure the chosen form (or combination) fulfils your aims.

2. **Define campaign rules:** Who can participate? What should 'the crowd' do? What is the timeline? Who will evaluate the winners? Who has IP rights for submissions?

3. **Release the campaign online:** Ensure you have a professional, user- and mobile-friendly interface. See more information on platform design in the 'Design' section.

Combine co-creation workshops with input from an expert board or jury to ensure that both users and experts are involved in evaluating your campaign and its ideas.

Social Entrepreneurship Workshop in Thessaloniki.

4. **Advertise the campaign:** Use a mixture of online and offline methods to maximise user outreach. See more information in 'Recruitment and uptake'.

5. **Gather contributions:** It is important that the campaign organiser is active in supporting platform users with any issues as they arise.

6. **Evaluate and reward:** Be transparent and publish documentation on the evaluation process. Ensure also that your reward conveys the right message about your campaign. See 'Recruitment and Uptake' for award ideas.

The nudge method: A field experiment in Rotterdam (Netherlands) showed how 'social labelling' nudges can be cost-effective interventions. New, free travel card holders were distributed that labelled their carriers as sustainable.

Pre and post-intervention bus use was 0.89% higher within the group using new travel cardholders compared to those with standard ones.

RECRUITMENT AND UPTAKE

Use both online and offline methods for collecting ideas. Frequent website and social media updates signify an active campaign; newsletters can reach diverse target groups; and short videos are effective at creating interest in contests.

For offline awareness raising, communicate via local media and take part in community events. Furthermore, consider organising a consultation event with the local municipality.

Irrespective of method, make use of multipliers, such as civil society groups, committed politicians, trade unions, and local

businesses. That includes employers or organisations promoting campaigns to their staff or members.

Rewards for campaigns: Possible prizes for a winning idea might be a monetary or material reward, free travel on PT services, and even a trial of the idea if funds are available.

EVALUATION METHODS

CIPTEC used co-creation workshops as the next step to validate and evaluate ideas gathering from crowdsourcing.

Such workshops should not constrain participants by promoting certain types of behaviours or ideas, whilst participants should reflect the demographics of the PT user base.

Combining such workshops with input from an expert board or jury ensures that both users and experts are involved in the evaluation process.

TOOLS AND RESOURCES

- CIPTEC crowdsourcing platform - link here.
- CIPTEC online toolbox - link here.
- CIPTEC collective intelligence guidelines - link here.
- CIPTEC advanced marketing research presentation - link here.

PHOTO CREDITS

Image 1: Ana Dragutescu

Image 2: CIPTEC

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ELIPTIC LESSONS LEARNED

Using electric public transport to power future e-mobility

PROJECT OVERVIEW

Electrification of transport is a major way to reduce the carbon footprint of the transport sector. However, it requires more than simply switching from fossil fuel-powered cars to e-cars to transition to sustainable mobility and reduce congestion. Public transport is crucial and forms a major part of Sustainable Urban Mobility Plans.

ELIPTIC (electrification of public transport in cities) developed a series of new concepts and business cases related to the optimisation of existing electric public transport (PT) infrastructure and rolling stock.

With these, it set out to show that current electric PT infrastructure – such as metros, trams, light rail, and trolleybuses - could support the next wave of transport electrification for both public and private users.

ELIPTIC had 20 use cases in 11 European cities, which delivered insights about technical, legal and fiscal frameworks to achieve the uptake of electric vehicles in a cost-efficient way.

Project snapshot

Project length - June 2015 – May 2018
Who was involved? - 11 European cities tested measures
Thematic area - Collective passenger transport
Website - www.eliptic-project.eu

The use cases involved three main thematic areas:

1. Safe integration of e-buses into existing electric public transport infrastructure;

2. Utilising energy storage systems to use recuperated energy, for example from trolley or trams braking; and

3. The multi-purpose use of electric PT infrastructure, such as for (re)charging of commercial vehicles, private vehicles and taxis.

ELIPTIC also foresaw that reaching full electrification requires the integration of public electricity grids and those used by public transport operators. Various guidelines and tools are available that advise on upgrading and regenerating electric public transport systems.

IMPLEMENTATION

ELIPTIC implemented a wide variety of new concepts, which led to a wide variety of interesting results.

When **procuring charging systems**, it is best to demand interoperable solutions with open standards and the exact specification of technical details.

New models: Hybrid trolleybuses can drive 'off-wire' (without a catenary), as seen in Eberswalde (Germany), Gdynia (Poland) and Szeged (Hungary). Public transport companies can thus enlarge trolleybus networks without the high outlay needed for catenaries. Such vehicles are also quieter and emit fewer fossil fuels.

Auxiliary consumption: In Brussels, tests showed how braking systems now recuperate a significant amount of energy. Instead, the main focus to improve tram network energy efficiency must be on the vehicle's auxiliary consumption.

As using battery energy for heating reduces driving range, consider to continue using diesel heaters if necessary during the transition to electrification.

"Public transport is a fundamental element of sustainable mobility. Like metros and trams, buses need to become an icon of efficient, convenient and environmentally friendly transport. Electrification is key to achieve post-fossil fuel public transport – but sustainable mobility needs more than 'just' electrification."

Michael Glotz-Richter
ELIPTIC Project Coordinator,
City of Bremen

Electric bus in Bremen.

In terms of charging:

- In Barcelona, on-street charging points supplied by the metro power grid were found to be more energy efficient than those supplied by the public distribution grid.
- If accessible, charging infrastructure is easier to manage when not located in a public space, as there are fewer regulations and statutory provisions to take into account.
- Combine overnight depot charging with short-interval 'opportunity charging' using other infrastructure at the end of bus routes. This enables hybrid and electric vehicles to service more routes, and worked successfully in ELIPTIC's trial in London (UK).
- Letting other vehicles access transport authority grids lowers emissions. By allowing its support fleet do so, Transport for London will reduce yearly $C0_2$ emissions by 13 tonnes.

BUSINESS CASES

With high upfront costs, investment in electric buses can seem to make little economic sense, particularly if significant infrastructure needs to be built for a small number of vehicles. Yet this picture changes when entire routes are electrified.

Infrastructure costs are reduced, whilst compared with diesel buses there are lower energy costs (higher system efficiency) and lower maintenance costs, especially when linking to an existing public transport grid.

Electric buses' total cost of ownership becomes even better if a cost-benefit analysis (CBA) is conducted which takes into account environmental costs resulting from emissions of pollutants and noise.

In terms of charging costs, Warsaw (Poland) is an example of how using the municipal tram power supply to charge buses can be cheaper than using the public grid. Read about ELIPTIC business cases here.

ENCOURAGING UPTAKE

To enable a greater use of electricity from existing public transport grids to power multimodal charging, **coherent regulatory frameworks** are needed for the interface between the transport and (electrical) energy sectors. These can help clarify legal uncertainties on the sale of electricity.

The lack of clear regulations and a standardisation programme impact on the ability to upscale or replicate ELIPTIC's measures - more clarity would make doing so easier.

ELIPTIC's Factor 100 campaign showed the impact **statistics and concise messaging** can have: "It takes 100 electric cars to achieve the impact of one electric bus (€18m)... but there is not 100 times the funding for electric buses". Soon after, a €100m national funding programme was launched for electric buses in Germany.

Ensure to test new solutions extensively and **train all staff** properly; be they control centre operators, maintenance staff, or drivers. This increases their trust in the new measures and ensures their ability to operate and look after new vehicles properly.

To aid uptake, ELIPTIC produced its Electrification of Public Transport Toolbox. This contains the aggregated results from all use cases, its learning materials, and a training element on the use of simulation tools.

The E-Bus Decision Support Tool is another rich resource. It enables users to compare the parameters of their own local bus line to data collected within 150 different use cases – this helps them to ascertain their best options for transitioning to a fully clean fleet.

The combination of (electric) public transport with (partly or fully electrified) car sharing (as in Bremen) goes beyond pure vehicle electrification to a system approach that gives an alternative to car ownership.

EVALUATION METHODS

ELIPTIC showed that evaluators of such electrification measures must be ready to revise plans and be flexible with their methodologies, as (sometimes major) changes are often necessitated due to technical issues.

In addition, electrification measures like those in ELIPTIC require more effort to implement than those with tire-based vehicles, which means more time should be set aside for testing.

For analyses that include a comparison of before and during measure implementation, include a Cost-Benefit-Analysis to evidence the wider cost-effectiveness of measures.

To assess the technological viability of measures, using a SWOT analysis is recommended to map the prospects of and barriers to innovative concepts.

TOOLS AND RESOURCES

- ELIPTIC Policy Recommendations - read here
- ELIPTIC Use Cases Brochure – read here
- ELIPTIC D4.2 - Final Business Cases – read here
- Electrification of Public Transport Toolbox – access it here
- E-Bus Decision Support Tool – access it here

PHOTO CREDITS

Image 1: Leipziger Verkehrsbetrieb

Image 2: Stadt Bremen

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CITYLAB LESSONS LEARNED

Incubating zero-emission logistics in living laboratories

PROJECT OVERVIEW

The objective of the CITYLAB project was to develop knowledge and solutions that result in the roll-out, scaling up and further uptake of cost-effective strategies, measures and tools for zero-emission city logistics.

In a set of seven Living Laboratories ("Living Labs"), promising logistics concepts were implemented, tested and evaluated, and the potential for further roll-out and upscaling of the solutions investigated and explained.

The Living Labs brought together citizens, governments, industry and research partners to co-design and co-create new policies, regulations and actions.

The participating cities were Rotterdam/Amsterdam (the Netherlands); Brussels (Belgium); London (United Kingdom); Oslo (Norway); Paris (France); Rome (Italy); and Southampton (UK).

Project snapshot

Project length - May 2015 - April 2018
Who was involved? - Seven cities hosted a Living Lab
Thematic area - Urban freight logistics
Website - www.citylab-project.eu

CITYLAB focused on four areas requiring intervention: highly fragmented last-mile deliveries in city centres; inefficient deliveries to regular recipients of large deliveries (e.g. businesses) and public administrations; urban waste, return trips and recycling; and logistics sprawl.

A series of measures encompassing these fields were tested, evaluated and rolled out in the seven Living Labs.

IMPLEMENTATION

Each participating city implemented one or more freight measures during the project:

- Amsterdam: City centre micro-hubs and cycle freight deliveries.
- Brussels: Increasing vehicle loading by utilising spare capacity.
- London: Growth of consolidation and electric vehicle use.
- Oslo: Common logistics functions for shopping centres.
- Paris: Logistics hotels to counter logistics sprawl.
- Rome: Integration of direct and reverse logistics flows.
- Southampton: Joint procurement and consolidation for large public institutions.

More information about each of the pilot sites – including a poster, factsheet, cartoon, presentations and dashboard - can be found on the CITYLAB website.

Further information on the measures implemented can also be found in the impact and process assessment of the seven CITYLAB implementations.

RECRUITMENT AND UPTAKE

The following were identified as being the key elements needed to successfully implement the measures associated with CITYLAB:

- **Stakeholder collaboration:** As solutions and measures are not just concentrated in the hands of one stakeholder, collaboration is important. In many cases, the support or intervention of local authorities is also needed. For example, in Amsterdam PostNL benefited from collaboration with local authorities when facilitating and implementing micro-hubs.
- **The ability to make small adjustments to the business models as needed:** Minor adjustments can make a large difference, for instance having the price of the common logistics function already included in the rental of a facility, compared to having to implement the costs afterwards.
- **Clear political will and support from the local government:** This played an important role in securing funding and building partnerships in the project. Public sector involvement, often across municipal agencies, was central to the success of several implementations. For example, waste management in Rome required the involvement of both the Transport and the Environmental Departments.
- **The ability and willingness of local authorities to implement policy measures** – This was crucial to drive forward sustainable logistics practices in some of the implementations.
- **Pilot and field surveys/studies to awake the interest of and gain acceptance from end-users** – It is beneficial to fine-tune the implementation according to users' preferences; understanding and acting according to their expectations increases participation. This was done in Rome, Brussels, Southampton and Oslo. For instance, in Brussels a sales representative visited stores to explain the concept, website, products and prices.

"It is not necessarily a lack of knowledge about measures that prevents more sustainable and efficient logistics operations in our cities, but more often a lack of focus and prioritisation in the public sector."

Jardar Andersen
CITYLAB Project Coordinator,
Institute of Transport Economics

EVALUATION METHODS

The indicators and evaluation methods used within the project can be structured into four fields of evaluation: adoption; process; context; and impact.

Adoption: 'Adoption' detects to what extent stakeholders that did not initiate the solution are willing to pay for the solution or to change their behaviour in order to perpetuate the solution. A solution's success depends on not only the characteristics of the solution itself, but also on how and where it was implemented.

Process: This relates to the Living Lab methodology and attempts to determine how successfully the final implementation adhered to the implementation plan devised during the planning phase. It allows evaluators to make the important distinction between implementation failure and success and theory failure and success.

Context: This describes important characteristics of the setting in which the solution was implemented. More than any other field of evaluation, it makes the connection between the implemented solution and a possible transfer to another city.

Impact: 'Impact' assesses and quantifies the changes that can be attributed to implementing the new urban freight transport solution. It concerns changes in the well-being of all stakeholders.

TOOLS AND RESOURCES

Find more information on CITYLAB materials here:

- Practical guidelines for establishing and running a city logistics living lab – link here
- Observatory of strategic developments impacting urban logistics – brochure – link here
- Definition of necessary indicators for evaluation – link here
- CITYLAB dashboards – link here
- Impact & process assessment of the seven CITYLAB implementations – link here
- Sustainability analysis of the CITYLAB solutions – link here
- Evaluation of the willingness to pay – link here
- Assessment of the roll-out potential of CITYLAB solutions – link here
- Tools for achieving CO_2-free logistics in cities by 2030 – link here
- CITYLAB transferability leaflet - link here
- City Logistics Living Lab Handbook - link here

PHOTO CREDITS

Image: Gnewt

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NOVELOG LESSONS LEARNED

Four steps for sustainable urban freight

PROJECT OVERVIEW

The innovative NOVELOG project provided guidance to 12 cities and regions on how to implement sustainable urban freight transportation (UFT). Known as 'New Cooperative Business Models and Guidance for Sustainable City Logistics', NOVELOG means that cities can now put sustainable policies and measures in place via four simple steps:

- **Understand** the UFT environment;
- **Focus** on the most suitable measures and policies;
- **Assess** these measures; and,
- **Guide** stakeholders for effective implementation.

For Athens (Greece), Barcelona (Spain), Copenhagen (Denmark), Emilia-Romagna Region (Italy), Gothenburg (Sweden), Graz (Austria), London (UK), Mechelen (Belgium), Pisa, Rome, Turin and Venice (all Italy), the goal was to be more sustainable and liveable.

Through six pilots and seven case studies, NOVELOG helped all these cities and regions to design, develop and demonstrate their UFT measures and policies.

Project snapshot

Project length - June 2015 – May 2018
Who was involved? - Six cities served as pilot cities and another six as case studies
Thematic area - Urban freight logistics
Website - novelog.eu

The specific objectives were:

1. cost-effective, eco-friendly measures and business models;
2. increased load factors and reduced vehicle movements;
3. optimised governance and stakeholder co-operation in urban distribution; and,
4. strengthened capacity of local authorities and public and private stakeholders for sustainable policy-making and mobility planning (using Sustainable Urban Mobility Plans).

IMPLEMENTATION

The NOVELOG factsheets explain in detail the project pilots and case studies – both in terms of results but also environmental, social and business impacts. But in a nutshell, here's what happened in each city/region:

The pilots:

- **Athens** – an integrated rail-road system and cargo consolidation for last mile transportation;
- **Barcelona** – the operation of micro-blocks and e-tricycles for urban freight distribution, together with the use of the AreaDUM app for smart urban freight parking management in the city;
- **Graz** – the extension of an existing e-bike B2C home delivery service and the introduction of an eco B2B delivery system;
- **Mechelen** – a smart locker system and bike services for last mile distribution of goods;
- **Rome** – the design and development of a 'decision support system' for freight distribution planning and monitoring; and,
- **Turin** – the flexible use of bus lanes by freight vehicles and parking management in limited traffic zones.

The case studies:

- **Copenhagen** – development of a freight network;
- **Emilia-Romagna Region** (Italy) – harmonisation of limited traffic zone rules for cities on a regional scale (sub-case A); urban distribution centre (UDC) served by electric vehicles in the city of Reggio Emilia (sub-case B); an e-commerce platform and home delivery system in the city of Bologna (sub-case C);
- **Gothenburg** (Sweden) – development of an urban consolidation centre;
- **London** (United Kingdom) - development of a freight plan;
- **Pisa** (Italy) - use of intelligent transport solutions for a better understanding of UFT systems, and promoting sustainable mobility solutions; and,
- **Venice** (Italy) – shared freight–passenger services in Venice lagoon.

"NOVELOG's success lay in its application of a holistic approach: in planning, supporting implementing and assessing the impact of sustainable city logistics solutions and ultimately helping cities understand that urban freight transport needs to be part of a city's planning process".

Dr Georgia Ayfantopoulou
NOVELOG Project Coordinator,
Hellenic Institute of Transport

BUSINESS CASES

Many sustainable UFT solutions turn out to be economically unviable. This is mainly due to a lack of critical mass and the additional mode change required by some measures. In this context, it is crucial to co-operate with private stakeholders (to increase load factors) and reduce the amount of freight vehicles entering city centres.

Similarly, potential cooperation schemes between public and private stakeholders need to be examined to enhance the long-term sustainability of measures like lockers, micro-consolidation, bike logistics and urban consolidation centres.

The NOVELOG project used the 'business model canvas' to develop business models for collaborative city logistics solutions and implemented these through pilot initiatives. Based on their success, the project suggested a number of collaborative business models (CBMs) for specific types of UFT measures.

The Guidance Tool assists cities in developing city logistics CBMs by mapping the value of co-operation among different stakeholders. This ensures the feasibility and the economic viability of sustainable city logistics solutions.

ENCOURAGING UPTAKE

The first step to help cities move towards implementing long-term solutions to their urban freight problems is to facilitate co-operation, consensus building and common understanding among city stakeholders. So NOVELOG developed a tool: "Understanding the Cities". Each city used this tool to reach agreement on the main factors affecting UFT and the most important characteristics that define the UFT environment in their respective cities.

NOVELOG also developed the NOVELOG toolkit. This kit helps cities identify and then select the measures most suited to them. In fact, it also takes into account a list of measures implemented in other cities with similar typology.

SUSTAINABLE URBAN LOGISTICS PLANNING

NOVELOG also developed a detailed guide for cities that want to design and develop a Sustainable Urban Logistics Plan (SULP), taking into account the EU SUMP Guidelines.

The NOVELOG SULP Guidelines are based on six key implementation steps:

1. Determine the city's potential for a successful urban freight planning process.
2. Define the development process and scope of the plan.
3. Analyse the city's current UFT context, challenges and opportunities.
4. Develop a common vision and future improvement scenarios.
5. Set priorities and measurable targets.
6. Develop an effective package of measures.

The NOVELOG SULP Guidelines were the basis for the development of the SULP Topic Guide, published as an accompaniment to the revised EU SUMP Guidelines in October 2019.

EVALUATION METHODS

NOVELOG produced its own evaluation tool*. It facilitates multi-criteria, multi-stakeholder decisions and stakeholders can even run their own evaluation scenarios based on their interests.

How does it work? Users first select indicators appropriate to their own specific context, including objectives, stakeholder type, and preferred measure(s). The tool then performs a holistic assessment based on a number of impact areas/ stages in the logistics life cycle.

Finally, the user sees how the measure(s) improves their logistics-related sustainability. This is based on a Logistics Sustainability Index (LSI) value (and more specific results can be generated using three embedded modules: 1) social cost-benefit analysis 2) transferability and adaptability 3) risk analysis).

**To use the evaluation tool, the user must first apply for a license via the website.*

TOOLS AND RESOURCES

Tools and resources include:

- NOVELOG'S "Understanding the Cities" tool - link here
- The NOVELOG Toolkit – link here
- NOVELOG Evaluation Tool – link here
- The NOVELOG Impact Assessment Guidance Tool – link here

Other key resources for cities include:

- NOVELOG Cities & Regions Factsheets – link here
- NOVELOG Roadmap for greener and efficient UFT – link here
- NOVELOG Yellow Pages - FAQs on UFT – link here
- NOVELOG Guidelines for the Planning & Development of SULPs – link here

PHOTO CREDITS

Image: NOVELOG

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SUCCESS LESSONS LEARNED

Sustainable logistics solutions in the construction industry

PROJECT OVERVIEW

SUCCESS (Sustainable Urban Consolidation CentrES for conStruction Projects) focused on the construction industry and its relationship with logistics. It saw potential to improve the efficiency of goods and waste movement and service trips in EU cities.

The project aimed to explore and test green and efficient solutions covering various issues in the construction supply chain and material freight logistics in urban areas.

To test those solutions, SUCCESS developed simulation tools to play out several scenarios focusing on the implementation of Construction Consolidation Centres (CCCs) at four pilot sites: Neudorf (Luxembourg), Paris (France), Valencia (Spain) and Verona (Italy).

Eight scenarios were defined: two without a CCC and six with one or more CCCs. These were then tested, evaluated and finally compared to identify the best solutions the type of construction projects represented by the pilot sites.

Project snapshot

Project length - May 2015 - April 2018
Who was involved? - Four pilot sites testing construction logistics measures
Thematic area - Urban freight logistics
Website - www.success-urbanlogistics.eu

IMPLEMENTATION

The CCC was highlighted as the key solution for reducing the negative impacts of construction-related logistics. For local authorities and residents, they reduce air and noise pollution and obstructions caused by construction vehicles.

For construction companies, CCCs encompass a series of benefits:

- Materials being available from a location close to (or on) the construction site(s);

- Prompt delivery of the necessary quantities of materials for daily activities;
- Reduction of delays in the delivery of materials; and
- Easier and more flexible organisation and management of supplies and stock.

This increases productivity and means fewer materials are wasted. Working conditions also become safer for those (un) loading and transferring materials between vehicles. These impacts are captured in the table below.

Yet a CCC alone is insufficient. It must form part of a new construction supply chain. This requires major changes in the construction value chain and for construction companies to:

- Refocus on their core activities, i.e. building.
- Consider logistics activities as a full support service that requires new skills and the development of new partnerships.
- Reconsider the contractual relationship between all actors in the construction sector to improve collaboration.

Other construction logistics and supply chain management good practices can be found in the SUCCESS handbook.

BUSINESS CASES

SUCCESS followed these steps to define the business models applied on its pilot sites:

- Identify characteristics that have an influence on urban and construction logistics.
- Conduct a SWOT analysis to determine opportunities and risks linked to CCC implementation.
- Develop at least two different scenarios where a CCC is used.
- Define the most suitable business model for each scenario using the Business Model CANVAS methodology.

The four business models employed were a fully private CCC operated by the construction company; a public-private partnership; a privately owned CCC managed by an external logistics operator; and a virtual/digital CCC.

Find more on the CANVAS methodology and the advantages and disadvantages of each business model in this SUCCESS introduction to the topic.

Expected benefits	Indicators	Average quantified impacts in the pilot sites	Luxembourg	Paris	Valencia	Verona
Reduction of congestion	Daily number of freight vehicles both for direct and reverse logistics	-40%	Up to 48%	Up to 42%	Up to 48%	Up to 54%
Reduction of transport related pollutant emissions	CO_2 emissions NO_x emissions PM_x emissions	-40%	Up to 33% Up to 41% Up to 30%	Up to 13% Up to 8% Up to 23%	Up to 31% Up to 39% Up to 26%	Up to 19% Up to 22% Up to 19%
Vehicle use & route optimisation	Kilometres / day travelled by vehicles	-20%	Up to 42%	Up to 20%	Up to 34%	Up to 23%
	Small deliveries (fewer than 4 pallets)	-50%	100%	Up to 100%	Up to 100%	Up to 100%
Maximise lead factor	% increase load factor	30%	Up to 41%	Up to 52%	Up to 44%	Up to 220%
Economic	Payback		Year 1*	Year 1	Year 1	Year 1

Table: The impact of a CCC on the four SUCCESS project sites

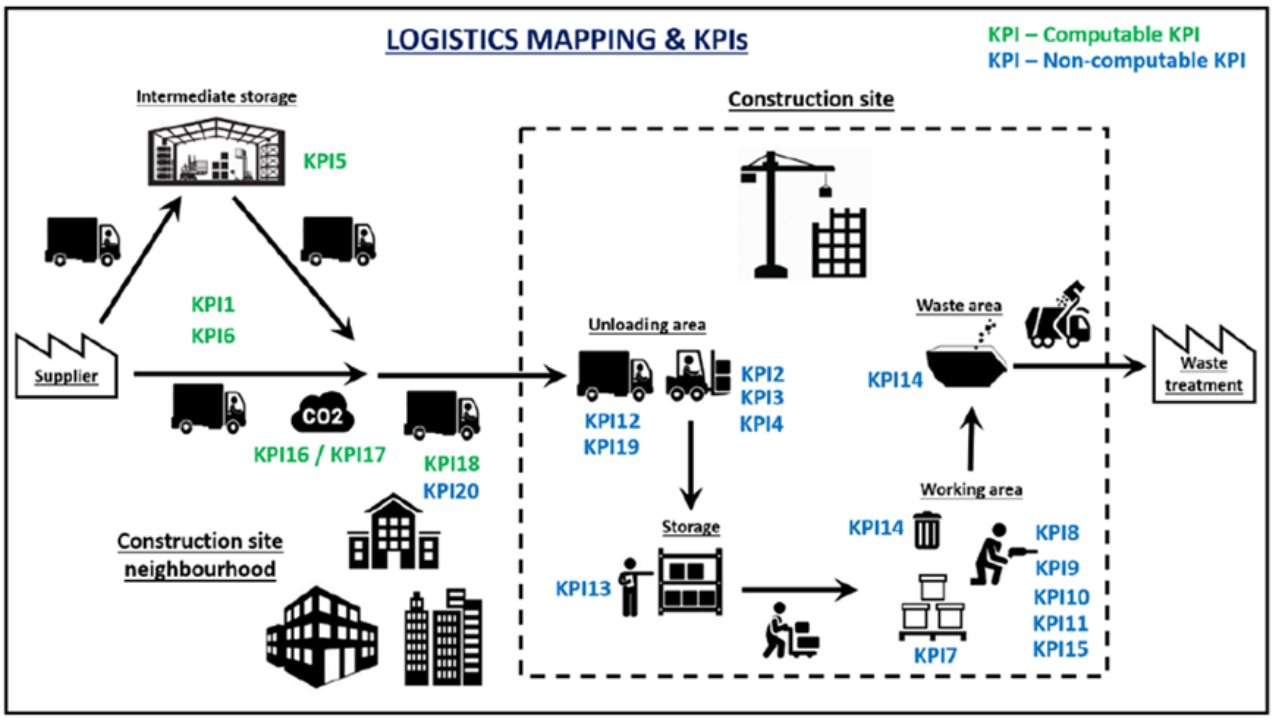

Image – KPIs for a logistics supply chain in the construction sector

EVALUATION METHODS

To assess the potential impact of an optimised supply chain, SUCCESS used 20 Key Performance Indicators across three categories - economic, environmental and social indicators.

These cover the main logistics steps involved in a construction project. Six of these can be simulated using digital tools.

Find the full set of KPI descriptions and the explanation of the methodologies behind them in SUCCESS's description of KPIs and methodologies in the construction industry. They can be applied by others working in the construction logistics sector.

TOOLS AND RESOURCES

The suite of materials created within the project serve as a good reference point for all working to make logistics in the construction industry more sustainable.

- Business Models Development and Analysis - link here
- Report on good practices in the EU and USA in construction logistics in urban area - link here
- Business models for construction logistics optimisation and CCC introduction - link here
- Good practices in construction logistics and supply chain management - link here

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PHOTO CREDITS

Image: SUCCESS

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U-TURN LESSONS LEARNED

New models for urban food transportation

PROJECT OVERVIEW

In urban areas, tackling economic and environmental sustainability challenges increasingly calls for horizontal collaboration in logistics.

In this context, the U-TURN project sought to tackle particular problems associated with with urban food transportation, including congestion, increased use of convenience stores, and a rise in home deliveries of food ordered online.

With shared logistics as its base operating principle, U-TURN sought to establish more efficient and sustainable distribution models for food by conducting three pilot initiatives:

- Pilot 1: The distribution of packaged goods from food manufacturers to retail outlets located in urban areas in Athens (Greece). This used two different practices: sharing a common vehicle for deliveries and an Urban Consolidation Centre (UCC) for collaborative 'last-mile' goods distribution.
- Pilot 2: The distribution of fresh food from local producers and online retailers to consumers in urban areas in Milan (Italy).
- Pilot 3: Food delivery from online retailers to consumers in urban areas in London (United Kingdom). Three different supply chain structures were identified, with a micro hub playing a different role in each case.

Through the knowledge gained from these pilots, U-TURN has helped improve understanding of freight (food) distribution in urban areas and put forward innovative practices and tools for stakeholders improve their operations. This set of tools facilitates the quick analysis and uptake of shared logistics practices for market stakeholders.

Project snapshot

Project length - June 2015 - May 2018
Cities involved - Three cities held pilot initiatives
Thematic area - Collective passenger transport
Website - www.u-turn-project.eu

IMPLEMENTATION

U-TURN contributes to a better understanding of the impact of food logistics in urban areas, and it provides qualitative and quantitative assessments of innovative, cost-effective and environmentally friendly strategies.

Taken together, the pilots show how the introduction of collaborative schemes helps operators increase load factor and reduce the total distance travelled. This in turn leads to reduced transport operating costs, air emissions, and impact from other transport externalities. The following results stand out in particular:

1. **Pilot 1** - The UCC Presidential Decree in Greece was informed by the findings of this pilot, showing the project's impact on policy making. The analyses conducted of the Urban Consolidation Centre scenario provided input into this decree, immediately translating U-TURN outputs into policy recommendations. More generally, in the various tests for this pilot it was possible to achieve 9-48% distance reduction for deliveries.

2. **Pilot 3** - Designed and built from the learning from Pilot 3, a series of e-cargo bikes were a collaborative effort between Sainsbury's and a newly established e-cargo bike company. The aim was to deliver groceries purchased online to consumers' homes using the bikes. They can travel on narrow bike lanes and shorten the time taken to deliver orders.

The Sainsbury's collaboration is just one example of how industry engaged with U-TURN. In addition, various numerous engagement events took place in Greece, Italy and the United Kingdom that saw industry mixing with U-TURN consortium partners.

"One of the real lessons from horizontal collaboration in logistics is that even with rivals, fruitful collaboration is the key to unlocking profits for companies, and enhancing the sustainability of urban logistics as a whole!"

Dr. Eleni Zampou
U-TURN Project Coordinator, Intrasoft International

RECRUITMENT AND UPTAKE

The series of tools that the project created helped the uptake of innovative food logistics measures. They are:

1. An **information series** for collaborative and shared logistics distribution models that suggest alternatives ways of sharing resources;

2. A **smart matching tool** that enables the identification of logistics sharing matches among different stakeholders, such as retail outlets, different food producers or companies;

3. A **simulation tool** that models and quantifies the impact of Urban Consolidation Centres as an alternative logistics sharing practice;

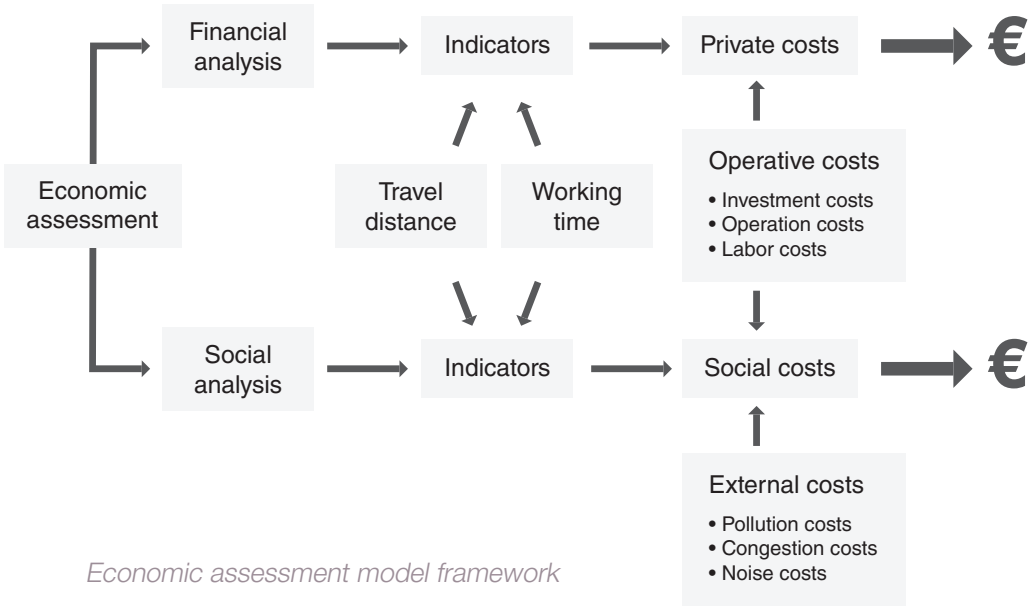
4. An **economic and comparative assessment model** that evaluates the operational and economic impact of various shared logistics models; and,

5. A **collaboration platform** (the U-Turn Platform) that supports information sharing, identifying synergies by using smart matching logic, and the creation of appropriate partnerships.

BUSINESS CASES

Thanks to the various business models and tools utilised among the U-TURN pilot cases, the project attested to the real challenges faced by stakeholders in horizontal collaboration on food distribution. These business cases also provided valuable lessons learned:

- The Barilla and NESTLE case: horizontal collaborative logistics by using shared vehicles in the Attika area;
- The AB Vassilopoulos and Metro–MyMarket case: horizontal collaborative logistics by using an Urban Consolidation Center in the Attika area;
- The case of four 3PL companies: horizontal collaborative logistics by using the U-TURN platform in the Attika area;
- Horizontal collaboration among local fresh food producers in Milan; and,
- Sainsbury's: E-cargo bikes for online home delivery of groceries in London.



Economic assessment model framework

EVALUATION METHODS

In order to fully and properly evaluate horizontal collaboration practices, U-TURN used a number of primary methods:

- **Data analysis** of distribution flows and execution of field studies in four collaboration schemes;
- An **economic assessment model** to evaluate operational and economic impact – see more details on the project's economic assessment model here;
- Discrete **simulation** to quantify the impact of alternative logistics sharing choices from efficiency (cost), effectiveness (service level) and environmental perspectives;
- **Stable matching logic** to identify and evaluate feasible partnerships.

TOOLS AND RESOURCES

- New business models, field study results and practical guidelines – link here
- U-TURN's Economic Modelling and Comparative Assessment of the Pilot Sites – link here
- Smart Matching Algorithm – link here
- Video on the U-TURN Platform – link here

PHOTO CREDITS

Image 1: Wikimedia

Image 2: CIPTEC

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