

THINKING cities

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CITIES AND REGIONS FOR
TRANSPORT INNOVATION

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June 2019

CITYVIEW

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HEALTH IN
TRANSPORT

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At the end of the tightrope

Karen Vancluysen posits the theory that it's going to take more than a seismic modal shift to change the culture of mobility. It's time to start thinking differently

This Spring I had the pleasure of moderating a panel debate for an evening event that bridged a Polis Working Group meeting with a CEDR Conference on the multimodal transport system. Among my panelists was Pascal Smet, the Minister for mobility and public works of the Brussels Capital region. Brussels is an active Polis member and the hometown of our network secretariat.

We spoke about the importance of multimodality for sustainable transport; about the role of infrastructure for modal choice; about how far we have come in the urban mobility transformation and whether along the way we have always kept the user in mind along with policy goal or expert views.

To achieve a more sustainable transport system the human factor, in addition to infrastructure and technology, gets increasing attention. This represents a careful balancing act for policy makers between the needs of the individual user, societal needs, economic needs and the urban environment. Some say that the era of the automobile has peaked but is the urban space adequately equipped to meet the needs of the population as well as society? Along with the benefits of redefining and reallocating street space in a multimodal system come possible new political problems in terms of fighting for that space and balancing the needs of all societal stakeholders.

We all know that the way we look at things is a matter of perspective. We can call ourselves experts or policy makers, but what about the users, which ultimately, we are as well? We have to consider the user view at all times. This is not necessarily the same as doing what the user is asking for however, as individual wishes and societal needs are not always aligned. Reducing pollution and congestion, as well as improving safety, unavoidably require a combination of carrots and sticks, of incentives and interventions which may not be very popular at first.

At one point Minister Smet said: "Sometimes, you have to make people happy against their will. You have to stand against the storm, swim against the tide, and at some point, change is happening and people will say 'It's good!'"

Later in the evening of the aforementioned event, we watched the Dutch documentary *Why We Cycle*, which

“
Is it nothing less than a change of culture that is needed to achieve a more sustainable transport system?”



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explores the unique Dutch cycling culture. Regular cyclists as well as researchers and architects give their personal perspective on why they cycle. What becomes evident is that the Dutch themselves see nothing special about cycling as it is so mainstream that the choice to cycle is barely reflected upon.

As the individual reasons as to why cycling is the preferred mode of choice was unpacked, we began to see perspectives that diverge from the usual mentions of health, environment and economy. Words such as "meditation" and "therapy" intermingled with reports of increased creativity, happiness and reduced absenteeism from work. Most importantly, cycling aligns with the central pillars of Dutch culture that include egalitarianism, inconspicuous consumption and freedom.

Is it nothing less than a change of culture that is needed to achieve a more sustainable transport system? To quote Pedro Gouveia from the city of Lisbon, after he watched *Why We Cycle* with us: "The physical environment shapes behaviour. Repeated behaviour is: culture. So we, as local authorities, have a huge tool in our hands that is: infrastructure."

The cover of this issue of *Thinking Cities* very neatly sums up the balancing act that cities are having to perform. Many of the articles that follow touch upon the concept of finding the perfect balance between not only the wide variety of mobility options and transport modes available to us, and how they are delivered, but also between varying degrees of practical sustainability. 🌱

User view



Credit: VK.com/Piterskii_Punk_Wall

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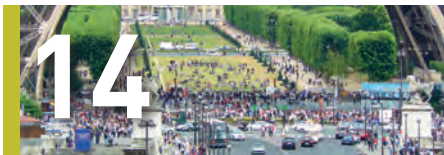
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I think that people now understand that the reason we want less cars in the city is all about the quality of life and the quality of air

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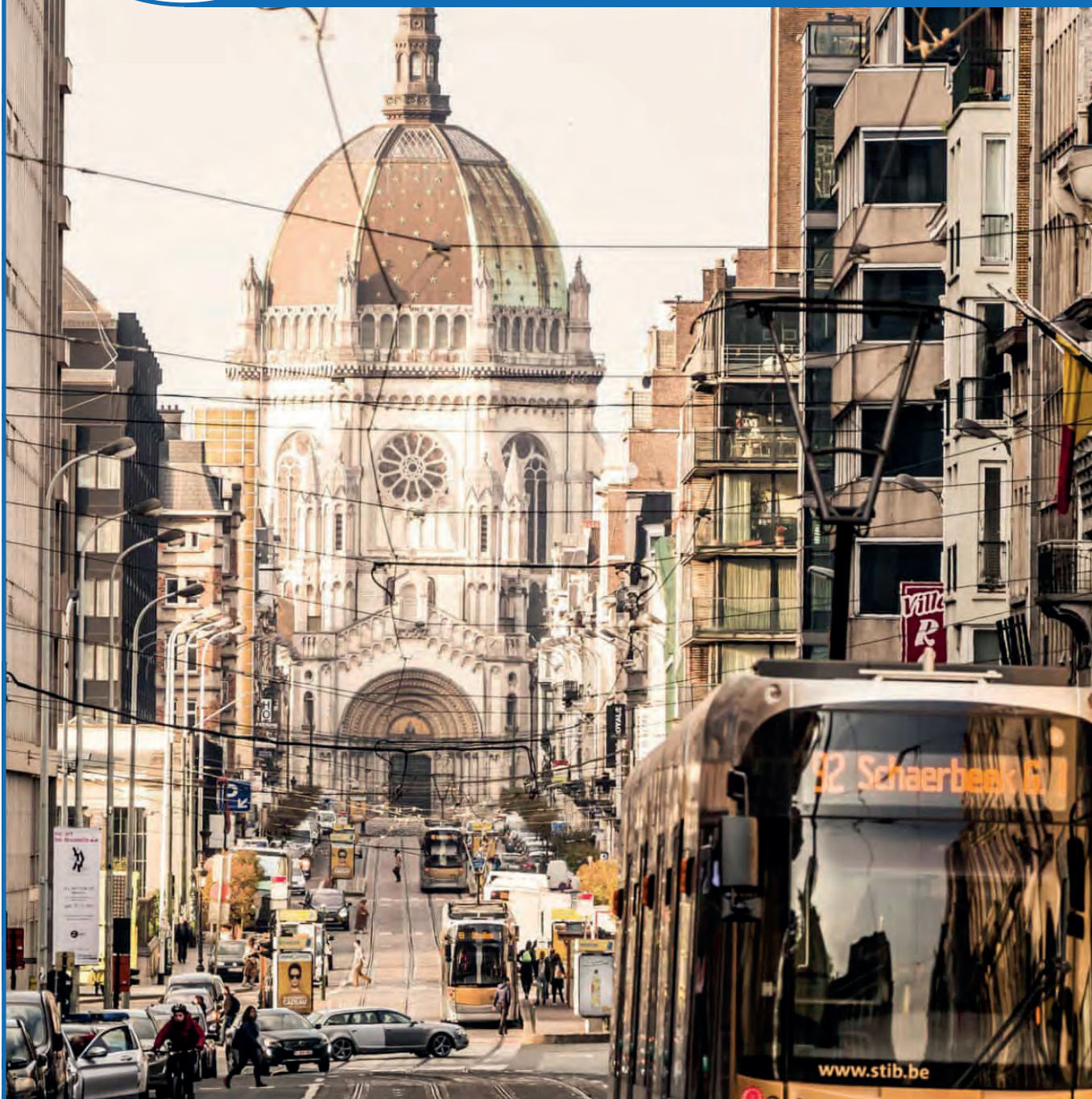
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Cityview

Senior transport officials from forward-thinking cities around the world discuss their plans for the future and how they are addressing the mobility issues that matter most to their citizens.

- o Pascal Smet, Brussels
- o Philip Broeksma, Groningen





Urban hymns



Polis' project officer **Pasquale Cancellara** talks to **Pascal Smet**, Minister of Mobility and Public Works of the Brussels Capital Region for Thinking Cities

How would you describe the overall state of urban mobility in Brussels? What are the main challenges and trends at the moment?

I think we are in transition. We used to be an exclusive city for cars, now we are transforming into a city for people: we are doing that by demolishing fly-overs, we are doing that by transforming urban highways and urban boulevards; we are making squares car-free, we are constructing dedicated cycle lanes, and investing

massively, 6.2 billion, in public transport. But we are not there yet. There is a lot of work to do, because we are coming from far: because for a long time people here in Brussels were even addicted to their cars, and now, for the very first time over the past couple of years you can see there is a change of mood in the city.

People now understand that there are too many cars, that we have to do something about them, that we need more space for pedestrians and more space for cyclists; they understand

that we need to support more cyclists and pedestrians. So, I think we are in a good way now, but the main issue will be to keep on the same path after the elections and it is not going to stop because it is all something worth fighting for.

There are still too many cars: it's a double explanation. There is still too many people, who are living in Brussels and use the car for short distance trips (less than 5 kilometers). However, they are not the main "main" problem. The main problem



People in Brussels were addicted to their cars but over the past couple of years you can see there is a change of mood in the city

is the commuters who are coming into the city with their own individual car: they do not share their cars, and consequently there is a very inefficient use of road capacity.

Since the 50s-60s cars were seeped into the city, but you can't do something like that anymore. Indeed, we are still dealing with that phenomenon. So this is what we are now doing: we have to convince commuters that they should not come by their individual cars and therefore should rather use carpooling or taking public transport. Biking will eventually be an efficient way of commuting as well, but that will take some more time. But of course, all this is mainly a federal competence - Belgium is a bit complicated as a country in terms of politics - but also the fiscal policy of the mobility and the living conditions are federal: the RER, Réseau Express Régional or Réseau Éternellement Retardé [in English this translates as Network

eternally late due to the time that is taking to build a suburban commuter/rapid transit system like the Parisian one] is federal, and the status of company cars, which has also a major effect on the total number of cars we have in the city, is federal as well. To be fair, we do not have all the competence but, within our competence, we are changing the paradigm and I think that what we are doing is extremely important.

How do you see the role of private cars in Brussels today and in the future, particularly in relation to alternative and more sustainable modes of transport such as walking, cycling, car sharing, carpooling, etc.?

In the long future cars will disappear. I am really convinced that one day we will live in a city where there will be no individual, privately owned cars. They will be replaced by automated vehicles. We have a study that

states that between 20,000 and 26,000 automated vehicles can replace all the cars in Brussels. That would be a major change, a completely different way to look into the city, and that is the reason why we are now preparing people to that, in order to promote car sharing like Drive Now, e-scooters, and e-bikes. We have also seen Jump, with its electric free-floating bicycles, arrive in Brussels. As "we are a little bit hilly" for biking, these Jump bikes are a major game-changer: one day people use them to go uptown too.

We have to free space, step by step, from cars, and convince people to share cars, because that is the future. And, for the short-distances, there will be the trotinettes (e-scooters) and bikes.

Recent research says that air pollution is killing 800,000 people a year in Europe. Brussels has recently launched a Low Emission Zone (LEZ) programme - what are its main features and what kind of impact do you expect it will have on the whole Brussels Region? Which other mobility measures do you think can be taken to fight climate change and improve air quality for all?

I think that people now understand that the reason we want less cars in the city is all about the quality of life and the quality of air. For the last few months citizens have clearly made the link between car use and air quality, therefore low emission policies are becoming more and more easier to implement: it took some time to decide it on a political level, but once it was decided there was not difficult. I think we should speed up the decisions regarding which cars are allowed to access the city and drive in it; at the beginning, this process had been fairly slow, but now it is going a bit faster, and I think we can actually speed it up a bit more.

We have also to embrace the principle that there will be no more fuel cars in Brussels by 2030: only electric,

or gas, or hydrogen. There is still a debate with the sector, so I think that it will be a major challenge for the next government. It will also be a major challenge to electrify the bus fleet, as we also know that that will cost 1.2 billion! For now, we are only buying hybrids and electric buses, but I think that in the future we will exclusively buy electric buses.

So, to be fair, the Low Emission Zone (LEZ) programme is only one of the measures we are introducing. The thing that is missing right now, and I think we really should do it although it is not my competence and I am just trying to work together with my colleagues, is to get measurements of air quality everywhere in the city, because people do not realize the problems related to bad air quality.

I think that when they will be in the Petite Ceinture, in Schuman, in the Sablon, or wherever, and they will see in real time the air quality measurements, they will wake up. I think that is something that is very urgent. We must get, like Barcelona did, real-time and app-accessible measurements of air quality everywhere in the city.

Brussels is an active member of the Polis network, where cities and regions look at how innovative solutions can help them to address urban mobility challenges. Many innovations are coming our way, at a very fast pace and all at the same time. It is also no longer the preserve of only the public sector to offer mobility services and the lines between public and private are blurring. Electrification, automation, the micromobility revolution, shared mobility services, and so on. How are you making use of these emerging trends to reach your policy goals?

First of all, we are including it and we made a new law for us to become a welcoming city through these micromobility solutions. New companies offering new micromobility services



I am really convinced that one day we will live in a city where there will be no individual, privately owned cars. They will be replaced by automated vehicles

recognized our welcoming approach and since then they all want to come to Brussels. They did not want to before and I am happy about that.

Secondly, there will be a big change in Brussels with Mobility as a Service (MaaS). Of course, with that, there will be more private operators, therefore I think it would be very important for public authorities to get inside the algorithms. Indeed, if private operators use applications with algorithms, we should be sure that what we are proposing to our citizens is really meeting their interests and not the interest of the providers.

I will give you an example: if we book a car through an app, but the application itself is made by a car rental company, the debate on neutrality would be on because of course they would try to propose you the car as a transport solution. That is what happened in Los Angeles and other cities where people started discussing these algorithms. Big change will come in the next two years, as we will

create in Brussels our new Traffic Center, and we will integrate public transport by dispatching traffic lights and traffic in general, as well as all the data of these operators. That is how we will finally start to manage traffic in Brussels. We are going to renovate a new building which will then be used to change all the software systems, too. Between now and two years time there is going to be a big change.

When working on improving Brussels' mobility, which are the cities in Europe and in the world that inspire you the most, and how do you see the role of politicians in leading the transformation in transport?

I think the role of politicians is very important because they need to have a vision and an ambition. In my case I would like to have a "One Brussels" with one ambition and one vision and not 19 different municipal visions. This is essential to convince people to give the same message. This is why it is so complicated in Brussels, because we

as a Region say something but then municipalities can say something else and so the message of the public authorities are not in unison and you need in unison messages to convince people, so I really believe that the role of politics is essential.

In all modesty, what I am doing in Brussels is not easy. I was working on a long-term, changed position, I was hit a lot but now people like it and that's also as a politician you have to believe what you are doing and to explain it and continue and stay focused, but in the end it will be good when it's a good project.

That's what happened with tram 8 and 9, the transformation of squares and the people are very happy now, whereas at the beginning they were not welcoming these transformations. And so, I take several cities as an example. Vienna is a good example, they have done great things; of course, Amsterdam, when you are going to take out all the cars from the city centre; even Madrid lately, or Copenhagen for the cycling but that's easy to say. So, I think there are many cities that inspire our work. But cities

are all different so you cannot just copy from one to another - you have to take the best practice and try to adapt it in some way to the local context.

If you had to take stock and assess your mandate as Minister of Mobility and Public Works of the Brussels Capital Region in these past five years, what do you consider your greatest successes and achievements? Is there something that you would have done differently?

The big success is the cycling lanes all along the Brussels small ring (Petite Ceinture/Kleine Ring) that is going to be a psychological change when it is finished in two years, because in Brussels if you are implementing a cycling infrastructure such as this one you first have to do work on the gas and sewer system, the water pipes, etc. Consequently it takes quite a lot of time but when it's finished in two years it will be a major change. It will be the first time where we are really taking space away from cars and giving it to cyclists and pedestrians.

What I would have done differently concerns the government agreement

where we should have included since the beginning all the streets where we want to make cycling lanes, because now we get too many discussions with the municipalities, politicians and the government who don't want to get rid of parking space and car lanes whereas it's necessary in some cases. So that is what I would have done differently: getting all in there right from the beginning.

If you were re-elected, what would be your top priorities to improve Brussels's mobility?

Consolidate the Traffic Centre, keep reducing space for cars and building a lot more dedicated bike lanes. 🚲

The role of politicians is very important because they need to have a vision and an ambition. In my case I would like to have a "One Brussels" with one ambition and one vision and not 19 different municipal ones

FYI

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The next Groningen

Francesco Ripa talks to Groningen's Deputy Mayor, **Philip Broeksma**, about how the past is informing the future

A brilliant mix of medieval buildings and breath-taking modern architecture. A fort-shaped wall around the city centre, conceived to underline the city's commercial strength and protect it from attacks. A university dating from the 17th century that started as a centre for religious education and now attracts students from all over the world. And bicycles, of course. A lot of bicycles.

It's Groningen, a city of roughly 200,000 inhabitants in the Northern

Netherlands. Founded around 950 AD, the city with a turbulent past is betting heavily on sustainability and innovation to secure itself a bright future.

This year, Groningen is hosting the sixth edition of the European Conference on Sustainable Urban Mobility Plans, a yearly conference supported by the European Commission.

For the occasion, *Thinking Cities* sat down with Mr Philip Broeksma, Deputy Mayor for Transport and

Mobility at the City of Groningen, to discuss the city's current plans and ambitions in terms of mobility.

A few years ago, Groningen started a process of strategic thinking on how to manage the city's expansion in a sustainable way. A document called "The Next City" sets out Groningen's vision for 2030.

***Thinking Cities (TC):* Deputy Mayor Broeksma, what does the Next Groningen look like?**

Deputy Mayor Broeksma (PB): ‘The Next City Groningen’ addresses the five challenges the city faces: facilitating growth, with 20,000 new homes needed and 15,000 new jobs; accelerating the energy transition to become CO₂-neutral; and staying an inclusive city with opportunities for all people. The central theme is quality of life. This is also a theme in the new municipal coalition agreement, “Healthy, green and happy Groningen”.

Groningen has always been a compact city and the Next Groningen will remain compact in the future, too. We are planning to build the new homes inside the city, mainly redeveloping former industrial areas. This will stimulate walking and cycling and prevent unnecessary car trips. The countryside will stay green and open, providing a great way for recreation and sustainable agriculture. The city has also taken great steps to become CO₂-neutral by 2035, for example by providing renewable energy (heat and electricity) instead of natural gas to homes and companies.

TC: What role does sustainable urban mobility play in Groningen’s 2030 strategy?

PB: Sustainability is one of the key elements of Groningen’s strategy ‘The Next City’. To facilitate growth and stay a compact city, a sustainable and emission-free urban transport system is essential. We’re achieving this by following the hierarchy of modal transport: walking and cycling come first, followed by stimulating and facilitating public transport.

On the bottom are motorised vehicles such as cars and trucks. The results of this policy and approach is that in Groningen more than 60 percent of the inner-city movements are done by bicycle. Therefore, Groningen already has in base a fairly sustainable system.



Groningen has always been a compact city and the Next Groningen will remain compact in the future, too. We are planning to build the new homes inside the city, mainly redeveloping former industrial areas

TC: What is Groningen doing to comply with EU climate standards in terms of curbing CO₂ emissions and reducing traffic?

PB: Our ambitious goal is to have a CO₂-neutral and emission-free traffic system in our city not later than 2035. That is why we stimulate walking, cycling and public transport. Almost all buses will be powered by green electricity or green hydrogen from December 2019 onwards, reducing their CO₂ output by a vast 90%. From 2023 all the school taxis and most of the regular taxis will be emissions-free. Most of our own vehicles (cars, vans, garbage trucks, etc.) will be emissions-free by 2025. We are creating more public space in the city, for example by expanding the car-free zone (which is already quite large) and reducing the

number of parking lots and increasing the amount of parking lots for shared vehicles. Everyone with an electric car can opt for a free public charging point near their home. To create more space and a healthy environment in the city centre, the city also plans to enforce zero-emission city logistics by 2025, as a step up towards a complete zero-emission inner city by 2030.

TC: Groningen is home to a vibrant academic and innovation community. How does the city benefit from the cooperation with knowledge institutions and innovative start-ups in the mobility sector?

PB: In late 2018, the province of Groningen, the municipality of Groningen and the University of Groningen, the Hanze University

of Applied Sciences and Noorderpoort signed a letter of intent to work towards the establishment of the Mobility Innovation Center (MIC). In this centre, unique to the Netherlands, these parties and business life will collaborate in the field of smart, sustainable and innovative mobility. The opening of the centre is expected in the middle of 2019.

TC: Groningen is now widely known as a great city for cycling, but it has not always been like that. A crucial shift towards cycling as a means of transport happened in the 1970s, when car access to most of the city centre was restricted. How did that happen?

PB: The implementation of the Traffic Circulation Plan (TCP) in Groningen was done more than 40 years ago. In the 1960s and 1970s the number and use of cars grew dramatically, also in Groningen. To accommodate this growth, Groningen made plans for breakthroughs and the demolition of houses and even whole housing areas. However, things changed with the 1972 elections. The new left-wing city council made an alternative plan, the Traffic Circulation Plan, or TCP. The main goal of the plan was to decrease the car traffic in the city, especially in the city centre, and to stimulate the use of bicycles and buses.

One of the most important conditions for the implementation of the plan was the realisation of two bypass roads: one existing bypass road circumventing the inner city, the Diepenring, was needed for the accessibility of carparks, and a new bypass road was needed for through-traffic.

The second condition was the development and building of new car parks around rather than within the city centre, with the aim to reduce the number of cars.

The four sectors were chosen regarding the lay-out of the city

The 6th Conference on Sustainable Urban Mobility Planse

The mobility experts, practitioners and decision-makers that will gather in Groningen at the 6th Conference on Sustainable Urban Mobility Plans will have the privilege to experience first-hand the result of Groningen's approach to sustainable urban mobility.

The sixth in the series of EU-backed conferences on Sustainable Urban Mobility Plans, or SUMP, this year's edition in Groningen will focus on Planning for sustainable and active cities. A highlight of the event will be the debate on the revised SUMP guidelines, a document that will guide local authorities through the SUMP process in the framework of an ever-changing urban mobility landscape.



The main goal of the plan was to decrease the car traffic in the city, especially in the city centre, and to stimulate the use of bicycles and buses

centre. The Vismarkt and the Grote Markt are the heart of that city centre and the heart of the four sectors. Many streets were turned into one-way streets, making little circuits. After the Traffic Circulation Plan, cars still could go to the city centre, but couldn't go through it anymore. Of course, these boundaries don't exist for cyclists." 🚲

FYI

Philip Broeksma is Deputy Mayor for Traffic and Transportation at the City of Groningen.

Francesco Ripa is Communication and Project Officer at Polis.

This section looks at the impact that urban and regional mobility has on the environment and on health, and how the adverse impact can be reduced

Environment and Health

- o Paris
- o Amsterdam
- o Soft Mobility
- o Johannesburg
- o Green Retail
- o Stuttgart





To visualise the invisible: air quality mapping goes mobile on the streets of Paris

Valeo is taking its expertise in air quality detection for passengers and putting it to good use for citizens. The automotive supplier is using mobile sensors to generate dynamic, full-scale mapping of outside air quality levels in urban areas. For 28 weeks in Paris, the company equipped a fleet of 20 vehicles to track and transmit data in real time, compiling more than 28 million pollution data points and covering 80% of Parisian streets. **Marion Deveycx** reports



Air Quality has been catapulted to centre stage as one of Europe's primary concerns for urban living. A large majority of Europeans believe that air pollution is the most alarming environmental issue we face. Likewise, the European Commission is addressing health risks associated with atmospheric pollution through increased regulatory pressures on European states and local authorities.

To meet these challenges, authorities in Paris have taken significant measures, like creating the Crit'air programme, which restricts authorization to vehicles to drive within city limits based on their air-quality label. The objective is to convince drivers to use cleaner vehicles and

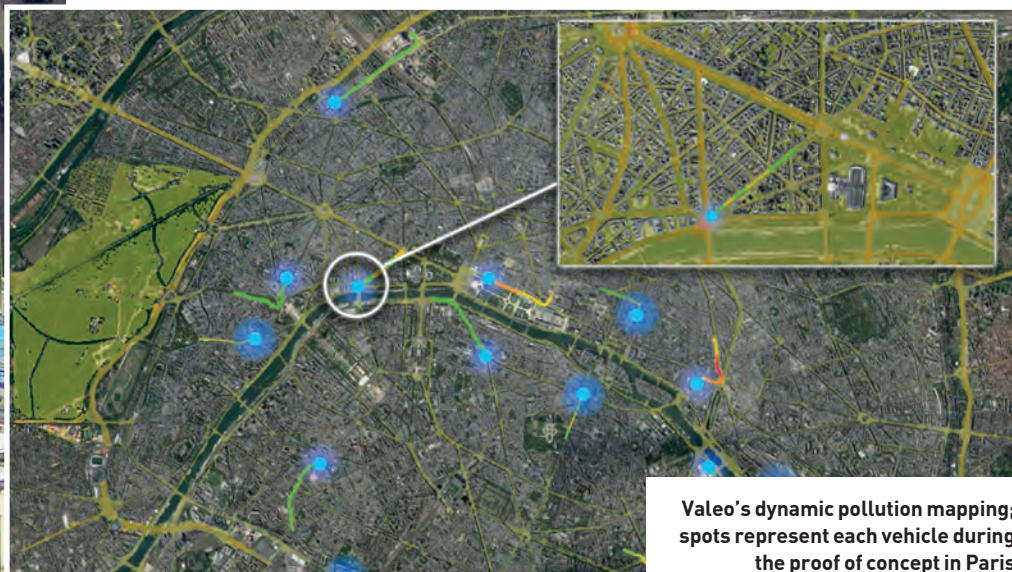
thus contribute to reducing atmospheric pollution on peak-pollution days.

CURRENT AIR QUALITY INDICES

Today France has its own Air Quality Index, reinforced by the European Air Index, called "CITEAIR, which both communicate pollution levels to the public. But existing models have certain limits, as they are based on static monitoring stations and on an average estimation of pollution levels over a given time period (1 hour in Paris).

MOBILE MAPPING WITH VALEO SENSORS

As a global leader in air quality management, Valeo anticipates

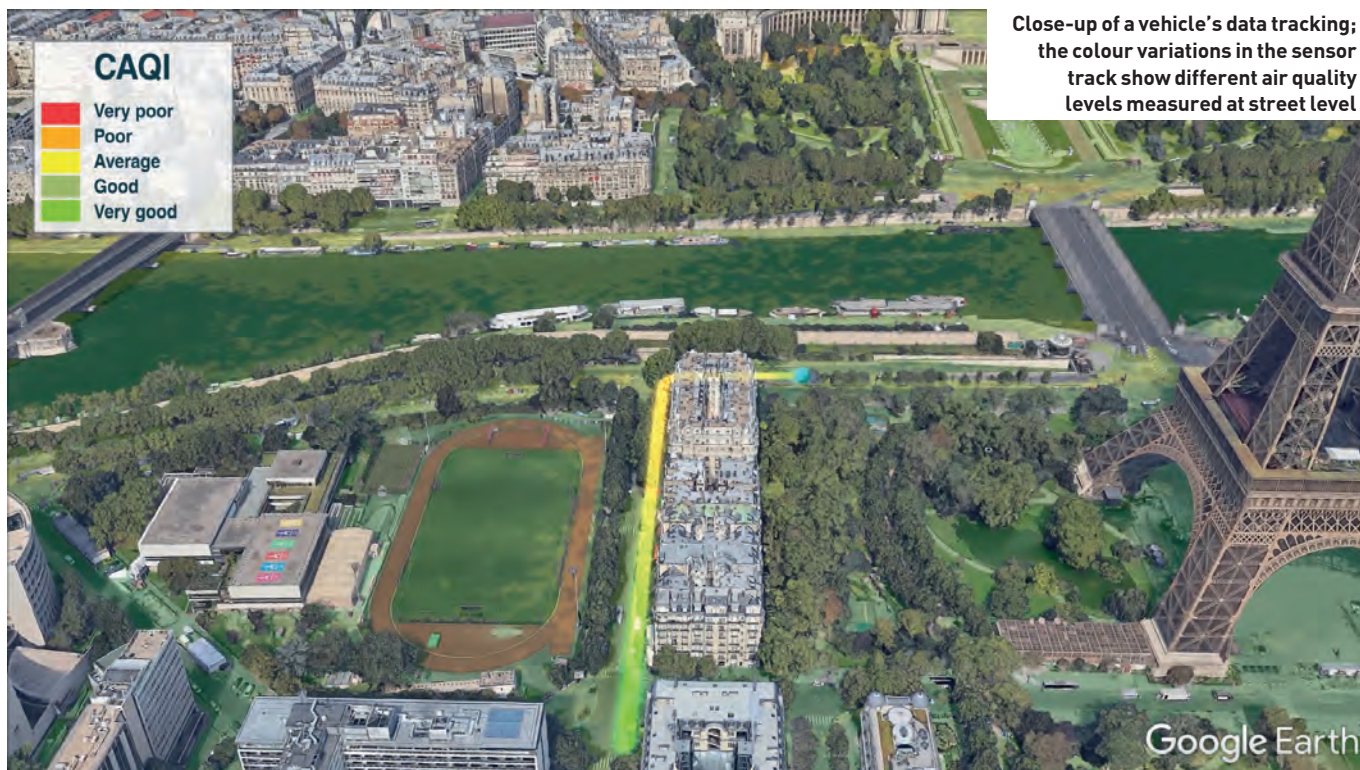


Valeo's dynamic pollution mapping; spots represent each vehicle during the proof of concept in Paris

What is an Air Quality Index?

An Air Quality Index (AQI) is a model used by local authorities to forecast pollution levels, so that the public can take necessary precautions to protect themselves during pollution peaks. The higher the AQI index, the more dangerous pollution levels may be. Different regions around the world have their own air quality indices, according to different national air quality standards.

The AQI can increase due to a number of reasons, including an increase of air emissions, or a lack of dilution of air pollutants, such as stagnant air due to high temperatures or low wind.



long-term needs by developing innovative technical solutions for today's growing emission reduction ecological challenges.

The company decided to put its expertise to work through a public-private initiative, conducting a proof of concept in which 20 electric vehicles were equipped with sensors to collect air quality data throughout the streets of Paris.

Over the span of 28 weeks, these vehicles crisscrossed Parisian neighbourhoods, collecting and delivering real-time data on pollutant concentrations in a hyperlocalized way.

By using mobile sensors, Valeo's model is able to generate a dynamic and highly accurate monitoring of air quality in real time. The experiment also gained a more precise and dynamic understanding of how air pollution develops, concentrates, appears and disappears.

The sensors embedded in the fleet enable Valeo to build an "Air Quality Index" covering an exhaustive range

of pollutants, which aggregates both data from the existing stations and from Valeo's own air quality sensors. This forms a detailed mapping grid based on high-frequency data collection.

A PRECISE AIR-QUALITY INDEX IN REAL TIME

To develop its High Definition Pollution Map, Valeo teamed up with two leading partners. EcoLogicSense, a TERA Group company, co-developed the sensors, and ARIA, specialised in the development of modelling algorithms for atmospheric environments, provided the mapping solution.

HOW IT WORKS

The Valeo sensors are positioned at the air-intake level of the vehicle in order to meet functional and operational constraints – such as extreme heat, vibration and humidity – and thus allow for the development of mass scale production. The sensors provide the precise measurements

of several pollutants needed to accurately assess air quality: fine particles (PM2.5, PM10), sulphur and nitrogen dioxide, ozone and carbon monoxide.

Data concerning traffic estimates, weather forecasts and pollutant emissions are first pulled together to generate a base mapping. The data provided by Valeo mobile sensors – transmitted every second – are then used to complete and enrich this database and refine the modelling in real time. Each vehicle can thus deliver an instant mapping of the air quality surrounding it. And since urban air quality can significantly vary within a short distance and short time frame, instant mobile monitoring means a more precise view of which areas are most or least impacted.

Valeo is now leveraging miniaturisation technology to fine-tune its sensors and plans on bringing the technology to the market by the end of 2020. The technology can be integrated into a wide range of vehicle

types for a number of mobile applications, including taxis, buses, tramways and small electric cars.

MOBILE AIR QUALITY APPS FOR URBANITES

The benefits of air-quality mapping will extend far beyond regulators and car manufacturers. Valeo plans to share this real-time information with everyday urbanites as well.

This will likely come in the form of a mobile app that combines air-quality tracking with other metrics that can impact passenger itinerary choices, such as traffic incidents, congestion and roadwork. By merging all this data together, the app proposes alternate routes, thus limiting the exposure of users – pedestrians, cyclists and drivers – to excessive pollution.

ADDRESSING THE CONCERNS OF LOCAL COMMUNITIES

To further transform technological innovation into concrete actions for communities, Valeo is keen on working with other cities and authorities – notably, the European Commission – to leverage substantial results in terms of air quality monitoring in large cities.

Findings from this Proof of Concept

Valeo 2019

Valeo is an automotive supplier, partner to all automakers worldwide. As a technology company, Valeo proposes innovative products and systems that contribute to the reduction of CO₂ emissions and to the development of intuitive driving. In 2018, the Group generated sales of 19.3 billion euros and invested 13% of its original equipment sales in Research and Development. At December 31, 2018, Valeo had 186 plants, 21 research centers, 38 development centers and 15 distribution platforms, and employed 113,600 people in 33 countries worldwide. Valeo is listed on the Paris stock exchange and is a member of the CAC 40 index.

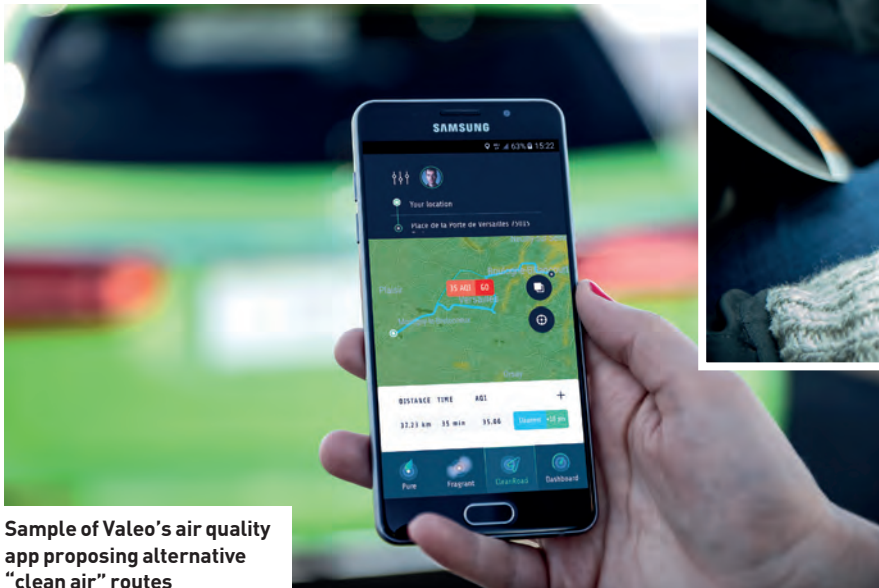
Valeo Thermal Systems is one of Valeo’s four Business Groups. The strategic objectives of the Thermal Systems Business Group are three-fold: reduce harmful emissions from vehicles with internal combustion engines, increase driving range and battery life for hybrid and electric vehicles and promote passenger health and well-being.

may also incite communities to consider corrective adjustments to improve air quality in particularly sensitive areas for pedestrians, such as schools, parks and bike paths, and monitor the real-time impact of these adjustments.

Ultimately, it’s all about having the tools and data necessary to make the right strategic planning decisions in terms of urban mobility, whether it be deviating certain routes, flexing public transportation according to local pollution

peaks or implementing new, dynamic traffic-management tools.

Based on the results of the Paris study, other European cities are expressing strong interest in the Valeo solution. In the near future, as people look to technology and intelligence to live healthier lives, Valeo is ideally positioned to make the invisible aspects of pollution visible to everyday citizens.



Sample of Valeo’s air quality app proposing alternative “clean air” routes



FYI

Marion Deveycx is Air Quality Director at Valeo Thermal Systems



The Amsterdam approach

Gerald Brugman and **Filiz Çatalgöl** on being creative, innovative and inclusive in reducing the footprint of the car in Amsterdam

The Frans Halsbuurt, a 19th century inner-city neighborhood in Amsterdam, is characterized by its narrow streets. Yet, despite the scarce public space, parked cars occupy a great share of the available space. Although this dominance of cars already activated residents to protest for change as early as in the 1970s, the car stayed a dominant player in the streets during the decades that followed. A second

In a growing and increasingly popular city like Amsterdam, there is simply not enough space to accommodate bicycles, pedestrians, public transport and cars simultaneously

removal of all 600 on street parking spots (with the exemption of disabled parking, cargo spots, and space for shared car systems). This resolution was adopted, and the city government has taken a great leap forward to realize their ambition of a more traffic-calm Amsterdam's city centre. In this article we elaborate on the ambition to reduce car traffic, discussing the Agenda Amsterdam Autoluw and the 'Amsterdam approach' to realize this ambition.

THE AGENDA AMSTERDAM AUTOLUW

Amsterdam is more popular than ever, with a yearly growth of 10,000 residents per year since 2008 and an all-time high number of visitors (from 11 million visitors in 2005 to 18 million visitors in 2016¹). The population is expected to reach 862,987 in 2019. After a brief pause during the financial crisis of 2008, the economy is buzzing and the city is growing rapidly.

This popularity comes with a cost, putting pressure on Amsterdam's housing market, mobility and public space. Especially in Amsterdam's historical city center, with its world famous canals, the increase in people and traffic threatens the livability and accessibility of public space.

With the election of a new city government in 2018, the College of Mayor and Alderpersons presented ambitious approaches to protect the city's quality of life. One of the suggested policy agendas promotes a new vision on mobility, implementing so-called 'autoluw' (roughly translated, 'fewer cars') measures to safeguard the city's livability: "It is

time for decisions, in which we prioritize pedestrians, cyclists and public transport, and in which Amsterdam reduces car traffic".²

The city government tries to free up space to play and recreate. This does not imply a 'carexit'. It is realistically acknowledged that a city cannot function properly without cars. The ambition respects the position of residents and visitors with special needs, elderly, certain entrepreneurs and the role of city logistics. However, the self-evidence of private cars and car traffic is being questioned. In a growing and increasingly popular city like Amsterdam, there is simply not enough space to accommodate bicycles, pedestrians, public transport and cars simultaneously.³

The reduction of cars in the city is not a new phenomenon. Significant steps have been taken since the 1980s. One of the biggest measures was the implementation of parking fees in 1964. In recent decades traffic-calming was realized by creating park & ride hubs on the city outskirts and discouraging go-through traffic in the city center by designing 'cuts' in the traffic circulation. More recently, traffic-calming measures are realized by redesigning some high-density mixed shopping and residential streets, in which the car now plays a less dominant role. Currently, a bike street is under construction, forming an inner-city ring road where bikes are the main user and cars are 'guests'.

The city is continuing this line of pursuit with future measures. The new direction will be captured in the Agenda Amsterdam Autoluw, a long



round of civic initiative has taken place and change is now around the corner.

With the opening of a new underground parking facility in 2018 on the border of the Frans Halsbuurt, Amsterdam's city government aimed to cut 273 of the 600 on-street parking spots. Some local residents and business owners asked for higher ambitions, which resulted in three council members to call for a full

term policy currently designed and expected to be presented to the City Council for approval in the Fall of 2019. The Agenda will consist out of four pillars. The first pillar is aimed at “choosing clean, healthy and shared transport”, with multiplying the growing trend among employers on introducing alternatives modes of transport to their employees. The city aims to increase investments, in sidewalks, ‘bike streets’ and public transport, in both the city and the region.

The second pillar focuses on “creating and utilizing space” for pedestrians, including people with special needs, cyclists, public transport, greenery, and room to play and recreate.

This includes the ambition to eliminate 7000 to 10.000 parking spots. The third pillar acknowledges the conditionality of these measures, aiming for a good fit between proposed measures and specific areas in the city. The fourth and final pillar aims for state-of-the art techniques for effective law enforcements.

THE (INTER)NATIONAL JOURNEY OF THE AGENDA AMSTERDAM AUTOLUW PROCESS

To design a long-term sustainable policy such as the Agenda Amsterdam Autoluw, Amsterdam aims to include as much expertise as possible, not only from policy experts, but also by including the voice of the public. What characterizes the Amsterdam approach is the reciprocal acquirement of knowledge and creating a dialogue on several levels: both local, national and international as well as online and offline.

Cooperating closely with policymakers in the field of car traffic reduction and inner city livability, the City of Amsterdam has collected experiences and practices from other Dutch cities and abroad.

To make sure Amsterdam builds on best, and worst, practices from other cities with similar challenges, the director of traffic and public space asked a group of trainees of the City of Amsterdam⁴ to

collect insights from other Dutch and European cities. In visits to Groningen, Utrecht, Den Bosch, Den Haag, Hamburg, Oslo, Copenhagen and Munich, a wide variety of experts and interests groups were interviewed. The most important lessons that emerged from this empirical research will function as inspiration for the Agenda.

Of course, knowledge exchange is never a one-way street. Therefore, the City of Amsterdam organized an international expert meet-up that took place from 13-15 February 2019. Experts from the Netherlands and abroad gathered, together with policy makers of Amsterdam, to share experiences and practices with traffic-calming measures.

A direct outcome of the meetup was the creation of new connections and the formulation of several key lessons on the importance of stakeholder-management, framing, alternatives modes of transport, the application of a holistic approach and behavioral interventions. Sharing



experience, knowledge and connections on an international level appeared to be of great value. The positive feedback of the participants showed it was not only valuable for Amsterdam but also for the other cities involved.

Another very important trajectory in the process of designing the Agenda, and with the implementation of measures, is actively involving residents and entrepreneurs. The City of Amsterdam experiments with new approaches towards civic participation. In this case, 'Amsterdammers' were informed and asked to share ideas during public meetings. The dialogue is also facilitated online through the establishment of a digital platform where citizens are encouraged to join the conversation on traffic-calming matters and livability.

On a more micro level, involvement of residents and entrepreneurs is currently in progress for the redesign of the previous mentioned Frans Halsbuurt. The starting point in the process was to ask residents, during various meetings and with a door-to-door survey, how they prefer to be involved in the process. Based on that response the actual participation process was designed and outlined. So, a 'start' before the actual start.

After that kick-off, policy-makers shared the necessary requirements, followed by sessions, and again a door-to-door survey, for residents to collectively define the design principles they find important. Next follows the co-designing process, with residents and urban designers co-creating the neighborhood's public space.

ARE WE THERE YET?

In this article, we have illuminated the Amsterdam approach towards creating a livable city by diminishing the presence of cars and introducing traffic-calming measures. They will be shared during the presentation of the Agenda Amsterdam



The international expert meet-up that took place in Amsterdam earlier this year

Autoluw in the Fall of 2019. In the meantime, many measures that serve as input for the Agenda are already implemented. This involves a wide range of measures that can be found on the website of the City of Amsterdam⁵. Furthermore, a number of events have taken place to exchange knowledge, inspiration and experiences on a local, national and an international level. The trajectory of involving the people of Amsterdam in the decision-making process is also a significant part of the Amsterdam approach. The city is buzzing with ideas and knowledge

that should be maximally utilized when creating policy solutions or interventions.

The City of Amsterdam is in the midst of this journey towards a more livable future. The Frans Halsbuurt is a telling example of this ambition: a traffic-calm area initiated and shaped by Amsterdammers. The road towards a livable and lovely city is paved with many (more) creative, innovative and inclusive solutions aimed at reducing the footprint of the car in Amsterdam. Since, as always, the journey is as spectacular as the final destination. 🌍

NOTES

[1] "Amsterdam zou de drukte nu echt te lijf gaan – en, werkt het?" NRC, 20th of January 2018

[2] Coalition agreement "A new Spring and a new Sound". City of Amsterdam, May 2018.

[3] Website of the City of Amsterdam. 22nd of March 2019.

[4] The traineeship of the City of Amsterdam is a 2-year education and training programme, which incorporates work experience for recently graduated young professionals. During the programme, the trainees carry out both individual as well as group assignments aimed at various current urban issues.

[5] <https://www.amsterdam.nl/en/policy/policy-traffic/>

FYI

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Step by step: getting to the airport sustainably

Walking and cycling can certainly be a step forward towards a future of sustainable mobility in and around airports. **Marius Nicolescu** looks at how one EU project is pushing soft mobility forward

In many cities, active mobility (walking, cycling, etc.) is encouraged and is one of the top options to relieve congestion and improve the citizens' quality of life. New active mobility options such as e-scooters and e-bikes are increasingly popular. At the same time, more and more people are leaving the car behind to use a bike on their daily commutes. Airport

regions want to join in and are looking at ways in which active mobility can improve access to airports.

Indeed, taking a bike or e-scooter, or walking to the airport while dragging a suitcase does not sound like the most efficient method of reaching the terminal. That is if you are in Paris or London. However, there are some major European airports

located in the close vicinity of larger dense urban areas. Take Geneva Airport, for example, that is only 4km from the city center or Poznan's, which is 7km away.

In cases similar to Geneva and Poznan (and we can think of many others, especially smaller airports around the continent), urban density becomes a great asset to facilitate

active mobility. Yet, the main challenge in these areas remains the lack of infrastructure to facilitate active mobility. However, this is changing.

LAIRA PROJECT – INTEGRATED ACTIVE MOBILITY INTO AIRPORT MOBILITY

As part of an Interreg Central Europe project called LAirA (Landside Airport Accessibility), a group of airports and airport regions are looking at the best ways to alleviate CO₂ emission and congestion from the many trips we all take to the airport. Although the next time you fly into a major European hub the chances are that you won't be hopping on a bike to get to where you need to be, this can be different for the many people working at the airport or those with little luggage and a sense for adventure.

In Poznan, for example, the regional Sustainable Urban Mobility Plan not only aims at integrating the railway system better but also connecting with the network of bicycle paths. The airport is offering bike docking facilities for employees and locals. Nearly 1 in 10 people travelling to the airport there come by bike or by foot.

CHALLENGES – SECURITY, INFRASTRUCTURE, COLLABORATION

Yet, there is much work ahead. In many places, due to security concerns, as well as planning done with only road-based public transport in mind, it is virtually impossible to reach an airport by walking or cycling. As pedestrians are given more space in urban areas, cycle paths are developed at an astonishing rate throughout European cities, reaching the airport by bike is something that active mobility can certainly contribute to.

How do we move forward on this? The challenge at the moment is two-fold. On the one side, developing joint active mobility action plans need coordination among several

In Poznan, for example, the regional Sustainable Urban Mobility Plan not only aims at integrating the railway system better but also connecting with the network of bicycle paths



stakeholders at the airport as well as outside of the airport area. Outside the airport area, depending on the administrative system of the country, the municipalities or other regional coordinating entities play a key role in planning, implementing and coordinating actions which will make active mobility accessible.

On the other hand, the people travelling to the airport, and in this case realistically it will be mostly

employees and few passengers, need to know and be informed about the advantages of these new mobility options. A mindset change campaign can come from companies on the airport platform which should encourage and incentivize this.

A SOLUTION FOR EMPLOYEES NOT PROPERLY COVERED BY PUBLIC TRANSPORT

In many cases, airport employees

Measures LAirA project recommends developing efficient active mobility for airports

Infrastructural development

- Revising existing urban development and master plans in the functional urban areas of the airport to facilitate the accessibility by active mobility modes;
- Enhancing multi-modal transportation with special focus on active mobility modes in regional and urban SUMP / mobility plans;
- Building main infrastructure corridors (network integration) for cycling and walking in the direction of the airport.

Enhance existing infrastructural pedestrian and cyclist network

Making the commuting easier and better is a key in making soft modes more attractive. This entails:

- Increasing safety along the roads and at crossings;
- Improve the quality of roads thus increasing the comfort of commuting (e.g. barrier-free transport);
- Give priority of equal chances to 'soft' modes (waiting time at crossings, shortcuts, etc.), comfort of bicycle and pedestrian roads, crossings (quality, waiting time etc.);
- Allowing the use of active mobility and enhancing active mobility infrastructure on airport grounds.

Improving auxiliary infrastructure at the workplace

In some respects, human-powered modes may be less comfortable when arriving to the workplace due to the required physical effort.

- Creating changing and shower rooms for employees and providing them lockers;
- Establishing safe parking facilities for bicycles and scooters, etc. at a convenient distance from the workplace;
- Making all pedestrian roads barrier-free

Awareness raising activities, promotion of active mobility modes

Promotion of active mobility modes and the lifestyle related to them. These activities play a vital role in getting familiar with the use of these modes, new improvements other than the conventional car use.

- Participation of airports in awareness raising activities of thematic days such as EU Mobility Week, Cycle to work campaign, Earth Day, etc.
- Developing community programmes, site-visits for new soft mobility modes
- Celebrating successes and achievements
- Incentivizing the use of active mobility modes
- Establishing community/corporate bike sharing system
- Creating a mobility smart phone app for employees to track their achievements
- Offering platforms to report best routes to airport
- Gamification (the application of typical elements of game playing (e.g. point scoring, competition with others, rules of play) to other areas of activity, typically encourage engagement with a product or service)

drive to work because of odd working hours not directly correlated with the flights schedules, or because it is more convenient, as public transport mainly connects city centres with airport terminals, and rarely is able to provide a proper catchment areas for employees who may be from the surrounding rural areas. This is where active mobility could be a great solution, and with the advent of soft modes of transport that require less physical effort (like e-scooters and e-bikes), it can prove to be a life-changer for many people.

It is indeed possible to imagine a future with many more people cycling and walking to airports, with enough collaboration and infrastructure development in those areas. The focus of the LAirA partner airports is getting increasingly into the cyclist mobility development. Without safe and seamless bike road infrastructure cycling cannot flourish. In case the infrastructure exists other auxiliary, but nonetheless, crucial infrastructural elements are necessary. These include proper bike facilities supporting cycling habits at the airport, such as safe storage facilities, changing and shower rooms.

In all cases, the fundamental cyclist road infrastructure depends on the regional and local authorities. However, indirect impact coming from the good relationship between the airport and the other stakeholders could result in strong support for this goal to be achieved. 🕒

FYI

Marius Nicolescu is the Secretary General of Airport Regions Conference, the Communication Manager of the LAirA project.

LAirA website

<http://bit.ly/LAIRAproject>

<https://www.interreg-central.eu/Content.Node/LAirA.html>

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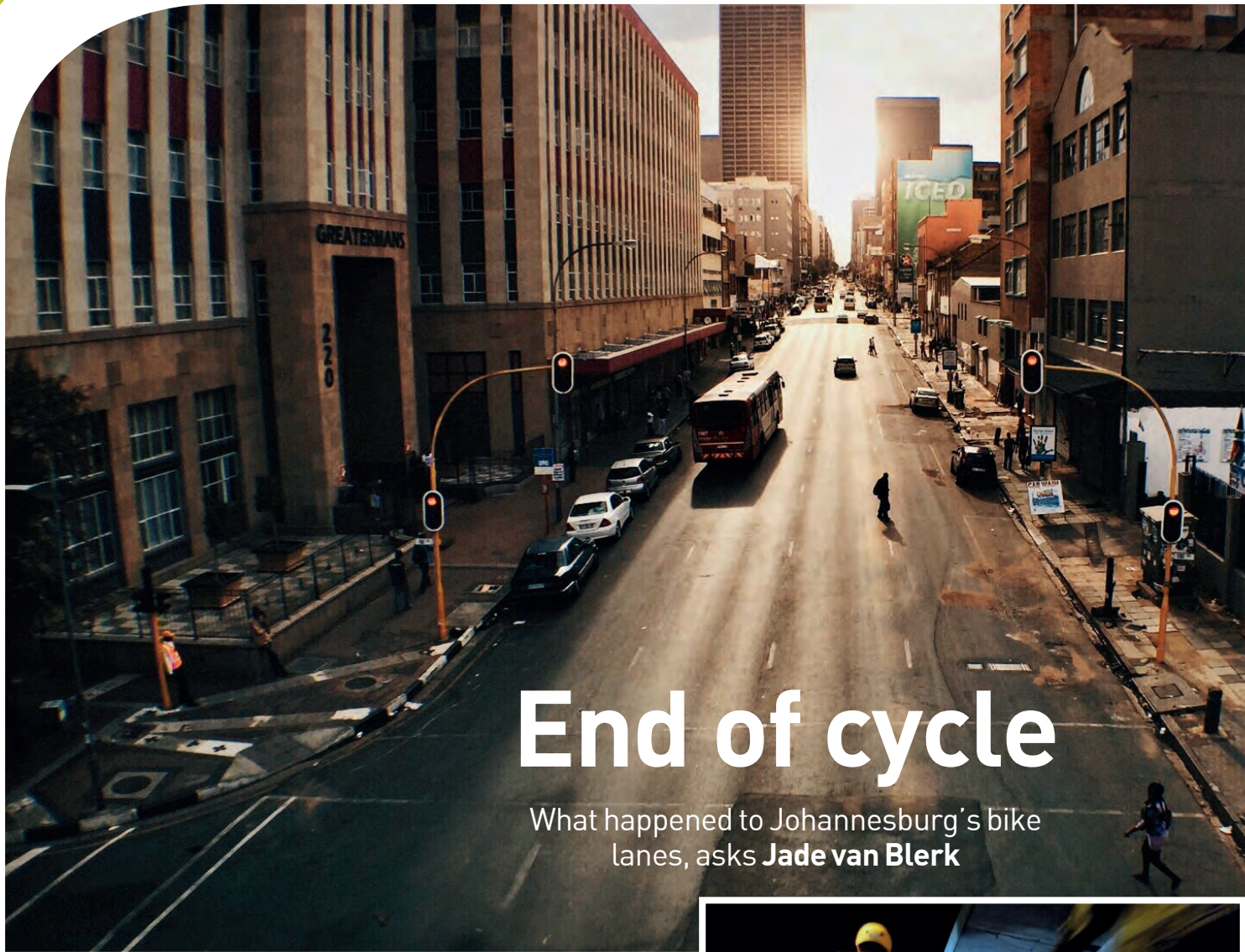
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End of cycle

What happened to Johannesburg's bike lanes, asks **Jade van Blerk**

When one mentions the city of Johannesburg, many things may come to mind but cycling is most likely not one of them. Instead, residents of South Africa's most populous city are all too familiar with the high levels of traffic and congestion that saw Johannesburg ranked the fifth most painful commuter experience in 2016. This ranking was out of a survey of 20 international cities.

Automobiles, mini-bus taxis, broken traffic lights and general chaos during peak rush hour times reflect the legacy of the Apartheid-era spatial planning and a high level of

motorised vehicle dependency. Apartheid's policies of racial segregation resulted in an urban form characterised by multiple inefficiencies such as unequal access to economic and social opportunities; the location of primarily black, lower income areas long distances away from social amenities and business districts as well as a public transport system inadequate for the needs of the population. Naturally, addressing these inequalities through urban planning and the development of the transport system have been key



focuses of the new dispensation. But how does one address these issues in a city blighted by infrastructure designed to segregate and keep people apart?



The development of cycling infrastructure in Johannesburg formed part of an attempt to improve mobility for its poorest residents. The cycle lanes were also intended to improve 'liveability' which was a relatively new conversation in South Africa at the time. The first cycle lanes began appearing around 2013, usually alongside larger projects such as Bus Rapid Transit systems, high

speed commuter rail and new sidewalks. But in a country where very few citizens use bicycles to commute, the lanes were largely misused and misunderstood. The local government appeared to have adopted a 'build it and they will come' attitude to infrastructure development and therefore did not implement any real efforts to educate the public about cycling or cycle lanes.

BARRIERS TO SUCCESS

The failure of the city to communicate the intention behind the development of the bicycle lanes and their lack of use made them an easy political target. Leaders of the opposition labelled the unused bike lanes as symbols of decadence put forward by the out of touch ANC ruling party. The lanes were associated with wealthy middle to upper class, primarily white South Africans who cycle for leisure. This unfortunate development undermined the potential of the project to increase mobility for the city's marginalised residents. With the election of the current opposition mayor, all planned cycle lane developments were halted. Only those that were already under construction were allowed to be carried

through to completion.

A further critique of the planned cycle lane infrastructure was that it was not the correct solution to Johannesburg's congestion problem. It has been said that this particular measure was an example of transferring a successful initiative from another country and

implementing it locally without an appreciation of the unique structure of Johannesburg's urban framework. In reality most of the city's lower income workforce live on its outskirts and travel long distances to reach their place of employment, making cycling the entire distance unfeasible in most cases. People that possess the finances to live closer to the economic centres are less incentivised by any potential savings offered by cycling and the car still remains an important status symbol in the country. Public health arguments that promote physical activity hold some validity, however the very real threat of crime and limited road safety are further barriers.

OVERCOMING THE BARRIERS

Despite the seemingly insurmountable obstacles that cycling faces in Johannesburg there are a number of grassroots organisations and initiatives looking to promote this mode. The Johannesburg Urban Cyclists Association (JUCA) promotes the use of the bicycle as day-to-day urban transportation. Their goal is to make the city bike friendly by pushing for both societal and infrastructural transformation. They have published the Johannesburg Bicycle Map which is widely distributed for free. The map provides information about recommended commuter routes and is open for contributions from the public. The purely volunteer-based

In a country where very few citizens use bicycles to commute, the lanes were largely misused and misunderstood

organisation focuses on lobbying the city of Johannesburg to implement its bicycle strategy and to change by-laws in support of cycling.

'Critical Mass Jozi', founded by James Happe and Melvin Neale, is a night time group ride that takes place in the city on the last Friday of every month. The initiative started in 2007 with a group of 20 cyclists riding into some of the city's most dangerous and 'no go' areas. Twelve years later the cycling group numbers over 1000 and the event has given rise to a number of other similar offshoots, such as the annual Freedom ride, full moon rides and women-only rides.

In the historically black township of Soweto on the western edge of Johannesburg cycling is being used to break through social barriers. Lebo Mahape runs a bicycle tour company which he founded in 2006. He invites tourists to experience the community that boasts famous former residents such as President Nelson Mandela from the perspective of bicycles rather than a tour bus. Mahape believes this promotes equality between locals and tourists, and allows for a richer experience for all. His company also provides free tours to local residents so that they are able to learn new things about their own area.

Bicycle Stokvel is a collective launched by Lesego Konupi, Lungile Mofokeng, Kgotso Mdakani and Bongani Maleswena. The concept behind the movement is to help young people living in impoverished townships overcome limitations placed on them by Apartheid-era urban planning. This is done through a combination of cycling, music and art. The tri-monthly gathering takes place in the township of Vosloorus and involves cycling through the area and stopping along the way to discuss the photography and drawings the group's artists have displayed at taxi ranks or on the walls of abandoned buildings.



The Bicycle Stokvel Collective

The purpose of these gatherings is to inspire the local community and provide opportunities for exposure for young artists. These activities also dismantle the stereotype that art belongs solely in the gallery space.

In 2018 the group cycled from Durban to Vosloorus, a distance of 550km. The group also recently completed a trip to Botswana and has others planned for Mozambique and eSwatini (formerly Swaziland). The intention behind these trips is to demonstrate that there are ways to be mobile and explore the country even without access to large amounts of money. Beyond this, these trips allow for self-reflection and communicate the message that

nothing is impossible if one puts their mind to it.

Jeffery Mulaudzi, the founder of a cycling tour operator in the township of Alexandra, has extended his business by launching a bike rental scheme. The scheme provides bicycles to local residents at a minimal charge per trip. The initial idea was to assist students with traveling the 8km stretch to and from school. Now working residents are also able to cycle into the nearby economic centre of Sandton for work. Mulaudzi estimates that residents are able to save up to 30 per cent of their usual monthly travel costs by cycling instead of using the overburdened bus service. Due to congestion, cyclists are able to reach their



In the historically black township of Soweto on the western edge of Johannesburg cycling is being used to break through social barriers

destinations faster than if they had used motorised transport.

SPIN CYCLE

The aforementioned initiatives are just a few examples of attempts to introduce and grow a culture of cycling in Johannesburg. Although commendable and encouraging they do not negate the need for a strong and tailored local government cycling strategy. Interconnected cycling infrastructure (although slowly being

addressed) remains a key barrier for commuters. In addition to this, a lack of safe bicycle storage facilities and the prohibitive costs of acquiring and maintaining a bicycle present a further obstacle. A general low level of road safety and a very real threat of petty and violent crime have also turned commuter cycling into somewhat of an extreme sport.

The safety of vulnerable road users, particularly women and children in particular who suffer

disproportionately as a result of violent crime, also needs to be addressed. In many ways the barriers to the uptake of commuter cycling lie beyond the scope of transport policy and lie within the wider socio-economic position of the country. 🌐

FYI

Jade van Blerk is a Project Officer Intern at POLIS



Best foot forward

Walking and cycling can boost local economies and people's well-being. **Heather Allen** and **Elah Matt** share examples of how promoting walking and active travel can benefit local businesses and inclusiveness

Many cities are prioritising walking and cycling in their centres, but others still hesitate to restrict car access to central shopping and business districts. This is partially due to resistance from local businesses, retailers and visitors. A key barrier is the perception that restricting car access will negatively impact the numbers of people visiting the area for shopping or leisure. However, research shows that pedestrians and cyclists spend as much or more time engaged in those activities than people who come by car. Typically, retailers also

overestimate the importance of car access to their customers.

For several decades, city centre retail has been challenged by changing shopping patterns. Initially, the rise of car-dependent, out-of-town shopping malls posed competition to local businesses and more recently, the rise of internet shopping has changed the way we shop. Both 'traditional', on-street retailers and shopping malls now find themselves in a highly competitive market that increasingly relies on providing a unique 'shopping experience', rather than only on price. The need

to provide attractive urban shopping environments is thus increasingly important. This article presents several successful examples that can be used by city authorities to address concerns raised by the public and local businesses and outlines how pedestrianising shopping areas can help retain their dynamism and attractiveness.

THE BENEFITS OF PROMOTING WALKING AND CYCLING

Mounting evidence shows that when public spaces are made attractive to 'slow modes' of travel, allowing





 Economic	Footfall & revenues	<ul style="list-style-type: none"> • Pedestrianisation can increase footfall by 30%-90%. • Traffic-free streets are more popular for shopping. • Retailers overestimate the need for car access and underestimate the spending power of those who walk and cycle.
	Property values & occupancy	<ul style="list-style-type: none"> • City authorities benefit with pedestrianisation of streets, as they frequently result in higher property values, rents and reduced shop vacancies. • Care is needed to ensure small independent retailers are able to afford to stay in the area, as they provide dynamism and local identity.
	Consumer spending	<ul style="list-style-type: none"> • Pedestrians and cyclists spend more over time locally than car owners and they often have more disposable income. • Many shoppers who access by cars buy similar amount that could be carried by foot or bike, but they take up more urban space.
	Time savings, return on investment	<ul style="list-style-type: none"> • Curbing car-use reduces congestion and local pollution. • Investing in cycling and pedestrian infrastructure can yield higher ROI '\$ for \$ invested' than road infrastructure.
 Environmental	Air quality	<ul style="list-style-type: none"> • Reduction in local air pollution
	Climate Change	<ul style="list-style-type: none"> • Reduction in use of fossil fuels and hence positive impact on reducing emission of CO₂ and short-lived climate pollutants.
	Green spaces	<ul style="list-style-type: none"> • Investing in attractive public/green spaces in pedestrian areas increases footfall and revenues for surrounding shops and businesses (especially restaurants and cafes).
 Health & Safety	Road safety	<ul style="list-style-type: none"> • Traffic-related injuries and fatalities are reduced with traffic-calming measures and pedestrianisation.
	Safer streets	<ul style="list-style-type: none"> • Vandalism and crime can be reduced in well-frequented areas.
	Public health & wellbeing	<ul style="list-style-type: none"> • Active modes, such as walking and cycling improve health and wellbeing • Reduction in air pollution, congestion and accidents have positive impacts on public health, generating cost savings.
 Social cohesion	Accessibility	<ul style="list-style-type: none"> • Accessibility needs to be factored into design. Making streets more accessible attracts more people and especially families, women and the elderly, who may not otherwise be able to use/enjoy this public space.
	Local population	<ul style="list-style-type: none"> • Cities that restricted car access have seen local population grow and are particularly popular among young families.
	Increased activity & sense of community	<ul style="list-style-type: none"> • Initiatives to calm or close streets to traffic increase street activities and sense of community.

Table 1: Key benefits of investment in walking and cycling zones.

Source: Table based on several sources and developed by the authors

people to walk and cycle safely, people spend more time and money locally. The European Cyclists Federation found that doubling the modal share of cycling in the EU (from 2015 levels) would generate an increase in retail turnover for local retailers of over €27 billion¹.

Amongst other benefits, numerous studies show an increase of 10-40% in revenues following pedestrianisation². Property and rental values often increase, ranging from 7.5% in a recent London study to 300% in Canada³. Pedestrianisation and urban regeneration can also increase

the number of local businesses and jobs, as seen in Dublin's Temple Bar District, which experienced a 300% increase in employment and a rise in number of local businesses from 60 to 450 within a decade⁴.

Overall, there are numerous economic, environmental and societal benefits to promoting walking and cycling and restricting vehicle access to specific areas, as summarised in the table above.

SHOWING THE WAY

There are a wide range of ways to keep town and city centres attractive

and dynamic. Some cities, such as Oslo, are looking to ban all cars, while others, such as London and Madrid, are restricting access to more polluting vehicles. Copenhagen led the way by pedestrianising the 3.2km long "Strøget" central shopping street in the historic centre in 1962, mainly for traffic-safety reasons. The following cities have successfully pedestrianised central shopping areas.

Vienna

Vienna began to pedestrianise its centre in 2011. The central shopping street, Mariahilfer Straße, is the most important shopping area in the city, representing 10% of retail sales volume, so making changes had to be carefully managed. The city invested in extensive public engagement, presenting plans and models to help visualise the redesign ahead of pedestrianisation. A year-long trial ensued and was evaluated with roundtables and surveys. This approach allowed people to voice their opinions and make informed decisions about the scheme. A referendum was then held, resulting in just over 50% of people favouring pedestrianisation.

The narrow majority included strong resistance from some business groups, media and political parties, combined with opposition from some residents to change. The results showed the importance of the extensive public-engagement strategy in gaining support and ensuring the acceptability of the scheme. Now visitors, residents and shopkeepers are very positive about the transformation. In an ex-post evaluation, 71% of respondents said they would vote in favour of the scheme and 55% stated that travel modes interact well with each other. Some 38% of shopkeepers stated they experienced a rise in sales while 46% stated that business was unchanged. The street transformation increased social interactions and decreased air pollution from vehicles,



Times Square before and after tactical urbanism interventions

Source: New York City Department of Transportation

enhancing public health. The overall cost of €23.3 million can be contrasted with the renovation of a mall outside of Vienna, costing €150 million⁵.

Munich

Munich established its central pedestrian area in the early 1970s, as part of preparations for the 1972 Olympics. Improved public transport would get people to the car-free main square, Marienplatz, and the city hall. Retail turnover and footfall increased significantly following pedestrianisation⁶. Kaufingerstrasse, the main shopping street, is today the second most popular in Europe, with an hourly footfall of over 12,800 people⁷. In 2016, Sendlinger Strasse⁸, another popular shopping street, was pedestrianised for a 1-year trial, as local retailers were sceptical about pedestrianisation and particularly concerned about how delivery times would work⁹. Based on its popularity, it was made permanent in 2018. Upgrading the

pavements and street furniture will cost €3.5 million (expected to be completed in 2020)¹⁰.

Istanbul

Istanbul's historic peninsula provides an iconic example of successful pedestrianisation. The UNESCO World Heritage site was severely challenged by traffic congestion, air pollution and road safety issues¹¹. An initial study examined possible impacts on the environment, traffic, trade and other issues. Pedestrianisation was then introduced gradually. Initially around the historical landmarks, then expanded slowly into the surrounding streets. A post-implementation survey was conducted among local workers and visitors:

Some 80% answered positively about the impact on the physical environment; 89% of visitors agreed that travel and shopping were more comfortable and 82% felt safer; 82% of the tradesmen said they

had benefited from pedestrianisation, with a 76% increase in visitor numbers. A 44% increase in bicycle use was also observed. Significant improvements in air quality and noise levels were reported. Those surveyed were generally happy with pedestrianisation and optimistic about the economic vitality of the area, with an overwhelming 83% saying they would support further pedestrianisation.

Today, over 250 streets in the Peninsula are pedestrianised, with roughly 2.5 million visitors daily. Traffic fatalities are down by an estimated 60% and 65% of employees and visitors use public transport.

New York

New York City has a large walking population and a growing cycling community¹². Following an increase in the number of traffic accidents in the Times Square area, in 2009 the city's Department of Transportation decided to close Broadway to vehicles and created a trial pedestrian-only zone. Five blocks stretching from Broadway through Times Square became an ad-hoc park with painted areas on street, deck chairs and tables. The project improved road safety, reduced travel times and increased business, so Mayor Bloomberg made the scheme permanent.

The use of temporary measures – paint, temporary street furniture, art installations and planters – allowed the city to test ideas and gain the support of the community quickly, rather than waiting for planning reviews or studies. This 'ad-hoc', or tactical urbanism, approach led to the creation of more than 60 pedestrian plazas across the city, converting more than 26 acres of car lanes to spaces for people. It has been replicated in cities across the world – from Boston to Los Angeles, San Francisco and Buenos Aires.

Over 250 streets in Istanbul are pedestrianised, with roughly 2.5 million visitors daily. Traffic fatalities are down by an estimated 60%

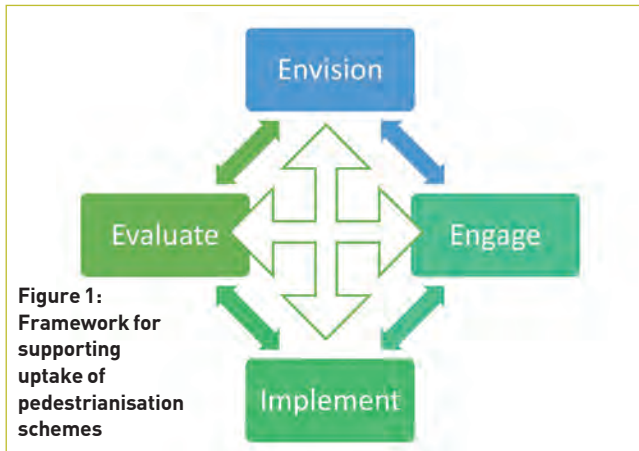


Figure 1:
Framework for supporting uptake of pedestrianisation schemes

DRIVING CHANGE

The successful examples given below have several common elements: they encouraged public engagement, created a common vision that was adaptively implemented to the local context, and evaluated impacts.

Engaging the public is vital for gaining support. Consultations, surveys and a referendum were carried out in Vienna, enlisting support from residents and retailers. In Istanbul,

several studies and surveys were conducted by local NGOs to gauge people's attitudes towards pedestrianisation and impacts on local mobility and retail.

Envisioning change and how pedestrianisation can be implemented helps to increase public acceptance.

In Vienna, models of the pedestrian zone were shown to the public. A pilot scheme ensued, demonstrating how the scheme would work in practice. In New York, a more radical approach was adopted – showing people how pedestrianisation would look through ad-hoc street closure and other tactical urbanism measures.

Implementation needs to be adapted to the local context. In Istanbul, pedestrianisation of the historic peninsula


was rolled out incrementally, but quickly, whereas in Vienna full implementation took longer (around three years). Gaining public support and creating a common vision are likely to influence how quickly pedestrianisation and other traffic-calming measures are rolled out.

Evaluation, both before and after implementation, is key to assessing public opinion and impacts on local businesses, street users and environmental conditions.

MOVING FORWARD

Urban retail centres need to remain attractive for people to visit them and spend money. When these centres suffer from traffic congestion and high levels of air pollution, people tend to avoid them. Investing in pedestrian and active-travel infrastructure has proven to be economically beneficial, with cyclists and pedestrians often spending more than drivers over time¹³. A range of other economic, social and environmental benefits are also commonly observed, as outlined above.

Strong political support and enabling policies are key. Crucially, it is important to build consensus and work with consumers, retailers and political decision-makers (who are also voters). Individual perceptions and mindsets play a vital role in framing people's opinions. Carrying out before and after evaluations helps to show that when measures are successful people do shift their initial positions and mindsets.

Reducing access to private cars in urban areas is a delicate and often contested issue, but one that needs to be addressed for economic, social and environmental reasons. 

FYI

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NOTES

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The heart of the matter

Stuttgart's clean air programme includes a traffic ban for diesel vehicles, as **Simone Haug** explains



Stuttgart, home to approximately 600,000 inhabitants, is the capital of the German state of Baden-Württemberg. It is also the center of the Stuttgart Region, with a total of 2.7 million inhabitants and 1 million jobs. Europe's strongest region in terms of exports and automotive industry supports, its strength mainly through the automotive and mechanical engineering sectors. The demand for mobility, generated by this economic power, puts a high pressure on the city's transport infrastructure.

For this reason, Stuttgart has defined an ambitious strategy to promote a more sustainable mobility

Stuttgart has defined an ambitious strategy to promote a more sustainable mobility in the city. The main objective is to achieve a better quality of life for all citizens

in the city. The main objective is to achieve a better quality of life for all citizens. Building on already existing plans and approaches such as the Land Use Plan, the Noise Reduction Plan, the Local Public Transport Plan, as well as the Transport Development Concept 2030, an

Action Plan for Sustainable Mobility has been developed. The action plan identifies and prioritises fields of action and measures to be undertaken. The strategy combines urban planning instruments with transport planning and infrastructure policy. In the long term, the aim is to improve



the living quality in Stuttgart by reducing traffic and pollution, and by redistributing public space towards a more human-friendly city for all. This strategy includes a wide variety of measures and projects in all fields of action related to mobility, including active travel (pedestrians and bicycles), public transport, sharing, logistics and intermodality. Every two years, an evaluation and update carried out by the municipality is presented to the city council.

TRAFFIC BAN FOR DIESEL VEHICLES

Some 800,000 vehicles cross the borders of Stuttgart every day. In



© Landeshauptstadt Stuttgart

addition, the city lies on challenging topographical landscape with more than 300 m difference in altitude. This obliges public transport and road users to share a limited transport infrastructure, resulting in congestion on main roads, high noise levels and deficient air quality.

Due mainly to the high traffic, Stuttgart's air is highly polluted by air toxins. This includes particulate matters and nitrogen dioxide.

At different points in the city, pollution exceeds by far the maximum limits determined by the European Union. The city's challenging topography influences the air quality, due especially to the

low exchange of air in the city basin.

Stuttgart has already implemented a wide variety of measures to reduce air pollution. This has led to a considerable decrease of the pollution levels by particulate matters. On the other hand, the nitrogen dioxide values are still considerably higher than the threshold. Nitrogen dioxide is mainly emitted by diesel vehicles in road traffic, therefore the Land Baden-Württemberg, which has the legal competence in the field of air quality, was forced to introduce a traffic ban in Stuttgart for diesel vehicles with the emission standard 4/IV and lower. The restriction is set down in the third update of the Clean Air Programme for the region of Stuttgart.

From 1 January 2019, the Land Baden-Württemberg implemented a driving restriction in the environmental zone Stuttgart (almost the entire urban area) for all vehicles with diesel motors with the emission standard 4/IV and lower. This is one of the measures included in the third update of the Clean Air Programme from 31 March 2019. For the residents of the city of Stuttgart, there was a transitional period until 31 March 2019. The traffic ban for diesel vehicles is based on the high level of air pollution. Whereas fine dust pollution has considerably decreased, limits for nitrogen dioxide are still considerably above the allowed limits. In 2017, the annual average for nitrogen dioxide was 73 micrograms per cubic meter at the measuring point "Am Neckartor". Compared to the previous year this value was 9 micrograms lower, but it is still considerably higher than the limit of 40 micrograms.

Following the decisions of the Higher Administrative Court (November 2018) a traffic ban from 1 January 2020 for diesel vehicles with Euro 5/V is under preparation as a supplement to the present Clean Air Programme 2018. Whether such a traffic ban is actually necessary will be revealed by the analysis of



pollution levels, which will take place mid-2019.

EXCEPTIONS TO THE DRIVING RESTRICTIONS

The third update of the Clean Air Programme 2018 include exemptions from the traffic ban for certain diesel vehicles. The City of Stuttgart is responsible for implementing these regulations. The conditions for being granted a special permit and the documents required for an application for an exemption can be found on the City of Stuttgart website.

The City of Stuttgart receives and approves applications for a special permit from applicants living in Stuttgart, the metropolitan region or abroad. There is no special provision for tourists. They are also subject to the traffic ban for diesel vehicles and must apply for a special permit with the City of Stuttgart in individual cases.

A special permit team has been established at the Office for Public Order. The applicants can apply for their exception personally at the responsible staff members or upload their data and the required documents at home or en route at a specially equipped online portal. The special permit is sent to the applicant by mail as a document and must

Stuttgart has already implemented a wide variety of measures to reduce air pollution. This has led to a considerable decrease of the pollution levels by particulate matters

be carried along in the vehicle in its original form.

CONTROL

Violation of the traffic ban resulted in a fine of €80, the legal basis for which is the Federal Emission Control Act. Including fees and general administration expenses the total amount of the fine is €108.50.

BACKGROUND

The NGO German Environmental Aid (DUH) has filed a suit against several states in Germany. This Organization wants to oblige the states to amend their Clean Air Programmes so that the limit for nitrogen dioxide is complied with. Therefore, it is calling for a traffic ban for diesel vehicles. Besides Stuttgart the cities of Cologne, Dusseldorf and Frankfurt are also affected.

On 26 July 2017, the Stuttgart administrative court upheld the decision of

DUH. In October 2017, the state government lodged an appeal (review) against the award of the administrative court. On 27 February 2017, the Federal Administrative Court dismissed the review. According to that, the court considers traffic bans for diesel vehicles in cities as generally admissible - ensuring proportionality.

FYI

Simone Haug is an employee of the Strategic Planning and Sustainable Mobility Department at City of Stuttgart
www.stuttgart.de/en/diesel-ban
www.stuttgart.de/en/diesel-ban/special-permit

Online portal:

<https://service.stuttgart.de/lhs-services/ag-diesel-verkehrsverbot>

Traffic Efficiency & Mobility

The section on Mobility, Multimodality and Traffic Efficiency addresses issues related to network management, network efficiency and innovative services, with a particular focus on Intelligent Transport Systems

- Antwerp, Elba & Turku
- NOCoE
- London
- MAVEN



Something for everyone



Moving towards multimodality with Mobility as a Service, by **Katia Kishchenko, Ana Dragutescu, Roope Virta, Giorgio Ambrosino, Saverio Gini** and **Richard Adams**

Multimodality is set to play a crucial role in the future of many European cities. By encouraging users to combine different travel modes and reducing reliance on cars, it can relieve congestion, reduce noise and air pollution, and generally improve quality of life.

However, when using the various forms of transport that they need in their daily lives, people can struggle with the multiple payment and ticketing processes and apps involved.

Indeed, taking and switching between various transport modes and finding relevant information can be overwhelming when confronted with multiple options and sources.

Mobility as a Service (MaaS) offers a potential integrated solution to these complex user needs. MaaS applications offer users access to various travel options via a single platform, such as trams, bikes, trains, buses, shared cars and scooters. It also combines these to present users with a



single, seamless journey that incorporates real-time information, reliable planning and considers different payment possibilities.

Still in its infancy, it is assuming different forms around Europe. This is illustrated by the cities of Antwerp (Belgium) and Turku (Finland) and the island of Elba (Italy). Aided by their participation in three Living Lab projects under the CIVITAS Initiative, they are experimenting to find suitable models.

Through project calls and active communication and cooperation with employers, employees and entrepreneurs, the Marketplace is encouraging the development of innovative solutions, such as MaaS

ANTWERP – CREATING A MARKETPLACE FOR MAAS

In Antwerp, MaaS has the potential to help alleviate major pressure on the city's (road) infrastructure. This is causing a challenging mobility situation that is impacting negatively on the city's livability and appeal to tourists and businesses.

With the support of the CIVITAS PORTIS project, Antwerp is creating the building blocks for the successful establishment of a MaaS marketplace in the city. This falls under the "Smart Ways to Antwerp" (SWtA) project, whose development forms a major part of Antwerp's CIVITAS PORTIS work.

SWtA is developing various measures and tools to instigate a shift towards sustainable modes,

change user mobility patterns, and improve travel times - both for passenger transport and urban freight. Through this, it enables and inspires people to choose alternative mobility solutions where possible and facilitates multimodality.

Soon after SWtA began, it became clear that people are not always aware of the range of mobility solutions available or cannot find the information to make use of them. The need for a multimodal travel planner was obvious.

After several market consultations, it turned out that no truly multimodal travel planner was available that supported the city of Antwerp's goals. A new travel planner was developed together with Be-Mobile, a market leader in smart mobility. This

Smart Ways To Antwerp utilises various tools to inspire people to shift towards sustainable modes of transport



Photo: Smart Ways to Antwerp

brings together the different transport modes offered within Antwerp based on various user scenarios.

Possible journeys combining cars, public transport, park and rides, shared bikes and walking are identified and presented to the end user through the website and dedi-

In combination with existing mobility players and MaaS experts, the city of Antwerp is building up its knowledge related to standardisation, reporting, technical requirements, and the user experience. Together, this information is creating a picture of what the end user



Photo: StadAntwerpen

cated app. Roadworks and traffic diversions are also shown.

The next step in the app's development will be to allow users to set preferences. For example, people will be able to filter journey options according to mode. Through this, the planner will offer more personalised route planning.

Whilst sound travel advice is crucial to changing users' mobility habits, the proper and appropriate mobility solutions must also be in place. To ensure this, SWtA has set up its Marketplace for Mobility.

The Marketplace brings together a wide selection of providers who each support the city to reach its mobility goals. Through project calls and active communication and cooperation with employers, employees and entrepreneurs, the Marketplace is encouraging the development of innovative solutions, such as MaaS.

to create a MaaS ecosystem incorporating several transport operators: its participation in the CIVITAS ECCENTRIC project is fostering this process.

Like many small- and medium-sized cities with limited budgets, MaaS appeals to Turku as it facilitates the integration of diverse mobility measures, including first and last mile solutions, mobility services in low demand areas, and parking space optimisation. This helps increase the efficiency of the overall transport system without too much financial outlay.

MaaS will also help Turku develop new solutions to raise the service level of public transport and establish shared mobility as a real alternative to car ownership. The combined impact of these should make the city a better place to live and work.

There remains the crucial question - how should MaaS be implemented? Up to four MaaS business models are thought to be employed at the moment: commercial car sharing, peer-to-peer car sharing, taxi/ridesharing, and subscription services combining local bus, taxi and car sharing services. Currently, the latter two are in place in Turku.

really requires and how to best address their needs.

It has become clear that for MaaS services in Antwerp to be efficient and successful, further collaboration between the city and the different players is necessary. In January 2019, the city of Antwerp launched a MaaS-specific project call, while continuing to nurture the MaaS ecosystem within the city.

Find out more about CIVITAS PORTIS online at its project page: civitas.eu/portis.

TURKU – ACHIEVING SMART MULTIMODAL MOBILITY

MaaS has undoubtedly had a head start in Finland. Recently, the Finnish Transport Agency invested in two MaaS start-ups, Whim in Helsinki and Tuup in Turku.

Against this backdrop, the city of Turku has set itself the objective



Föli is Turku's public transport system covering an area of 285,000 inhabitants

Photo: Anna Lilja

Like many small- and medium-sized cities with limited budgets, MaaS appeals to Turku as it facilitates the integration of diverse mobility measures, including first and last mile solutions, mobility services in low demand areas, and parking space optimisation

Photo: Pasi Leino



Turku Region Public Transport, also known as Föli, covers an area with 285,000 inhabitants. Together with numerous operators, Föli provides both individuals and companies with a range of applications and packages that make travelling easier.

Föli for businesses sees employers subsidizing tickets as a way of encouraging more people to take public transport. This enhances occupational wellbeing and health and reduces the costs arising from commuting. Businesses participating in the scheme also have screens in their offices displaying departure timetables for nearby bus stops.

The VR online service allows the purchase of both a train and a bus ticket at the same time. Single tickets for use on Föli services are also available via VR if the train or bus is departing from or heading to a station in the Turku area.

Fölix (Föli + Taxi) combines the flexibility of a taxi with Föli's affordable rates. Users can call taxis to take them from home to a Föli bus stop or vice versa. The Fölix service is available throughout the aTuregion.

Tuup is a smart application that allows for route planning and comparing the various mobility option. At a later stage, it should serve as integrated platform for platform payment.

The Föli mobile app can be used to buy single tickets, travel cards, and TurkuCards, all of which are valid in the entire Föli region. The app also offers combination tickets, which include the entrance to an event as well as bus tickets, whilst it can also renew season tickets.

The aim is for residents and the city's employees to be aware of these new MaaS services and to provide convenient, sustainable

and affordable alternatives to car ownership.

Currently, as part of CIVITAS ECCENTRIC, business models are being designed that should facilitate cooperation between different existing service providers and the development of service packages. These will later be marketed through various communication channels.

Explore CIVITAS ECCENTRIC further on its project page: civitas.eu/eccentric.

ELBA'S SHARED USE MOBILITY AGENCY - MAAS IN A TOURISTIC DESTINATION

On the Italian island of Elba, MaaS is taking a slightly different form. The island's "Shared Use Mobility Agency" (SUMA), designed as part of the CIVITAS DESTINATIONS project (*Thinking Cities* December 2017, pp74-76), is tailoring the concept to the needs of a touristic island with small communities.

Consisting of seven municipalities, Elba has numerous towns and small settlements spread across the island with predominantly rural areas in between them. In this way, it can be considered to be a Functional Urban Area with large peripheral zones. The island's public transport services operate mainly along its key transport arteries.

However, the summer tourist season brings with it a 30 per cent increase in transport demand, alongside an increase in trips to tourist destinations beyond the main transport network.

Currently, the island's (public)

The summer tourist season brings with it a 30 per cent increase in transport demand on the island of Elba, alongside an increase in trips to tourist destinations beyond the main transport network



Photo: VisitElba

transport system cannot meet these needs. This situation is further exacerbated by the fragmented nature of Elba's mobility offer (including rental operators): services are uncoordinated and information spread across various sources.

To tackle these problems and create a mobility ecosystem fit for residents and tourists, the Elba municipalities of Portoferraio and Rio and MemEx, a consultancy, have joined forces to design SUMA.

SUMA works on the basis that transport authorities should act as promoters of MaaS and ensure that ridesharing services are fully incorporated into the public transport and overall mobility service offer.

Its role is to integrate the various services available, make them easily accessible, and coordinate the responsible operators.

To achieve this, an IT platform is being developed that will be accessible via a mobile app and website. When released, this will be

called "Elba Sharing".

By aggregating data from various sources and systems, it will provide different services to facilitate multimodal travel, such as a journey planner and in-app payment and offer a single access point to Elba's ridesharing services and rental operators. This should make it possible for users to combine public transport with ridesharing and rental options for journeys of different lengths and at times of varying demand.

Ridesharing possibilities are numerous, including sharing a trip when a user is on the ferry; planning shared trips in advance; and sharing a taxi trip. These will be managed through a notice board on which passengers and drivers can publish their trip share requests and offers.

Moreover, a search engine function will make it possible to identify opportunities to combine ridesharing offers and requests with public transport. Features such as journey

tracking and user evaluation of vehicle drivers will also be included to improve passenger safety.

This demand- and user-driven model should help to reduce the number of private trips made over summer and convince more people to use collective transport outside of the tourist season.

A SUMA prototype was ready in April 2019 for internal testing, whilst its first features are expected to be operational by the end of this summer. Find out more on SUMA's design at www.memexitaly.it.

Discover more about CIVITAS DESTINATIONS on its project page: civitas.eu/destinations.

POWER TO THE PEOPLE

Mobility is a matter of convenience - people want to feel free to move around as they please. By giving users full control, MaaS has the potential become a driving force in attempting to encourage more sustainable travel.

- Discover more about the pioneering MaaS work of CIVITAS projects at this year's CIVITAS. [🔗](#)

FYI

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Knowledge: the new gold



There's no doubt that connected and autonomous cars, fully integrated traffic networks, and all the exciting technologies that are in development in laboratories will radically change our future for society's benefit. **Patrick Son** outlines how this will benefit to our cities

By definition, Smart Cities are about improving communities and the lives of their residents, but there's a part of the equation that sometimes gets overlooked, a part that some very smart people at some very influential trade organizations recognized a half-decade ago. That part is how effective, creative transportation systems management and operations, what we call TSMO, can maximize the benefit of technology.

Leaders from the American Association of State Highway Transportation Officials (AASHTO), the Intelligent Transportation Society of America (ITS America) and the Institute of Transportation Engineers (ITE), in partnership with the Federal Highway Administration (FHWA), recognized that in all the justified excitement about technology, Transportation Systems Management and Operations (TSMO) was getting left out of the conversation.

That's the sometimes amazing, occasionally routine, but always crucial work that's taking place in traffic management centers (TMCs), on the transportation system itself, and in the executive suites of departments of transportation. Those transportation leaders understood that human ingenuity, creativity, and experience would be a critical to the future of transportation and, by extension, Smart Cities.

They also understood that with their combined influence, they could not only lead the conversation but as a by-product, share the best operational best practices for departments of transportation, private sector organizations, and, most importantly, individual practitioners. With generous assistance from the US Federal Highways Administration, NOCoE was born.

Our mission is simple: to empower the TSMO community to succeed. We think the steady



We think the steady increase of agencies taking a TSMO approach is not only helping to save lives, time, and money for the traveling public, but is also a foundation for advancing the future of our transportation system

increase of agencies taking a TSMO approach is not only helping to save lives, time, and money for the traveling public, but is also a foundation for advancing the future of our transportation system. A TSMO approach creates foundations for the partnerships required to implement strategies across an entire city or region, allows for the coordination of all the data and technology that exists on the roadway, and supports the development of applications to both improve mobility and to benefit cities beyond the transportation system.

So you rightly ask, how does all this fit into a Smart Cities conversation right now? Knowledge sharing.

WHY WE DO WHAT WE DO

Knowledge sharing across the country has served as an essential exercise to advance the TSMO industry

overall, but also for agencies practicing TSMO, knowledge sharing and collaboration are proving to be essential aspects of implementing TSMO. At NOCoE, we realized early on that our most important role would be as a conduit, a sharer of knowledge rather than the originator of that information.

Partly, we were driven by the speed of change in transportation technology and the need for operations strategies to keep pace, partly by the vacuum that existed and the siloed nature of practitioners. Many practitioners control traffic flow on America's highways, others are involved in traffic incident management while still others are regional traffic engineers. What they had in common was a lack of a significant venue to share ideas, promote solutions, and exchange information. It's not an exaggeration to say that just

It's not an exaggeration to say that just a few years ago, the primary go-to place for TSMO strategies and solutions was a friend's office down the hall or maybe a peer in a neighboring agency

a few years ago, the primary go-to place for TSMO strategies and solutions was a friend's office down the hall or maybe a peer in a neighboring agency.

That's where we come in. There are tens of thousands of people engaged in TSMO on a daily basis, doing important and creative work, and we recognized that we could be most effective if we became the curator, gathering those strategies from practitioners, working with them to translate their successes for other agencies, and then sharing those strategies among the entire constituency.

Last year at NOCoE, we encouraged public and private agencies to submit entries for our first annual Best of TSMO Awards describing how their use of Transportation Systems Management and Operations solved problems, created efficiencies or improved safety. As a first-time awards event, we thought we might receive 15 submissions, maybe 20 if the stars aligned.

We ended up with more than 50 from all corners of the nation and without exception, each of them added a new strategy or solution to the conversation. We received detailed case studies highlighting scenarios as diverse as a massive, million- person hurricane evacuation that undoubtedly saved lives, to an impactful lane restriping initiative in Arizona that dramatically reduced crashes. We've spent the last six months publishing these entries as new case studies containing valuable TSMO ideas and solutions worthy of replication in other regions.

This type of industry-wide knowledge sharing exists in places like ITS Heartland as well. This regional ITS chapter set out to educate its membership on implementing and practicing TSMO by developing a 'TSMO University' program that used in-person and online tools to increase the knowledge, skills, and abilities of future TSMO practitioners in anticipation of states within their region looking to implement TSMO in the future. The program reached over 600 practitioners, a

third of whom were private sector, and even extended the trainings to the whole country, with 20% of participants coming from outside their region. This desire to connect technology and TSMO is exemplary (and yes, ITS Heartland did win a NOCoE TSMO Award!).

But the will to share knowledge like this among the TSMO industry doesn't exist simply because of the NOCoE or ITS Heartland; communications and inter-agency collaboration are an essential tenet of practicing TSMO within agencies to manage the transportation system.

THE PERFECT EXAMPLE

As we learned in a recent NOCoE peer exchange, the City and County of Denver, CO has taken a TSMO approach to actively managing their arterials to reduce travel times during traffic incidents. On 18 June 2018

Denver is managing its main arterials with TSMO



I encourage you to consider TSMO as both a foundation for the future of technology and as an example of knowledge sharing to advance the practice

a multi-vehicle accident on I-25 just before 7am and just north of downtown, created a tenuous situation. The incident left a hazardous materials truck rolled on its side forcing the closure of all northbound freeway lanes during rush hour. It hit all the marks of a traffic nightmare.

During incident mitigation, for responders to do their work safely, large sections of highway would have to be closed and a huge volume of traffic would have to be re-routed onto local arterials. There was an almost immediate 400% increase in traffic volume onto Federal Boulevard, the main alternative route just west of the accident. Denver TSMO

practitioners quickly took a strategic approach. They actively monitored the diversion routes, modifying signal timing as appropriate to reduce congestion. They flashed 'interstate closure' messages on variable message signs and collaborated with partner agencies to enact a coordinated, collaborative response. Eight hours later, as the remnants of the incident were cleared and I-25 North was reopened, the Denver TMC realized a 67% per cent reduction in travel times on Federal Boulevard directly attributable to the actions they took.

But TSMO programs are also using technology to push the boundaries of how we manage the transportation system. In Nevada, the Nevada Department of Transportation, Regional Transportation Commission of Southern Nevada, the Nevada Traffic Incident Management Coalition, the Nevada Highway Patrol, and the Nevada Department of Public Safety all contributed to the development of the Waycare Platform to advance operations.

As highlighted in our recent case study¹, Waycare is a cloud-based system that leverages in-vehicle data and artificial intelligence (AI) to help manage traffic and prevent crashes. Waycare aggregates real-time and historical traffic incident information, based on data from social media feeds, crowdsourcing applications and in-vehicle telematics, indicating possible traffic incidents and areas of concern. The Waycare Platform's seamless, real-time sharing of

incident information across agencies and disciplines yields a reduction in incident response times by 12 minutes and provided for a substantial reduction in secondary crashes via real-time information sharing with traveling public.

SHARING THE WEALTH OF KNOWLEDGE

This work is going on now and as you, the readers of *Thinking Cities*, envision and build the Smart Cities of the future, I encourage you to consider TSMO as both a foundation for the future of technology and as an example of knowledge sharing to advance the practice.

If recent history and the development of intelligent transportation and other Smart Cities elements are any measure, there's no doubt that where we are now is not where we will end up. Technologies and the strategies will inevitably evolve and morph, but ultimately whether you're in transportation, Smart Cities, some variation or both, we are all driving to the same goal: building a safe, efficient future for ourselves and our neighbors. The best way for us, as one community, to outpace technology is to share knowledge every day: in our teams, across our departments and within our industry.

How will you share knowledge every day? 🗣️

FYI

Patrick Son is Managing Director, National Operations Center of Excellence (NOCOe), based in Washington, DC

transportationops.org

REFERENCES

[1] <https://transportationops.org/case-studies/waycare-platform-deployment-southern-nevada-traffic-management-center>



Inside information

Sarah-Jayne Williams on how Ford Mobility is tackling our cities' biggest challenges using vehicle journey data



Every day, millions of people face mobility challenges in cities all over the world. And, as the number of people living in our cities increases, so do the challenges.

The question is, how can data be used to tackle some of these challenges? And can it help improve the quality of life for everyone living and working in our urban environments?

A wealth of insightful data was collected by a fleet of 160 connected vans

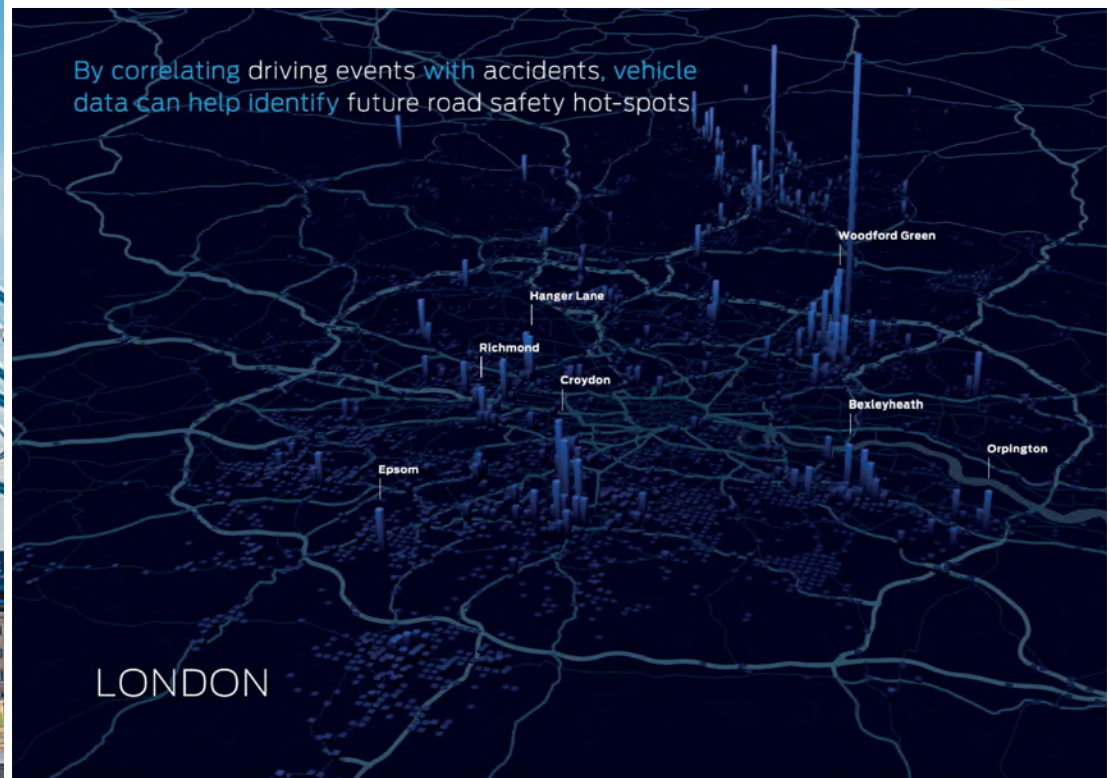
To help find the answer, Ford Mobility spent the last year recording and analysing more than 1 million kilometres' worth of vehicle and driver behaviour data in and around London to establish how data could address the concerns of transport authorities, as well as those of the

capital's businesses and residents.

The insights were encouraging: from pinpointing the optimal locations for EV charging points to proactively identifying likely road safety hotspots, the potential for the analysis has a far broader reach than London alone.

We believe that data is one of the most crucial drivers for advancing urban mobility innovations as we plan our future cities. It is the invisible infrastructure behind new possibilities”

By correlating driving events with accidents, vehicle data can help identify future road safety hot-spots



LONDON UNDER THE MICROSCOPE

With a population of almost 9 million people, London is the largest city in Western Europe by far. By collecting data from the city's vehicles, we were able to gain a wealth of invaluable insights that could help improve mobility for everyone.

With the consent of participants, we fitted 160 connected vans with

onboard computers to record journey data. Location, acceleration, braking, even whether the hazard lights were on – our simple plugin devices monitored and recorded everything. This generated more than 500 million data points, from more than 15,000 days of vehicle use, that was sent to the cloud for analysis.

The vehicles we selected were Ford Transit vans from a variety of sectors, from owner operators to larger fleets. Alongside the commercial vehicles, we also collected data from a fleet of private-use Ford Fiesta cars engaged on a year-long project to better understand driver behaviour.

The insights we found broadly fall into five main categories – areas where we feel data could potentially make a difference:

IDENTIFYING ROAD SAFETY HOTSPOTS

Our data enabled us to create a powerful algorithm – based on vehicle behaviour and historic accident reports – that has the potential to identify where road incidents may occur in the future.

In London, 93 per cent of all collisions on the road are caused by human error, perhaps through travelling too quickly, distracted driving or failing to comply with the laws of the road.

By cross-referencing our vehicle behaviour data with readily available accident reports, we were able to create a dashboard that allowed users to drill down and identify likely road safety hotspots.

This methodology gives us the potential to help authorities proactively investigate high-risk roads and junctions most likely to be the scene of future traffic incidents. This could empower city planners to re-design safer streets for their communities. Drivers could benefit from this information too, potentially helping them avoid risky areas at certain times.

ELECTRIC VEHICLE CHARGING POINT PLACEMENT

There are now more than a million electric cars in Europe and it is expected that, worldwide, electric vehicles will account for the majority of all new car sales and a third of all fleets by 2040.

Yet, for many people and businesses, when it comes to switching to a fully electric vehicle, there is a concern that charging stations will not be there when they are needed.

By understanding where vehicles travelled, where they parked and for how long, we were able to identify ways in which charging could be integrated within regular journeys, especially for businesses whose drivers might make multiple stops, for example, to make deliveries.

Our insight suggests that, in



London, productivity could be significantly improved with only a relatively small number of additional strategically positioned rapid charging stations.

It is an approach that we envisage could be extended to further cities, with data coming from connected vehicles, enabling those cities to more effectively plan how to spend their infrastructure budget.

Strategically located charging points could encourage adoption of electric vehicles and benefit both businesses and individuals as they spend less time hunting for places to top up their vehicle, reducing congestion and wasted time and energy.

RETIMING TRAFFIC

London is a 24-hour city. Yet

rush-hour traffic costs businesses and individuals vast amounts of time and money every year. It's estimated that direct and indirect costs attributed to congestion across the capital result in an annual loss of £9.5 billion (11 billion).

We wanted to see if we could use the capital's roads around the clock to reduce the social and economic impacts of peak-period traffic.

Our analysis shows that by setting out two hours earlier, one of our test fleets of vans could save up to 30 hours in a typical week. That's time currently wasted in traffic. What's more, by time-shifting groups of users, such as commercial vehicles, other drivers may benefit from less congestion on the road.

If commercial drivers could set

Understanding the potential benefits and efficiencies of time-shifting could be helpful to encourage businesses and individuals to embrace the concept

We identified that around a fifth of the driven journeys around London in this study could have been faster if they'd used public transport instead

out an additional 30 minutes earlier, the time saved doubles. That means that by beginning their rounds two-and-a-half hours earlier, a fleet of drivers can potentially reduce their time in traffic by up to 60 hours per week.

There may be trade-offs for consumers or business owners: deliveries arriving earlier or later in the day, for example. But understanding the potential benefits and efficiencies of time-shifting could be helpful to encourage businesses and individuals to embrace the concept.

MODE SHIFTING

Mode shifting – changing journeys from one type of transport to another – is central to the Mayor of London's Transport Strategy and key to improving the capital's road network issues.

We wanted to identify which journeys could be quicker by “shifting mode” from private transport to public transport, as well as to bicycle or walking.

To do this, we charted driven journeys across a fleet of privately owned Ford Fiestas. We then compared this to real-world public transport timetables. The web application we created clearly shows which driven journeys would have been faster if taken by public transport. It also identifies areas of London that are still generally quicker by car.

Overall, we identified that around a fifth of the driven journeys around London in this study could have been faster if they'd used public transport instead.

Tools like this could help city authorities optimise investment in

future public transport infrastructure, enabling them to better target funding towards specific districts or transport modes. They could also be used to give targeted feedback to road users, showing the time benefits of using public transport instead of private vehicles.

SUMMER HOLIDAY EFFECT

It might stand to reason that roads are quieter during the summer: longer days, closed schools, the holiday season at its peak. Yet our analysis shows this isn't necessarily the case.

There are difficulties with existing metrics for measuring congestion and traffic performance. So, we set out to create a new holistic baseline for measuring traffic performance using vehicle data to compare speed limits with the actual speeds travelled.

We combined these with mapping data, broke them down by time and road type, and compared traffic flow during school holidays against those during term time.

While some roads around schools clearly benefited from the “summer holiday effect”, others suffered: during the morning peak, a stretch of motorway by London's Heathrow Airport witnessed a substantial slowdown – holidaymakers en route to sunnier destinations, perhaps? Some stretches in east London suffered slower traffic too, particularly along the A13 and A406 North Circular roads.

Road users over lunchtime generally experienced faster traffic flow. But performance could be erratic, with some areas slowing down instead of speeding up. It

could be that faster speeds in some segments caused slowdowns in others, resulting in increased overall variability in traffic flow.

What our detailed vehicle data has allowed us to do is offer improved insights into traffic flow during different times of the day – and of the year – which could be of help to transport planners.

THE JOURNEY BEGINS

As we've seen, granular vehicle data, enriched with complementary data sets, has the power to provide real insights into how our cities move. We've learned a lot from a relatively small number of vehicles.

With connected vehicle numbers increasing in the future, we believe this data will be invaluable, opening up a whole new world of possibilities to make our cities more liveable. Through the power of data, we can help authorities to monitor and understand their cities much better, and consequently to optimise journeys for both citizens and businesses.

London is just one example of where Ford has been working with cities to provide mobility analysis. In the US, Ford's Global Data Insight and Analytics team is already collaborating with Pittsburgh, Pennsylvania, and Miami, Florida, to prepare dashboards, visualise data and provide actionable insights to address local challenges. [🔗](#)

FYI

Sarah-Jayne Williams is Ford Mobility's Europe director



Automated equals good... doesn't it?

A comprehensive look at MAVEN, a 3.1 billion project that was launched in September 2016 under the Horizon 2020 Research and Innovation Framework Programme of the European Commission, and the challenges and perspectives of automation in an urban environment, by **Alessia Giorgiutti, Jaap Vreeswijk, Ondrej Pribyl** and **Klaas Rozema**



Automated driving developments are experiencing a boom. They are driven by advances in technology, but also have a strong link with the Smart Cities agenda, where automated vehicles, the shared economy and electromobility will play an essential role. With this perspective, governments recognise the potential benefits of automated vehicle technologies but also see threats – researchers have recently become

WHAT DOES LEVEL 4 MEAN?

In 2014 and with an update in 2018, SAE International (the automotive standardization body) developed a harmonized classification system known as J3016: Taxonomy and Definitions for Terms Related to On-Road Motor Vehicle Automated Driving Systems. Within this frame, SAE outlined six levels of driving automation from “no automation” to “full automation”.

According to J3016, driverless automated cars are defined as Level 5 cars, which is the top level in the SAE automated scale. On all roadways and under all environmental conditions, the performance of these automated driving systems does not require human intervention whatsoever. As of Level 4 cars, no driver attention is required, and self-driving is supported in limited areas or under special circumstances.

A critical question is whether automated vehicles will increase or reduce total vehicle travel and associated external costs

more skeptical and often refer back to them as “wishful thinking”, while industry has scaled down its roadmaps to a perhaps more realistic proportion.

Governments are particularly attracted to the objectives of improving road safety while decreasing casualties, reducing congestion and supporting more affordable and efficient mobility services and infrastructures. However, these results would require new business models, different urban land uses and innovative regulations to be implemented and, furthermore, even after being reached, they would not be a guarantee of an overall positive impact of AVs.

In this frame, a critical question is whether automated vehicles will increase or reduce total vehicle travel and associated external costs. Depending on public policies, it could go either way: by increasing travel convenience and comfort, and allowing vehicle travel by non-drivers, they could increase total vehicle mileage, but they may also facilitate vehicle sharing, which will

allow households to reduce vehicle ownership and therefore total driving.

TECHNICAL AND HUMAN CHALLENGES OF AUTOMATION

There are various challenging technological factors related to automation, such as the relative slow progress of the engineering, and the limited scale and high-cost production. These quantitative, tech-challenges, however, do also mirror qualitative ones: factors like the predictability of behavioural intent and the concept of trust towards automated vehicles exemplify the more human side of automation.

As of now, self-driving cars have still issues in determining the intentions of pedestrians and cyclists, especially on urban roads, where multiple functions (flow, parking, drop off/collection) and transport modes are accommodated. Therefore, it is very important for automated vehicles to refer to programmed models of behaviour and updated maps within their (driving) algorithms. On the other hand, the

It is very important for automated vehicles to refer to programmed models of behaviour and updated maps within their algorithms

technology must be accepted and trusted by society.

The matter of trust, which is a human concept, could be overcome through a process of trials and errors where vehicles with varying degrees of automation are tested physically, either in closed environments, on public roads, or virtually. The matter related to technologies of automation, instead, should be supported by, for example, a bold advance in the development of Invisible-to-Visible interaction (I2V) for automated driving.

I2V AND MAVEN

By combining information from sensors outside and inside the vehicle with data from the cloud, I2V would be an enabler to allow automated cars to “see where eyes can’t see”, around the corner and farther down the road. MAVEN (Managing Automated Vehicles Enhances Network), a 3.1 billion project that was launched in September 2016 under the Horizon 2020 Research and Innovation Framework

ABLE-ALLOW-ACCEPTED

So what can authorities do to facilitate, anticipate and/or regulate automated driving? The priority for authorities might be derived from three success criteria that can characterise the introduction and deployment of automated driving: Able, Allow and Accepted.

Able refers to the capabilities of the vehicle given the road type, certain traffic and situational conditions, and includes the state of and functionalities provided by physical and digital infrastructure. Allow concerns regulation that prescribes where and what level of automated driving is allowed. Finally, Accepted is about adoption and usage of automated driving by citizens, vehicle drivers and other road users.

Although all three A’s are relevant and necessary on their own, they are also strongly related. For example, a system that is not or insufficiently Able or Allowed will not be Accepted. Moreover, a system that is Able but not Allowed or Allowed but not Able, will probably never go in production for usage on public roads.

Programme of the European Commission, is aiming to develop I2V interaction concepts for automated driving.

MAVEN specifically aims to provide solutions for managing automated vehicles in an urban environment, focusing on the transition stage where there is a mix of non-automated, automated and/or connected vehicles in the network. The core of the project is to manage automated vehicles at signalized urban intersections and corridors

with a combination of technologies focused on Level 4 highly automated vehicles.

Dynamic vehicle platooning, infrastructure systems for adaptive traffic light optimisation and negotiation algorithms and scheduling programs would contribute to increasing traffic and energy efficiency, improving utilization of infrastructure capacity, and preventing or mitigating dangerous situations involving pedestrians and/or cyclists.



Hyundai automated car during a test

DO PEOPLE NEED AUTOMATED VEHICLES?

MAVEN, however, is not “just technology”. It also tries to solve the above-mentioned citizens’ “matter of trust” in relation to automated vehicles. Indeed, to gain a general understanding about citizen’s perception and expectations with respect to the automation on roads, MAVEN surveyed 209 respondents from over 30 countries. The responses were reassuring, as they clearly indicated high expectations with respect to the benefits of automated vehicles.

Most respondents (about 75%) are shown to expect improved road safety, about half of them expect better prediction of traffic flows and one third travel time savings. It is then interesting to notice that respondents also affirmed they would spend their time in an automated vehicle working on tablet or smartphone, followed by reading a book or sleeping.

The most important obstacles on the road to automated vehicles have been identified as well: cybersecurity/privacy concerns and the lack of a regulatory framework are still a restraint to trust Connected Automated Vehicles (CAVs). Taking into account the actual state of technology or legislation, people responded also to the question when they believe that 10% of all traffic will be automated. The results can be seen in Figure 1.

ROADMAP FOR FUTURE TRAFFIC MANAGEMENT SYSTEMS

Not just from citizens’ perspectives,

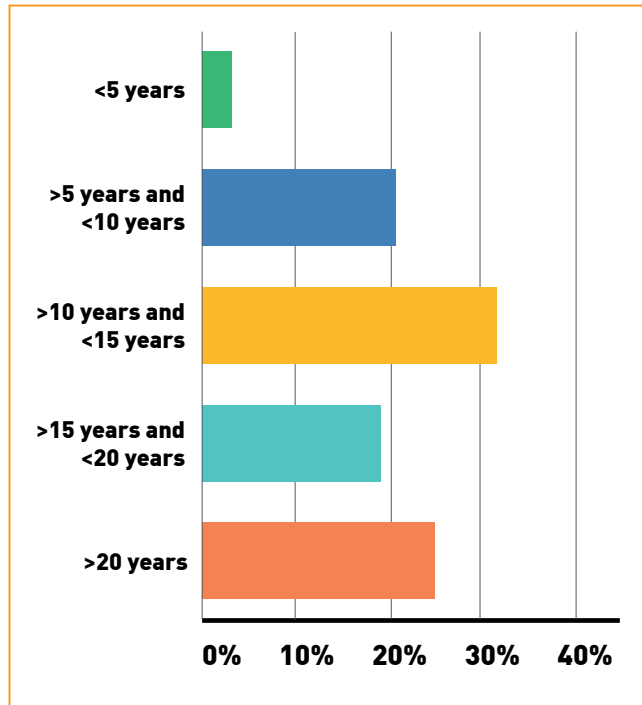


Figure 1: When do people think that 10% of all traffic in cities will be automated? Only 3% of respondents expect that it will happen in the next five years, 32% respondents within 10 to 15 years. An interesting fact is that 25% of respondents expect it for more than 20 years. The survey also confirmed, that the actual benefits of automated driving depend on the overall city policies focusing not only on automated vehicles, but also, for example, shared economy and electromobility. More detailed analysis will be available in the public deliverables of the MAVEN project.

but also from that of road authorities, the transition path to a cooperative, connected and automated world still looks uncertain. Inevitably, conventional, Cooperative Intelligent Transport Systems (C-ITS), automation equipped vehicles and roadside equipment will co-exist for some

time. Vehicles will also co-exist with other types of non-motorised road users, such as manually driven vehicles, pedestrians and cyclists.

Within this frame, the MAVEN project developed a roadmap for the introduction of road transport automation to assist local road authorities in understanding potential future changes in their role and in the tasks of traffic management at various phases of the transition. Moreover, it identifies all the steps to be taken by policy makers, road-authorities, and stakeholders on the route to a high penetration of highly or fully infrastructure-supported automated vehicles.

The roadmap not only considers political, institutional and organisational aspects, but also focuses on priorities related to the safety and comfort of special category road users such as public transport vehicles, vulnerable road users, logistics vehicles, and emergency vehicles.

HOW TO MAKE IT WORK

In order to achieve positive effects from automated vehicles, municipalities must actively develop ways to make best and most sustainable use of available transport modes, discourage urban sprawl, and if possible limit the amount of individual car driving that people can do using some form of incentives. Given the diversity of cities across Europe, it is essential to also consider different approaches towards facilitating and regulating automated driving.

Not everything can immediately be solved with technology. For example, artificial intelligence is struggling to make sense of traffic management plans given their diversity and cultural specificity.

In terms of infrastructure, many cities have not yet expressed support for investing in traffic management systems to facilitate automated driving

Although it has been suggested that communication between the traffic management system and vehicle could help to bridge this gap, cities believe that the traffic manager will still be needed, even though automated vehicles may increasingly manage themselves as a system.

In terms of infrastructure, many cities have not yet expressed support for investing in traffic management systems to facilitate automated driving. Other cities, especially the ones implementing Smart City strategies, are putting into place new sensors, digital infrastructures and other technologies, which could provide some of the building blocks for automated vehicles in the future.

NEXT STEPS

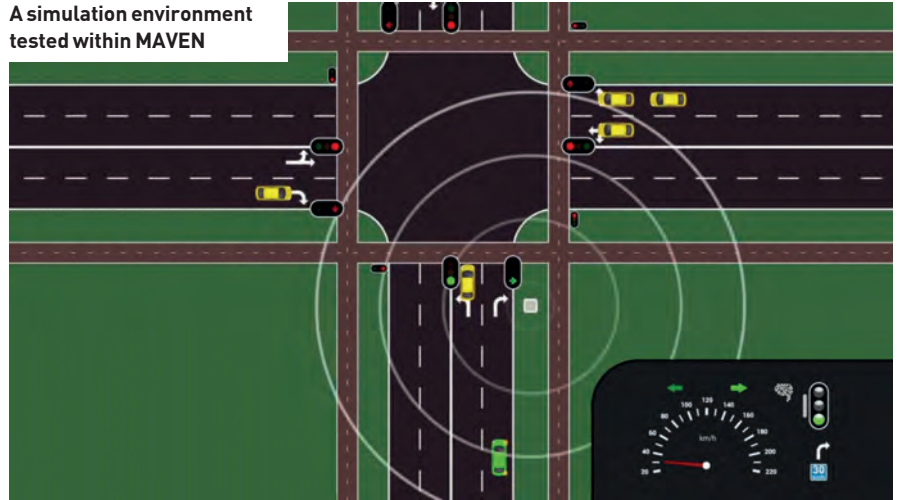
MAVEN will host a demonstration on the roads alongside a workshop on urban traffic management and automation on 6 June 2019 at the Helmond Automotive Campus during the ITS European Congress in Brainport Eindhoven, the Netherlands.

During the closed-circuit demonstration, delegates will be invited to take a tour in the automated vehicle to witness its responses to requests from the traffic light controller to change lane and/or speed. It will also be possible to see how the intersection controller will respond to information about the trajectory of the vehicle, causing it to change the traffic light sequence.


After the tour, delegates will be invited to the roadside display demo where the two aspects will be further highlighted: traffic controller's requests and responses to the vehicle will be visible on a dashboard and vehicle's responses will be observed through a live videostream of the traffic on the road.

The workshop will provide an opportunity to discuss the role of the urban traffic manager in a

A simulation environment tested within MAVEN



Lane change and speed advice use cases in Germany

future with increasing levels and penetration of automated vehicles. This discussion has been conducted primarily within the three MAVEN stakeholder workshops that took place between 2016 and 2018. Moreover, two key project deliverables will be available at the event: 'Transition Roadmap' and 'White paper - Management of automated vehicles in a smart city environment'. 

■ For more information on the event visit: www.polisnetwork.eu/publicevents/623/61/Urban-traffic-management-and-vehicle-automation

FYI

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Access

This section focuses on mobility for urban economic development and social policy. This includes accessibility of transport for the mobility impaired and accessibility to basic services for everyone; the financing of public transport and transport projects generally; and regulation, planning and governance

- o Urban Mobility
- o 7th EU SUMP Awards:
Basel, Dresden & Greater Manchester



The fruits of our labour

Why urban mobility is important to the future of cities, by **Jaanaki Momaya**

The past few years have seen an urban mobility boom in cities around the world looking to offer choice to their citizens. Technological advancements have accelerated mobility alternatives offering convenience and immediacy, and are challenging the urban mobility landscape for the better.

Many of these solutions are key to the future development of cities. For the first time in human history, over 75% of the European population are living in cities and this is expected to grow to 80% by 2050. As cities continue to expand and city populations continue to grow, mobility will become even more vital to the quality of life for residents. Issues such as population density, congestion, pollution and sustainability are causing a headache for cities that may be alleviated by innovative urban mobility options.

This has all happened over the past decade. While cities were continuing to improve local public transport offerings, including underground trains, buses and trams, a gap in the market still existed; one between public and private transport. On top of this, people today are demanding more sustainable, healthy, convenient and digitally friendly solutions.

STIMULATING THE NEW URBAN LIFESTYLE

A key driver has been the rise of the sharing economy. Responsible for introducing the concept of sharing goods, services and property, the younger generation have been quick to adopt the new trend of owning less



and sharing more. From home lending, reselling, talent-sharing to co-working, peer-to-peer lending and ridesharing, the sharing economy has allowed companies to take this a step further and develop a new concept of 'shared mobility'. This in turn has shaped the idea of 'urban mobility' into the term frequently used today to refer to the new generation of alternative transport solutions designed specifically for urban life.

This shift towards urban mobility has also been influenced by the digital economy; effectively using data is a vital component for companies

looking to innovate their industries. By building upon a foundation of big data, companies can now provide efficient services and products that are tailored to what people want and when they want them. Both the sharing and digital economies have grown successfully by catering their services, goods and platforms towards what consumers want and this will be critical for urban mobility brands looking to shape the cities of the future

MEETING THE DEMANDS OF THE NEXT GENERATION

Changes in consumer attitude have



Lime e-bikes are just one of many urban mobility options

paved the way for the growth of urban mobility solutions. Consumers are now more open than ever to the idea of sharing, whether it be using co-working spaces, sharing and renting homes, or even sharing tools with neighbours via apps. This is now translating into urban mobility with city residents willing to rideshare, car-pool or use shared vehicles like bikes or scooters to get to where they need to go.

The pace of city living has also meant that consumers are now prioritising convenience and immediacy in order to maintain their modern lifestyles. Because of this, more companies are being forced to provide quick, on-demand services that cater to customer wants and needs feeding the success of many urban mobility brands who are providing convenient, quick and low-cost options where traditional transport cannot.

CREATING NEW URBAN OPTIMISM

As cities continue to grow, the 'urban optimist' movement is being propelled forward with more people choosing to support alternative urban mobility solutions that tackle issues such as congestion, affordability, pollution and sustainability. Residents are consciously choosing to consider their personal impact on their city and how they can help create a home that offers

a high quality of life; this includes cutting down on the use of private cars and lorries, campaigning for better cycling and pedestrian infrastructure and advocating the use of light, electric vehicles such as dockless bikes.

Whereas owning a car was previously a mark of status and symbolised freedom and access, people are now choosing to value convenience and affordability. A car is no longer a necessity and to avoid the high costs of purchasing and maintaining a car, as well as insurance and parking, people are choosing to become urban optimists with affordable, sustainable mobility options in their cities.

SOLVING URBAN CHALLENGES

Cities across the globe all have similar issues of congestion and population density, with authorities trying to find innovative and transformative solutions to becoming a 'smart city'. One of the key requirements is ensuring there are efficient and sustainable mobility options that support the needs of residents; many experts emphasise that affordable and easy access to working and leisure activities is important to improving quality of life.

Quality of life is also heavily linked to the serious global issue of city pollution levels, with many in the industry seeing urban mobility as a vital component in helping cities to reduce

emission levels and improve air quality. Congestion is a significant issue to cities looking to lower these pollution levels; large numbers of cars, lorries and buses are sitting idle in long traffic queues and emitting huge quantities of dangerous air pollutants.

With more studies highlighting the consequential serious health risk to residents, cities must address the issue now and work collaboratively with urban mobility brands to find emission-free solutions. Cutting down on the number of private cars used in cities is a progressive step but it is difficult to implement a full ban. Urban mobility companies should actively work together with policymakers and industry leaders to figure out a solution to integrating new mobility alternatives into the existing transport ecosystem in a city. Not only can urban mobility companies offer carbon-neutral transport alternatives, but they can also help ease over-use of public transport, creating a city transport system that runs smoothly.

LOOKING FORWARD

The urban mobility options we see today are only just the beginning. Technology will continue to innovate the transport and mobility scene and influence how cities continue to grow and develop with them. With younger generations - and others - willing to embrace the benefits of urban mobility solutions, it's clear cities need to adopt this innovative approach to mobility and consider how they can work with companies to ensure cities become smarter, fighting against issues such as congestion and pollution. Prioritising the development of urban mobility will only positively shape the cities of the future - it's an exciting space to watch. 🚲

FYI

Jaanaki Momaya is UK General Manager of Lime

Excellent planning

Polis President, Transport for Greater Manchester, won the 7th EU SUMP Award, while Dresden and Basel were the runners up at a ceremony presented by European Commissioner for Transport, Violeta Bulc, in Brussels on 21 March 2019. **Thomas Mourey** takes a look why the three cities were successful in the face of stiff competition



Finalist of the 7th SUMP Award: Basel, Switzerland



In brief

Transport planning in the Canton of Basel-Stadt in Switzerland impressed the jury of the European SUMP Award: the jury named Basel as a finalist of the 7th SUMP Award recognising how Basel emphasizes multimodality in its

sustainable urban mobility planning.

Basel has a long history of promoting sustainable urban mobility and multimodality. As the canton lies just on the border with two European neighbours Germany and France, the local authority plans transport and

mobility in a particular context that involves differences in policies, languages, transport rules and planning approaches. Despite these challenges, Basel developed an outstanding plan integrating the region's transport system into a single operating network



that connects three urban areas.

Context

Urban mobility planning has a long tradition in Basel. Promoting the use of different modes including cycling has been a major objective of the authorities since 1975. Thanks to continuous initiatives, the current modal split in the canton Basel-Stadt is balanced and

shows that longstanding efforts to promote public transport and active travel modes have been effective. In 2015, the canton of Basel-Stadt accounted for the following modal split: cars 22%; public transport 27%; cycling 17%; walking 33%.

Basel's first Sustainable Urban Mobility Plan (SUMP) is currently in the implementation phase. It aims at making the canton even more attractive for citizens, visitors and businesses. At the heart of the SUMP are the goals defined in the cantonal constitution:

- Ensure safe, cost-efficient, eco-friendly and energy-saving mobility;
- Prioritise public transport;
- Advocate for attractive mobility services within the agglomeration, fast connections to the Swiss centres and connection to international transport links.

The SUMP is also considering the cantonal environmental goals: to protect people and the environment from noise and other unpleasant and harmful emissions. Additionally, the results of a referendum held in 2010 reinforced the sustainable approach of the canton Basel-Stadt in its transport planning process. Citizens voted for a 10% decrease of the traffic flow of

privately owned cars by 2020. This was incorporated into the Environmental Protection Act.

Based on these requirements, four overriding goals have been defined:

1. Increase quality of life and livability
2. Further improve accessibility
3. Increase safety
4. Ensure cost effectiveness

This translates into measures favouring sustainable and space-efficient transport modes not only for short trips within the canton but also for longer trips, for which convenient, efficient and sustainable alternatives are available.

In action

The implementation phase began with an action plan for 2015-2017 that included specific measures and projects for this period of time. In June 2018, a report analysed the status of implementation and achievements of those first measures. It went on to define the measures and projects scheduled for the next three-year period covering 2018 to 2021. This approach allows Basel to keep a flexible yet efficient approach by planning, implementing and monitoring different measures at the same time. It also

enables the canton to adapt targets and plan for new developments and technologies.

The canton Basel-Stadt has put a lot of effort into integrating multimodality in its sustainable urban mobility plan. The main motive behind is to reduce commuter traffic and limit congestion during peak hours while promoting sustainable, eco-friendly and space-efficient alternatives.

For example, a Combi-ticket system for car parking and public transport (<https://www.tnw.ch/service/city-park-and-ride>) was implemented to encourage people moving in the city without their cars.

The most effective and durable measure has probably been the creation of the Penderfonds (commuter fund) that collects the revenue of parking management.

This fund is used to finance projects within the whole tri-national agglomeration of Basel that have a proven positive effect on commuter traffic to and from Basel. Among the projects funded and implemented in this framework was the creation of Bike & Ride (B&R) and Park & Ride (P&R) facilities in strategic regional railway stations throughout the agglomeration of Basel. These initiatives aim at making sustainable alternatives for



commuting more user-friendly and straightforward. Since the fund has been established in 2012, a total of 394 bicycle parking spaces and 966 car parking spaces have been co-funded at a number of railway stations.

Basel is planning for the whole tri-national agglomeration. In addition to the P&R and B&R facilities, two tramway lines have been extended to the neighbouring countries, to Saint Louis in France and to Weil am Rhein in Germany, facilitating seamless cross-border commuting. It is foreseen to further expand and optimise Basel's transnational connections through the improvement of the regional railway network (S-Bahn).

Results

Positive results have been obtained by implementing measures from the SUMP in the first three years. Some examples include the reduction of car traffic on urban streets while witnessing economic growth in the canton. Basel also receives outstanding ratings in surveys capturing people's assessment of the quality of life in their city, and accounts advanced accessibility of the region, especially with public transport.

A significant increase in the number of cyclists and the noticeable improvement of road safety and air quality are further improvements suggesting the effectiveness of the transport strategy and the SUMP.

Car ownership in Basel is below average with 334 private cars per 1000 inhabitants. About 52% of the households are car-free and use or combine various transport modes.

The system to review, adapt and define specific goals and interventions every three years enables the authorities to consider new technological developments and respond to new trends through the plan of action. It is expected that, by continuing to follow the SUMP and implementing the measures, targets will be met, and results will benefit not only the



inhabitants of the canton Basel-Stadt but also the surrounding region and, at a bigger scale, the climate.

Challenges, opportunities and transferability

Shared mobility services are developing in Basel and various car-sharing companies operate. These services will be further extended to include sharing electric vehicles, e-bikes, bicycles, e-scooters and cargo bikes.

The selection of Basel as one of the three finalists of the 7th EU SUMP Award on multimodality reflects the

inspirational character of the canton. The jury highlighted the fact that Basel can be considered by other European cities as good practice example in urban mobility planning. Basel is a demonstration that a planning urban mobility on the long term delivers results.

In depth

Basel's finalist video: <https://www.youtube.com/watch?v=IhDuCqZhang>

SUMP Plan: <http://www.mobilitaet.bs.ch/gesamtverkehr/verkehrsstrategie/verkehrspolitisch-leitbild.html>

Dresden: planning for multimodality and measuring the results



In brief

Dresden (Germany) was, again, named one of the three finalists of the 7th European SUMP Award that was presented by European Transport Commissioner Violeta Bulc on 21 March 2019. After Dresden's approach to monitoring and evaluation was commended four years ago, the city now impressed the jury once again with forward-looking planning, this time addressing multimodality in transport planning.

The city of Dresden adopted its first SUMP "Sustainable Urban Mobility Plan 2025plus" in 2014, which is currently in the evaluation phase. First results show that Dresden achieved most objectives, and even exceeds them.

Context

Dresden is a city located in the former

East Germany and has more than 500,000 inhabitants. The city has been developing and implementing transport plans for the last 70 years under different political systems.

Dresden's transport challenges derive in the context of recent growth of the population and densification of the urban area, economic developments and an increase of energy prices that all impact urban mobility. Air quality and NOx emissions, traffic noise and road fatalities and injuries are pressing challenges. The emergence of new mobility services require the authority to address new issues such as digitisation and automation of transport, data collection and management as well as coordinating with new players in the mobility market. Dresden's SUMP aims at responding to the aforementioned issues in a resource-efficient way.

The general objective of the SUMP is to develop a "sustainable urban and regional transport system, a more attractive and liveable, efficient city with higher road safety" which can be declined in four priorities:

1. Sustainable and eco-friendly transport and mobility for citizen and the economy
2. Socially just participation in mobility
3. High quality and efficient integrated transport systems to reduce the use of natural resources for transport purposes
4. Open and inclusive planning and decision-making process, involving the population and different experts and groups.

In action

Facilitating multimodal transport, called "multimobility" by the city in

its communication with citizens, is a key component of Dresden's SUMP. The flagship communication campaign led by the city administration is called "Multimobil. For you. For Dresden." The city addressed the various transport modes, and the connection between those, in a number of interventions:

- To foster active mobility, Dresden adopted a bicycle concept and is working on the publication of a dedicated walking concept. These separate documents complement the SUMP and path the way for the development of a prioritised route network, the improvement of signage and facilities as well as the improvement of safe infrastructure.
- To enhance public transport, Dresden made plans to increase accessibility and create three new tramlines.
- New mobility services are addressed consciously: To avoid that car-sharing replaces trips previously taken by public transport, by bike or by foot, Dresden decided against free-floating car sharing schemes. To enhance mobility options but not to increase inner-city car trips, only station-based car sharing has been introduced.
- Dresden elaborated on alternatives to trucks and vans and to keep its cargo-tram running along with the promotion of cargo-bikes.

To facilitate the combination of different transport modes within one trip, Dresden is now introducing a network of 76 intermodal mobility hubs. The first "MOBI" mobility hub opened at the occasion of the 2018 EUROPEANMOBILITYWEEK. "MOBIs" are central places where public transport offers meet bike-sharing, car-sharing and e-charging. Transport information will be provided



in real-time and for all transport services. Ultimately, such improved offer shall make alternatives to the privately owned car a reality for more people, contribute to a decrease of emissions and a better use of urban space.

Results

First evaluation results were reported in July 2018, looking at both the process and the results of implemented interventions by 2017. Out of 90 foreseen measures, half are currently being implemented, one quarter have been completed, 10% have not yet begun and four measures have been dropped.

Results show that the growth in the population is no longer accompanied by linear increase of cars in the city. The cumulated modal share of public transport, walking and cycling accounted to 61% and is expected to reach 63% by the next evaluation in 2020, exceeding the SUMP's original target of 58%. The number of car-sharing users increased by 80% between 2013 and 2017 while the number of shared cars grew by 62%.

Challenges, opportunities and transferability

As Dresden already managed to reach

many of its targets, one of the city's next challenges will be to continue planning for mobility in order to reach even more ambitious targets. To achieve this goal, the city of Dresden wants to seize the opportunity given by the digitalisation of transport. For instance, the local authority plans to develop a Multimodal App which will integrate information, booking and ticketing solutions for public transport, car-sharing, bike-sharing, electric charging and parking.

The city of Dresden is also a great example for other European cities, as attested by its selection among the three finalists of the 7th EU SUMP Award.

In addition to its recognised capacity for planning for multimodality, Dresden stands as an example for developing a SUMP and especially for conducting the evaluation process.

In depth

Dresden's finalist video:

https://www.youtube.com/watch?v=ImRtkLn_CMY

SUMP Plan: https://www.dresden.de/media/pdf/stadtplanung/verkehr/VEP_2025plus_-_Ein_Ueberblick_EN.pdf (English version).

Greater Manchester: Using SUMP to make urban mobility multimodal



In brief

Greater Manchester was recently awarded the 7th Award for Sustainable Urban Mobility Planning (SUMP Award), which focused on multimodality, during the European Sustainable Mobility Award Ceremony held in Brussels on 21 March 2019. From the three SUMP Award finalists (which included Basel and Dresden), the British metropolitan area proved to have the most developed concept and ambitious targets in achieving a multimodal transport system covering both the inner city and the outer territories of the metropolitan area, and also demonstrated its strong support to the use of active modes.

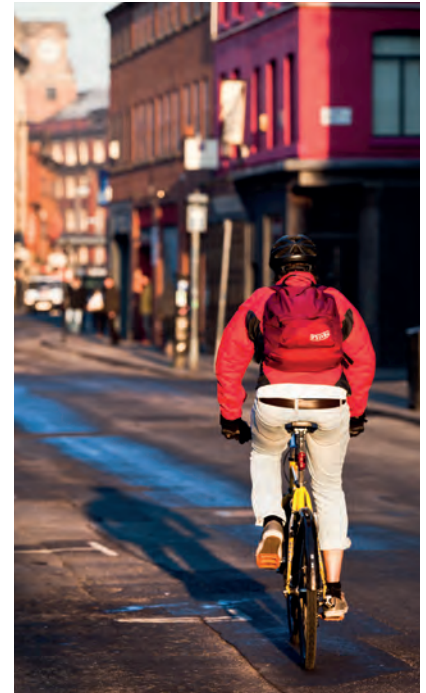
The overarching 2040 Transport Strategy (i.e. its first SUMP) detailing the long-term ambitions of Transport for Greater Manchester (TfGM) covers all important aspects of sustainable urban mobility planning, and can serve as a positive example for the many European cities that don't yet have a clear, long-term plan.

Context

Greater Manchester is a large polycentric city region of 2.79 million

residents. The metropolitan area is the country's first combined authority, representing 10 local authorities (i.e. districts) and their leaders, working together and chaired by a directly elected mayor.

The combined authority deals with a variety of urban policy areas, including growth, quality of life, environment, and technology & innovation. When it comes to mobility challenges, Greater Manchester faces problems that are common to many European metropolitan areas, such as a high number of individual car trips causing traffic jams, and deteriorating air quality. Currently, 2.5 million short trips of 2km or less are made every day, and 45% of these trips are made by car. Furthermore, there are 1.7 million daily car trips to destinations across the Greater Manchester area that are longer than 2km and do not start or finish in the regional centre. Additionally, the fragmentation of mobility solutions is a barrier to rapid and seamless trips in Greater Manchester. This shows the necessity of planning for all modes, to cover a larger regional area than the immediate city footprint. The approach chosen by Greater



Manchester is to plan for all modes in order to reduce the modal share of the private car.

In action

To respond to the challenges identified by Transport for Greater Manchester during the SUMP preparation process, a clear dedicated plan was adopted for decreasing private car use and providing more sustainable alternatives for local residents.

The metropolitan region is currently implementing its first SUMP, which is accompanied by a five-year delivery plan including a defined set of desired outcomes measured by a set of Key Performance Indicators. Regular monitoring of these indicators allows Transport for Greater Manchester to adjust course, depending on issues such as available funding and emerging political priorities, while still working toward the long-term strategy aims.

Within the Greater Manchester 2040 Transport Strategy, TfGM's targets are itemised by spatial theme. This classification of targets helps take into account the different types of journey made on the network in a modally agnostic way, avoiding a planning approach

restricted to modal silos and allowing for the adaptation of objectives and measures to certain types of trip and specific areas of Greater Manchester.

There is a strong emphasis in the Greater Manchester SUMP on enabling people to travel more easily and safely on foot and by bicycle. Achieving this will help to increase levels of physical activity, as well as reducing the significant number of very short car trips currently made in local towns and neighbourhoods, making them more attractive places to live. This will, in turn, reduce harmful emissions and traffic noise.

The ambition of Transport for Greater Manchester within this area is “to create a comprehensive network of on- and off-road walking and cycling routes that make it easier and safer for people to walk and cycle to key local destinations, such as local centres, jobs, healthcare and education, for leisure purposes and for local transport access”. The first step was the publication of a detailed, Greater Manchester-wide walking and cycling infrastructure proposal, in collaboration with all 10 local authorities. This followed a proposal made in 2017 by Greater Manchester’s Cycling and Walking Commissioner, Chris Boardman, MBE, the Olympic gold medal-winning cyclist.

Further to the promotion of active modes, TfGM has adopted a sub-strategy called “Streets for All”, which aims

to “design streets which balance the movement of people and goods with the creation of more people-friendly places.” This approach for the movement of people and goods has ambitious goals offering a comprehensive and consistent cycle network, a reliable and accessible bus network, reliable freight access routes and to harness new mobility innovations.

In order to develop its SUMP, Transport for Greater Manchester has worked in partnership with the different public transport providers operating in the urban area, and has created a multimodal and multi-operator ticketing structure, called “System One”. This is being further enhanced by TfGM’s multimodal smart ticketing platform “Get Me There”, allowing customers to purchase travel tickets using a smartphone or a smartcard, and to travel seamlessly across operators. Furthermore, a simpler zonal fare structure is being introduced imminently on Metrolink (i.e. the local light rail system, owned by TfGM) to improve ease of understanding fare structures for customers, preparing for integrated fares in future, required for the development of a Mobility as a Service (MaaS) platform.

Results

Greater Manchester is at the starting phase of implementing its SUMP, but the planning approach has a clear and

positive long-term structure, as demonstrated by its selection for the 7th EU SUMP Award for multimodality.

Moreover, the region has already achieved a significant modal shift over the last two decades, substantially growing its regional centre economy while reducing traffic levels. This has been achieved partly through transport investment stimulating an accessible urban core, which has in turn attracted business investment, thus launching a cyclical agglomeration process.

Challenges, opportunities and transferability

Greater Manchester’s vision for 2040 is to reduce car use to no more than 50% of daily trips, with the remaining 50% being made by public transport, walking, and cycling. Through extensive scenario testing, their analysis suggests that achieving this vision will enable the metropolitan authority to deliver growth ambitions, without increasing overall traffic levels, despite the fact that the population is growing rapidly and the city is becoming an important international centre.

Without a doubt, the case of Greater Manchester is an excellent example of how a well-planned SUMP can help a metropolitan region to improve its urban mobility situation with creative and well-integrated plans.


In Depth

SUMP – Transport Plan 2040:

<https://www.tfgm.com/2040>

Introductory video about the SUMP of the region: <https://www.youtube.com/watch?v=cl6fiVWFNTY>

Manchester 7th SUMP Award

video: <https://www.youtube.com/watch?v=BkgfMaEjICs> 

FYI

Thomas Mourey is Project Manager at Polis



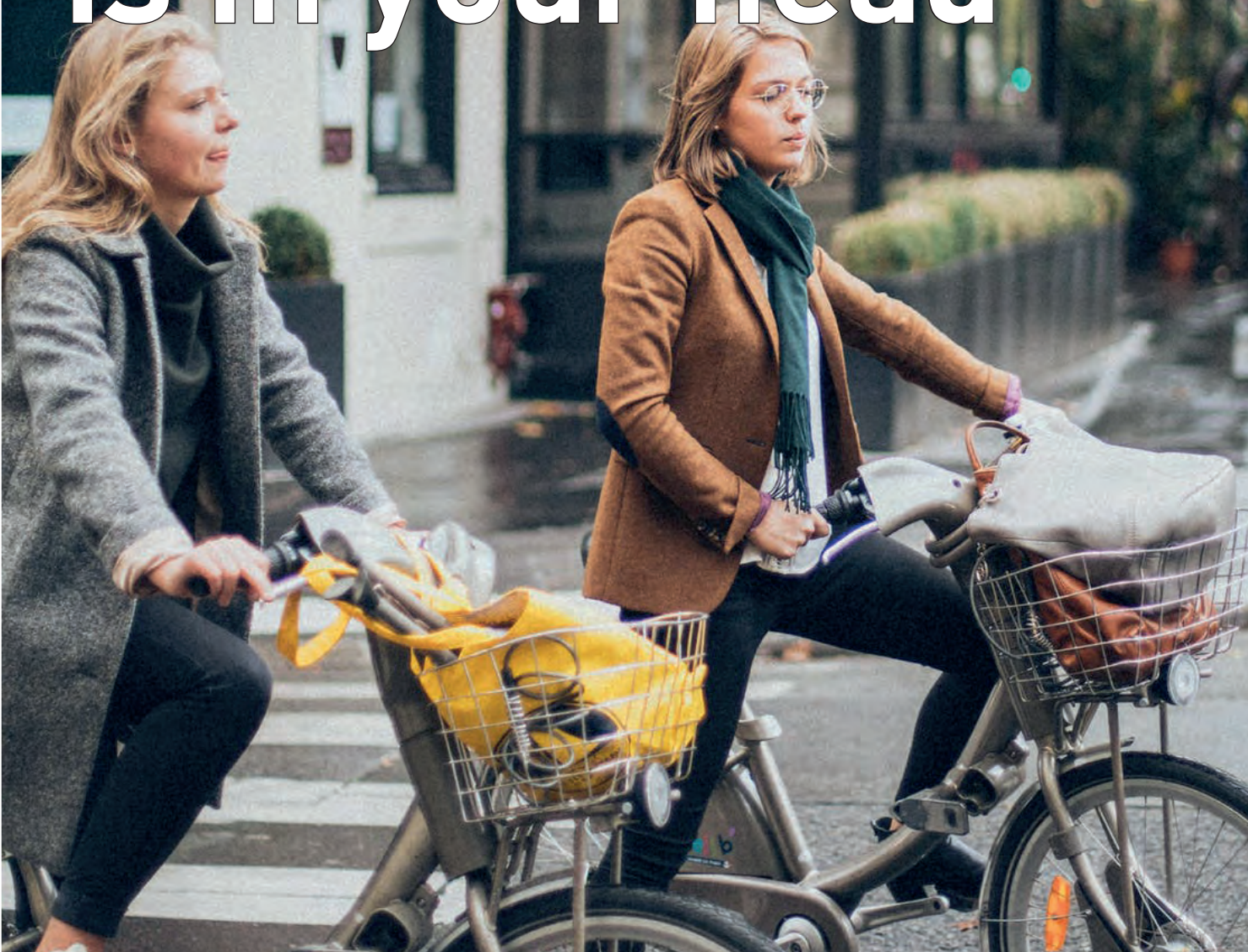
Safety & Security

This section addresses road safety and the security of transport systems. It covers road safety policies, addressing all categories of road users and supporting the development of innovative solutions. It also covers technological innovations contributing to the improvement of road safety

- ISAAC
- Bluetooth Low Energy Urban Networks



Travel behaviour is in your head



National road authorities funded research to understand user needs in a multimodal transport system. **Alessia Giorgiutti** investigated what the new tool in town can do for planners, what is known about Europeans' attitudes towards walking, cycling and new mobility services, and why it is wishful thinking that our travel choices were conscious.



How rational are people when deciding about transport? People think that they make choices that after all are the best for them, given their situation and experience of constraints and opportunities. To a certain extent, they are right: For everyday travel, most of the deliberation is spent on the first trip. After that, we think less about it, which makes sense. You could not function in life if you every day woke up and spent time and mental energy on deciding between all possible ways of getting to work. So that initial decision is crucial. But even if this decision is deliberate it can still be biased or based on lacking knowledge of alternatives. We do, after all, carry with us both habits and attitudes when solving this challenge” – Aslak Fyhri, TØI

Comfort, safety, distance, physical effort and overall individual personal features influence how we move. But it is also a matter of habits. According to the World Health Organization (WHO) physically active young people more readily adopt healthier behaviours, including changing their travel mode choice towards more walking and cycling.

While we know there is a positive correlation between infrastructure for active modes and their usage, the direction of effect is less clear. Does more infrastructure induce more active travel, or is infrastructure simply following the demand that is already there and being built where people generally walk and cycle more? Does infrastructure determine travel behavior? What role do subjective and psychological factors play, how different do user perceive the options they have got?

What makes us (not) move?

To understand travel mode choices, researchers within the ISAAC project examined the psychological determinants for mode shifts, and especially the process of how people take up alternatives to driving their private car. ISAAC was funded under the research programme “User Needs in a Multimodal Context” of the Conference of European Directors of Roads (CEDR). The project brought together various disciplines including health, environment, transport, urban planning and road safety to find out how to achieve modal shift in favour of walking and cycling



Fact sheet preview: interim design strategies

Authors: Regine Gerike & Rico Wittwer, Technical University Dresden, Germany

Innovative solutions require courage, various stakeholders might have reservations. Interim design strategies help to overcome these issues. They might serve as a bridge to concerned stakeholders and help to build support for a project. Interim design strategies allow communities to get engaged and to actually experience change within a short period of time and based on low-cost solutions.

Examples of use:

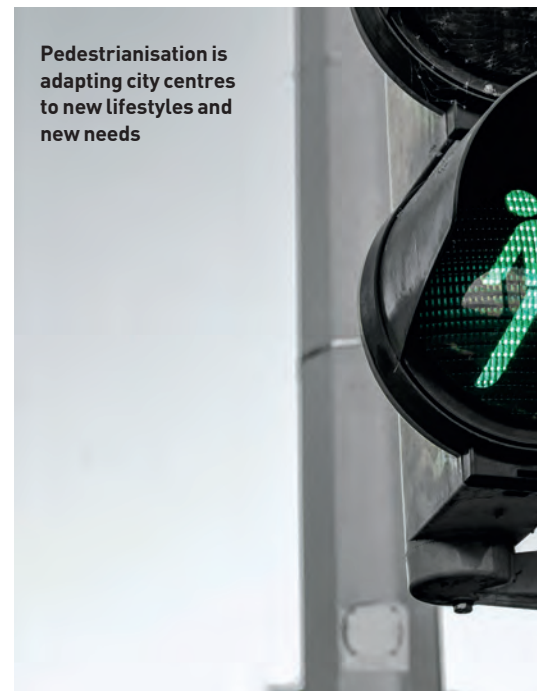
- Ciclovía in Bogotá and other cities in Colombia which inspired similar activities all over the world
- Sunday Streets in San Francisco, see <http://www.sundaystreetsf.com/>
- Bike corrals in Portland (Meisel 2009)
- Parklet programmes in many cities in the U.S. (Loukaitou-Sideris et al. 2012, NACTO 2012, Pratt 2012)
- New York city plaza programme (NACTO 2012)

Mode change effects:

Interim design strategies pursue different objectives. ... Pratt (2011, see also Birdsall 2013) finds for the San Francisco parklet programme that pedestrian activities increased substantially in some locations but only moderately in others. The number of people stopping to engage in stationary activities substantially increased in all locations. Provided bike racks were well received. This might have increased cycling in the area. No problems were reported in terms of drops in customers for local businesses.

Effects on safety and security:

No effects of interim design strategies on safety and security have been reported to our best knowledge but positive effects can be expected as most interim design strategies contain elements of either speed reduction for motorized vehicles and/or reduction of traffic volumes. Interim design strategies need to comply with all design rules that apply to permanent solutions, particularly in terms of ranges of vision, tangibility, trafficability and usability for all parts of the street and all user groups.



Pedestrianisation is adapting city centres to new lifestyles and new needs

information about alternative choices is most effective.

ACTIVE MODES ARE ALL DIFFERENT

An extensive representative user

– without compromising road safety, social security and comfort.

“People often assume they are making choices that are best, and most rational for them, including their transport choices. However, rationality inevitably meets both habits and attitudes to find a fitting solution to any transport challenge”, explains Aslak Fyhri, research psychologist at the Norwegian Institute of Transport Economics TØI. According to the most recent wave of behavioural

research, modal choice is determined for a considerable part by habits. Getting to work, to school or to the restaurant is a repetitive habitual behaviour. Transport mode habits can therefore “cut” conscious decision-making.

The ISAAC project consortium described these processes in the integrated behavioural model: Travel behaviour is most likely consciously evaluated if a mode choice is not habitual yet, or has been disrupted. Under these conditions



survey was carried out within the ISAAC project in nine European cities, i.e. Ghent, Liège, Tilburg, Groningen, Trondheim, Bergen, Düsseldorf, Dortmund and Berlin.

It has been found that people's

Fact sheet preview: land use planning

Author: Tim De Ceunynck, VIAS

The mode choice of people is influenced by the location and accessibility of a destination. By combining transportation needs and land use planning, the travel patterns of people can be influenced, potentially reducing the negative impacts of low-density and mono-functional living centres. Following the example of Curitiba (Brazil), cities that apply the design method known as Transport Oriented Development (TOD), which concentrates urban development around public transit hubs and link areas of development together using high-quality public transit lines, could easily harmonize transports with land use by making security and safety two top priorities.

Effects on safety and security:

One of the main goals of land use planning is to reduce the number of trips made by motorized vehicles. This may reduce the crash risk exposure of people. A study by Xu et al. (2017) on the relationship between the ratio of job opportunities and housing in Los Angeles (USA) showed that if the number of jobs in an area reduces compared to the number of houses, people are exposed to a higher risk of getting involved in a crash due to longer travel times. Therefore, it can be concluded that a well-designed land use plan can indirectly contribute to increasing the overall road safety through a reduction of exposure.

reasons not to walk more frequently for short trips differ strongly from not cycling more often. For cycling, road safety is the main barrier, while for walking, travel time is perceived too long. "It may seem trivial, but cyclists and pedestrians are not the same species. So we also have to treat them differently", says Tim de Ceunynck, researcher at the Belgian VIAS institute who analysed the data. "While lowering any barrier will have benefits for both, the study makes it clear that a powerful strategy aimed at boosting cycling will be different from a strategy for walking", he says.

A NEW TOOL TO IMPROVE DECISION-MAKING

In May 2019 on the occasion of a conference concluding CEDR's research programme on multimodal transport system, ISAAC launched its final tool: the PedBikePlanner is a tool that provides planners with evidence-based information about

what impact transport interventions have on modal shift and on road safety. The PedBikePlanner contains fact sheets about interventions supporting modal shift.

The factsheets include research results on their impact as well as examples of successful application around the world. Information is available, for interventions such as interim design, pedestrian crossings, walking strategies, 30Kkm/h speed limits, bicycle sharing systems, bicycles right turn on red or awareness campaigns to name just a few.

Additionally, the webtool provides tailor-made recommendations: Based on a city's characteristics the tool suggests which are the most promising measures to boost cycling and walking in that city. The PedBikePlanner advises based on local conditions such as on current travel patterns and modal split, road safety and environment, population and policy ambitions.

Fact sheet preview: walking to public transportation

Authors: Balazs Nemeth & Dagmar Köhler, Polis

Walking plays a pivotal role to cover the first and last leg, or “the last mile”, of an urban journey, however, it is the forgotten mode of a multimodal trip. Travel surveys often do not count walking that is done as part of a multimodal trip and the planning scope of public transport operators does traditionally not include how their customers reach and leave a public transport stop. Facilitating walking to public transport stops is essential for any transport system to be multimodal. Safe and comfortable access to public transport facilities is the backbone of a system that provides alternatives to the use of the private car.

Mode change effects:

Distance to a public transport stop has proven impact on modal choice. In Madrid, the ratio of metro rides per person gradually declines with distance from a metro station to home, from 0.55 rides per person in the first 100 metres to 0.06 at 1500 metres. Decrease is linear and shows that the ratio of rides per inhabitant falls 6.9% with each additional 100 metres of distance (García-Palomares et al., 2013).

Based on a dataset from 10 communities in the metropolitan area of Tyne and Wear in northeast England, Aditjandra et. al. found that ... changes in walking are determined mostly by built-environment. To promote walking to public transport, policies must focus on changes to the built-up environment and address safety, accessibility, and the sociability of the environment (Aditjandra et. al., 2016).


Effects on safety and security:

Improving walkability to public transport stops includes to consider safety of pedestrians. The reallocation of public space around Strasbourg’s central station for example resulted in safe infrastructure for pedestrians, but also for vehicular traffic. Pedestrians coming to and from the public transport station no longer walk on the roadway travel lanes as they pass other pedestrians.

Implementation costs are also considered in the recommendations. The tool is available via www.pedbikeplanner.eu to use free of charge.

“Before ‘PedBikePlanner’, transport planners needed to search through vast amounts of fragmented information, which was very time-consuming and biased. This tool will save them lots of time and improve the decisions that are made”, says

Tim de Ceunynck, researcher at VIAS institute, Belgium.

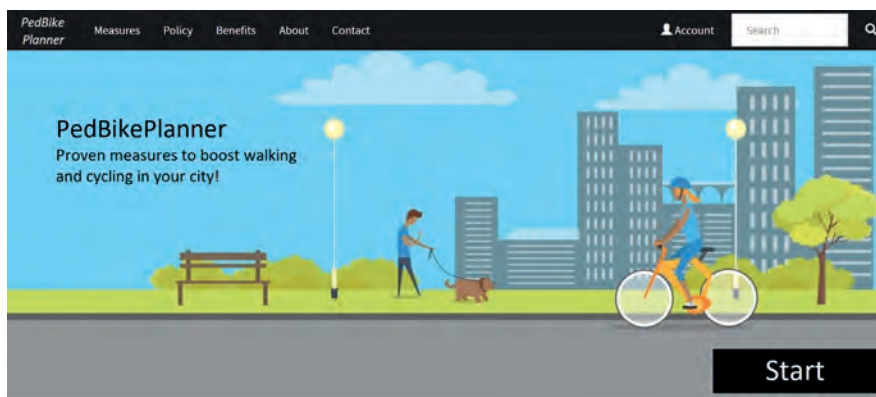
“Walking and cycling have an instrumental role to play in making our cities healthier, more liveable, greener and cleaner. Tools that can help cities to bring about modal shift in favour of active travel, and to make more informed and evidence-based policy decisions are much needed”, said Karen Vancluysen, Secretary General at Polis. 

FYI

Alessia Giorgiutti is Communications Intern at POLIS

ISAAC stands for “Stimulating safe walking and cycling within a multimodal transport environment”. The project was implemented by SWOV (NL, Coordinator), VIAS (BE), TU Dresden (DE), TOI (NO) and Polis (BE). ISAAC was commissioned by the CEDR Transnational Research Programme Call 2015 “User Needs in a Multimodal Context”. The programme was funded by the CEDR members from Germany, Netherlands, Finland, Ireland and Sweden.

www.pedbikeplanner.eu





Connected

www.h3bconnected.com





Low energy, high impact

Francisco Aletta explores the infinite possibilities of BLE Urban Networks and explains the origins and goal of Tetramax: Technology Transfer via Multinational Application Experiments

Tetramax (www.tetramax.eu) is a EU-funded innovation hub for digitizing European industries in the domain of customised and low-energy computing (CLEC). Its mission is to boost innovation for SMEs in search of leading-edge digital technologies and solutions. In the framework of this programme, Etelätär Innovation (together with partners Intelligent Parking and Semab) is undertaking the BLEUN

project (Bluetooth Low Energy Urban Networks), which aims to deploy accurate geolocation services for smart mobility applications and several other market segments in the Smart City.

ADVANTAGES OF BLUETOOTH LOW ENERGY NETWORKS

RTLS (Real Time Location Services) can be provided by using different existing systems, such as the GPS

(global positioning system), RFID, UWB or Bluetooth.

GPS satellites continuously transmit data about their current time and position. A GPS receiver monitors multiple satellites and solves equations to determine the precise position of the receiver and its deviation from true time. At a minimum, four satellites must be in view of the receiver for it to determine its position.



GPS signals are relatively weak and can be easily blocked by mountains, trees, buildings, etc., thus the receiver device needs to allocate a certain amount of energy to the antenna to scan for these signals. A 2016 study by computer engineering professors in the UK and Saudi Arabia found that with a good signal strength, a battery depletes by 13 percent while a weak signal could cause the battery to drop up to 38 percent¹.

For this reason, GPS devices reach energy consumptions of 200 mAh in many cases, which would be equivalent to 1 watt/hour. In terms of CO₂, if we calculate 8,760W of yearly consumption for a device that is connected 24h/day, the CO₂ generated would be 5,694g, following the formula published by the EU. In comparison, a BLE Beacon only needs 5µA, which translates in less than 1W per year, or 0.65g of CO₂.

Also, compared with RFID, due to the widespread adaptation of the Bluetooth standard, BLE solutions are cheaper and easier to integrate into other systems and everyday devices.

In fact, nearly all smartphones are already equipped with the technology. So BLE greatly simplifies every step of the process when smartphones and devices can be used as part of the real time location system.

We can find a similar situation with UWB (Ultra Wide Band). This system is very attractive due to the level of location precision afforded by ultra-wideband positioning systems. This precision is achieved thanks to the ability to accurately measure the time it takes for an encoded signal to travel from a transmitter to a receiver. However, this precision comes at an elevated cost, as much as 10 times more costly than a Bluetooth (BLE) system. Finally, UWB is not available in most smartphones currently in the market, making it unsuitable for any application requiring the use of these devices.

Though BLE can certainly not totally replace GPS, RFID or UWB in the market, as these systems have some very strong use cases, it

clearly offers some net advantages for the needs of smart cities.

BUILDING BLE NETWORKS

There are two kinds of BLE devices: beacons and receivers. Both can be fixed or mobile. Mobile beacons are usually called “tags” or “trackers” and fixed receivers are often referred as “readers”, “nodes” when they are part of a network, or “gateways” when they also send the information to the Internet. Of course, there are many different models, sizes and specifications for each of these devices.

Smartphones can function both as beacons or receivers, thus, six different combinations of smartphones with fixed beacons, roaming beacons, receivers and software can be implemented to adapt to the environment and the purpose of the network.

Another remarkable characteristic of BLE devices is that they allow us to build networks using extended MESH topology, where each device (node) transmits its own data as well as serving as a relay for other nodes. This topology is based on non-hierarchical and dynamically self-organise and self-configure network and was originally developed for military communications, providing a robust and easily installed solution.

The redundant nature of mesh networks is an essential characteristic sought out, as in the event of a hardware failure, many routes are available to continue the network communication process. Therefore, high performance and scalable broadband networks can be built at very low cost using a mesh net. Autonomous roaming devices can

BLE greatly simplifies every step of the process when smartphones and devices can be used as part of the real time location system



join the network and exchange data with the nodes, extending this way the network coverage.

BLE APPLICATIONS: THE BLEUN PROJECT

BLE networks can be used to develop a scalable system able to provide a great variety of functions and services at low cost. These services include outdoor location services, assets tracking, proximity marketing, POIs information and eventually indoor navigation.

1 - Proximity marketing:

the customer (with a smartphone and specific app) gets some info, or an app is triggered when enters in the range of the beacon.

2 - Positioning/navigation:

The beacon is fixed in a known position and sends a signal with a short information packet periodically (i.e. every 30 seconds) to identify itself. When a smartphone with a navigation app enters the beacon's range, it can calculate the distance to the beacon based on the power of the signal received from

it. If the smartphone is in the range of at least three beacons it can determine its position with a high level of accuracy.

3 - Tracking: The beacon is the roaming device and a series of receiver nodes detect the signal and send this information to gateways connected to the management centre to determine the position of the roaming beacon.

From here, possibilities are endless, for mobility, marketing, routing, navigation, and almost any application that we can imagine. Using this technology, the BLEUN project has allowed Etelätär Innovation to deploy the MOVEERE solution (<http://etelatar.com/movere>), an advanced system allowing the 360° operation of private e-bike systems. Targeted at business parks, intra-company networks, university campuses, hotel and golf resorts, marinas

NOTES

[1] Tawalbeh, Mohammad & Eardley, Alan & Tawalbeh, Loai. (2016). Studying the Energy Consumption in Mobile Devices. *Procedia Computer Science*. 94. 183-189. 10.1016/j.procs.2016.08.028.

and eco-Tourism, MOVEERE brings together:

- Last-generation e-bikes with 40-70+ km range per charge.
- Easily portable, closed modular stations (e-hubs) allowing e-bike storage and charging.
- Ready-made booking and management platform providing real-time information on available e-bikes and empty e-hubs.
- User-friendly mobile application stimulating usage, interaction and gamification (specially customised for corporations' CSR strategies).
- Low-energy, IOT-based tracking for accurate point-to-point mobility. 🌐

FYI

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Governance

The local and regional level is where disruptive change and transport innovation can flourish and are happening. However, this requires good regulatory approaches which make sure that the current paradigm shift does not undermine sustainable mobility policy goals. This section focuses on an evolving mobility landscape with increased involvement of private sector stakeholders and new public-private partnership

- o Cheshire & Merseyside
- o Bilbao, Arnhem-Nijmegen, Helmond & Stavanger-Sandnes
- o Trust & Sustainability



The challenges brought by the global financial crisis of 2008 and the resulting impact on local communities across the UK has meant an increased focus on the role of community resilience. But what is community resilience?

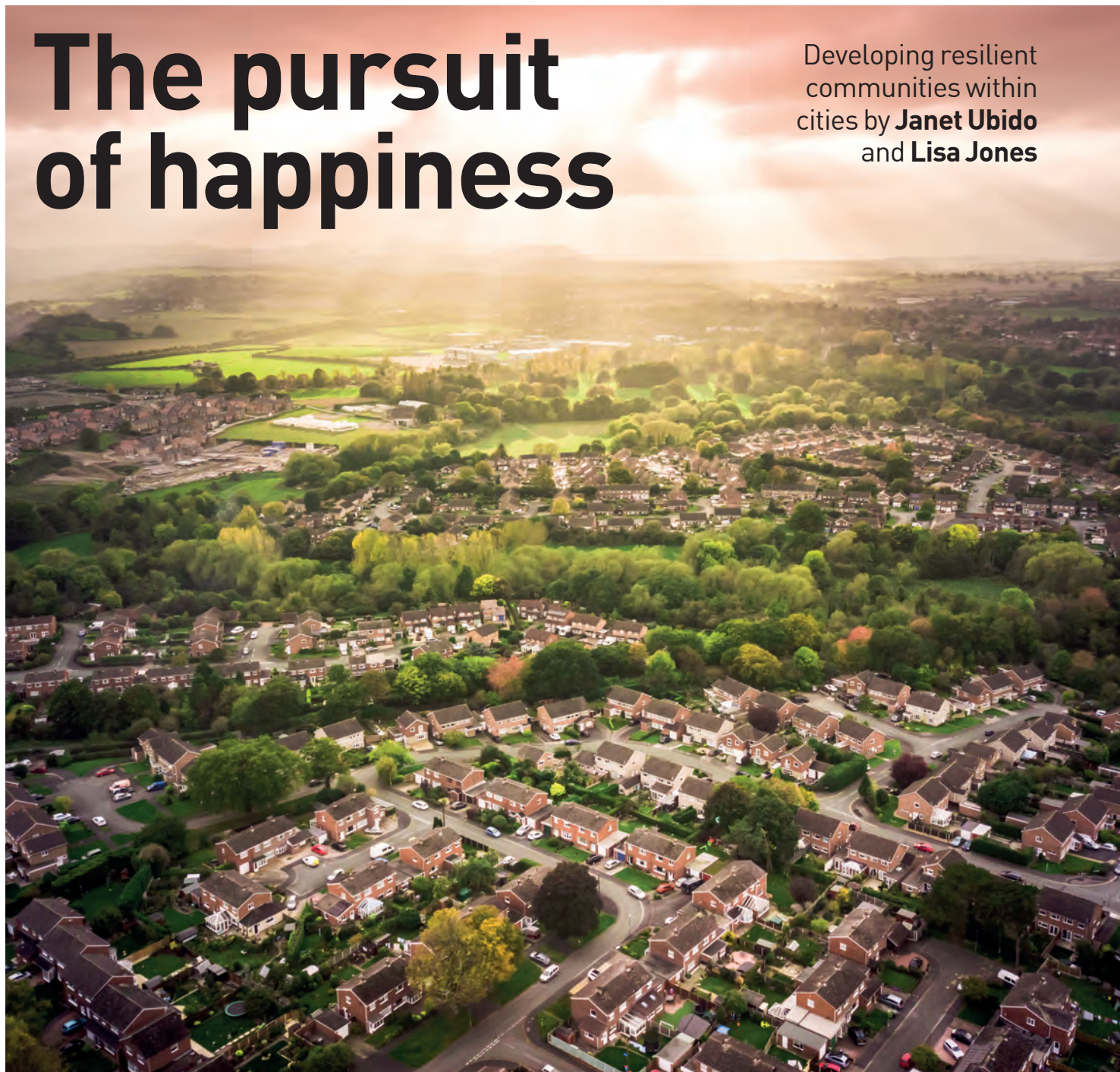
In our work, we have considered community resilience broadly, as being the ability of a community to withstand and recover after an event or crisis.

Other perspectives also draw on this idea of the ability of communities to anticipate threats, and to

respond, adapt and grow when confronted by such a threat. Particularly influential on our work has been this definition by the Glasgow Centre for Population Health: "The capacity of communities to respond positively to crises... to adapt to pressures and transform."

The pursuit of happiness

Developing resilient communities within cities by **Janet Ubido** and **Lisa Jones**



In Cheshire community land trusts have been promoted as a model that puts communities in the driving seat and is seen as part of the process of encouraging communities to become involved in Neighbourhood Plans

GROWING INTEREST IN COMMUNITY RESILIENCE

Here in the UK, since the financial crisis hit, we have seen reforms to our welfare system and cutbacks to public services because of sustained reductions in public spending. As a result, many local communities across the UK have experienced significant economic and social 'shocks'.

As we see in other countries around the world, the UK also has an ageing population and changing job opportunities, with a growing numbers of self-employed, entrepreneurs and "gig" workers. Income inequality in the UK is now higher than in any other large country in Europe. It is against this background that we have seen an increasing interest in the potential for community resilience to support people and communities in the face of these social and economic challenges.

We recently published a report that considered evidence for different approaches to building community resilience, and the potential impact of these approaches within our local communities in the North West of England.

The different approaches to building community resilience we included were:

- Encouraging social network development (eg innovative community schemes and supporting volunteering)
- Promoting community governance and levels of control (eg community budgets)
- Economic approaches to developing community resilience (eg local jobs for local people, local supply chains)
- Enhancing environmental assets (eg good housing and green spaces)

Plans for Halton Lea, Runcorn in Cheshire



In keeping with the Urban Sustainability theme of Meeting of the Minds, here we focus on what we identified about the role of environmental approaches in building and sustaining community resilience.

THE ROLE OF ENVIRONMENTAL APPROACHES

Environmental assets, reducing environmental harm and enhancing the natural environment are an essential feature of resilient communities. Social cohesion, and both physical and mental health and wellbeing are protected and improved by building on environmental assets.

Reports by the World Health Organization, and in the UK, the former Sustainable Development Commission and the Sustainable Development Unit, have made recommendations for action including the need for more work around:

- Green space and urban open space areas, planning and design, housing and air pollution
- Improving shared spaces and facilitating chance interactions between citizens, civic pride, and active travel
- Ensuring improved standards in the rented housing sector

Transport systems and increased mobility are not always good for social interaction

The damage that traffic does to social systems in urban areas has been described as one of the most serious of all the problems it causes. Traffic can suppress casual conversations, children's play, and other street-based social life. For example, in the city of Bristol in the UK, research found that residents of busy streets have less than one quarter the number of local friends than those living on similar streets with little traffic.

Natural spaces help increase social contact and social integration, especially in poorer neighbourhoods

Access to a natural environment, especially trees and grass, provides a meeting place for all ages and has a positive effect on social interaction and cohesion for different age groups. As well as increased neighbourliness, the presence of nearby natural spaces may also be related to reductions in crime. Actions that have been proposed include increased investment in the creation of quality green spaces, focussing on deprived areas.

Community land trusts, a form of community-led housing, can deliver affordable local



The damage that traffic does to social systems in urban areas has been described as one of the most serious of all the problems it causes. Traffic can suppress casual conversations, children's play, and other street-based social life

housing and other benefits

Community land trusts have emerged as an innovative environmental approach, involving alliances of local people working together to buy and manage land for affordable housing and other community assets (eg community pubs, shops, cafés, allotments, orchards and workspaces). In our local county of Cheshire in England, community land trusts have been

promoted as a model that puts communities in the driving seat and is seen as part of the process of encouraging communities to become involved in Neighbourhood Plans and to engage with local housing and related issues.

People's homes and neighbourhoods provide the health setting for most of their life

NHS England, the body that oversees

the National Health Service in England, are working with housing developments to shape the health of communities. They are focusing on improving health through the built environment and rethinking how healthcare services can be delivered. In March 2016, NHS England announced 10 demonstrator Healthy New Town sites, one of which is Halton Lea, Runcorn, an industrial town in Cheshire. The development intends to regenerate the area into a thriving community hub, with new opportunities for social and community activities, healthy retail provision, integrated housing, health and social care provision. NHS England is focusing on developing a health and wellbeing ecosystem, with people at the heart of it, and an infrastructure that supports wellbeing and health. This involves the implementation of a new Halton Hospital and Wellbeing Campus, where healthcare services, along with facilities for leisure, exercise and socialising, will be co-located.

100 Resilient Cities is helping more cities to build resilience to the physical, social, and economic challenges of the 21st century

100 Resilient Cities was pioneered by the Rockefeller Foundation in recognition of the fact that as well as acute shocks such as flooding, cities face chronic stresses that weaken the fabric of a city on a day-to-day or cyclical basis. Examples include ageing infrastructure, homelessness, and inefficient public transportation systems. The Foundation assists cities to develop a resilience strategy by building on existing activities, processes and projects.

The Happy City Index can be used to provide a progress report on the conditions for wellbeing at a city level

The Happy City Index has been used, for example; to encourage decision makers to consider how to use

Progress needs to be made in the evaluation of approaches to developing resilient communities. The evidence base for the effectiveness of these approaches is currently lagging behind practice



Dementia-friendly communities work to help overcome difficulties in physical surroundings

housing design to fight social isolation. Indicators include accommodation, public transport and green space.

Dementia friendly communities work to help overcome difficulties faced by people living with dementia

People with dementia and their carers face everyday challenges in living well. Dementia friendly communities work to help overcome difficulties in using technology, getting appropriate service in shops, banks and post offices and in using transport, going on holiday and maintaining social contact and hobbies and ensuring safe, accessible physical environments.


An important feature of community resilience is a thriving local economy, which provides good local jobs for local people

Actions to promote resilience include schemes to revitalise high street shopping areas; support for small

businesses in poorer areas; purchasing policies that create local jobs; the provision of education, training, and job opportunities for young people; and the promotion of responsible employment practices (such as the living wage) and health at work.

In summary, there is much that can

be done to promote resilient communities through environmental approaches, starting with providing more green spaces, affordable good quality housing, tackling air pollution, improving shared spaces and promoting active travel, especially in areas of deprivation, with a consideration of innovative approaches. For this to be effective there needs to be greater coordination among local authorities and partnerships with public and private stakeholders to develop resilience strategies. This will allow frameworks to be developed to inform thinking on how economies and environments can promote resilience to maximum effect.

Progress needs to be made in the evaluation of approaches to developing resilient communities. The evidence base for the effectiveness of these approaches is currently lagging behind practice. Funding for evaluation is generally too short-term to offer scope for capturing the developmental nature of community resilience related activity and evaluations on wider outcomes are lacking. 

Janet Ubido, Researcher at the Public Health Institute, Liverpool John Moores University. Carries out research funded by the Directors of Public Health from a group of nine local authorities in the North West of England.

Lisa Jones, Reader in Public Health in the Public Health Institute, Liverpool John Moores University. Leads the Public Health Institute's programme of work in Evidence Synthesis.

This is part of a larger piece of work, commissioned by Champs (the Cheshire & Merseyside Public Health collaborative). The full Resilient Communities reports are available from: j.ubido@ljmu.ac.uk

This article first appeared, in a different form, on meetingoftheminds.org and is reproduced with the kind permission of the authors and **Gordon Feller** of Meeting of the Minds



Upwardly mobile

Small and medium-sized cities: living laboratories for urban transport innovation, by **Pasquale Cancellara**

When it comes to testing and implementing innovations in the field of mobility, size doesn't really matter. Over the past few years, smaller cities have shown that they can be living laboratories for innovation just as much as their bigger counterparts. Nevertheless, their potential often seems to be overlooked by those looking for the perfect place to trial their next big mobility solution.

When it comes to the plethora of new mobility services that are entering our market these days, SMCs also notice it is often more challenging to attract such service providers to deploy in their area. Still, such services do have the potential to complement existing public transport supply particularly in SMCs where the mobility offer is sometimes less extensive compared to big cities.

For small and medium-sized cities, size is a strength rather than a problem. Testing new transport technologies and services in a smaller city means that it will be easier to assess their impact with lower financial risks. In smaller cities it is also easier to build cross-sectoral alliances to turn a mobility innovation into a success for all. The strong ties with local suppliers and industry can also prove to be beneficial.

That's why small and medium-sized cities, or SMCs, no longer see themselves in the shadow of large metropolitan cities when it comes to testing and implementing innovation. In autumn 2018, the Polis network established the SMC platform for small and medium-sized cities to discuss their specific mobility governance issues.

This article lists some examples of successful mobility measures and projects that have been developed in small and medium-sized cities to highlight that SMCs are just as ready and able to join today's transport transformation.

Testing new transport technologies and services in a smaller city means that it will be easier to assess their impact with lower financial risks



HJEMJOBBJEM: PUBLIC AND PRIVATE JOINING FORCES TOWARDS MODAL SHIFT

The cities of Stavanger, Sola, Sandnes and Randaberg in Norway are cutting car traffic in urban areas by encouraging employees to walk, cycle or use public transport to and from work. HjemJobbHjem (home-work-home), the mobility solution aimed at the business market and set up by the mobility company Kolumbus and the four cities in 2015, has engaged 600 companies and 60,000 employees so far.

Enabling a shift to sustainable transport modes, according to Siri Melberg, leader of HjemJobbHjem in Kolumbus, is possible “by providing good information on public transport availability, cycling and walking. Our services consist of a 30-day public transport pass, electric city bikes, competitions and activities on company premises. We have also developed our own mobility concepts, focusing on health and micro-mobility,” says Melberg.

This is working. According to a study conducted by the Norwegian Research Centre and the University of Stavanger (UiS), the number of employees using their cars to work has decreased, while use of public transport has



risen. “We can see that many employees have cut the total number of days on which they use their cars to work, and some have entirely switched to other means of transport after joining HjemJobbHjem. All this happened before the new toll system was put in place in October 2018. It looks as if HjemJobbHjem encourages workers to reconsider their travel habits and cut down their use of cars”, says Daniela Müller-Eie, associate professor at UiS.

ARNHEM NJIMEGEN: THE ONLY DUTCH CITY REGION WITH TROLLEY BUSES

Moving south to the Netherlands, the city of Arnhem is showing leadership on the development of clean mobility innovations. Arnhem, a city of 150,000 in the Eastern part of the Netherlands, is the only city in the country where overhead wire buses, or trolley buses, can be found. With a battery pack on board, these vehicles can travel a journey of about 10 km without overhead wires. The batteries are charged when driving under the overhead

contact line. It is the first application of In-Motion Charging (IMC) in the Netherlands, which makes it a perfect example of how the Arnhem Nijmegen City Region is an ideal place to test new mobility solutions and services.

The trolley buses rely on the existing overhead wire network, which is used as a charging path. The 18m electric buses are charged in motion, so that they do not have to stand still while charging. This ensures a high rate of availability for buses and a higher efficiency. Service without overhead wire facilitates the extension of the existing bus line without having to build overhead wiring, which facilitates the replacement of diesel/gas bus lines.

“The bus runs faster and quieter than with a diesel unit. That is not only pleasant for the travellers, but also for the residents along the route” explains Jan Lagerwey, trolleybus instructor and driver, after his first trip.

The self-learning energy management system is unique. The bus gradually learns on its routes where and how much energy has to go to the batteries to cover the intended route.



'Brengr' director Juul van Hout, mayor Ahmed Marcouch and regional minister Conny Bieze

With this, Arnhem claims to have a world's first.

The vehicles are a valuable laboratory test, too. Data is received and analysed by the HAN University of Applied Sciences in Nijmegen. Data pools are useful as a basis for further developments. Together with Interreg Germany-The Netherlands, the province of Gelderland is one of the sponsors of the project. Regional minister Conny Bieze announced at the launch of trolley 2.0 that, as far as she is concerned, there will also be a pilot with a smaller trolleybus 2.0.

Overhead wire as charging station

Electromobility will boost cities' energy demand. Therefore, the extension of the energy network is necessary. In the E-Bus 2020 project, the overhead wire network is expanded as a smart grid. Assembled charging stations for electric passenger cars are developed with batteries and connected to the overhead wire. The batteries hold brake or sun energy. Besides for local public transport, the charging concept can also be used for other transport modes. As 'launching customer', the cities of Arnhem and Renkum provide a platform that allows testing of all the technologies across companies.

BILBAO: COOPERATIVE ON STREET PARKING MANAGEMENT

In Spain, the city of Bilbao is using innovation to tackle the mobility challenges it faces. Take parking, for instance. Bilbao's on-street parking management system is based on the digitalisation of 16,000 parking spaces, an open ticketing system and a surveillance system. Through a ticket reimbursement system, city authorities can identify when users free the parking space. Bilbao's objective is to find a cooperative operational model to improve the quality of parking availability data.

The city is also looking into the development of a service that will allow drivers to receive real time information on urban parking availability, with the aim to improve traffic flows and reduce congestion. This initiative is backed by the EU via the C-Mobile project. Bilbao's goal is also to develop similar services for freight vehicles and disabled people, each with their specific parking needs and specific reserved areas on the curb.

Inclusive Vertical Mobility

The capital of the Basque country is often referred to as "El Botxo" (the hole) by its inhabitants, revealing



Bilbao has 40 pedestrian lifts offering free assistance

a complex orography: the city was founded on a valley and grew towards the surrounding hills. As a result, there are 25 upper districts that host 50% of the total population. This fact, along with the progressive ageing of the citizens (24% of inhabitants in Bilbao are older than 65) makes Inclusive Vertical Mobility one of the city's greatest challenges.

Currently, a total amount of 40 lifts, both vertical and inclined, and 20 outdoors ramps and escalators provide free mobility assistance in Bilbao, enhancing universal access to the upper neighbourhoods. Together, these services accounted for more than 8 million trips and, over 20 million passengers in 2018. The city expects to further extend this service in the near future.

Even though there is an average availability rate of these services of close to 98%, the public bus network (Bilbobus) provides operational support when required. Both vertical mobility systems and e-biking (public shared electric bikes) services are available 24/7, providing mobility options to commuters at night, without involving further investment of the Council.

Pasquale Cancellara is project officer at Polis

Helmond: A lab for living in

Pasquale Cancellara talks to Gert Blom (pictured), strategic advisor on mobility for the city of Helmond about its relatively recent rise to prominence in the ITS and smart mobility fields



Why is Helmond hosting the 2019 ITS European Congress?

The city of Helmond in the Netherlands won the iMobility award in 2011 for its work in the field of C-ITS. Strangely enough, nobody in the region was aware of this. The average citizen in Eindhoven or Helmond is not aware of what's going on locally in the field of mobility, and which companies and organisations are involved. For this reason, Helmond decided to apply as host for the ITS European Congress. The reason why the city was successful with the bid, is because it already is a living lab for ITS.

Helmond is recognised in the field of ITS, but it was not always like this. What do you think was the key to becoming a hub of innovation and cooperation with innovative companies?

Helmond can show real ITS services on the ground. The city has an automotive campus, a highway equipped with ITS, companies working on ITS, and some ITS services in operation. I think this is the main reason why we were successful with our bid.

It may sound a bit silly, but the key is not wanting to do everything. Helmond is focusing on some niches and trying to excel in those. It's important to know what you're not good at. What we really wanted to do, because we have an automotive campus, was to create a bridge between the automotive sector and innovative mobility. ITS is about connecting vehicles with the environment. So, I would say the key is focus – focusing on what you're good at, but also reflecting on the mobility issues we face in our cities. We didn't decide to become involved in European projects just for the sake of it. We did it because they can offer solutions to the mobility challenges in our city.

To give an example, we have a lot of traffic, a lot of heavy-goods vehicles and trucks coming to the centre of our city. Fifteen years ago we had two options. The first one was to build new roads and tunnels, but this was very expensive and of course we did not have the space for it. The other option was to investigate more innovative solutions. The European C-ITS projects we became involved with really start from challenges we face in

our city. So, what made us successful was to start from our real problems, to focus on what we are good at, but also to actually turn policy into practice and not just talk about things. Sometimes for big cities, things can be a bit more complicated, whereas it's in the DNA of small and medium-sized cities to get things done and be pragmatic.

What are the main innovations that have become part of the way you manage mobility in Helmond?

We have some C-ITS services that we piloted in an EU project and then implemented. In one case, we worked on the connectivity between trucks and emergency vehicles and traffic lights. It's just a niche, a small part of ITS, but it was very successful. We ran some tests seven years ago within the FREILOT project. We have been using it for many years now. Talking about something very different, we have introduced flexible-on demand transport services within our public transport system. Using an app, people can opt for a mini-bus and mini-shuttle on-demand. This started as an experiment, but it has now become fully operational and is very successful. As a small city we do not have a metro, so these flexible buses and minibuses extend the public transport offer, and we are now planning to upscale the service.

How is the response of citizens to this innovation? As you said, the reputation of Helmond as an ITS leader is not very widely known locally.

This is the reason why we are hosting the ITS Congress, to make citizens more aware of all this. Ahead of the Congress we will host a public day in Dutch. We want to show the public how we are working on innovation in the automotive sector. The past couple of years, we did not focus on end users but on professional users. It proved to be useful to work with transport companies and their drivers, because they are directly affected by the innovations and can act as ambassadors. This two-step approach is very useful and efficient, but we now want to involve the public too.

The smart city is enabled and sustained by trust

To be relevant and remain so, a well functioning and sustainable smart city must design trust into its policies and processes right from the outset, and continually reaffirm this process, says **Benson Chan**. This trust must be integrated into all aspects of the smart city - its beneficiaries, creators, processes, management, policies and technology

Smart city initiatives are top of mind among city leaders, urban planners and technology vendors today. However, most of their mindshare and resources is directed towards technology, and not on trust.

While a smart city is powered by technology and data, it is enabled and sustained by the trust its stakeholders have with the city, its services and service providers, and with each other. When there is no trust or that trust is lost, people will not use its services, nor will they participate and contribute input and data. The value of smart city services declines as expected outcomes do not materialize and people seek better alternatives.

TRUST IN THE SMART CITY: MORE THAN CYBERSECURITY AND PRIVACY

Many smart city builders and solution providers equate trust with privacy and cybersecurity. While important and relevant, these are only two elements of many that create trust in a



smart city. Distilling trust into these two elements oversimplifies the challenges involved and leads to inadequate solution approaches.

For city residents and businesses, trust is closely aligned with outcomes. When a city creates services that consistently provide the outcomes

A more holistic definition of trust is the firm belief in the outcomes and value of the services provided, regardless of whether they are provided by the city or others in the smart city ecosystem



irrelevant and benefit only a few stakeholders. These services are often labelled as a misuse of taxpayer money and resources.

- Services are not rendered reliably, accurately and consistently to deliver the outcomes they were designed for.
- Services are not in compliance with regulations or policies, and/or misused beyond its intended purpose.
- Service providers are not knowledgeable and capable, transparent, and fair in delivering the desired outcomes.

THE SMART CITY TRUST FRAMEWORK

With the importance and relevance of trust established, we now introduce a framework for building trust into the smart city ecosystem (see Figure 2 over page).

At its core is the end-to-end process used to create and operate smart city services. A set of 10 strategic and operational levers acts on the process to create trusted outcomes. At each stage of the process, a different combination of trust building tactics from each lever is applied. There is no “one size fits all” set of tactics - they vary from service to service, provider to provider and city to city.

The ability of the city and its service providers to deploy these levers is a core competency in building a

residents and others expect and rely on, at a fair cost, then a sense of trust is earned and reinforced. Residents expect that the bus service gets them to work and back home safely and on time everyday. When that occurs consistently, they will trust and rely on the bus as their main commute choice.

A more holistic definition of trust is the firm belief in the outcomes and value of the services provided, regardless of whether they are provided by the city or others in the smart city ecosystem (Figure 1, right). These trusted outcomes are relevant, rendered reliably, fairly and consistently, for its intended purpose, by service providers who are credible, transparent and

have the capacity to execute.

Trust is lost when:

- Services are consistently

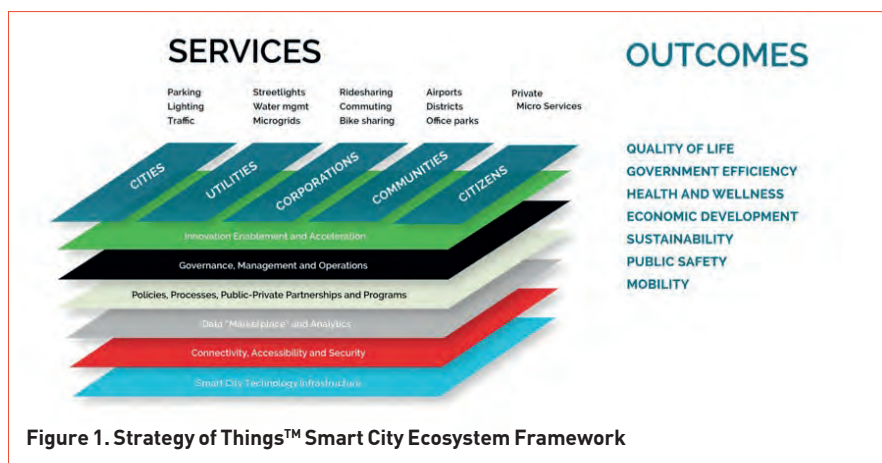


Figure 1. Strategy of Things™ Smart City Ecosystem Framework

smarter and more responsive city. Over time, as users expectations and needs evolve, these levers must be continuously adjusted to maintain or exceed current levels of trust.

BUILDING TRUST IN A CITY'S SMART STREETLIGHTS

A city wishes to deploy smart technologies to connect and remotely monitor and manage its streetlights. The city will know immediately when lights are out or “dayburning” and schedule repairs. Machine learning algorithms, using sensors from streetlights, predict impending failures and proactively notify maintenance crews.

Once smart streetlights are deployed, “business as usual” is not good enough. Trust in this service and the city diminishes when the lights are not repaired quickly because there is now no excuse for not knowing a streetlight is out. Conversely, trust is also diminished if the maintenance crews discover that the lights are functional when it is not, or if the light needs servicing when it does not.

Resident and other stakeholders must be engaged to understand their concerns, needs and expectations. Current processes, performance metrics, policies and systems must be redesigned to allow the city to respond to outages in days, not weeks. In addition, changes to the organization, including jobs, roles and responsibilities, team structure, culture and accountability will be necessary. To minimize the disruption caused by these changes and facilitate adoption by city employees and residents, change management activities, including communications

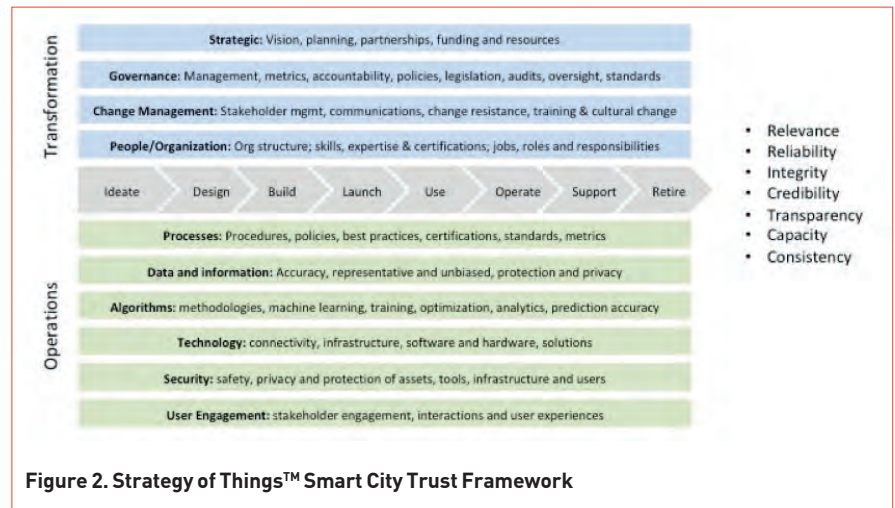


Figure 2. Strategy of Things™ Smart City Trust Framework

and training, must be conducted prior to the actual service transition.

The new service is only as effective as the technology, algorithms and data enabling it. Machine learning algorithms must interpret the sensor data from the remote streetlight controller units and distinguish between a true anomaly and a false positive. In addition, these algorithms must predict with high accuracy when the lights may need servicing by examining the sensor data.

To maintain this accuracy, these algorithms must be continuously trained by certified experts using representative and unbiased data sets. Finally, the connected streetlight system must be secure, and not allow for unauthorized access to the lights, nor disrupt the metering and billing systems.

NEXT STEPS

Regardless of where cities are in their journey, smart city and service planners must build the trust foundation now. Key next steps are:

- Understand the trust ecosystem framework and adapt it to fit the vision, strategy and realities of your specific city.
- Perform a SWOT (strengths, weaknesses, opportunities and threats) analysis using the framework to assess your trust capabilities and ecosystem. .
- Use this framework to identify and address “trust gaps” in ongoing and planned smart city projects.

Build your “trust capabilities” by identifying and focusing on high priority areas through a combination of internal development, outsourcing, augmentation and strategic partnerships. 🔄

Benson Chan is a Senior Partner at Strategy of Things, a Silicon Valley, California-based innovation consultancy that brings science, breakthrough strategies and disruptive digital technologies to help cities become smarter and more responsive

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Regardless of where cities are in their journey, smart city and service planners must build the trust foundation now

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