

THINKING CITIES

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CITIES AND REGIONS FOR
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SMART TRANSPORT FOR CITIES AND REGIONS

Citizens shaping the thinking city



**User-centric versus Greater Good:
what lies at the heart of cities' new
approaches to urban mobility?**

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People have the power

The User-Centric Smart City versus the Greater Good: solving problems with a citizen-focused approach is easier said than done, say **Karen Vancluysen** and **Kevin Borrás**

User-centric approaches are at the heart of new mobility services and Mobility as a Service (MaaS), as well as the individual needs and wishes of citizens. This issue of Thinking Cities is positively creaking under the weight of articles about cities and regions and projects and schemes where the citizen (ie, the user) has been at the centre of every phase. Not least of these is the enthralling piece by Andy Burnham, Mayor of Greater Manchester, in which he highlights his city's 2040 Transport Strategy and how the people of Manchester, host city for this year's Polis Annual Conference, will be the ultimate beneficiaries of a less congested, cleaner, healthier environment.

The overarching sustainable mobility policy objectives of local and regional authorities are surely obliged to address severe societal challenges such as air pollution, congestion and safety.

The cities showcased in this publication are all doing exactly that, but it does not require a huge leap of imagination to realise that, almost without exception, the path to acceptance has been anything but smooth. It's not a question of good versus evil, or finance versus romance. It's more a case of User-Centric versus the Greater Good: the chosen measure may just not be the same. Here's the dilemma for any city worth its salt:

a) Putting citizens at the heart of mobility policies may not necessarily be the same as trying to meet the individual wishes and demands of users, which do not always align with the interests of society as a whole.

But then again there's b) Safeguarding sustainable, healthy and inclusive mobility for all unavoidably also implies taking measures that may be unpopular and difficult to digest at first by the public or individual user and citizen. Policies exclusively based on carrots and thereby not involving any sticks will not result in the drastic and urgent action required to solve the transport-related problems that our cities are facing.

Local authorities engage with citizens in different roles: the citizen as a voter, the citizen as a co-creator of mobility solutions, the citizen as a user of mobility services and so on. Over the past few years, the citizen as a legal contestant of urban policies has started emerging, with non-governmental organisations (NGOs) and citizen groups going to court to challenge

“
Whatever smart plans our cities intend to implement, their over-riding responsibility is to keep their citizens and visitors as safe as possible....



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local decisions. While the NIMBY (Not In My Back Yard) syndrome may have a part to play on the one hand, on the other hand we are increasingly seeing civil society taking action as well, no longer accepting the health challenges that citizens are exposed to every day, for example with regard to air pollution caused by transport.

How can you resolve this tension as a policymaker? Does the answer lie in public involvement and the co-creation of mobility policies? Will this help to increase the acceptance of measures that have the greater good in mind above individual comfort and interests?

La Rochelle (see page 10) has been involving citizens in mobility debates, even on the innovative and forward-looking topic of vehicle automation. In our interview they said: "If you are willing to talk to people, you'll be surprised at their willingness to work with their elected representatives."

Another article central to the theme of user-centricity is the 10-page feature on the European Commission's frontierCities2 Accelerator. We've showcased all 18 of the start-ups that have been engaged with the project at different levels and without exception their smart city mobility solutions have all been designed with people in mind.

One offers incentives to citizens who cycle to work; one provides cities with a way of monitoring noise pollution levels; one helps you track your stolen bicycle; another provides customers with a fail-safe method to prove that medicine is in date and produce is fresh. All very different solutions from eight different companies but all of them are user-centric.

We'll end on a quote from Client Earth's website: "We use the law to shift the balance in favour of the public good. (...) We take governments to court – and win."

Is the government the enemy here? Are governments not taking responsibility for the severe health and environmental hazards caused by transport? Are democratically elected governments handcuffed to individual wishes as voting is an individual act? Where does the responsibility of the transport industry begin and end? The answer to some of the questions may well be found in the pages of this, our 11th issue of *Thinking Cities*. Happy hunting. 🕒

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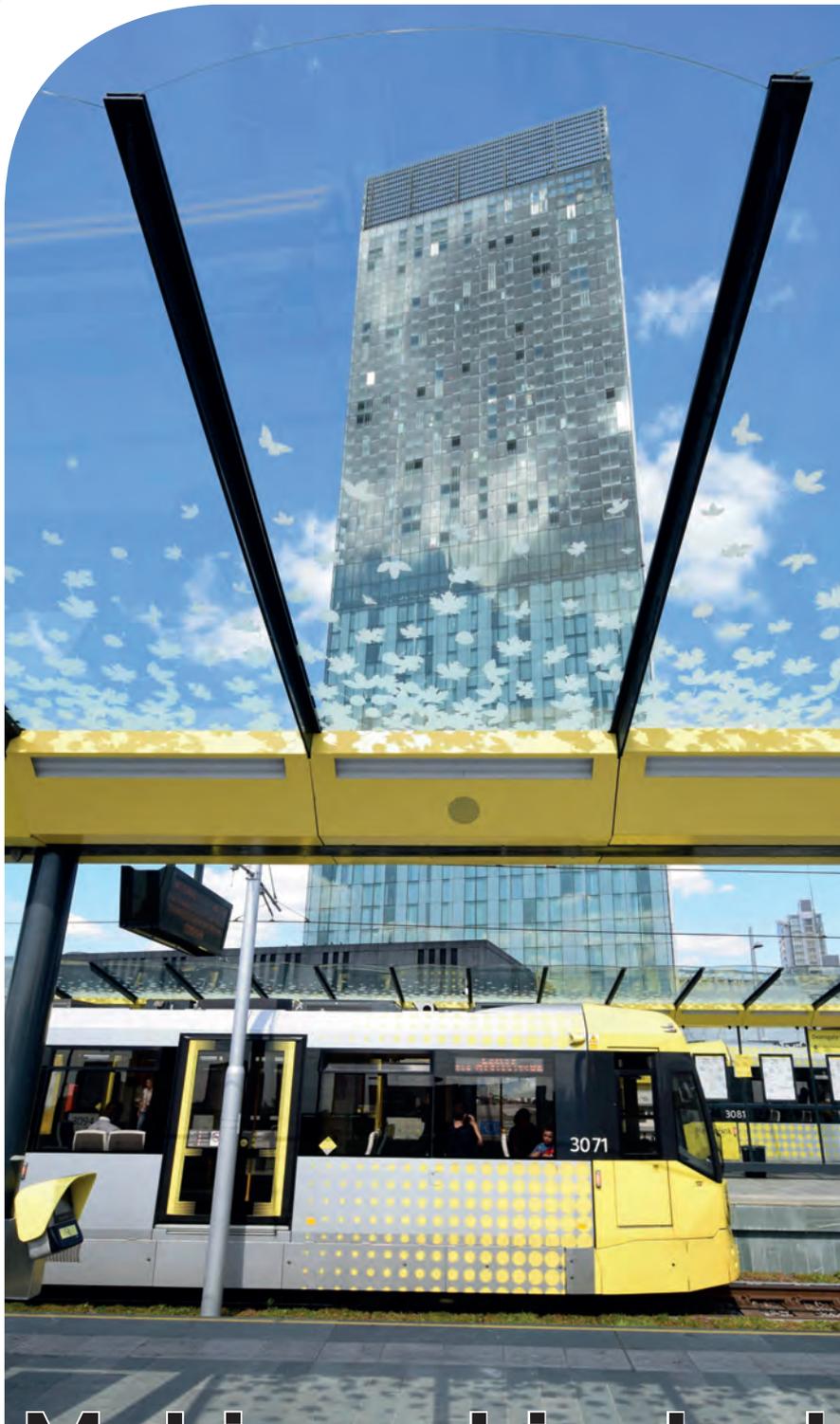
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Cityview

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.

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Making a big deal out of mobility

Mayor of Greater Manchester
Andy Burnham on how his 2040 Transport Strategy is piloting his city-region's journey to sustainable, smart status

Greater Manchester is growing. We are creating more jobs, building more houses and attracting more investment and residents. That, of course, inevitably means we are making more journeys. Currently we are making 5.5m journeys every day in the city-region, with 3.4m of these made by car. By 2040 this is projected to rise to 6.3m journeys, which would mean 3.8m daily car journeys if nothing is done to provide people with better alternatives.

That would mean more traffic jams, more air pollution and more accidents. Our current road network would, frankly, be unable to cope. That is why our 2040 Transport Strategy sets out our long-term vision to increase people's use of sustainable transport so that in 20 years' time we would actually be making fewer car journeys than we are today.

However, congestion is already an issue affecting thousands of Greater Manchester's residents and visitors. Our busy roads mean missed meetings and lost appointments, parents missing the start of school plays and plans cancelled. It's estimated that the issue costs our city-region £1.3bn every year.

It's a highly complicated issue: every journey has its own reason, its own start point and destination. The way people travel and when they do it is influenced by a range of factors, such as distance, time, the availability and accessibility of public transport and even the weather. It's clear that there is not one simple solution.

Our busy roads mean missed meetings and lost appointments, parents missing the start of school plays and plans cancelled. It's estimated that the issue costs our city-region £1.3bn every year

Part of it requires Greater Manchester having more direct control over its transport network. This is why I am calling on Government to devolve more powers to the city-region level, including greater control of the local and strategic road network, more control of the local rail network and the ability to regulate private hire drivers, vehicles and operators.

But this political approach can only be successful if Greater Manchester's residents, organisations and businesses support it. That is why last year I launched the Congestion Conversation to gather their views, find out how the issues affect their everyday lives and what they thought the priorities for tackling it should be.

It was a valuable exercise, we received over 7000 responses that really brought to the fore the personal impact of long and delayed journeys. It's easy as policy makers to focus on the large-scale abstract issues, such as the economy and the environment, but the harmful effect congestion has on people's day-to-day lives is, when you get down to it, what really matters.

We heard stories of people stressed by their commutes, unable to spend enough time with their families, concerned about the effects on their health and unable to regularly get to work on time.

We also heard about what they thought were the primary causes of congestion, including: too many people travelling at the same time, too many short car journeys, uncoordinated road works, poorly timed traffic signals and the lack of alternatives to driving.

I asked Transport for Greater Manchester (TfGM), the city-region's 10 local authorities and a panel of experts to use the information gathered, alongside other data we had collected, to develop our plan to tackle increased traffic. The result is Greater Manchester's Congestion Deal.

It is called a Deal because it depends on everyone doing their bit to help cut traffic. Our approach is to focus on people and their behaviour, rather than vehicles. While there are measures to improve the way the road network is managed, and there is investment in new infrastructure, many of the interventions proposed are not traditional transport solutions.

DEAL OR NO DEAL

The Congestion Deal has seven key themes. The first is smoother journeys. We want to ensure that there is less stop-start driving, by keeping traffic moving at the busiest time of day. We will do this by delivering a £400m programme of schemes to upgrade junctions and provide new roads to address key bottlenecks. Alongside this there will be investment in new smart traffic signals at around 90 junctions to improve movement on congested corridors. We have also introduced a dedicated Corridor Management Team to focus on the city-region's most congested routes. They will identify causes of delay and develop solutions to improve the flow of traffic. Highways England have invested heavily in our region, with the new A556 link road on the border with Cheshire and over £200m on Smart motorway improvements.



We also want to make journeys more reliable. Greater Manchester's transport network is complex and, inevitably, things will go wrong. If people don't know why their journeys are taking longer it can cause frustration, stress and anxiety. Additionally if people know about possible disruption in advance they can plan their journeys to avoid it. We therefore want to ensure we are getting the right information and sharing it with the right people at the right time. To do this we have expanded the operating hours of TfGM's transport control centre so it runs 24/7 and bring together multiple transport agencies for a coordinated approach.

We are also launching a new digital service that will update sat-navs and other navigation services, allowing better real-time communication. For example, if there was a burst water main or other emergency road works on Rochdale Road, TfGM would be able to flag that immediately as an incident. We will also be working with people and employers on Greater Manchester's most congested corridors so we can give them better information on disruption. As we have seen with recent events around Old Trafford, communication during

planned events that create significant traffic is also key, so we will ensure we are using all the channels available to us to reach the right audiences. We also want to take tighter control of roadworks through targeted enforcement of roadwork permit conditions and a lane rental scheme, so they are coordinated and finish on time.

SAFE TRAVELS

Safety is another priority. Safer roads mean fewer accidents, which improves the flow of traffic. We will deliver the National Driver Offender Retraining Scheme (NDORS) to help reduce dangerous driving. We will also want more people to feel confident cycling by delivering more cycling training courses. People will only use public transport if they feel safe doing so. In the past year we have employed 50 extra TravelSafe police and community support officers to patrol the transport network to reassure passengers and discourage antisocial behaviour.

Getting more people to cycle and walk not only cuts congestion, it also boosts our health and helps cut air pollution. We will complete delivery of the £42m Cycling City Ambition Grant, which will provide new and improved cycling infrastructure. Alongside this



£160m from the Transforming Cities Fund has been allocated to take forward the recommendations of Chris Boardman, Greater Manchester's Cycling and Walking Commissioner, in his Made to Move report, as part of our ambitious city-wide cycling and walking infrastructure plan. Getting more people into cycling and walking at an earlier age is also critical so the Deal will encourage more pupils to cycle and walk to school.

Of course we will never encourage more people to use public transport unless their options are reliable, affordable and attractive. The Bus Services Act 2017 provides me with new powers to reform bus services

in Greater Manchester. These new powers have the potential to bring significant benefits for residents and passengers, allowing for greater local control over routes, frequencies, timetables, fares and quality standards. The Leigh to Ellenbrook guided busway has proved to be incredibly successful and we will be increasing the number of buses running during the morning and evening peaks to meet demand. We will also continue to identify other locations where bus priority schemes can be introduced and improved.

The Metrolink expansion to the Trafford Centre will be completed in 2020 and there will be an additional investment of £82m in 27 new trams, to increase capacity across the network by over a quarter.

From January 2019 we will also be introducing a six-minute service on the Ashton line during the week, so even more people will be able to use the tram to get to work. In rail we expect there to be an additional 40,000 seats across the north every day, as the outdated and cramped pacer units are finally phased out. Building on the recently completed programme of interchange improvements at Bolton, Altrincham, Wythenshawe and Wigan we will build new transport interchanges, in Ashton-under-Lyne and Stockport town centres.





MAKING FLEXIBILITY WORK

Businesses and other employers also need to do their part. More need to allow flexible working and vary opening hours, to reduce the number of people travelling at the same time. We will encourage this through the development of the Greater Manchester Good Employer Charter. Over 30 businesses have introduced a flexible start time for staff, or in the process of doing so, including: Kelloggs, Salford University, Talk Talk, Manchester Airport Group and Walker Sime. Additionally, nearly 60 large employers are signed up to Metrolink's Corporate Scheme to get a further 10 per cent off already heavily discounted tickets on the tram.

We also want to work with

businesses to encourage their employers to considering different ways of commuting such as cycling, and to reduce the number of deliveries at the most congested times of day. We will work with the communications sector to increase coverage of ultrafast broadband so that people can work anywhere. On Metrolink we will build on the existing corporate discount on annual season tickets and work with employers to simplify and promote the use of free and low interest season ticket loans. We will also be piloting a new cheaper Early Bird ticket to encourage drivers to switch to the tram instead. The offer will be available for those travelling before the morning peak so as to increase passenger numbers but without

adding to overcrowding during rush hour. For commuters who choose to travel by car, we will look to expand the car-sharing clubs currently operating in Manchester, Salford and Stockport. To support electric vehicles we are expanding the city-region's charging network.

Finally we need to ensure our plans are future-proofed and forward-looking. We need to work with developers, construction companies and service providers so that as we grow we do not make congestion worse. This means putting new buildings in the right place and working together to create more attractive places for people. It also means making use of new technology and new solutions to tackle today's problems. The Greater Manchester Spatial Framework will help ensure that new development is located where it can be highly accessible by cycling, walking and public transport, to reduce reliance on the car, particularly for short journeys. Our Construction Management Plans will ensure developers and constructions companies keep road clear at the busiest time of day and that disruption is kept to a minimum. We have also established a Highways Academy across the local transport sector to develop the skills and work force for the future.

As you can see there is a wide spectrum of measures in the Congestion Deal. There's no quick fix or single solution to tackling congestion. No major city in the world has solved the problem. But if businesses, bus operators, councils and commuters work together, we can all make Greater Manchester a better place to live, work, visit and travel around. 🚗

FYI

Andy Burnham is Mayor of Greater Manchester.

Manchester is the host city of the 2018 Polis Annual Conference.



Can we talk?

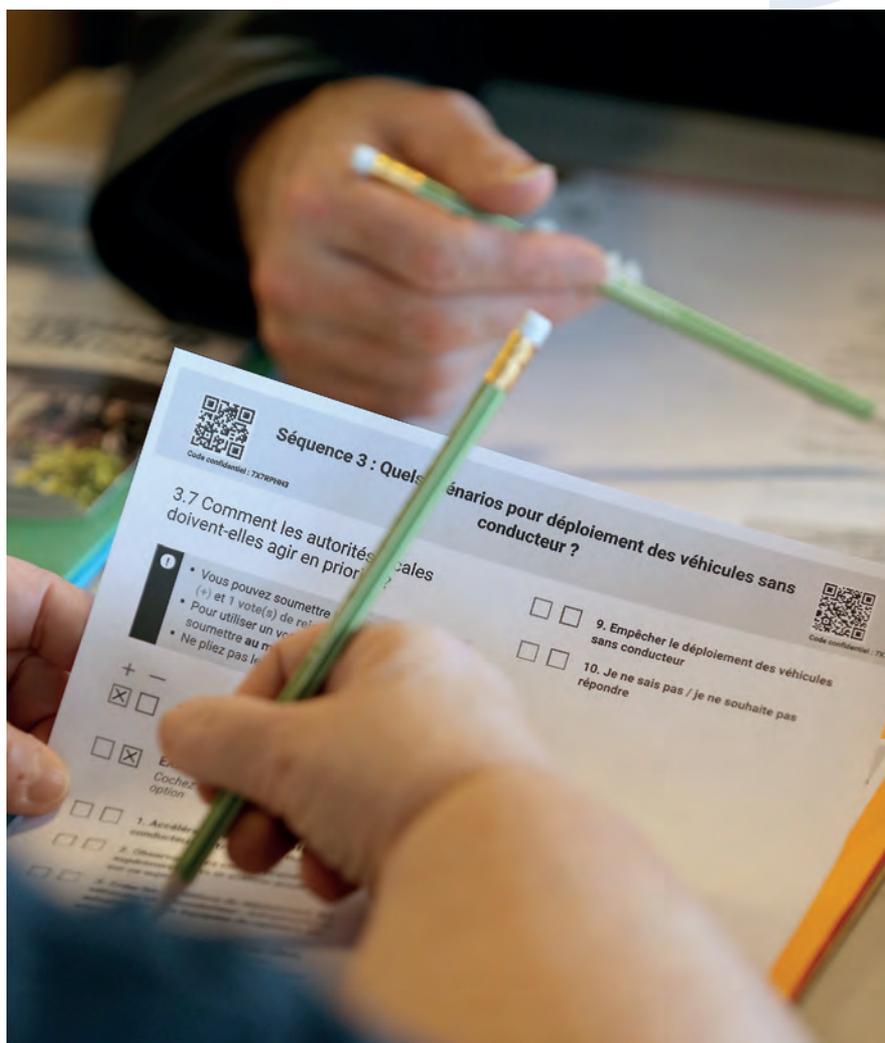
Suzanne Hoadley talks to **Brigitte Desveaux**, Councillor and Vice-President of La Rochelle in charge of Transport and Mobility

SH: La Rochelle has a history of piloting automated transport systems. What is needed for it to become a reality for its inhabitants? Which mobility problem can it solve?

BD: The Citizens' debate organised by La Rochelle on 27 January of this year showed that our citizens are ready for the deployment of automated shuttles! We have already run three demonstrations in our city: the first in 2008, then in 2011 and the last in

Photos: Frédéric Le Lan / CdA La Rochelle

Economic, environmental and social impacts have to be identified. Public acceptance also needs to be considered. Such a public debate can be revealing



2015. The third demonstration, lasting five months and operating in a mixed traffic environment, linked two neighbourhoods of La Rochelle and carried close to 15,000 passengers.

At the moment, any local authority wanting to go beyond a trial comes up against French law that does not allow the operation of driverless vehicles on public roads. It is for this reason that I have great expectations of the future mobility framework law. A decree

published last March authorised the trial of automated vehicles on public roads. The next step is to create a regulatory framework which responds to the many questions and challenges that this new technology gives rise to. Furthermore, the economic model has not yet been proven. The system remains expensive and there is also the question of employment, not to mention security, which is something that cannot be compromised.

Once the framework is in place, La Rochelle will be ready to introduce this new form of mobility into its public transport offer. Our conurbation aims to become the first zero carbon coastal city offering inclusive MaaS-style mobility – the automated vehicle plays a big role in this regard. Several deployment scenarios are being studied: serving the historic centre, the university campus, business/research parks and connecting to rural areas

(via a park and ride scheme). We are targeting collective modes via a car-sharing system, with individual vehicles.

SH: Why did you decide to host a Citizens' Debate? Why did you feel a structured dialogue with the people was necessary?

BD: Before the widespread adoption of a new technology, the challenges must be anticipated and the economic, environmental and social impacts have to be identified. Public acceptance also needs to be considered. Such a public debate can be revealing.

La Rochelle has been renowned as an innovative medium-sized city in the mobility and environmental domains since the 1970s. It was a natural step to take part in a debate along with the larger metropolitan areas, in light of



the lessons gained from our last large-scale demonstration. The debate also allowed us to verify the level of public enthusiasm for new technologies and trials, to identify their fears, hopes and suggestions as well as to consider new ways of using the technology. It was a very enriching experience.

SH: How receptive are La Rochelle's citizens to vehicle automation? What key messages come across in the debate?

BD: As I said beforehand, the people of La Rochelle are ready, even enthusiastic, for new forms of mobility. It appears that this enthusiasm distinguishes us from the other four citizens' debates within France. That doesn't mean that our citizens are blinded by technology. They have clearly stipulated their desire for a

About the Citizens' Debate

Missions Publiques and its partners, including Polis, are launching a European and North American Citizens' debate on driverless mobility. It is the first time that a public participation process will take place at international level on issues related to driverless vehicles. During the first quarter of 2019, some 2000 European citizens (100 from each of the 20 participating cities spread over a dozen countries) will respond to the same set of questions. A few weeks later, the same number of North Americans citizens (from the United States and Canada) will follow the same process.

This Citizens' Debate deals with societal, territorial, ecological, social and economic issues related to the arrival of driverless vehicles, covering individual and collective matters, professional and personal. This debate will provide insight into the consequences as perceived by the citizens. They will be asked about their perceptions, fears, wishes and points of attention and invited to make suggestions.

Each organising partner will receive a set of recommendations based on their citizens' proposals. This process takes place after



a French national process implemented in January in which some 400 people took part. The success of this first round of debates has allowed Missions Publiques to scale up this initiative.

To learn more about the Citizens' debate on driverless mobility: <https://driverless.citizensdebate.eu>

If you wish to be part of this unique initiative, please contact Tifenn Durand:

tifenn.durand@missionspubliques.com



service regulated by public authorities rather than by the market. They understand the need to reduce car usage for environmental reasons and view the automated vehicle as a shared service or as a complement to conventional public transport. Job losses are an issue of concern for 62 per cent of those taking part. Another key finding is that 78 per cent believe that driverless vehicles should firstly benefit people with reduced mobility (the blind, disabled and elderly). We hadn't considered this type of use.

SH: Did the Citizens' debate meet your expectations? Did you learn anything new?

BD: I was pleasantly surprised by the quality of the debate, which was moderated by willing young students trained for this purpose and the involvement of local people for a whole day on a specific topic. We particularly targeted people who are not used to such public debates. As mentioned previously, the presence of handicapped people opened our eyes to the potential social progress that this technology can deliver.

SH: What advice would you give to other towns and cities wishing to set up a Citizens' debate?

BD: Vehicle automation is just around the corner so it's better to take the time to talk about it, to gather fears and fantasies and to discuss technological maturity and legislation, from

The people of La Rochelle understand the need to reduce car usage for environmental reasons and view the automated vehicle as a shared service or as a complement to conventional public transport

a distance. It's not just another debate but a way to listen to people and to hear about their aspirations. If you are willing to talk to people, you'll be surprised at their willingness to work with their elected representatives. It would be a shame not to do this, wouldn't it?

SH: What messages do you have for the French Government and European institutions in relation to citizens' and automated vehicle developments?

BD: I'm looking forward to the new mobility law that will provide the regulatory framework and, I hope, lead to new opportunities for mobility. I'm delighted that the European Commission has launched new calls for pilot projects which also cover the human and social sciences, notably user acceptance. Public

involvement and awareness-raising goes without saying in La Rochelle. The changes brought about by these new technologies require an ongoing dialogue with citizens. I hope that other countries and Europe will support those local authorities embracing such innovations. 

FYI

Brigitte Desveaux is Councillor of the City of La Rochelle and Vice President of La Rochelle Urban Community in charge of Transport and Mobility.

Suzanne Hoadley is Senior Manager at Polis with responsibility for activities related to ITS and network management.



Harbouring ambitions

Francesco Ripa interviews **Angelo Del Mastro**, Deputy Mayor for EU Affairs for the largest town on the Italian island of Elba, Portoferraio

When Horatio Nelson found himself fighting against the Spanish Navy off Elba Island in 1796, he referred to Portoferraio, the island's main settlement and natural port, as the "safest harbour in the world". Some centuries later, this little town is populated by roughly 13,000 people and, luckily, no longer has to deal with naval battles and post-revolutionary uprisings. On the contrary, Elba Island has become a renowned tourist attraction. This means that on weekends during the summer months some 4,000 vehicles reach the island from the coastal town of Piombino, which is only 20 kilometres away. During the summer Elba's population of 30,000 multiplies almost seven-fold, reaching 200,000 people in July and August.

"We are a small island, but in summer we face similar challenges to



We want to know how cities with 150,000-200,000 inhabitants are facing such challenges. This way we would find new solutions that will help us improve mobility on the whole island, especially during summertime”

medium-sized cities” says Angelo Del Mastro, Deputy Mayor of Portoferraio in charge of EU Affairs. Recently elected to the Political Advisory Committee of the CIVITAS Initiative, Mr Del Mastro is coordinating the efforts to solve Portoferraio’s most pressing mobility issues thanks to the exchange of knowledge with other European cities. His town has recently joined Polis, the leading network of cities and regions for transport innovation, which shows that networking and best-practice sharing is not only a prerogative of bigger and better-equipped cities.

Their main objective is to develop new strategies to improve mobility from and towards the port, with a view of reducing congestion. Among the options that are being explored, Del Mastro mentioned the introduction of interchange parking spaces, the

regulation of access to the city centre and the improvement of local public transport. “We want to know how cities with 150,000-200,000 inhabitants are facing such challenges,” admits Del Mastro. “This way we would find new solutions that will help us improve mobility on the whole island, especially during summertime.”

The management of parking spaces and the reduction of vehicles in the city centre are topics that most European cities, regardless of their size, are dealing with. Their objective is common: reducing congestion, improving air quality, making urban spaces more liveable and enjoyable. To achieve this, consulting all concerned stakeholders is vital. The City of Portoferraio is actively contributing to the discussions for the development of a Sustainable Urban Mobility Plan (SUMP), together with the other

municipalities of the area, both on the island of Elba and on the coast. As Del Mastro puts it, “it takes a joint effort, because mobility affects us all”.

A PEOPLE-CENTRIC APPROACH

Citizen engagement and political debate is at the very core of the SUMP process. “We really insist a lot on this aspect” says Del Mastro. “We strive for a bottom-up kind of cultural shift, which means that it should happen from within the population. Our challenge is to achieve a better mobility and show inhabitants and shop owners that they can all benefit from a limitation of traffic in the city centre. This would also benefit visitors and tourists.”

The old town of Portoferraio dates to the 14th century, when the Grand Duke of Tuscany, Cosimo de’ Medici built a series of forts to oppose the Spanish

presence on the island. Much of that glorious past is still visible today, but according to Del Mastro the high presence of cars in such a scenery is harmful for tourists and locals alike.

There is an increasing awareness that a gradual shift to more sustainable transport modes is essential, but the process faces some barriers. The cycling infrastructure is, for now, limited to a few-kilometre-long bike lane in Marina di Campo, the municipality that hosts the island's longest beach. An attempt to establish a public bike sharing scheme, put forward by the previous administration of Portoferraio, did not work out well. Furthermore, the physical and natural features of the island make it difficult to build underground parking spaces, which would curb the presence of cars on the streets.

The conditions to make a case for a more sustainable mobility on Elba are not optimal. Nevertheless, Del Mastro sees the future with optimism. In the framework of the CIVITAS DESTINATIONS project, the municipality strengthened its cooperation with hotels and campsites. It provided them with electric bicycles to give tourists an opportunity to move around the island in a sustainable way and it worked: both hotel operators and tourists welcomed the initiative with great enthusiasm. Additionally, an ambitious project - already approved by the Municipality - to build a 250-kilometre-long bike path - or *ciclovia* - all around the island might become a reality in the future, thanks to the financial support of the Tuscany Region and the Italian Ministry of Transport and Infrastructures. If this visionary plan succeeds, Elba Island would outnumber the kilometres of Rome's cycling infrastructure (at the current stage, cyclists in the Italian capital can count on 240 kilometres of bike lanes).

DESIRABLE DESTINATION

Soft and hard measures to support



more sustainable transport modes, citizens engagement, public-private partnerships and sustainable urban mobility planning are just a few of the topics in which Portoferraio is strongly interested in sharing best practices with other European small and medium-sized cities. Even before joining Polis, the town's experience in the CIVITAS DESTINATIONS project has been very positive in this regard. "Within CIVITAS DESTINATIONS we are learning a lot from the experiences of Valletta, Madeira, Rethymno (Greece) and Limassol (Cyprus), especially in terms of public transport information systems and new mobility services" recalls Del Mastro. Being part of a European-wide network will allow Portoferraio to keep on track. "We would like to exchange with small and medium-sized cities and islands that are facing the same problems. Our objective is to try to understand the solutions they have found and, if possible, replicate them."

The efforts to improve mobility in Portoferraio are mainly inspired by the island's touristic appeal. This is understandable, since tourism accounts for a large share of the local economy. Unfortunately, the economic benefits of tourism go hand-in-hand with some mobility conundrums that the municipality needs to deal with. The summer months are when most of the island's economic activities boom. Restaurants, hotels and beaches are always full and more

young people can find seasonal jobs in the tourism sector. "On the other hand," says Del Mastro, "locals experience some problems related to such a high number of tourists. In high season, a 10-minute drive can take up to 45 or 50 minutes." Striking a balance between the interests of locals and tourists is a challenge for all tourist destinations in Europe, regardless of their size, but improving mobility is one way to serve the interest of both groups and achieve a more liveable environment for all.

For this reason, one of the objectives of the municipality is to convince residents to convert the shortest car trips into cycling, walking, or public transport. This is not an easy task, but not an impossible one either. "We are only starting" says Del Mastro. "We're trying to understand what is best for the city and what we should do. But when an idea is good, we need to bring it forward." 

FYI

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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 Twente
- o Bologna
- o V2X
- o Berkshire
- o Lille



A photograph showing two cyclists riding on a wide, red-paved bicycle highway. The cyclist in the foreground is wearing a red jacket and a tan cap, while the one behind is also in a red jacket. They are riding on a smooth, red surface that curves to the right. In the background, there are brick houses with white window frames and a clear blue sky with some clouds. A white car is parked on the street to the right.

In both directions, cyclists can ride side-by-side comfortably

Twente unrolls the red carpet

The Twente region, in the east of the Netherlands, is a diverse area with cities, suburbs, villages and rural parts. Regio Twente is developing a new connection for this area, the F35 bicycle highway. *Thinking Cities'* **Ralf Tinga** travelled to Twente to give the F35 a try.

F35 is a nod to the A35, a regional motorway that connects Twente's main cities Almelo, Hengelo and Enschede. The 'F' refers to 'fiets', the Dutch word for bicycle. The F35 bicycle highway is meant as an attractive alternative to urban and regional car traffic. Despite the local

population's enthusiasm for cycling – 32 per cent of the journeys in the region are made by bike – car traffic is on the rise in the region.

Around 30 per cent of the 62 kilometre bicycle highway has been completed, with Regio Twente planning to finish construction in 2020.

We try the F35 on a sunny Saturday in October. This is not a weekday rush hour, but it is an ideal day for recreational cycling. With a slight wind at our back, we head from downtown Hengelo in the direction of Enschede. The F35 truly resembles a highway: the asphalt is broad and smooth and

we stop at only a few crossings. The path gives enough space on both sides to ride next to each other. Two cyclists in front of us are engaged in a casual conversation.

We pass new and old residential neighbourhoods, parks, playgrounds, industrial heritage, business parks and a university campus. All walks of life appear to use the highway, including the elderly, youth, students, and parents with children. While the F35's main track runs between Twente's larger cities Almelo, Hengelo and Enschede, it also connects smaller towns, like Borne and Wierden and, in the future, Oldenzaal and Vriezenveen. This connection between cities, villages and public facilities gives the highway an important economic and social function.

The F35 also encourages recreation. We pass a pop music stage, ice rink, cinema, athletics fields and a football stadium. All of them are well-connected to the bicycle highway. This makes the F35 an alternative to the car when going to a big event. Cycling over the F35 itself also appears to be a pleasant experience. Thanks to the absence of traffic and the limited number of crossings, we roll along smoothly and carelessly. Signposting and road markings are clear, while at the Enschede Kennispark railway station, we find parking space and a place to rest.



The location along the railway tracks allows for space and non-stop connections

The F35 connects urban areas and runs along the most beautiful nature of Twente; a very relaxing way of going to work

– Gerard Gerrits, Director for Mobility, Regio Twente

Cyclists on the F35 take full advantage of its course along the railway tracks. It runs along city centres and areas around railway stations that are hubs in the F35 network. This makes it convenient for cyclists to transfer to the bus or train, or to head downtown. At the railway station Enschede Kennispark, the platform is a matter of a few steps away from the bike path.

The strip of free space along the railway tracks also allows for the generous width of 4-4.5 metres. The increased popularity of e-bikes is essential to this design. E-bikes ride at higher speeds and impose new requirements on cycling infrastructure, notably wider dimensions and fewer crossings. The track benefits from under and overpasses between railways and roads, benefitting both speed and safety.

Regio Twente plans to finish construction in 2020. 🕒

FYI

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Good connections with train stations encourage multimodal journeys by bike, train and bus



Download / Unlock / Ride / Park Properly

Tommaso Bonino reports from a city that is looking beyond smart-docks and smart-bikes and concluding that the best policy for bike-sharing might be smart-regulation

In recent years, bike-sharing has undergone some radical changes: the scheme got rid of docks, the business went Chinese and the local authorities are happy to be spoon-fed by operators. This has allowed bike-sharing systems to record momentous increases in effectiveness.

The truth is, in fact, much more complex: free-floating bike-sharing has generated chaos in cities, especially where road networks are poor or undersized and where the number of private vehicles is high; Chinese companies have highlighted a technology – the “smart-lock” – which

is not their exclusive and the local authorities have had to regulate a sector that was believed to be able to do so on its own.

Increases in use, however, have been significant, not only thanks to new technologies or to the arrival of new operators, but also – and in

the writer's opinion in most part – because the bicycle has returned to its natural role and perspective. The latest generation of bike-sharing schemes makes the bike available, safe (because of integrated lights), secure (because of the lock and the GPS system), friendly and trendy. The inner cyclist in each of us – when we make a home-work trip less than 5 km long or when we need to move during the day, at work or for leisure – now has the possibility to access a bike without worrying about maintenance and theft, just by activating an app and paying by credit card.

FROM DUMB TO SMART TO...

The “dumb-bikes” scheme (born in the Netherlands in the 1960s) has evolved into the “dumb-docks” scheme (where bikes were linked to stations, without intelligence), then into the “smart-docks” scheme (where stations were recognising bikes and users, collecting data on usage as well) and then finally into the fourth generation: the “smart-bikes” scheme, where bikes are stand-alone, free-floating, linked to the users' smartphones, with no need for infrastructure.

The “smart-docks” systems in London, Paris and New York, financed by the public and/or by large companies, following those characterised by “dumb-docks”, are well known to all; the sequence “SIGN UP/SWIPE OUT/RIDE/DOCK” has been the subject of many rides – London has recorded 600,000-1,100,000 hires/month in 2017 and has benefitted from £11 million (€12.47 million) of customers income, £6.4 million from Santander and £3.6 million from Transport for London (TfL).

Now the description has changed a bit and has become “DOWNLOAD/UNLOCK/GO”; the parking phase at the end of each trip is less cared for. The local authorities play a minor role: no resources are needed



The latest generation of bike-sharing schemes makes the bike available, safe (because of integrated lights), secure (because of the lock and the GPS system), friendly and trendy

and the regulation is minimal, just referring to the common circulation regulations.

Bologna would have liked to have moved on from the model of the “dumb-docks”, already active for at least 10 years, providing some 200 bicycles which have collected over time about 6,900 members. As the “dumb-docks” system do not generate sufficient usage data, Bologna would have liked to set up a scheme of “smart-docks” while investing significantly in cycling, in the early 2010s. However, setting up a system like the one in London would have cost the city at least €5 million a year and Bologna is not as attractive as London, or New York, in the eyes of the investors who wanted to be a sponsor of the initiative.

Given the lack of such a budget, Bologna waited, paying attention to the evolving market, yet maintaining a growing commitment to cycling – for example by adopting its “Bicipan” (a plan for cycling trips and infrastructure, targeting over 10 years in the future).

As a result of what was experienced in other countries, not exclusively China, we understood that with a significantly lower budget it would be possible to take advantage of the newest technologies and to overcome the existing system of bike-sharing. In March 2017, the city council allocated €800,000 per year for six years to the project and SRM – the local authority for transport – launched a tender through a competitive dialogue to find an

The fares for bicycle use will work as an incentive: users who park at a station spend less, those who park free-floating spend more

which shall be to identify and define the means best suited to satisfying their needs”). Fares incentives motivate an individual to perform an action; the instrument of incentive structures is central to individual decision-making within a larger institutional environment.

The planning of the award procedure was conceived in detail:

- An adequate tender scheme was designed;
- An incentives' structure was to be provided to the operator and to the users;
- The service obligations had to be clearly defined;
- Data from both parts have to be made available;
- Revenues are known and shared if beyond a defined threshold.

MEETING ACTUAL NEEDS

The tender was launched in June 2017. The data collected in the city thanks to initiatives to promote cycling organized in previous years (the “European Cycling Challenge” and “Bella Mossa”, both born under the patronage of the European Commission) were made available to competitors so that they could submit solutions and projects as close as possible to the real needs of city-users. The tender was immediately appealed in the administrative court by an Italian company, already active on the market with a “smart-docks” system that was not designed for free-floating.

It deserves to be underlined that London’s first “Dockless Cycle Hire” Code of Practice was launched by TfL in July 2017 and was updated in September 2018.

Three companies expressed interest: two European and one Chinese (Nextbike, Velospot, Mobike). Following an interesting debate – and after winning the appeal before the administrative court – SRM awarded the service



operator on the market who could organise a free-floating bike-sharing system in Bologna, incentivised by means of the parking fees.

The competitive dialogue, by

definition (Directive 2014/24/EU), helps local authorities find what they need (“Contracting authorities shall open, with the selected participants, a dialogue the aim of

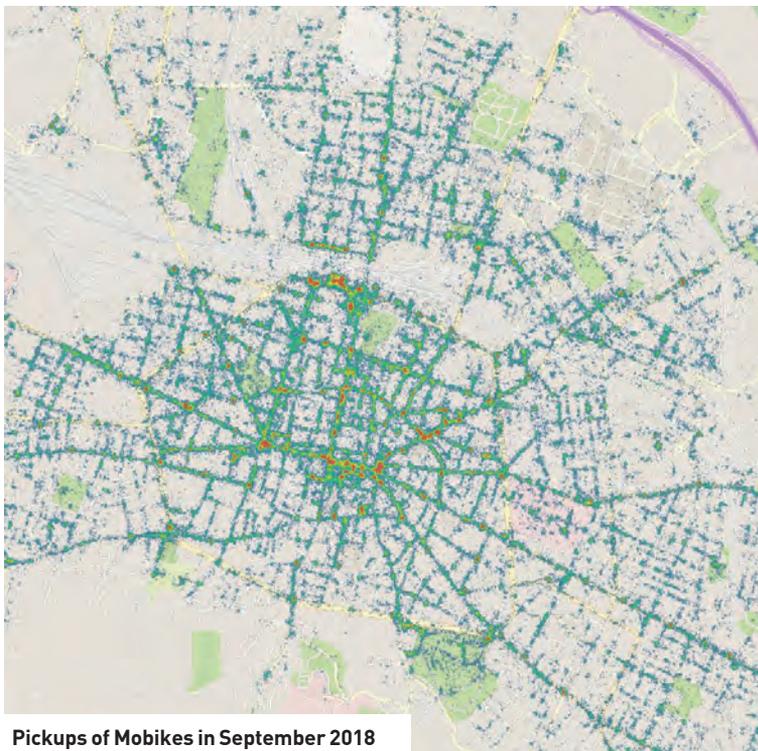
to an Italian company, licensee of the Mobike brand (whose name is IDRI BK). The fee was reduced by 50 per cent, to €400,000 per year, VAT included. The first Mobike bike appeared on the streets on 19 June 2018.

Some 2,500 bicycles are expected to be in service, with the operator committed to creating 240 “light” stations called “Mobike HUB”, equipped with so-called “beacon” sensors, more accurate than GPS, that allows users to recognize if a bike is parked in the station. Stations are indicated on the smartphone app as well. The fares for bicycle use

will work as an incentive: users who park at a station spend less, those who park free-floating spend more.

The compensation from the municipality covers the service obligations imposed by the contract with regards to maintenance, replacement and repositioning, all these operations being regulated through quality indicators. The maximum fares to the public are regulated and also the maximum level of average revenues per journey is set to a threshold beyond which the contract has to be rebalanced in favour of SRM. In addition to that, the assignee is obliged to refer to users granting a point of contact in the city centre, to make the usage data available and to provide the city with 300 e-bikes (Bologna will be the first city in Italy to host Mobike e-bikes next Spring).

Mobike in Bologna is committed to delivering a mobility service, not just in deploying a bicycle fleet. SRM has selected a partner whose commitment is to satisfying a significant



Pickups of Mobikes in September 2018

amount of users in order to turn urban modal-share towards a more sustainable balance.

The first few months of operations have shown very interesting results:

- The growth in the use of the service was initially proportional to the distribution of bicycles in the city, then fast and consistent; with the advent of the school year four average uses per day per bicycle in service were exceeded (this means more than 10,000 hires/day);
- The bicycles’ collection and return data made it possible, after just two months, to redesign the area covered by the service so as to serve the zones that had best responded to the service offer;
- 91 per cent of the trips lasted less than 30 minutes, the unit of time that was taken as a reference for the fare.

The collected data is shared among the parts and the first impressions are positive - SRM has had

no problems in accessing them and no issues about commercial use and/or privacy have been noted.

The appreciation of city-users, citizens’ representatives and tourists was immediate and surprising; social networks promptly welcomed Mobike bicycles as a main feature on the streets.

USE AND MISUSE

In addition to these gratifying numbers, there have been the inevitable issues of misuse and vandalism of bicycles to report. Some bicycles have been parked on the sidewalks and alongside public transport stops, undermining in particular the safety and confidence of

people with disabilities; some bicycles have been painted and some burned, in some cases they have been parked in private spaces, making them unavailable for other potential users. For the time being, these episodes have been limited to less than 10 per cent of the overall size of the fleet, thus respecting what was planned so that the provision of the service would not be compromised and costs would not increase beyond the threshold of acceptability.

Finally, the old bike-sharing system has been reallocated towards specific spots in the city, where “dumb-docks” can still provide a benefit to city-users, notably at minor urban railway stations. 🚲

FYI

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Everything is illuminated

V2X is the energy revolution electric vehicles need, according to **Alan McCleave**

Electric Vehicles (EVs) are finally breaking into the mainstream. As EVs become more powerful and practical, we are fast approaching a point where EVs will be a common sight on our roads. Government incentives have also had a big part to play in shifting consumer sentiment towards EVs, with targets set to completely ban sales

of traditional fuel vehicles by 2040. This soaring demand has started a race within the automotive industry to produce EVs on an unprecedented scale.

While this is great news for everyone who has pushed for a transition towards EVs, producing enough of them was only ever half of the puzzle. There remains a number of hurdles

that need to be overcome to turn the EV dream into a reality. One of the major factors to consider is how we power them. At the moment, it's not as simple as plugging your car into a wall socket and charging your car's battery. Instead, the UK's charging infrastructure network is considerably more complicated and is in need of a more consumer-friendly

All the evidence supports the fact that the mass adoption of EVs would place too much strain on the national grid during times of peak demand

approach that is both easy to use and understand. These are serious issues that will need to be addressed in the long run to facilitate a successful transition to e-mobility en masse, but there is one concern that stands above the rest. Namely, the question mark over how the UK's (or indeed any country's) national electric grid will be able to cope with demand if every driver began using EVs. This is a legitimate concern and all the evidence supports the fact that the mass adoption of EVs would place too much strain on the national grid during times of peak demand, like in the evening when people are arriving home from work.

SUPPLY & DEMAND, DEMAND & DEMAND

This does not mean an EV revolution is unattainable, however. Within the industry, an answer to this issue exists, known as Vehicle-to-Grid (V2G) technology. In essence, V2G technology would enable EVs to evolve from a form of transportation into mobile power plants, capable of giving energy back to the grid when it was not being used. This means EVs could help support the balancing act between electricity demand and supply by adjusting their charging levels second-to-second in order to maintain a steady voltage and frequency. Taking full advantage of this will require new market rules, but the majority of EVs could provide valuable services to the grid, and, in theory, would be able to respond more quickly than existing power sources.

Though V2G offers a solution to the biggest problem facing the transition towards EVs, the initial technology was not without

its limitations. The current generation of V2G chargers are highly impractical to install, requiring deep trenches in the ground to be dug as part of the process, and only available in industrial-sized units, meaning they were unfit for home installation. This meant V2G was off limits to the majority of the public, greatly prohibiting its effectiveness as the technology was incapable of supporting the national grid during times of strain.

Now, a new advancement in V2G has just been announced to the public market. Vehicle-to-Everything, or V2X as it's more commonly known. V2X encompasses aspects of V2G technology but takes it to the next level in both accessibility and efficiency. Occupying little more space than a mini-fridge, V2X units, like those developed by NewMotion, are characterised by their small size and lightweight design, making the device suitable for easy installation in private homes, offices and many other locations. As such, V2X represents the point where V2G could become a truly consumer technology.

VEHICLE TO EVERYTHING

This opens up a huge new realm of possibilities in the way we utilise energy stored in our EVs. Despite persistent myths about the limitations of EVs, contemporary EV batteries are capable of storing huge amounts of electrical energy. In fact, an EV battery, like that in the Nissan Leaf, can power an average household for up to four days. As such, a home fitted with a V2X charger could be fuelled by an EV during times when the grid is under pressure and electricity is more expensive. So, not only will this ease

the burden on the grid, but it could also save people money on their electricity bill.

As well as circumventing national grids' capacity issues, V2X could also solve problems outside of the transport sector. It's a common understanding that renewable sources only generate energy under a very particular set of circumstances – when the sun shines, when the wind blows, when the tide comes in, etc. Currently, there is a huge waste of renewable energy as we are unable to properly store or fully make use of it during the times when it's being produced. For example, by drawing power during the daylight hours when solar output is greatest and then putting it back into homes during the evening, EVs could use V2X technology to help create a sustainable energy chain underpinned by renewable sources.

How we better harness the potential of EVs is a great opportunity. Most cars are stationary for 90 per cent of the time. EVs have the ability to provide additional utility during this time and V2X can be the key to unlocking this. By empowering EV drivers through V2X to take a more active role in the way we store and utilise electrical energy, we can spark an energy revolution to go hand-in-hand with the revolution taking place on our roads. It will require a change in mindset from commuters, but one that will benefit the next generation of drivers on UK roads considerably. 🚗

FYI

Alan McCleave is General Manager, UK for NewMotion



DriveStart – a success story

Analyse, understand, research, design, implement, evaluate: bringing theory into practice, by **Dan Campsall, George Ursachi, Tanya Fosdick and Steve Ferris**



Distraction puzzle game

Collisions involving young drivers aged between 17 and 24 that resulted in injuries have reduced significantly over the last 10 years, but information from the most recent period has shown a plateau in casualty reduction (Figure 1). The initial reduction was largely seen as a result of a lower number of young male drivers rather than a reduction in collision rates per driver.

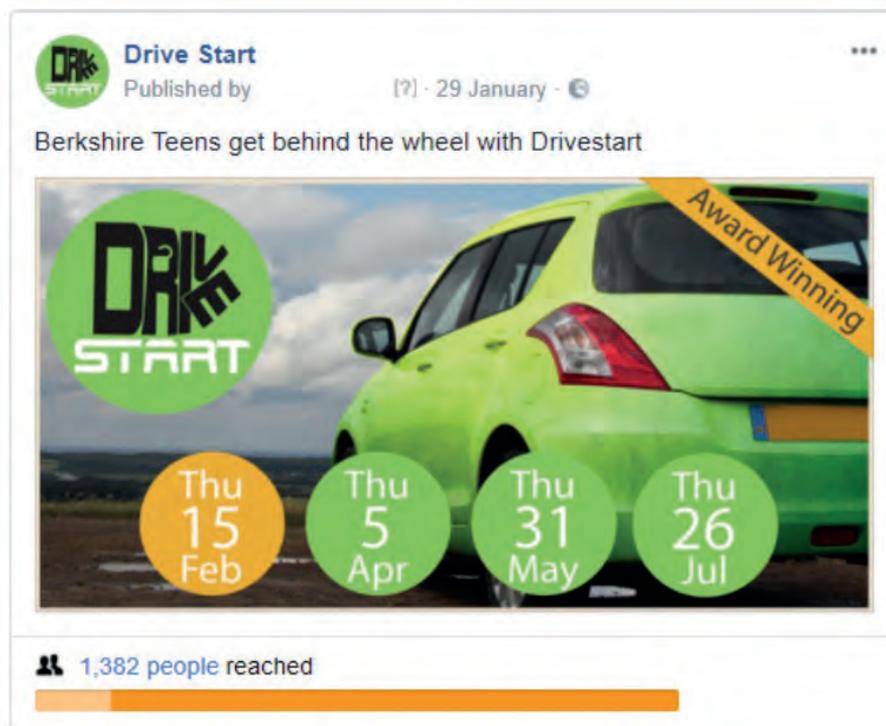
The effect of education on driver behaviour has been the subject of significant scrutiny, leading researchers to conclude that



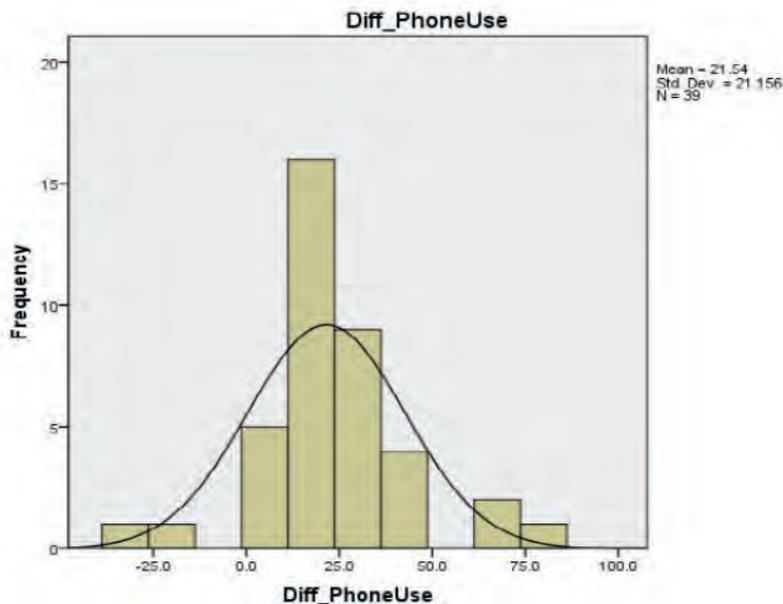
Analysis of young driver casualties in Berkshire (source: MAST online)

relatively low expectations should be set against potential outcomes. Meanwhile the road safety community has been challenged to develop interventions based on recognised theoretical approaches whilst implementing robust evaluation frameworks. Further strands of research have also identified a questionable reliance on ‘fear appeal’ and a lack of behavioural change techniques (BCT) in studies of existing education programmes.

DriveStart utilised behavioural insights on over 3,000 young people drawn from seven years of young driver evaluation studies carried out by Road Safety Analysis¹. These studies reveal positive intentions, but wider studies reveal a greater propensity for adopting unsafe practices. This disparity is explained through the Prototype Willingness Model (PWM), which proposes that personal vulnerability, risk images, willingness and



A sample social media post



Sample statistical output demonstrating change in social norms for phone use

		Paired Differences		t	df	Sig. (2-tailed)
		95% Confidence Interval of the Difference				
		Lower	Upper			
Pair 1	PhoneUse pre - PhoneUse post	14.6805	28.3964	6.358	38	.000
Pair 2	PhoneUse preRec - PhoneUse postRec	.952	1.715	7.073	38	.000

social norms are all better predictors of behaviour than intentions.

Through critical evaluation of other schemes, it became evident that a new approach was required. Qualitative evaluations of a pilot programme revealed a danger of normalising bad behaviour through conventional approaches to pre-driver interventions, which often use shock tactics and emphasise illegal activities.

The refined DriveStart content ensures the incorporation of 16 identifiable BCTs from across taxonomy groups. Given the evidence-base, increasing perceived vulnerability whilst not negatively affecting social



Hazard perception simulator

norms should be delivered through practical sessions.

The day-long experience is aimed at pre-drivers and comprised a variety of interactive sessions targeting issues highlighted in research as contributing to novice drivers'

high risk. Topics include hazard perception, distractions and impairment, and practical information regarding licensing and test procedures and selecting a driving instructor.

Games and demonstrations are used to employ a variety of BCTs, including action planning, social comparison, problem solving and behavioural practice. Rather than deliver a broad education and awareness message to large audiences, these workshops are for 32 people who often work in smaller groups.

STOP DOING THE 'SAME THING', DO THE RIGHT THING

The behavioural science utilised within DriveStart is pioneering. The

The full results table

	Social Norms		Willingness		Vulnerability	
	Movement	Statistically Significant	Movement	Statistically Significant	Movement	Statistically Significant
Mobile Phone Use	Yes	Yes				
Peer Distraction	Yes	Yes				
Drink Drive	Yes	Yes	Yes	No	Yes	No
Drug Drive			Yes	No	Yes	No
Speeding			Yes	Yes	No	No
Texting			Yes	Yes	Yes	Yes
Talking			Yes	Yes	Yes	Yes
Watching videos			Yes	Yes	Yes	No

development of ‘Experience’ events, thoroughly re-designed utilising PWM as the underlying behavioural theory, was a first for Road Safety.

Reframing the entire intervention using behavioural science has required agencies to adjust their content, expectations and tone of delivery. Presenters are coached to operate within established guidelines, ensuring the innovative approach is not compromised. Recruitment is carried out using a variety of methods including a highly successful social media portfolio that drives significant numbers of attendees.

COMPARING THE RESULTS WITH PREVIOUS INTERVENTIONS – IS IT WORTH THE EFFORT?

Significant movement in the desired direction was reported for many of the behavioural aspects investigated. Significant success was achieved in changing social norms and willingness, especially around messages covering distraction.

Where results were not statistically significant, the movement was still positive. It appears high baselines (indicating an already appreciable understanding about the risks) only

allowed a smaller movement.

The level of engagement and satisfaction among participants was higher than previous or comparator ‘traditional’ interventions based on ‘fear appeals’. Feedback has shown they appreciate interactivity, especially where this is reinforcing positive behaviour, showing them how to engage in correct actions and providing coping mechanisms for challenging situations.

DO WE WANT IT CHEAP OR DO WE WANT IT GOOD? OR WE CAN HAVE BOTH?

DriveStart operates within a relatively low budget per annum. The investment comes through local authority teams and Safer Roads Berkshire to support six experience events, involving nearly 200 young pre-drivers each year; and engaging with over 7,000 users on social media each month.

Costs include event staffing, resources, equipment and web and social media support. With a cost of less than £100 (€113) per pre-driver for a full day of practical advice and behaviour change activities resulting in statistically significant results, it represents clear value for money.

Larger-scale interventions usually have lower costs per head but often fail to deliver significant changes in behaviours.

SCALABILITY & WIDER IMPLEMENTATION

The principles behind the scheme are entirely replicable, either through emulating the entire scheme or through re-framing of messages in existing pre-driver schemes.

The DriveStart Experiences are supported by a thoroughly documented approach allowing other road safety bodies to replicate the entire scheme with a high degree of probability that it can deliver comparable results.

Involvement from a range of public and commercial partners is key to ensuring the ongoing feasibility of the program. The redesigned intervention has served to reduce the financial and human resource commitment for each participant organisation, compared to previous interventions.

In 2017-2018 DriveStart was awarded a number of very prestigious awards² that come to underline and support once again, the practicality of the program, its innovative approach and the promising results. 

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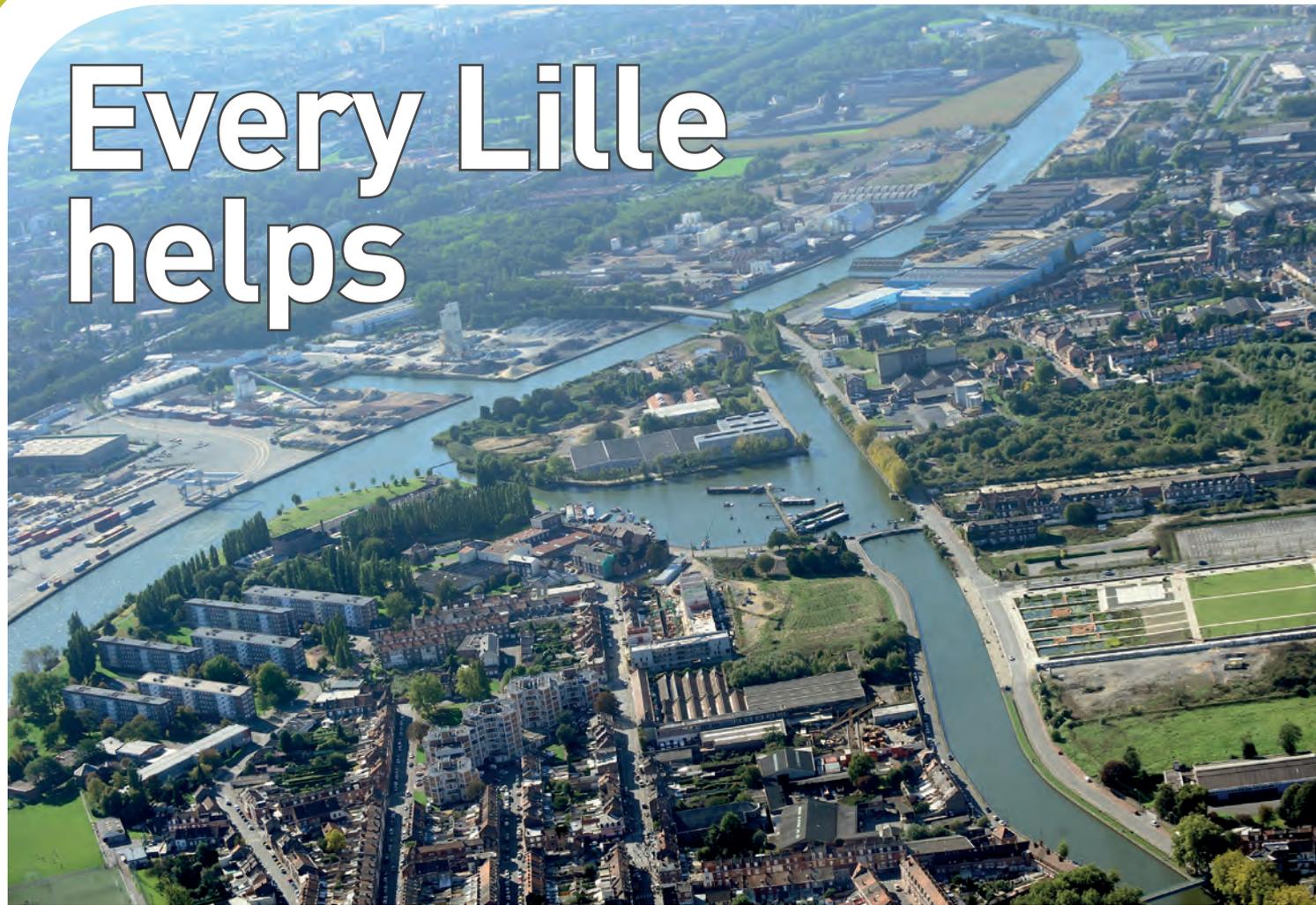
NOTES

[1] Road Safety Analysis is an associated company of Agilysis Limited;

[2] (1) Prince Michael International Road Safety Award (PMIRSA) – December 2017; (2) Best Partnership Scheme of the Year – First Car Young Driver Road Safety Awards 2018; (3) John Smart Road Safety Award, CIHT Awards – June 2018;

Every Lille helps

Photos: Vincent Lecigne / Pascaline Chombart



Driving e-Mobility in Lille Metropole: investing in charging stations in suburban areas to improve uptake and unlock the market, by **Théo Fievet**

As the 4th largest French metropolis¹ and the most rural, the 1.2million inhabitants of Métropole européenne de Lille (Lille Metropole) are spread over 650 km² territory. This gives Lille Metropole a relatively low density (1762 inhabitants/km² compared with Lyon Metropole 2568 inhabitants/km²).

This demographic makes it more difficult to set-up and efficiently run a dense and frequent public transportation network all over the territory. Therefore, the need to drive is still high and the data on the

average distance travelled between work and home shows this (6.2km on average during week days in 2016). Such traffic leads to air pollution and congestion problems within the metropole.

Lille Metropole has already taken steps to tackle this by running most of their public bus fleet on natural gas (NGV), which in turn is made from local waste. For them, the next important step to improve air quality is to introduce electric cars as they see this as the most viable option for light vehicles until hydrogen powered engines can be further

developed and NGV infrastructure (mainly gas stations) can be further developed.

THE EV CHALLENGE

EVs are predicted to have a great future ahead, but as far as European cities are concerned, it is much easier to find EVs in the media and political commitments than in the urban environment where they are most needed. In Lille Metropole, the diagnosis showed a discouraging prognosis: although a large percentage of metropolitan citizens are willing to invest in a personal

EV, this good-will is cut-off first by the extra cost of such a vehicle (on average 8000 extra compared to a standard vehicle), by the fear of running out of power (range anxiety) and by the lack of charging stations. On the supply side, private charging station developers were not willing to invest before seeing a net rise of EVs in Lille Metropole - the dictionary definition of a vicious circle.

LOCAL GOVERNMENT TO UNLOCK THE MARKET

In 2015 Lille Metropole put together a strategy to push for private, light EVs by investing in charging stations and therefore help the market to get out of this vicious circle. Following the symbolic signature to engage in the Third Industrial Revolution by developing EVs, and included into its Sustainable Urban Mobility Plan, the public authority is exploring three paths of investment to answer commuters' needs regarding charging stations: a) charging stations in public spaces, b) charging stations in Park & Ride sites, c) charging stations in off-street parking lots.

SHARING THE BURDEN WITH THE PRIVATE SECTOR

Over the whole metropolitan area's public main roads, 215 charging stations (on which two cars can be plugged in at once, hence a potential of 430 charging spots) are necessary to unlock the full potential of EVs. This number corresponds to one spot in public space for every 3000 inhabitants, as recommended by ADEME (*Agence de l'Environnement et de la Maitrise de l'Energie*). To reach this ambitious number in reasonable time and budget, a win-win-win (citizens, private and public stakeholders) agreement has been found with Groupe Bolloré² to share the distribution of charging stations between urban areas and the suburban zones of the metropole: 167 stations will be installed by the



215 charging stations (on which two cars can be plugged in at once) are necessary to unlock the full potential of EVs. This number corresponds to one spot in public space for every 3,000 inhabitants

Groupe Bolloré in municipalities of more than 5000 inhabitants (representing 90 per cent of the population of Lille Metropole). The remaining 47 charging stations are provided by Lille Metropole and are foreseen to cover the least dense areas, where private individual car ownership is most needed. This will ensure coverage over the territory and at least one charging station in the centre of each small town in the metropole. While private charging stations will start mushrooming by the end of 2018, all of the publicly owned 47 stations are now running. This operation has been possible through close cooperation with regional and national stakeholders: 80 per cent of the investment has been subsidized by Hauts-de-France Région and by ADEME.

These public stations are integrated into a regional offer (former Nord-Pas de Calais Région) to ensure similar prices (set by

Hauts-de-France Région) and services (paying card, mobile app) with the 300 stations in the area, including other cities in north of France (Arras, Douai and Boulogne among others). The Metropole will ensure that interoperability and price similarities will be guaranteed with Bolloré's stations.

STATIONS IN PARKING LOTS

Stations on public domain (streets, municipal roads excluding highways and managed by local authorities such as Lille Metropole) answer a very necessary but specific need: a relatively quick 30 to 60-minute full charge/recharge. This enables travellers or commuters to stop for a few minutes and have enough power to reach their final destination, either the workplace or home, where they usually stay for several hours and are equipped with a private charging spot. Stations on street parking spots or squares

EV owners can charge their cars in one of 10 suitably equipped car parks



directly accessible without gateways are tariffed accordingly: consumers are charged by occupation time even if the car is fully refilled to ensure a better turnover of vehicles.

For longer occupation of charging stations outside the home and workplace, large parking lot infrastructure (mostly underground in the city centre) directly owned by Lille Metropole or its cities (Lille, Roubaix, Tourcoing) enable the development of charging stations in a clearer way. Today, Lille Metropole's ambition is to make all off-street parking lots (operated by different private operators under a delegation of public services) equipped and delivering charging options for at least 12 EVs each at a time.

Alternatively, Park & Ride facilities are ideal for suburban EVs owners planning a day in the city centre. To ensure multimodality, Lille

Metropole has 10 Park & Ride facilities with car parks connected to public transport hubs among which two are already equipped and the other eight to be delivered before 2019. There, users can leave their car for about 8 hours when a slow charge is possible. The price for this type of service is still debated and making it free for EVs owner is an option that the authority of Lille Metropole is considering.

GOING FURTHER

The development of e-mobility is a top priority in Lille Metropole and the deployment of charging stations is an essential step toward this objective. However, this alone will not be enough. The presence of charging stations must be complemented by clear communication campaigns and coordination with the regional authority is paramount to integrate the service within the regional city

network. At the metropolitan level, the private and public stations integration need careful examination to develop an effective strategy.

Looking further into the future at technologies and e-mobility applications and uses, Lille Metropole is keen to develop smart grids in order to soften the potential impact and pressure of EVs on the electric grid. With high capacity batteries soon to hit the market, this can mean longer charging times or more powerful stations. The Metropole's authority is also questioning how to ensure coverage for high-speed charging stations for users of motorways - roads that don't fall under the city's auspices. 🚗

FYI

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NOTES

[1] The most integrated form of inter-municipal structure in France local administration system. Lille Metropole gathers 90 municipalities;

[2] Certified by the French government to develop charging stations.

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

- o Amsterdam
- o Flanders
- o Madrid
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- o Helsinki
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- o Autonomous Vehicles
- o frontierCities2





Post-modernism

Last-mile logistics in Amsterdam: challenges and opportunities,
assessed by **Marco Ferrari** and **Giacomo Lozzi**

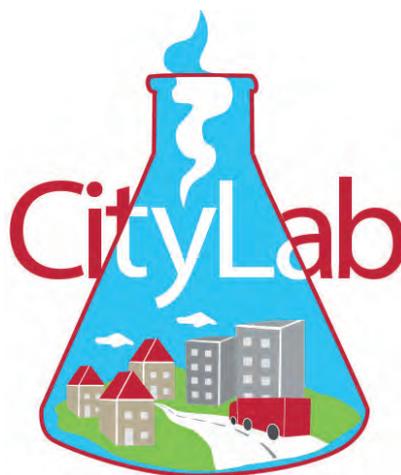


In the framework of the CityLab project, the experience of the Living Lab in Amsterdam examined different models for last mile freight delivery in the city centre. The pilot test conducted by the Dutch mail and e-commerce provider, PostNL, underwent numerous changes, from the initial concept to its last phases of implementation. PostNL tried to improve the efficiency of the highly

THE CITYLAB PROJECT

The principal feature of CityLab is the creation of living laboratories in cities as context for the creation and implementation of new solutions to increase the efficiency and sustainability of urban logistics. The project was funded under the European Union's Horizon 2020 research and innovation programme and it lasted from June 2015 until April 2018. The aim was to reduce the impacts and costs of freight and service trips in urban areas with the involvement of different actors, in the public as well as in the private sector. In the end 24 partners were involved in the project.

The living labs were introduced in eight cities (Amsterdam, Brussels, London, Oslo, Paris, Rome Rotterdam and Southampton) and each of them studied and implemented one or more measures to reduce the negative impacts of freight vehicles whilst enhancing business profitability. In the labs, researchers, public authorities and business partners gathered to identify common issues and goals and define consequent solutions. The project also intends to provide a platform for the transfer and replication of the best practices to a larger group of follower cities in its afterlife. More information at: www.citylab-project.eu.



fragmented last mile parcels delivery.

The city is engaged in several initiatives to become more sustainable and has set the target of taxis and delivery vans to be emissions-free by 2025: large vehicles (→7.5T) will be banned from the city centre and subsidies for electric vehicles for freight and privileges for electric trucks are foreseen. The use of bicycles as a personal mean of transportation is so widespread that, as Erik Regterschot of the Department for Sustainability of the City of Amsterdam stated during the CityLab workshop in Amsterdam, no subsidies are needed for cargo-bikes, as there already many of them

in the city (Amsterdam, 8 March 2018). However, despite these good features, Amsterdam still needs to improve its approach concerning the introduction measures for efficient and sustainable freight delivery as well as traffic congestion.

During a CityLab workshop held in Amsterdam on the 8 March 2018, Mr Regterschot presented some interesting figures about congestion in Amsterdam. Camera counts registered a 5 per cent annual growth of vans circulating within the ring road, corresponding to 30,000 vans per day. Congestion remains a main issue for urban logistics, as it accounts for up to 65 per cent of added travel time during peak hours.

THE THREE PHASES OF THE CASE STUDY

In CityLab, the Amsterdam implementation aimed to improve last mile logistics by making better use of canals and existing cycling infrastructure. The Amsterdam Living Lab examined three solutions of parcel depots for the last mile. This implementation followed the Living Lab approach: based on a shared vision of making the city centre of Amsterdam more sustainable and reducing congestion, PostNL

cooperated with the local authority and researchers to improve last mile logistics in the city centre. In line with this approach, different concepts have been discussed and evaluated, before coming up with the definitive solution that was tested.

The first concept that PostNL explored to improve the last mile logistics foresaw the use of the canals of Amsterdam to reduce the number of trucks circulating in the city centre. The plan was to use floating depots that would have been loaded at hubs located on the outskirts of the city. These vessel depots would have used the canals, avoiding the traffic and reducing congestion, to get to a hub in the centre. As floating depots they had to have a mechanism to lift the goods onto the quays. From there, eco-friendly e-freight bikes and clean vans would have unloaded the floating depot and completed the delivery of the parcels, reducing at the same time emissions, congestion and making the delivery even more pleasant for the last mile couriers. After some issues, related to financial and organisational restrictions, PostNL decided to use conventional vans instead.

AN IDEA THAT DIDN'T FLOAT

In the second scenario, PostNL considered using a floating depot pushed by a hybrid-push boat from where zero emission (ZE) vehicles (EV trucks or bikes) would deliver parcels in the 'de Pijp' district in Amsterdam, a very dense and popular area full of cafés, restaurants, coffee shops and bars. However, evaluation performed at the end of design phase illustrated the lack of a sustainable business model for this scenario. Overall, it was decided that it was not cost-effective to bring the goods into the city by boat. Based on these evaluations, PostNL decided to look at the other possibilities using existing infrastructure. Therefore, while the idea of using waterways for freight delivery remain interesting and the Living Lab stakeholders are

still open to develop it in the future should the circumstances change, PostNL decided to abandon it for the time being. The final concept was the one that was implemented with a pilot project in the city: the third solution reviews different models of e-freight bikes for the last mile

THE FINAL CONCEPT: MICRO-HUBS AND E-CARGO-BIKES

The idea of using electric cargo-bikes for the last mile delivery has been revived in this last scenario as well. These e-freight bikes distribute mail and parcels from micro-hubs located in the city centre. To avoid the high rents in the city centre, the depot utilisation needed to be maximised and eight micro hubs (for example, abandoned stores or existing PostNL hubs) are shared with other PostNL activities like daily mail. What changed was the introduction of the micro-hubs within Amsterdam. It started with just one hub and, at the end of the project, eight of them were established in the city. The locations were unutilized stores and facilities of PostNL that were equipped with charging facilities for the cargo-bikes and reutilized for the implementation of the project. Vans were replaced by 50 to 60 e-freight bikes and each micro-hub is supplied by a truck twice a day. In the morning they deliver mail to business clients. Then they return to the hub, get recharged and start the second shift in the afternoon, to empty all public mailboxes and pick-up mail and parcels from business clients. The benefits at the operational level include a reduction of the time required to park and reduced cost of fuels. Not only that, but the use of e-bikes allows the taking of shorter routes for the deliveries and therefore it ensures similar average speeds.

GOOD NEWS: LAST MILE DISTRIBUTION WITH E-CARGOBIKES WORKS!

With the creation of the micro-



Amsterdam in numbers

830,000 inhabitants;

Daily centre visits:

- 30,000 vans;
- 3,000 trucks;
- 3,000 buses;
- 2,000 taxis.

hubs for the distribution of parcels, PostNL has obtained two main improvements. The first one is the use of micro-hubs in the inner city to consolidate the last-mile freight flows to and from the city centre. The second one is the exploitation of the well-developed cycling infrastructure of Amsterdam and the use of electric cargo bikes, to reduce pressure on the road network and improve their quality of service. About 1,300 orders are still handled by vans while the remaining 2,200 orders are handled by bikes from the micro-hubs that are supplied by truck. Due to time savings during the trip caused by cycling infrastructure and lack of parking, bicycles can



represent a stepping stone in a possible future revival of the floating depots concept.

LESSONS LEARNED

There are several challenges ahead, especially when extending to other cities. The main challenge in Amsterdam is to find sufficient employees to make deliveries by freight bike. Another challenge is to increase the utilisation of those freight bikes by extending the operations towards the delivery of packages, food, local products and evening deliveries.

The first lesson is that floating depots do not quickly create a valid business case. The development of an entirely new technical functionality begins long before it is ready to be used in operation. Another lesson is that using the floating device for delivering food products doubled the costs compared to conventional daily practice, due to the higher operational costs. They result from the longer delivery time and the capacity of the floating depot.

Cooperation between industry, research and local authorities resulted in better understanding of each other's issues and strengths. These relations contributed in developing and evaluating the concept. Especially the fact that it was clear to everyone involved why something failed has been helpful when together looking for feasible solutions in a new cycle. If this concept works well, PostNL would like to extend the concept of micro-hubs and sustainable transport to other cities and the remainder of Amsterdam. 🚲

Overall, the Amsterdam implementation has been a rather successful experience, despite the evident challenges the project had to face in its initial phases

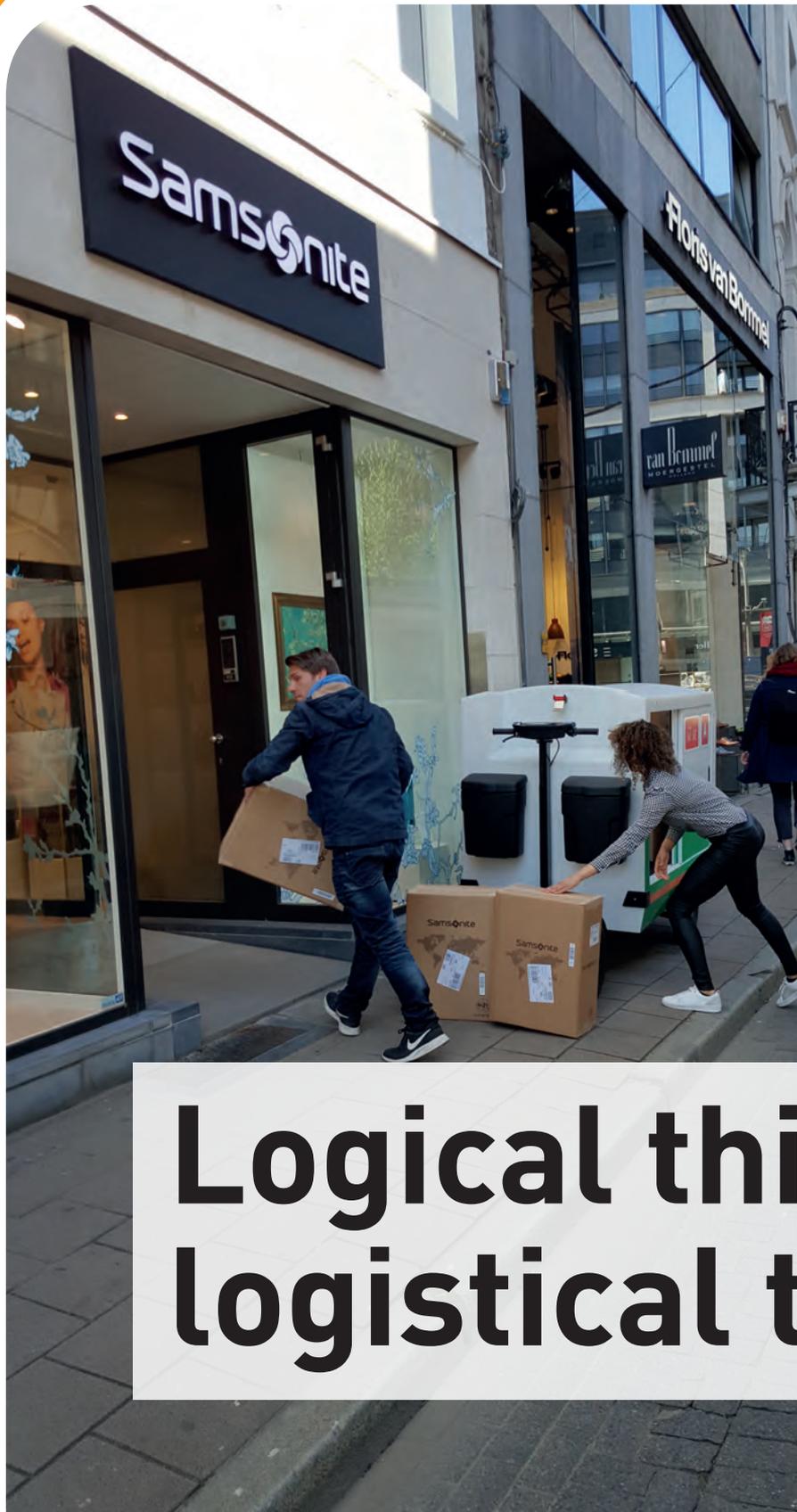
handle 5 per cent more orders during a trip which saves about five trips per day. Drivers are satisfied with the additional exercise due to the cycling and experience less stress because congestion and parking issues are no longer affecting them. This has also brought reputational benefits to PostNL, appearing as an eco-friendly company, and the initiative seems to have been welcomed with warmth by

citizens and tourists as well. Overall, the Amsterdam implementation has been a rather successful experience, despite the evident challenges the project had to face in its initial phases - the pilot is currently under extension. Moreover, it seems plausible that the solution of utilizing waterways for freight delivery will not be completely abandoned: the micro-hubs implemented in the CityLab framework

FYI

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An ideal scenario consists of a hyperconnected network in which autonomous vehicles are used to their maximum capacity

Flanders' Innovation Cluster for Logistics (VIL) is deploying numerous innovative city logistics projects, as **Kris Neyens** and **Stefan Bottu** report

Logical thinking, logistical thinking

VIL is Flanders' sole innovation spearhead cluster for logistics. As the spearhead cluster for logistics it is also a membership organization that harbours some 550 logistics stakeholders. It is the region's reference when it comes to company-oriented innovation in logistics and will remain so for the coming decade supported by a Covenant with the Government of Flanders.

VIL focuses on four domains: digital, sustainability, Flanders' Gateways and urban logistics.

The primary focus lies with projects and their subsequent valorisation. VIL acts as project manager and executor bringing together different key stakeholders around pertinent innovation tracks and leverages collaboration. There is specific attention for the valorisation of such projects focusing on maximal implementation of new concepts and direct contribution to the businesses' cost-effectiveness.

VIL has just concluded two projects at the heart of the urban logistics domain: "ALEES", a project focused on autonomous logistics' electrical entities for city distribution and "Intelto City", a project focused on how the Internet of Things can help make logistics more efficient in cities.

ALEES

Autonomous vehicles can be deployed for efficient parcel delivery in cities. The technological possibilities are promising even though a large-scale implementation of such vehicles for parcel delivery might still take a few years. Legislation needs adjusting and volumes need to be sufficiently large. In many cases this will be the result of various forms of collaborative models.

In the ALEES project VIL, together with seven companies and the City of Mechelen investigated the possibilities that autonomous vehicles can be used to make deliveries within city centres. In Mechelen, a city with a population of about 85,000, the high density of business activities results

in a high level of freight traffic. For this reason, the city counts the reduction of CO₂ emissions due to urban freight transport among its main mobility and environmental objectives. In this context, autonomous vehicles might offer numerous advantages. They are compact, silent, emission free and safe. They operate under flexible route planning and show better fill rates and subsequently realize higher efficiency of deliveries. An increase in consolidation of volumes results in less traffic and improved quality of life in city centres.

HYPERCONNECTED NETWORK

An ideal scenario consists of a hyper-connected network in which autonomous vehicles are used to their maximum capacity. Inbound volumes, such as stocks of local retailers can be stored in city distribution centres at the edge of town. The autonomous vehicles can be used to provide goods to either the retail stores or micro-warehouses in the city centre that act as connectors for all possible forms of local or low- or emission free distribution.

To make this concept profitable there should be enough volume. The Flemish region does not have many large city centres, so collaboration and consolidation of volume is key. Such collaboration between various parties is crucial but at the same time the most difficult task.

LONG TERM TESTING IN DIFFERENT CITIES NEEDED

A first licensed test of an autonomous vehicle in the public domain in Belgium took place on 25 May 2018. An EasyMile EZ10 vehicle was used in centre of Mechelen. The vehicle ran autonomously and made various stops at local retailers delivering and picking up all kinds of parcels. Several scenarios were tested amongst which was the delivery of passively cooled goods. "Thanks to the use of dry ice we were able to demonstrate that cooled

and frozen food stuffs can reach their destination in city centres safely by using autonomous vehicles. The cooling elements accompany the journey from producer to recipient without breaking the cold chain and this without any external intervention," says Koen Draggers, key account manager at ACP. "This seamlessly integrates with the use of autonomous vehicles for last mile deliveries. As a participant of this project we are extremely pleased with the demonstrator as well as by the extremely positive reactions from both the participating retailers as from the public in what is the most densely populated shopping street of the City of Mechelen."

In the next phase, long-term testing needs to be organised together with one or more logistics service providers, cities and the competent regional and federal agencies. The importance of a coordinated approach while testing such autonomous vehicles cannot be stressed enough. Mutual injection of knowledge and experience of both industry and the logistics sector must empower the authorities with specific expertise. Ultimately this will lead to a faster implementation of autonomous logistics electrical entities for city distribution and the realisation of its associated benefits.

INTELTO CITY

In this collective research project, the state of IoT technology and its potential use for city logistics and distribution were investigated.

In a first phase of the project, the following potential application areas were defined: intelligent loading and unloading zones, notification of the retailer, autonomous microhubs, product traceability, carrier and vehicle traceability, temperature control and selection of the appropriate storage location.

In the second phase, after consultation with the different project participants, the case of an autonomous microhub in the city was selected for

the proof of concept. Through a city microhub, goods outside the city can be consolidated, allowing green last mile delivery to stores or consumers (through e.g. a bike courier). Such a microhub can also be used as a collection point, or for reverse flows. But such a hub represents an extra stop, hence extra cost compared to the current way of delivery. Therefore, the project focused on the use of IoT to make the microhub autonomous so that the extra costs related to this set-up can be reduced to a minimum.

For the proof of concept, the microhub got located at the Thomas Moore School at the Kronenburgstraat in Antwerp. A loading and unloading zone with parking sensors was created with the help of the city of Antwerp. Antwerp is the second city of Belgium by population and is home to Europe's second largest port. The city's need to reconcile freight and logistic transport with major flows of commuters and visitors make it a perfect location for the proof of concept.

Imec developed an android app that allowed Proximus and Samsonite to book a delivery slot in the loading and unloading zone. The last mile was executed partially with a Stint operated by a student and partially by bike courier Cargo Velo. An electronic display in front of the zone and connected to the app highlights that a delivery will take place so that the zone will not be occupied by other users. Through an intelligent lock connected to the app, the driver can open and close the intelligent door lock installed on the microhub, allowing the microhub to be operated without personnel. In a further phase one could install in the microhub a locker or create separated zones accessible through a code created by the app in case multiple parties make use of the micro hub.

A first high-level economic



Existing autonomous vehicles serve multiple city logistics purposes - here a cooled roller cage being discharged

analysis indicates that the IoT technology can reduce the extra costs due to this logistical set-up, but that the size of the saving depends on factors like the number and the size of the packs, the distances between the microhub and the delivery addresses, the size of the vehicle used for the last mile and so on.

As a general conclusion, the Internet of Things can make a considerable contribution towards a more reliable and efficient city distribution. Current identified roadblocks for a large-scale implementation are a lack of collaboration, openness and standardization of the different technologies that would allow the different smart city solutions to be easily integrated into one platform.

RESULT

Both ALEES and Intello City have revealed a clear need for an integrated solution for city deliveries. The R!sult (Responsive Sustainable Urban Logistics) project therefore has the ambition to work out and validate a generic logistic concept for ideal city deliveries. Important aspects are smart use and combination of logistic modes and to provide and utilize storage and cross-dock capacity (microwarehouses) in and

at the edge of the city.

VIL wants to work out a model for sustainable as well as economic city logistics that is beneficial to all stakeholders (producers, cities, logistic service providers, traders and citizens). To accomplish this, it is important to define the use of the right combination of transportation modes, the required volumes and other conditions that make such a model viable. Logically, the business model and IT requirements to support such a concept will have to be investigated as well.

Some 26 participants (four cities and 22 companies) have committed to this project that kicked off in October 2018. Watch this space to read about the continuation of our collective research and development journey. [🔗](#)

FYI

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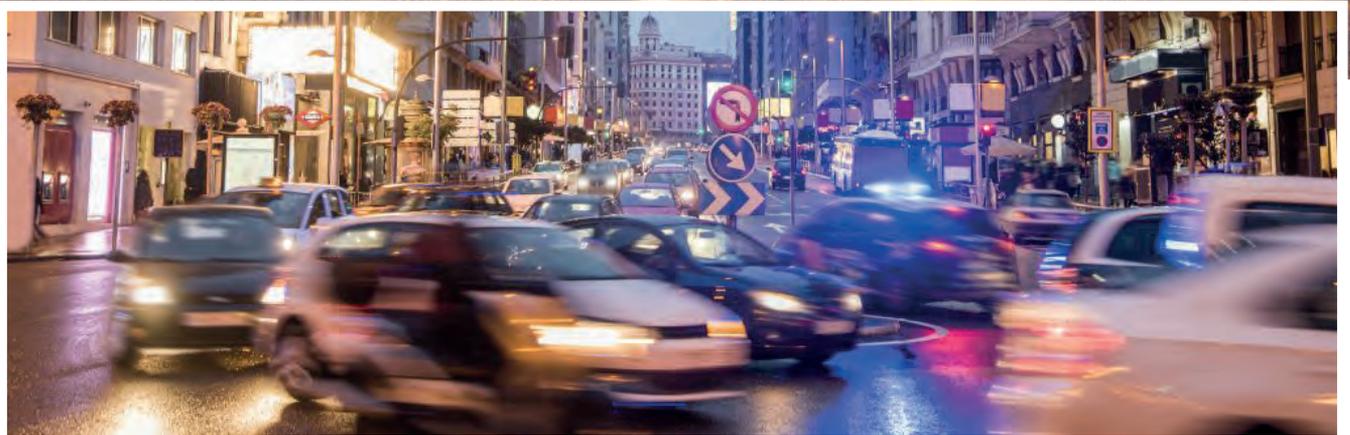


SMALL CITIES
BIG IMPACT



www.polisnetwork.org

In Polis' new SMC platform, Small and Medium-sized Cities discuss mobility governance specific to their size and shape.





Plan A is a great step forward for sustainable transport, say **Michel Arnd** and **Sergio Fernandez Balaguer**

Now for Plan A

In the past few years, Madrid has struggled with problems such as air pollution and heavy traffic. To approach the issue, Madrid plans to reduce the number of cars in the city, and to promote public transport and active mobility modes, also by introducing new mobility solutions.

- The BiciMAD bike-sharing scheme (*pictured below*) provides 2,028 electric bicycles on 165 stations across the city centre. The bicycles are available throughout the year.
- The four electric car sharing providers, Emov, Car2Go, Zity and Wible have more than 400,000 subscribers all together. Together, they also maintain over 2,300 electric cars.
- The six electric scooter sharing providers, eCooltra, loScoot, Movo, Coup, Muving and Acciona manage a fleet of slightly more than 4,100 e-motorbikes.

In 2017, the city approved its new Air Quality Plan, a comprehensive strategy to develop sustainable transport further. The strategy proposes air-cleaning measures under a 30-point plan entitled *Plan A for Air Quality and Climate Change*, “because there is no plan B,” as the Mayor Manuela Carmena said.

Plan A stands for a paradigm shift in Madrid, which the Municipal Transport Company of Madrid (Empresa Municipal de Transportes, EMT) applied consciously. While

traditional policy approached pollution with marked-based mechanisms, the new policy aims at preventing polluters from driving. It forbids high-polluting vehicles to use public space. The new measures include

- Reducing the space dedicated to cars in favour of more sustainable modes
 - Parking permits related to pollutant level
 - Social public transport prices
 - Introducing alternative modes while removing parking
- Madrid is actively encouraging a shift to cycling. It has doubled the number of shared bikes and extended docking stations beyond the M30 ring road for the first time.

A PLAN OF ACTION

EMT is seeking to position itself as a provider of sustainable mobility services of the future. The city has created its own Mobility as a Service application, MaaS Madrid, which aims to provide high quality and updated information on public transport and additional services in the Spanish capital.

In the smartphone application, MaaS Madrid, EMT gathers all of the mobility service providers operating in Madrid in a single interface. With the new app, the city of Madrid aims to position itself as a pioneer in mobility sharing and multimodal transport. It is part of measure 21 of Plan A which supports shared and multimodal mobility initiatives.

MaaS Madrid was launched in spring 2018. It provides users with different, more efficient and eco-friendly ways to travel across the city.

It contains georeferenced information, allowing users to identify all of the mobility services available in their surroundings. Initially, it will contain public transport and the sharing services Bicimad, Car2Go, Emov, Zity, Muving, eCooltra and loscoot. It will also facilitate access to taxi services. EMT will gradually include more features, such as the calculation and comparison of routes, more customised options and the possibility to book seats, purchase tickets, etc.

By selecting the origin and destination of their journeys in the MaaS Madrid app, users can visualise the a range of options according to their preferences (the fastest, the cheapest, the least polluting trip, etc) and complete all of the necessary reservation processes, directly or through the provider's app.

Gradually other services will be incorporated, such as the station-based car clubs Respiro and Blumove, with which the EMT is working technically to differentiate them from free floating car sharers.

Implications for governance and policy

When developing the plan, EMT drew some additional conclusions which they see as success factors for developing such as policy.

- Political will to implement urban policies and strategies
- Clear priorities and messages for communication and awareness raising
- Cooperation among stakeholders (incl. public administrations)
- Policies based on legal frameworks
- Stable financing schemes

EMT practises an open approach and invited further companies to join the system.

In addition to serving the citizen, the city and the participating operators that perceive the tool as an opportunity to develop their services and to extend public-private collaboration further. Ultimately it might even lead to a new model

of urban mobility. EMT also operates an extensive open data portal, providing statistical, dynamic and real-time data about the different services it provides (bus, public bike, mobility, parking), as well as instructions on how to integrate with your own applications.

RESULTS

The services haven't been in place for very long, but they show how public transport operators can successfully create their own multi-modal app, which includes a range of high-profile services.

Nevertheless, developing a MaaS app and the intensive dialogue with the local stakeholders has positioned Madrid at the forefront of mobility development and allows EMT to maintain a structured dialogue with all stakeholders.

Next steps could include a stronger packaging approach that would allow users to use certain modes as flat rates or packages.

With the new policies around the Plan A, EMT reinforced its policy approach to support the deployment of clean fuels and vehicles in cities. The new plan marks another step towards the goal of zero emissions. 🌱

The MaaS Madrid app will contain sharing services including emov and Car2Go



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FYI

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Plan A Approaching climate change and air quality in a single strategy

Paz Valiente is Deputy Councilor, responsible for Environment, Sustainability and Mobility, for Madrid City Council. Her government developed the comprehensive strategy Plan A, which will change Madrid's Mobility substantially. She talks to *Thinking Cities'* **Michel Arnd** and **Luana Bidasca**

MA: Why does the city of Madrid need a new approach such as Plan A, its new air quality strategy aimed at further developing sustainable transport?

PV: Madrid has a problem regarding air quality and commitments to fulfil on climate change goals. With the new municipal government, we decided to develop an ambitious strategy. This is a commitment to the citizens regarding public health and a response to the European Commission that was about to sue Spain for the air quality in Madrid and Barcelona at the European Courts.

How does the new approach differ from the previous policies?

We changed Madrid's approach entirely as we put the focus for the citizens on the health problems attributable to air quality. This was a serious change to the former government's policy as they were denying the pollution problem. At the same time, we linked the difficulties of pollution with the challenges in urban development. Before, the mindset was that a pollution curb would be bad for our economy. We changed that and put the problem on the table. We decided to merge approaching climate change and air quality in a single strategy because of the synergies of the measures. We developed Plan A, our municipal plan for air quality and climate change.

How do you see the local economy profiting from the plan?

For the local economy the change



of the model brings more opportunities. It means that we decouple growth from the measures, bringing new opportunities of employment and innovation. New technologies, such as Mobility as a Service and IT technology, allow for approaches that we could have never thought of before. Now we can integrate car-sharing, motorbike-sharing and bike-sharing. The combination of climate change and air pollution is an opportunity to focus more on resilience in the long term, i.e. mitigating climate risk. Addressing this in the

plan is also a warranty for investors. Investments are always endangered by the change of conditions. That we are able to make the city resilient and much more able to mitigate the effects of climate change ensures that investments are protected to whatever happens. This includes alignment with the European policies and the UNFCCC (United Nations Framework Convention on Climate Change) guidelines. We think that this is no risk for the economy, but a good step toward and securing the ambitions of everyone.

How do you see Mobility as a Service contributing to these goals?

Mobility as a Service (MaaS) provides much more public space for people to enjoy recreational activities. Currently, the design of the city is dominated by car ownership. One to five cars per family. If we change the model where we think more about accommodating our needs of mobility and what the city can offer to fulfil these needs. I believe we will find the solution in sharing and public transport. I think that MaaS gives us the concept and the tools to change the city to become much cleaner, much more publicly available to citizens and more nature-based.

Why did you choose to develop your own MaaS approach and app together with the city-owned public transport operator EMT, rather than having a private company coming in and developing it for you?

EMT is a very powerful enterprise and we support local enterprises. We see EMT as a tool for mobility. Before it was often seen as just a bus operator. Now it has become a modern enterprise that is leading and paving the way forward to modern mobility.

EMT is very well connected to European innovation networks, thus it is a knowledge reservoir with lots of technical capacity. For us it is necessary that such an independent body of public interest unites private enterprises who all have their own approaches and agendas. It is a warranty that we work with a body that advocates the public interest rather than the private interest. We certainly respect the interests of the private sector, but it is important that the administration establishes a backup. However, we are not exclusively working with EMT. We see it rather as one means to achieve the mobility goals. We also have a data portal where all information is available for everyone – free of charge. In that sense we look for new



City-owned public transport operator EMT

proposals and new developments of PPP and new private initiatives. We welcome any mobility provider that is willing to integrate into our daily management of the city.

How do you evaluate the services and collection information to measure their performance?

Information is key for us. For some years, we have been working blindly because we lack information on how people move. The only information we had was from a public mobility survey done by the region. The last edition was in 2005, so you can imagine how mobility changed since then. But the city couldn't develop its own, since this is a regional competence. All the information we could rely on was that we collected in public buses, taxis and traffic cameras. So we have more or less an idea of mobility in the city but not the accurate picture we would like.

How do you plan to change this?

Having information about movements in a database, such as which trips are made by public bike, car-sharing, public transport and so on, is very valuable. We can use it to feed our models and develop our measures. It helps to prioritise measures against each other and adapt measures and policies continuously. We know what can be improved when the information

is available. It is the most valuable thing for planning.

Do you require your bike-sharing or car-sharing providers to share information with you?

Every movement and position of a vehicle has to be geolocated and the information shared with us. In that sense we get a picture of how these vehicles move, if they are in the centre or how many are on the periphery. We also understand which trips are made most often and by which transport mode. This information is required to shape the public transport offer much more accurately to the needs of people.

How did you encourage the providers to share that information with you?

We require them by regulation. At first some of them were a little bit reluctant. I don't understand why but I guess private enterprises sometimes don't like to share much information with public administrations. But in the end, they were clever enough to understand that this helps to support the transition from the old culture of owning my own car to a much better, cheaper and more efficient Mobility as a Service culture. If they all unite to support that, the cultural change will happen much, much faster.

There will be times in the future where they can compete, once

everyone is using Mobility as a Service, less people own a car and most of us find their mobility needs in intermodality. Once that is achieved they will all be able to compete freely. But for now they are all required to provide information and the city council is there to help them develop. We are collaborating with them to get the complementary information on the user and the user's profile. Information about gender and age will allow us to customize our services' public transport and mobility policy.

How did you the discussions with the providers go?

Our conversation with car-sharing enterprises followed the line I sketched out. The difference now comes with the new free-floating bike-sharing and kick scooters. In contrast to the other modes, we were not relying on voluntary agreements, but needed to establish some rules about the use of sidewalk space. People live longer today, and there

are a lot of people that have mobility issues. We have to protect these and other pedestrians and ensure that they are safe. Therefore we did not just ask them to share information but also approved a new bylaw.

We developed to the bylaw to support the Plan A with a legal security, as it is a quite ambitious but also disruptive plan. The city council just approved this completely new mobility bylaw that incorporates Plan A, which came into force in late October.

The new bylaw requires all mobility providers that want to use the sidewalks to ask for an administrative permission for deployment. Permission will be given based on a number of factors, data-sharing being an important one. We can use that information to detect the piling of bikes in the city, for instance. Besides that, we require insurance coverage for users and third parties.

So what will happen if they don't perform to the agreed standard?

Well first of all, I don't think that private

enterprises have an interest to keep operating if their business model doesn't turn out to be successful. But for the situation that happened in some other cities where very cheap bikes just appeared, we have developed a mechanism governed by the mobility bylaw. It requires deployers of sharing schemes to recover all their bikes or devices. If they don't do that, they lose a deposit we require them to leave with the city when they enter.

Do you have already some figures on how users responded to the MaaS application?

The MaaS app is only a beta version and we are just starting all this, so unfortunately we don't enough information about that at the moment. We hope it will be a success, of course. However, it will always stay voluntary to use it. It is an offer and we think people will like to pick it up, but we don't require anyone to use it. It is an offer of the public bodies and of course we will also have our benefit from it, but we also see the benefit of connected mobility for the user. We think although it is not obligatory it is good for everyone. In the case of bike-sharing we were much more rigid, as it is easy to establish a business model on these fairly cheap vehicles that is based on data rather than mobility. For cars or more expensive vehicles that is more difficult to achieve. But for MaaS we really don't see a need for that as it embraces a new approach because there is a collective benefit. 

People live longer today, and there are a lot of people that have mobility issues. We have to protect these and other pedestrians and ensure that they are safe



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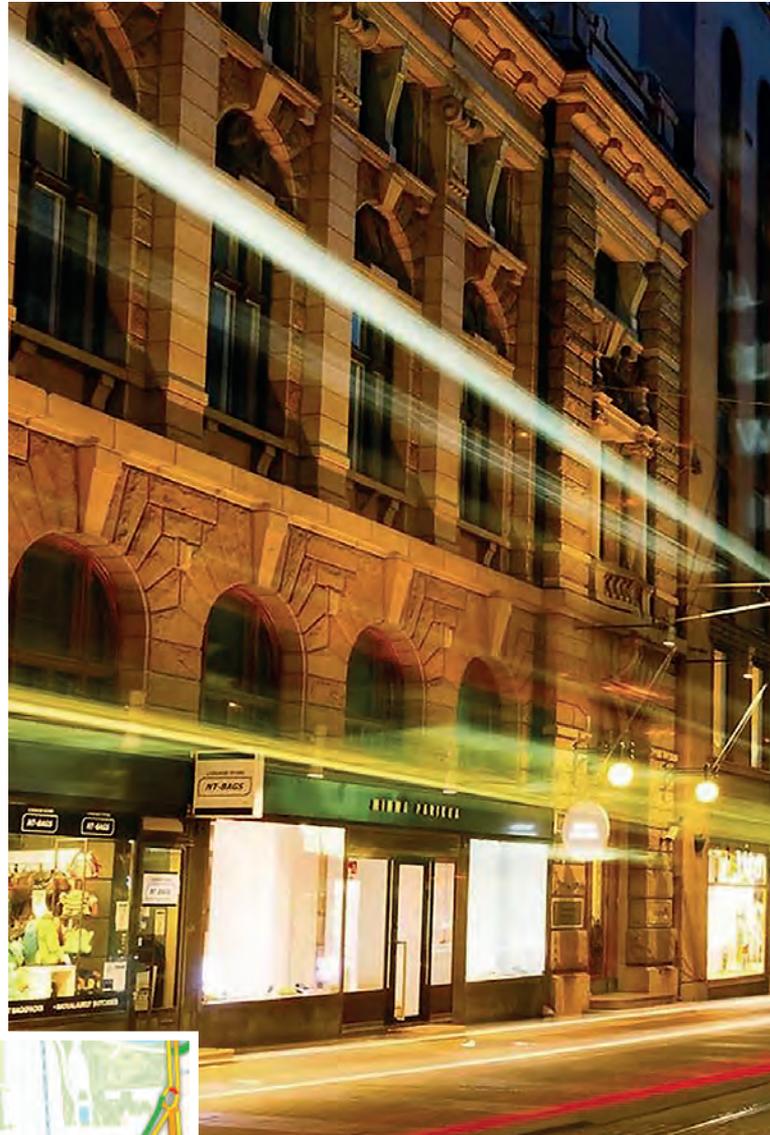
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Analysing the past to define the future

Helsinki recently conducted a study analysing the city's traffic patterns using TomTom's accurate and cost-effective Traffic Stats and proved that for the first time since 2010 traffic in the city has started to ease, as **Stephanie Leonard** reports

Increased traffic congestion is an unavoidable problem in almost every growing city in the world. Peak-hour stop-and-go traffic is, therefore, nowadays a characteristic result of how our metropolitan areas function. As urbanization is expected to further increase the world's population living in cities by up to 80 per cent, the problem of increasing traffic and congestion is a serious challenge for policy makers. Some cities, such as the Finnish capital, Helsinki, are beginning to 'move the curb' by investigating options that will lead to a reduction in congestion.

Between 1991 and 2011, the Traffic Planning Department of the City of Helsinki monitored passenger car traffic rates every two years to keep track of congestion levels. Conducting



regular assessments of the city's traffic levels was deemed an essential exercise to support the overall development of the city's transport network and to help identify when timely adjustments and changes might be required to address increased congestion.

These prior traffic studies were performed by installing probes in three cars that drove through traffic along 14 predefined routes. The city found that this probe data was extremely limited and caused problems with variability, as it only measured point studies, and was also very expensive to conduct. The Helsinki Traffic Planning Department then started

Helsinki's Aleksanterinkatu street



About TomTom Traffic Index

The TomTom Traffic Index is published to provide drivers, industry and policy makers with unbiased information about congestion levels in urban areas.

Now in its sixth year, we're offering even more insight into why our urban centres are congested, putting the issue into context, and offering ideas about how the problem can be alleviated. This year, TomTom is also celebrating those cities that deserve special recognition for their efforts to beat traffic congestion, with the TomTom Traffic Index awards.

www.tomtom.com/en_gb/trafficindex

data to measure delay times per kilometre and identify high-congestion streets or areas throughout the city. Published earlier this year, Blomqvist's analysis provided detailed results to the city government to show how traffic flow improved over the study period. Besides studying individual streets and the overall situation, Helsinki also studied pre-defined corridors using TomTom's Route Analysis. Compared to similar studies, Blomqvist was able to deliver stronger results while lowering the cost of production by using data from TomTom.

The Helsinki study selected 10 predefined time intervals each consisting of 45 days, resulting in highly reliable data with an impressive 800 per cent growth in probe count in only three years. On average, traffic delay time in Helsinki is calculated to be 27 minutes per day, which is an increase of 26 per cent compared to travel times at normal expected congestion levels. During morning and evening peak traffic hours, the extra delay time percentage jumps up to 40 per cent and 48 per cent, respectively.

to explore alternative avenues to conduct this assessment in a cheaper, efficient and effective way.

A Masters thesis completed by Samuli Kytö in 2016 studied TomTom's commercial data and found it to be very accurate for Finnish traffic analysis. TomTom Traffic Stats data are based on millions of anonymous probes (based on multiple data sources, including anonymized measurements from GPS enabled devices, mobile phone signals and sensor data) that are evaluated and analyzed automatically. This data is highly precise and reliable and several independent

studies have confirmed the accuracy of TomTom's traffic data.

INARGUABLE DATA

The Helsinki Regional Transport Authority (HSL) also studied TomTom's data and published a report in 2017 with equally positive results. With this high-quality data, City of Helsinki traffic engineer Petri Blomqvist created a meticulous and factual report that is an example of best-in-class problem-solving initiatives created using TomTom's data.

This study, based on seven years of data between 2010 and 2017, uses TomTom Traffic Stats commercial

From this data, Blomqvist identified the top 10 most congested streets based on delay in hours over the period of 45 days. One example revealed by the analysis suggests that the traffic delays on Mannerheimintie – the most congested street – add up to 145 days; in other words, the time spent driving 4.3 times around the equator at an average speed of 60 km/h! And that’s only for one street over a period of 45 days of measurement.

“The Helsinki study was only possible to this extent thanks to the highly granular and precise data from TomTom Traffic Stats,” says Blomqvist. “TomTom’s data is well-suited for any kind of evaluation on traffic congestion. With Traffic Stats, it is easy to perform city, city section, and street-level traffic analysis for an accurate understanding of what makes traffic slow down or stop. Ultimately, this analysis can help cities take measures to reduce congestion and improve traffic flow.”

According to TomTom’s Traffic Index, Helsinki’s 24-hour congestion rate is an average of 26 per cent, marginally lower than neighbouring Nordic capitals Oslo (30 per cent) and Stockholm (28 per cent). Helsinki is ranked 168th out of 390 cities around the world.

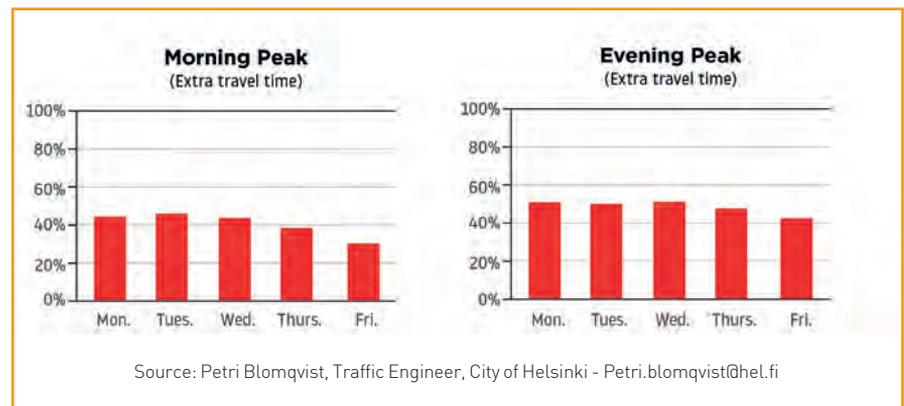
IF YOU FAIL TO PREPARE, PREPARE TO FAIL

The Helsinki study recommended that from now on the city traffic should be monitored every year rather than every two and a detailed regional level analysis (city, highway and street level) should be conducted. A key measure that the city is now proactively using TomTom data to try and improve is the planning of road works.

“By using TomTom’s Historic Traffic Data, we can see how the road works affect the traffic in dedicated streets and in the surrounding street network,” says Marko Mäenpää, Head of Traffic Management Unit, City of Helsinki. “By getting this knowledge

Number	Street	Delay 2017 (hours, total number of observations)
1	Mannerheimintie	3.494
2	Vihdintie	2.318
3	Mechelininkatu	2.279
4	Mäkelänkatu	2.277
5	Hämeentie	1.771
6	Porkkalankatu	1.689
7	Huopalahdentie	1.332
8	Runeberginkatu	1.109
9	Topeliuksenkatu	1.055
10	Helsinginkatu	1.053

Above: the top 10 most congested streets in Helsinki. Below: daily peak traffic comparisons



we hope we can better evaluate in advance the effects of road works that haven’t started yet. I think this also offers other possibilities, for example to follow the effects of new traffic arrangements or changes in traffic signal control. However, our main goal is not to focus only on car traffic; public transport and bikes are high in our prioritization and all these must be planned together.”

Launched in 2008, TomTom’s historical traffic database has trillions of data points with 11 billion new records being added each day. This extensive database makes it possible to obtain detailed information such as travel times, average speeds and probe counts on each segment of a defined road or area at any given time of the day and any day of the year enabling advanced traffic modelling and analysis.

The most extensive historical traffic database available. TomTom’s

historical traffic data can be accessed in two ways: The easy-to-use Traffic Stats Portal is a self-service web application that enables traffic professionals to easily create, edit, save queries and retrieve results. The Traffic Stats API allow developers to directly integrate this data into their own platform and software, and automate large volume queries.

FYI

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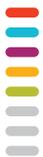
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Integrated mobility in the Paris Region, as told by **Françoise Guaspere**

The project “Mobilité Intégrée pour l’Île-de-France” (or m2i – Integrated Mobility for Ile-de-France) is an initiative dedicated to developing smart mobility solutions and addressing the need of travellers, public authorities and networks operators (road traffic as well as public transport). It is part of a global project promoting modal shift from individual car to public transport and other modes such as cycling and shared vehicles.

Firstly, the action relies on gathering various data on all modes (road traffic, public transport, shared bicycle and car service, car-pooling, parking lots, on-street parking) and on different time scales (PT timetables,



real-time data, predictive data, historical data) under the umbrella of the public authority with a smart open data policy. Secondly, the data is processed using big data tools by private stakeholders. Today m2i has gathered 1 billion pieces of data every day. m2i will enrich Ile de France Mobilités' data portal to build major mobility services in the world:

- For the travellers, m2i seeks to provide a multimodal GPS, to help users choosing the most appropriate transport mode, and support them while travelling.
- For the public authorities, m2i is developing a digital mobility observatory helping to set up strategies on a reliable



diagnosis and to evaluate the public actions undertaken.

- For the network operators, m2i through the use of predictive data and mixing road traffic and PT data, is setting up a predictive networks management, to optimise their use.

This project received funding from the French government (PIA) and the European Commission under the 2016 Connecting Europe Facility (CEF) call to promote innovative transport technologies. The initiative will contribute to address a key traffic situation and to remove bottlenecks on the Paris Urban Node of the Trans-European Transport Network (TEN-T).

The 2011 Transport White Paper of the European Commission formulates ambitious urban mobility policy objectives, following on the established need to cut transport GHG emissions by 60 per cent compared to 1990. These include the full

phasing out of conventionally fuelled vehicles in city centres by 2050 and close to zero-emission logistics in cities by 2030. Advancing new mobility systems and services, the available transport decarbonisation levers are the following: demand and land use management, modal shift, fuel substitution, and fuel/energy efficiency. New mobility service innovations have the potential to contribute to these levers to achieve overall decarbonisation targets. In line with the European Commission's objectives, the m2i project aims to foster modal shift towards softer modes through a set of high-level traveller information services and can be for this reason considered as a milestone in multimodal travel information. m2i is a part of the digital action plan for Ile-de-France Mobilités, which is structured around seven components: 1) a multimodal assistant accessible to all (Vianavigo); 2) the use of open data; 3) the creation of a regional data and services

platform; 4) the collection of new data; 5) connectivity; 6) modernisation of the ticketing systems; 7) innovation.

Coordinated by Ile-de-France Mobilités and Transdev and its IT subsidiary Cityway, m2i brings public and private sectors under the regional transport authority Ile-de-France Mobilités' governance: public transport operators, road network operators, private services operators, car industry, IT industry.

Building a fair mobility infrastructure is one of the main challenges that the Ile-de-France region is facing. Mobility issues concern all citizens. While many alternatives to privately owned car are numerous in the city centre, this is not the case for rural or suburban areas. As in most European cities, in Île-de-France car occupancy rate for commuting is close to one single passenger. Moreover, more than half of car trips are less than 3km. There is tangible scope for reducing the modal share of solo

m2i aims at providing information to the public at large on the whole range of mobility services in Ile-de-France region through the “Navigo” and “Vianavigo” brands, together with other brands well-known at the national and international levels

cars, developing multimodality and pushing for a more sustainable and smarter mobility.

CAR SHARING AS PART OF THE MOBILITY CHAIN

In addition to public transport and soft modes, the car can help to optimise travel in urban areas. Due to the latest developments of car sharing schemes, the shared cars can be considered as a valuable link in the mobility system. Moreover, thanks to digital technology, services are evolving to meet the expectations of the users, making it easier for them to travel. Information is becoming increasingly accurate and reliable, both in terms of readable and accessible offers and regarding public policies being assessed and optimized.

Today the travel information in Ile-de-France is fragmented and incomplete. This is mainly due to an excessive numbers of websites and mobile apps in Ile France. m2i aims at providing information to the public at large on the whole range of mobility services in Ile-de-France region through the “Navigo” and “Vianavigo” brands, together with other brands well-known at the national and international levels. The first step will include gathering mobility data sets on all modes, upgrading the data quality. Then, the project will develop and test a predictive multimodal navigator which will enhance mobility in Ile-de-France and better serve the needs of the inhabitants of the region.

More specifically, the study and pilot action aim at integrating the whole mobility offer (public and private) and



various smart mobility services that have been developed by start-ups and industrial stakeholders providing them with a unique portal. The consolidated predictive datasets, gathered thanks to the contribution of the users, will

include information on public transport, road traffic, freight and parking. The resulting mobility data portal will be enriched in terms of coverage, depth, and quality, making it the most comprehensive mobility data portal for an Urban Node in the world.

Throughout the process, private sector actors will play a prominent role. Public-private partnerships are essential to building long-term partnerships with mobility data suppliers and building comprehensive data sets.

The efficient multimodal traveller information will benefit passengers, mobility operators and the Transport authority. In fact, the planner will offer a range of travel solutions based on real-time and predictive data. Integrating real-time carpooling and individual vehicles, passengers will have the possibility to opt for more multimodal or intermodal behaviour. Furthermore, the planner will also provide information on passenger comfort. Mobility operators will particularly benefit from an advanced transport network management tool, which will use 1-hour traffic forecasts for all modes. The data collected from the connected cars and buses will be

used to regulate traffic in real time. It will significantly improve the road junction management and adapt the public transport services to the real needs of passengers, resulting in an increased reliability of travel times. Ile-de-France Mobilités, the Region's transport authority, will rely on a digital observatory at the service of mobility policies. Intended to evaluate the flow of travel within a territory, the observatory will base its strength on databases compiling travels and travel time on all modes of transport. It will make it possible to know precisely the trending mobility behaviours, helping Ile-de-France Mobilités in the development of their mobility strategies and to evaluate their impacts.

This new project will have a real impact on mobility behaviour in Île-de-France region and will be replicable in cities and regions across Europe and beyond. 🌐

FYI

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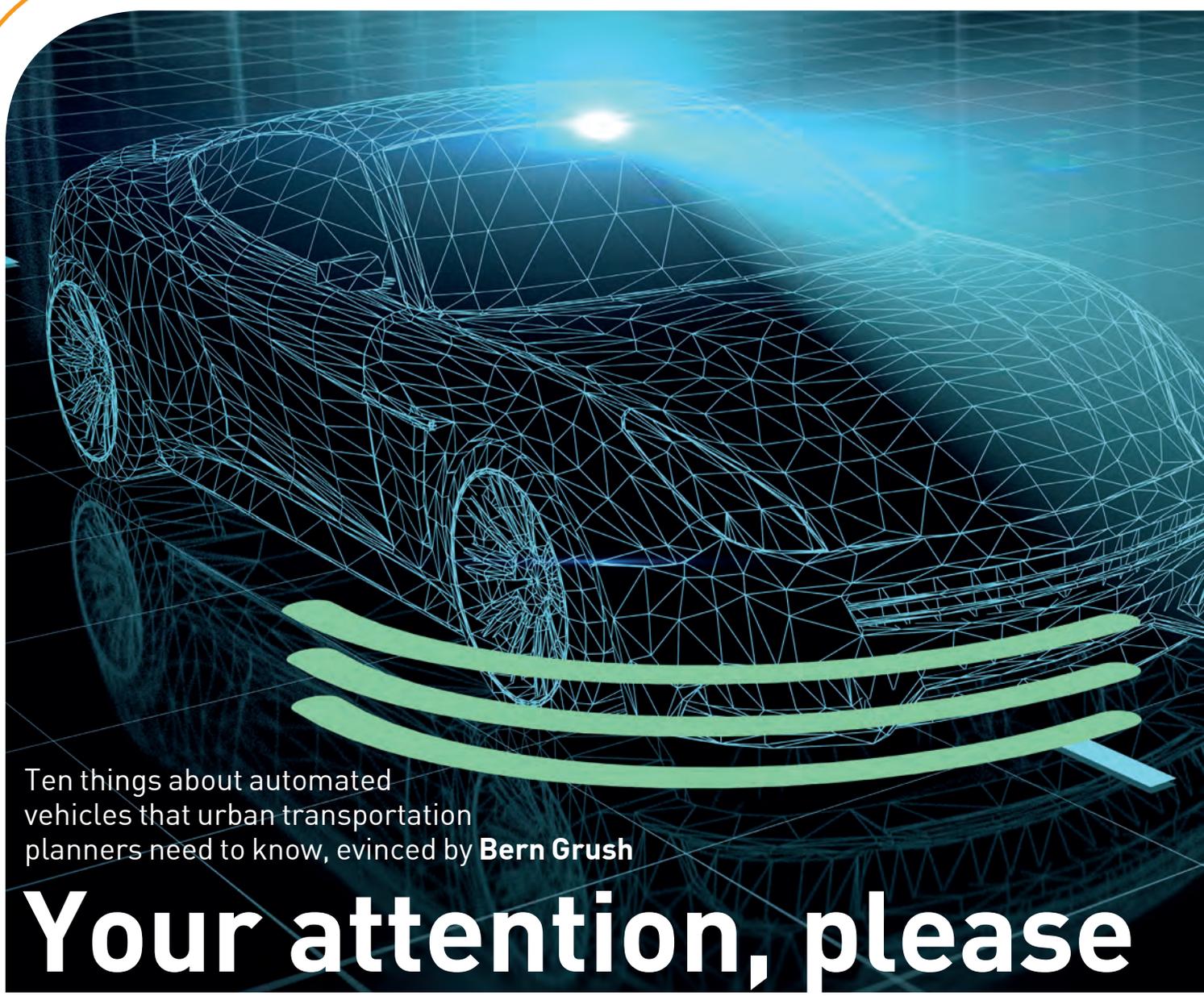


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Ten things about automated vehicles that urban transportation planners need to know, evinced by **Bern Grush**

Your attention, please

Professional planners in many cities are starting to think about what automated vehicles will mean to their land use, traffic management, and transit planning. Hype is rampant with the spectre of “full automation” arriving shortly — which is not exactly right since what will arrive will be constrained to specific areas, times, distances, weather and speeds for some time yet. But it is coming. So, what should urban planners be aware of and how can they prepare, given the extraordinary uncertainty

about the nature and the timing of this technology?

1.TWO MARKETS

For most of the past several years we have been barraged with several stages or flavours of automation — partial automation, self-driving, driverless, fully automated. We have been shown images of drivers reading and working in the driver’s seat. We are told we will soon be able to sleep there. We read stories about robotaxis without drivers — that they’re coming to your city soon.

This hype should not distract planners. What does matter is whether the majority of the public continues to buy and sell cars, which we call Market 1, or shifts to buying and selling rides, which we call Market 2.

If one group of planners were tasked to plan a city such that 95 per cent of all residents used a personal vehicle (like now, but with fewer fatalities) and a second group of planners were tasked with planning the same city such that 95 per cent would rely entirely on on-demand robotaxis, these two sets of planners would



Vehicle automation will change the modal arsenal for both private choice and public governance

create entirely different cities. Why this matters is that many planners prefer the forecasts of a very high use of robotaxis (Market 2) and a dramatic reduction in car ownership (Market 1) over the next two or three decades. While we can expect some combination of these two markets, the key questions become: how much will the scale tip toward Market 2 and how much should it be tilted by the hand of government?

2. CONTRADICTIONARY EFFICIENCIES

Travellers have modal and travel-time preferences for personal reasons:

time, cost, comfort, prestige, hygiene, loads, convenience, privacy, kids, trip chaining, pets, age and distance. Market 1 (car-buying) addresses this. Market 1 predominates today in most developed countries.

Urban and transit planners design land and transportation systems for urban design and sustainability reasons: spatial, environmental, traffic flow, tax, infrastructure, parking management, growth and liveability. Market 2 (ride-buying) is favoured by urban planners in the same countries.

These two efficiency models pull in

opposite directions. Each is optimal for its context, but for incompatible reasons. Hence they conflict.

Vehicle automation will change the modal arsenal for both private choice and public governance. I expect the competition between Markets 1 and 2 to continue as it has for the past 120 years. But will the social and structural rules of public policy change enough to alter its outcome?

3. AUTOMATION ENABLES (BUT DOES NOT REQUIRE) SHARING

While automation enables sharing,

Innovation disrupts, removes costs and adds capabilities, data, opportunities and changes that are hard to anticipate — and even harder to prepare for

there is no guarantee that the current revealed preferences regarding Market 1 or Market 2 will be altered more than a little unless the fundamental traveller preference structure changes, whether spontaneously or through nudges. The ingrained behavioural manifestations are clearly supported by the current installed base that exploits present day technology, infrastructure and social norms.

Reduced trip costs will be insufficient as a primary motivator to make the change to 95 per cent robotaxis by 2030 that futurists Tony Seba and Jamie Arbib (ReThinkX) insist will transpire. If that were enough, single-occupant car travel and congestion would not remain so stubbornly high even as new urban rail links open and ride-hailing soars in popularity.

4. AUTOMATION ANXIETIES

There are other barriers. Early Market 2 automated vehicles — taxis and shuttles — will be geofenced

(constrained to specific areas and roads). They offer a perfect alternative to our current taxi, ride-hailing and bus systems within geographic boundaries.

Where they are widely deployed, Market 2 vehicles would soon become preferred, bringing about the demise of today's local taxi, ride-hailing and bus. However, because driverless cars cannot go everywhere in their early decades they will not be suitable as replacements for the family car. We call this access anxiety, which is more problematic for sales of personal vehicles than is the range anxiety associated with battery-electric cars.

Access anxiety will initially constrain driverless cars to the business of robotaxis that disrupt today's ride-hailing and public transit systems as those users are clearly accustomed to such access constraints. During the next couple of decades, access anxiety will help sustain automotive

manufacturers that sell Market 2 cars and light trucks for personal and family use.

Today, people who are polled are anxious about not being in control or not trusting this impending technology. As a current reference to a much older technology, about 18 per cent of adult Americans are anxious about flying and an additional 13 per cent are afraid to fly altogether in spite of the safety record of today's airlines (<https://flyfright.com/statistics/>).

Many people are concerned about privacy and security in the automated vehicles of the future. Others are anxious that a suitable car might not always be immediately available.

These anxieties will ease as they usually do with new technologies, but they are numerous and many will likely ease only slowly, due to setbacks after with each accident, each privacy breach, each security failure and each service hiccup.

5. EVIDENCE FAILS TO PROVE WE WILL ALL USE ROBOTAXIS

The argument that most of us will move away from Market 1 to become Market 2 ride buyers is, in reality, a hopeful assumption largely based on the human preference for lower cost and driver dislike for nuisances such as congestion or finding and paying for parking. The greater number of arguments for owning a personal vehicle — at whatever level of automation — includes the litany I listed above.

We may be confident that automated taxis and shuttles will disrupt our current formats of public conveyances and we may believe that urban, per-household vehicle ownership has reason to fall. However, projections of a majority — or even a significantly greater portion — of



Market 2: the predicted very high use of robotaxis

families becoming zero-car families in the near-future seems far-fetched — at least before fleet services are available to match or exceed today's preference configuration for owning family vehicles.

This will be a difficult deployment, regulatory and infrastructural task. A task that receives too little attention to achieve the outcome we seek.

6. INNOVATION FAVOURS CAR OWNERSHIP AND USE

Innovation disrupts, removes costs and adds capabilities, data, opportunities and changes that are hard to anticipate — and even harder to prepare for.

Given its potential range, unfettered innovation will do more to enhance the experience of the personal Market 1 vehicle than it will for the publicly shared Market 2 fleet vehicle. As costs are driven out, and access to small reliable electric vehicles improves, the desirability of a personal vehicle will remain as a significant rival to buying rides in public conveyances.

To have individuals and especially families rely entirely on on-demand vehicles requires a spectrum and level of service innovation that we have not yet imagined much less described. Any residual reasons to own personal vehicles guarantee that such owners would more often use those vehicles.

To overcome this factor the ride industry and its promoters need to innovate deployment, regulations, infrastructure, services and costs that make Market 2 more attractive than Market 1 to most travelers. We are far from that today. Planners may dream about a Market 2-dominant world, but there is not yet described a feasible plan to get there.

7. DIFFUSION OF AVS (SOUTH TO NORTH)

Waymo is promising to launch a revenue-generating robotaxi service in the sunny, snow-free Phoenix, Arizona

How will we behave in vehicles we do not own?



metro area during winter 2018-19. When this happens, Market 2 driverless automation enters its infancy in modern cities. Until then, everything else is hype. If the technology sees user acceptance, it will spread as rapidly as the vehicles can be manufactured and operating areas within cities mapped and geofenced.

But they will be slowed by nasty weather. If you have 10 to 25 per cent of a city's population relying on these vehicles, having a robotaxi fleet grounded due to snow will be unacceptable. Until this technology reaches a high level of reliability in poor weather conditions, northern cities, which are not yet planned, will see a delayed future.

These cities have an opportunity to watch and study deployments to the south, so that in spite of snow in more northern cities, perhaps they will learn how to achieve easier deployments.

8. THE TRAGEDY OF THE COMMONS WILL MOVE INSIDE THE VEHICLE

The public commons we know as our roads and streets is subject to the tragedy of the commons from our driving and parking behaviour. Most cities have too many vehicles in a limited geographical space, to the degree that city populations adopt vehicle automation with multiple passengers per vehicle, this commons will become less abused, less risky for

cyclists and pedestrians, less of a random killing field, less polluted, quieter and more reliable.

To the degree Market 2 ride-buying is successful in making public roads safer and calmer, perhaps becoming dominant, so a new, expanding public commons will migrate to the inside of our vehicles.

I own a car. The inside is my personal space, a private extension of my living room and dining room. When I use the bus or subway I am in a public commons subject to its abuses. When I am in a Lyft vehicle, I know the driver owns the vehicle. I behave in between. But I worry less about the mud on my shoes. How will we behave in vehicles we do not own and that have no driver to supervise our behaviour?

How this new commons is managed will be critical to motivating Market 1 car owners to become Market 2 ride buyers. Many people would balk. People who use public transit will understand this problem — and perhaps be inured to it. But too few of us are thinking this through for the majority who are not.

9. ATTENTION IS THE PRIME MOTIVATOR

Everything attractive to consumers of automated vehicles involves attention or distraction. Safe travel in vehicles that do not require driver attention is a huge safety benefit. Right behind safety is the diversion of passenger

The attention economy: time freed up by automation is ripe for monetization



attention to other things: read, work, play, sleep, call, watch, surf, drink. Be more productive. Be safe while distracted.

Remember when the gold standard for websites was eyeball counts? Passenger-vehicle automation is this history repeating.

The reason the people-transport market is slated to expand from a couple of trillion dollars to seven to 10 trillion dollars by 2050 is because automation allows the capture of more attention — and its implied knock-on value.

The Attention Economy implies that time freed up by automation will be monetized. If 50 per cent of 37.5 million Canadians spend an hour a day driving a car, that represents 6.7 billion new hours of attention capture opportunity.

Is it time to start thinking about the justification for road use fees (or taxes) to be paid by in-vehicle advertisers?

10. CONGESTION WILL BE MONETIZED

Passenger time sitting in vehicles is monetizable. If you are a driver today, then sitting as a passenger in a driverless vehicle tomorrow means you will most likely contribute to a new captive market for attention. That market grows with congestion.

There are only 24 hours in each human's day — far fewer if you discount for biological requirements and work-related hours. The remaining hours — perhaps three to five are already subject to attention monetization (smartphone, computer ads, TV, radio, billboards). Removing the driving task considerably increases the fraction and capturability of monetizable time — perhaps, an additional hour each day for a typical adult or teen — so we're talking a 20 to 33 per cent increase. Time inside a vehicle is captive. According to Sara Fischer of Axios, media and advertising companies will "create more opportunities

for people to view media content and advertising." As vehicles become increasingly automated and travellers drive less and less, industry will change how it thinks about marketing and serving content.

Imagine being served up a Netflix serial in tailored, trip-sized chunks instead of the way episodes are currently chopped for an hour's viewing. Imagine a car routing or pacing itself to be sure you see the full segment with its embedded ads. Imagine if trip-sized YouTube videos are picked for you based on your likes and dislikes, with tailored ads, of course, serving to put your attention on automatic-capture as a continuous extension throughout all your trips.

Even with interim conditional automation in personal vehicles, location-based in-vehicle targeting coordinated with dynamic billboard advertising will innovate.

Will robotaxi operators be more focussed on moving you from A to B or more interested in monetizing every second of your trip? Congestion has long been valuable to any company who sells you things for automotive trips. The American economist Anthony Downs made this clear in his seminal book *Still Stuck in Traffic* (2004):

"... my advice to...drivers stuck in peak hour traffic is... Get accustomed to it! Get a comfortable, air-conditioned car with a stereo radio, a tape player, a CD player, a hands-free telephone, perhaps a fax machine and a microwave oven, and commute with someone you really like. Then regard the moments spent stuck in traffic simply as an addition to your leisure time."

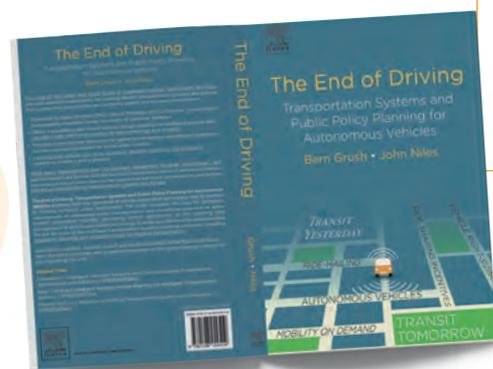
If the data enabling your attention capture during a robotaxi trip are monetizable, trip length will accrue value to shareholders. Think about that in case you thought robotaxi companies are coming to traffic's rescue and take congestion away.

Politicians are still afraid of road pricing, but governments will need to get over that fear in order to offset the

Everything attractive to consumers of automated vehicles involves attention or distraction. Safe travel in vehicles that do not require driver attention is a huge safety benefit



Imagine being served up a Netflix serial in tailored, trip-sized chunks instead of the way episodes are currently chopped for an hour's viewing. Imagine a car routing or pacing itself to be sure you see the full segment with its embedded ads



fact the congestion will soon represent massive shareholder value.

THE CHALLENGE

Until now most cities have been waiting for the fog of uncertainty to dissipate. Some are enumerating things that will need to be addressed and considering aspirational goals, for example what to wish for 2050 or for when all vehicles are fully automated.

As the real driverless robotaxi ends its gestation period in the months ahead, here is my recommendation:

Forget about 2050 for now. Consider instead what you need to do to have your city move 10 per cent of its passenger kilometres travel in robotaxis by 2028. Who will those passengers be? Where will they get picked up or dropped off? What will

be encouraged? Discouraged? How big will this fleet be? What size vehicles will you permit? What changes will you make to the curb? And where? Will the fleet be privately or publicly owned? Or both? Do you care? How will it be policed? How will this affect your buses or trains? What hand will you take in influencing their social-equity impact? How will seniors be served? Or will they be? How should TNCs be managed in the interim, since they are the natural segue to robotic fleets?

The list to consider is indeed far longer than space allows. I encourage you to become a Ten Per Cent City now on your way to becoming a "smart city" later. Getting the first 10 per cent right is key to the next 50 per cent happening at all. 

FYI

Bern Grush has most recently co-founded Harmonize Mobility to address the governance of massive competing fleets of robotaxis.

bern@harmonizemobility.com

This article is excerpted from a new book coming in 2019: *The End of Driving: The Ten Percent City* by Bern Grush and John Niles. It is the follow-up from the authors' successful: *The End of Driving: Transportation Systems and Public Policy Planning for Autonomous Vehicles* (Elsevier, 2018).

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Mobility: the final frontier

As the two-year smart city mobility-focused frontierCities² Accelerator draws to its conclusion, **Kevin Borrás, José Papí, Claudio Caferri** and **Raffaele Alfonsi** provide a comprehensive guide to the 18 FIWARE SMEs and start-ups from eight different European countries that were selected for Market Acceleration Grants aimed at already-developed FIWARE-supported applications, and Development and Acceleration Grants aimed at novel FIWARE-supported applications. The project promised “Another Level of Impact” and it’s delivered.



FI-ASSIST → Germany



THE SOLUTION

Location awareness has become a key factor to Smart Mobility in public space and industry. Location based services in industrial environments can offer a highly relevant field of conveniences such as tracking assets, such as machines and inventory, or analyse industrial processes.

FI-ASSIST is a novel technology and product developed by the German startup company Telocate to introduce a high precision indoor navigation system and location infrastructure for industrial applications based on acoustic localization. FI-ASSIST consists of mobile acoustic senders and the Telocate acoustic receivers to be installed in the building. By the novel acoustic technology, a precision of 10 cm is

achieved - by a factor of five better than conventional approaches.

THE COMPANY

Telocate is a young German technology startup with the ambition to revolutionize the market of indoor localization with Telocate FI-ASSIST. The company is a spin-off from the University of Freiburg and currently consists of nine people. The team has excellent links to industry and science and is well aware of the needs of the user. Even at its young age, Telocate has earned high reputation from its business idea and market uptake. Among several other awards, Telocate was awarded 2nd place as an ICT-Foundation of the Year 2017.

THE TEAM

Johannes Wendeborg, CEO
Marion Holtz, PR
Simon Päusch, Development
Philip Klein, Development
www.telocate.de



GREENAPES → Italy



THE SOLUTION

greenApes is a digital platform, rewarding certified sustainable behaviors and active participation of citizens, customers & employees. The platform, accessible via native mobile apps and web, can be customized by Public administration and Corporates to reward activities of choice (e.g. green mobility, energy savings, volunteering, best practices sharing). greenApes is built to be integrated with third party apps to certify real life eco-friendly behaviours (e.g. carpooling, using green energy, biking or buying organic products). As a rewarding platform greenApes also partners with e-commerces, producers and retailers of eco-friendly products, offering visibility while rewarding people who take care of the planet.

THE COMPANY

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THE TEAM

Giovanni Bajo, Co-founder & Technical Leader
Renato Orsato, Co-founder & CFO
Gregory Eve, Co-founder & CEO
Francesco Zingales, Cofounder & Partnership Director
www.greenapes.com



KISSMYBIKE → Italy**THE SOLUTION**

Kissmybike is a complex IoT product that detects theft and tracks the bicycle's location until its successful recovery. Unlike other products, Kissmybike is invisible, chargeless and effective. It features an ultra-compact robust design that allows installation into a bicycle's construction, hiding it from hand and eye. The combination of smart adaptive algorithms and energy-efficient electronics enables several years of operation on a single charge. The system comprises cutting-edge satellite and mobile technologies in order to accurately track a bicycle's location in different conditions in the event of theft. Open cloud-based FIWARE infrastructure is intensively used in order to build a scalable and cost-effective solution.

THE COMPANY

KMB Lab srl was established in 2015 to disrupt the IoT security solutions market. More than 100 person months have been invested to develop an MVP of the first offering – Kissmybike.

There is already positive feedback from the market: six companies are trialling the system and one has confirmed an order. In 2018, KMB Lab received the EU's 'Seal of Excellence' for Kissmybike as recommended for investing. €270k have been raised from public funds.

THE TEAM

Dr. Nadya Bobova,
Co-founder, CEO

Dr. Ivan Minakov,
Co-founder, Head of
Electronics Development

**Dr. Uladzimir
Kharkevich**, Cofounder, Head of Software Development

Junior Tonett, Marketing and Sales

Anna Matosova, Industrial Designer

www.kissmy.bike

**IDA** → Italy**THE SOLUTION**

greenApes is a digital platform, rewarding certified sustainable behaviors and active participation of citizens, customers & employees. The platform, accessible via native mobile apps and web, can be customized by Public administration and Corporates to reward activities of choice (e.g. green mobility, energy savings, volunteering, best practices sharing). greenApes is built to be integrated with third party apps to certify real life eco-friendly behaviours (e.g. carpooling, using green energy, biking or buying organic products). As a rewarding platform greenApes also partners with e-commerces, producers and retailers of eco-friendly products, offering visibility while rewarding people who take care of the planet.

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THE TEAM

Elisa Arnone, climate service specialist

Marcello Petitta, Founder and commercial responsible

Marco Cucchi, Routine and software developer and FIWARE expert

Giulia Petitta, Social scientist

Eugenia Polizzi, Social Innovation manager

Sara Dal Gesso, Climate, communication and marketing expert

Livia Ortolani, Project Manager and responsible for commercial exploitation

Brian Baldassarre, designer

www.amigoclimat.com



MUV-App Italy

THE SOLUTION

Our idea is based on the concept of MaaS for public administration. We have derived the governance model of the MaaS systems to provide innovative tools for the management of the mobility system. Looking for a clear mobility view, we developed MUV App. Four are the main areas of action, fragmentation and complexity, poor quality of user experience, lack of attention for user in terms of engagement and empowering, need of effective tools to support green mobility policies. Throughout the mobile and web channels, services are delivered to mobility users and public administrations. The product architecture is divided in two main sectors, for the users and for the officers, based on three modules: City-Glance; City-Loop, City-Zen and City-Green.



THE COMPANY

Phoops is an IT company in Florence since 2008 that gained significant experience in ITS services for the public administration up to the creation of its own start-up MUV-App. In 2015 the start-up was financed by the FIWARE "frontierCities" and new projects have been launched, like the platform "Muoversi in Toscana". In the last 5 years phoops dedicated its resources to design and develop MVP RTD. Phoops team is also involved in the development of apps for private customers and business platform based on open source technology.

THE TEAM

Filippo Severi, Founder and CEO
Massimo Mangoni, CTO
Alessandro Meiattini, Senior mobile and back-end developer
Alessio Antonielli, Data Analyst and backend developer
Riccardo Salucco, UX Designer and Frontend Developer
Francesca De Marco, Business Analyst
www.muv-app.city

OPENMOVE Italy

THE SOLUTION

OpenMove is a suite of software solutions for MaaS designed for users, transport agencies, inspectors and sellers. OpenMove handles ticketing from end to end and helps transport and parking agencies to sell more tickets, to reduce operating costs and optimize their services.

The ecosystem is composed of three products:

- OpenMove WAY, the app for users to plan their trip and purchase tickets autonomously.
- OpenMove ACT, the app for field personnel to perform sales and inspection.
- OpenMove ATLAS, the web admin platform for a full control in real-time on the ticketing system.



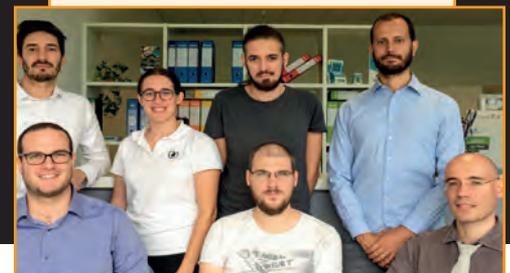
OpenMove is an end-to-end solution that works as-a-Service and does not require setup and configuration, dedicated hardware or any specific technical competences.

THE COMPANY

The company has public and private customers in Italy, UK, Poland, Austria, Germany, France, Belgium and Qatar. OpenMove currently features 7 transport services in one app and sells more than 2.5M of tickets every month. It has been awarded multiple times as best innovation in Italy for Public Administration (eGov at Smay, ForumPA and EGS - Mind the bridge) and has been featured as best practice of re-usage of public data by W3C.

THE TEAM

Lorenzo Modena, CEO
Alessandro Sosi, COO
Michele Margoni, CTO
Matteo Nodari, Sales and Marketing
Maddalena Ciaghi, CFO
Amedeo Capuzzo, Full Stack Developer
Federico Bertolini, Full Stack Developer Co-founder & Technical Leader
www.openmove.com



ROSY → Germany

THE SOLUTION

Traffic authorities today have to deal huge amounts of data that are no longer manageable with the Excel approach and consume a significant amount of their work capacity. Following the latest EU regulations, ROSY provides a platform for easy traffic data management including data quality assessment. Traffic authorities save time and get in-depth data analytics on current traffic conditions, such as speeds and remaining capacities plus a set of simulation tools that allow them to optimize their traffic management strategies in order to reduce traffic jams, noise and pollution.

THE COMPANY

ROSY traffic solutions was created by three founding SMEs: tsenso GmbH,



TRC Transportation Research & Consulting GmbH, abstracture GmbH & Co KG and later joined by Software-Kontor Helmert GmbH. The vision is to combine the existing knowledge

on traffic planning, traffic management with latest scientific findings to create an easy to use European traffic data platform to support cities and regions in optimizing personal as well as cargo traffic.

THE TEAM

Dr. Matthias Brunner,
Management

Rahul Tomar, Sales

Prof. Jörg Schönharting,
Traffic Models

Dr. Volker Schönharting, Cloud

Dr. Uwe Koch, Analytics

Christoph Helmert, Simulation

www.rosy-traffic.eu



SAMMY → Greece

THE SOLUTION

SaMMY is an IoT cloud-based service solution for the global yachting industry sector, which enables the marinas to efficiently manage their resources, to attract and offer services to the yachts and support the local markets by linking them with the yachting communities. It includes a fully featured marina management system, a booking management module and a set of vertical services for the yachters that are offered over different channels by exploiting a multilayer architecture.

THE COMPANY

Sammyacht.com is a spin out activity of OptionsNet, a Greek SME activated in the ICT sector and based



in Western Greece (Patras). As a start-up, Sammyacht.com has been founded in 2015 by a group of highly-skilled computer engineers and information technology scientists, with experience in the

design and development of information systems, integrated with 3rd party platforms, cloud computing infrastructures and diverse sensing devices.

THE TEAM

Ioannis Kostopoulos,
CEO and Co-founder

Spiros Mazarakis,
Product Marketing Manager

Ioannis Panaretou,
CTO and Co-founder

Linos Kostopoulos, Solution Architect

www.sammyacht.com



SAVE-A-SPACE UK

THE SOLUTION

No technology deployed within cities and the transport sector addresses the complex problem of truly integrated end-to-end journey planning. The Save-a-Space cloud software solution allows parking providers and transport operators across several market segments the ability to offer customers the option to reserve and pay for parking spaces in advance as part of their journey planning. Integration of real-time parking availability, live public transport information and updates within the end-user app helps travelers seamlessly plan, adapt and complete their journeys. We are running a successful commercial pilot with the West Midlands Combined Authority in the UK and have established a number of other successful partnerships across Europe.



THE COMPANY

Save-a-Space is a cloud parking management platform allowing parking providers and transport operators to employ technology to optimize parking capacity, revenue and to encourage travelers onto public transport and shoppers back into cities. We address the urgent imperative to reduce traffic congestion and CO2 emissions. We aim to become a key player in the popular proposition of mobility as a service linking private and public transport.

THE TEAM

Paul Fortesque, Business Development Consultant

Ralf Kernchen, CEO/CTO

Lorna Parris, Sales & Marketing Manager

Muhammad Talha, Lead Developer

www.save-a-space.com



STOP-BUY Belgium

THE SOLUTION

Stop-buy is a smart-Parking platform addressing cities and enterprises with a turnkey IoT platform consisting of wireless sensors and management software. Stop-buy enhances mobility in the city by alleviating congestion, allowing the quick access to available parking (via a mobile application to commuters), effective enforcement (through a management dashboard application for stewards), and enriched reporting for optimized urban planning.

THE COMPANY

The company was founded in 2014. Based in Brussels, we have over 25 active customers in 10 countries and →2000 parking bays under deployment. Poised for hyper-growth,



CommuniThings is on the verge of closing a \$2.5M seed round, led by a major global telco operator. We wish to complete the round through a \$1M injection by a specialized urban-mobility fund.

THE TEAM

Etay Oren, CEO

David Gillot, CTO

Anne Demarche, COO

www.communithings.com



ACOUSTICITY.IO Switzerland

THE SOLUTION

AcoustiCity.io's suite of analytics tools and open data platform offers cities a noise monitoring solution that enables them to quickly diagnose noise pollution problem areas and validate successful traffic noise reduction improvements much more cost-effectively than investment intensive microphone-based solutions and much more accurately than existing solutions using historical data sets generated from brief human-based traffic surveys. Since many cities already have made large investments in traffic sensor networks, AcoustiCity.io enables cities to leverage this previous investment for a dual purpose – cost-effectively creating noise maps based on highly reputable traffic-to-noise-pollution models.



THE COMPANY

inNET is the leading provider of next generation environmental monitoring solutions in Switzerland, combining the latest innovations in IoT technology, with a deep expertise of environmental science. InNET has more than 15 years experience in the different fields such as air quality monitoring, water, soil, weather and natural hazards measurements as well as traffic and noise observations.

THE TEAM

- Mario Betschart**, Head of Business Development
- Christian Ruckstuhl**, CEO
- Maurus Frey**, Chief Solution Architect
- Michael Blättler**, Full Stack Developer
- www.acousticity.ioation



BETTAIR Spain

THE SOLUTION

Bettair® is a Platform as a Service (PaaS) that permits, for the first time, to map air pollution in cities on a previously unimaginable scale based on a large deployment of outstandingly accurate gas sensors by using an advanced post-processing algorithm. Our platform perfectly assists cities to i) identify unknown pollution sources; ii) to assess the impact and effects of different environmental actions to identify the most effective ones; iii) recommend specific local actions. This information enables smarter and better decisions to mitigate air pollution in the short run. In the medium run, it is also a very powerful tool in order to define effective and appropriate urban plans to enhance urban air quality in cities.



THE COMPANY

Bettair® is a spin-off of Ateknea Solutions initially incubated in the same facilities. After the completion of Citi-Sense project, due to the interest raised from the market, key members from the management and technical team of Ateknea created this spin-off. The mission of Bettair® is to provide cities with insights to cities to mitigate urban air quality and improve their citizens' quality of life.

THE TEAM

- Ioannis Kostopoulos**, CEO
- Josep Perello**, CEO & Co-founder
- Leonardo Santiago**, CTO & Co-founder
- Francisco Ramirez**, Senior Software Developer
- David Matas**, Senior Software Developer
- Adrian Rodriguez**, Full Stack Developer
- Sergio Vargas**, Mechatronics Engineer
- Francisco Pavan**, Mechanics Engineer
- www.bettaircities.com



BUSTIMIZE Spain

THE SOLUTION

Bustimize is an analytics platform that provides public urban bus companies tools to increase fleet management efficiency by scoring driving patterns. It provides a service not supplied by any other fleet management system: precise measures of the bus driving performance while encouraging its improvement. Bustimize creates mathematical models that distinguish between delays caused by external factors (such as traffic and delays caused by a poor driving performance. The app combines i) Operational insights ii) Drivers feedback iii) Supervisors support. Bustimize allows urban bus companies to increase their service level, improve their capital efficiency and raise travellers' satisfaction.

bustimize

THE COMPANY

Bustimize is a Spanish SME created in 2016 dedicated to the collection and analysis of situational data to track and map a global UrbanBus fleet diagnostic. The company is a spin-off of the Polytechnic University of Valencia (www.upv.es) and is formed by experts in Data Analysis. Bustimize has been supported by FC2 Fiware accelerator and Spanish R+D IVACE organization.

THE TEAM

Federico López, CEO
Román Ortin, Business developer
Jeronimo Tocado, CTO
Adriá Sansaloni, Developer
www.bustimize.com



CASMOB Italy

THE SOLUTION

CASMOB is a web platform and mobile app that provides customised tourist itineraries, coupling Cultural Points of Interest (CuPOIs) and Commercial Points of Interest (CoPOIs). Itineraries are based on user's preferences and real-time mobility data provided by municipalities. Its purpose is to avoid traffic jams and queues in city centres while promoting the development of peripherals zones where CuPOIs and CoPOIs are located. By using FIWARE technologies, CASMOB is able to dynamically build customised itineraries handling a large volume of data in a responsive way. CASMOB is aimed at tourists or citizens, commercial and cultural activities. The latter can promote their activities through coupons and special offers.

CASMOB

easy way to discover

THE COMPANY

Alma Digit offers consulting services to companies in order to develop highly innovative solutions in ICT. Alma Digit provides design and implementation of scalable Cloud-based products tailored to the specific customer needs. The solutions will provide efficient tools for storing, processing and analysing data, using on-site or public systems and considering the ease of use of developed systems as being of prime importance.

THE TEAM

Massimo Villari, Scientific Director
Antonio Celesti, Project Manager
Agata Romano, CEO
Maria Fazio, Software Architect
Alessio Salzano, Commercial Director
Giovanni Parrino, Software Developer
Silvio Trotta, Senior Developer
Alberta Giannetto, Commercial & Communication Support
www.casmob.eu



CICLOGREEN → Spain



THE SOLUTION

We provide an online reward system to companies and city councils that allows them to reward their employees with gifts for using sustainable means of transport to go to work. Employees register their trips with our tracking app and get points that they can redeem for attractive gifts. We use data to give information about mobility patterns and CO2 reduction to companies and city councils, helping them to design new infrastructures and services. We have created the first online rewarding system for the most common sustainable mobility practices, including walking, cycling, car-sharing and public transport. We are the only one rewarding several modes of transport, implementing FIWARE technology to provide services for the Smart City.

THE COMPANY

Ciclogreen was funded in 2016. We have now customers in more than 40 cities in Spain and Argentina. We closed our first investment round in June 2018 (245.000) and have opened a new investment round of 150.000 to accelerate our organic growth.

Main milestones:

2016: Winner Climate-KIC Accelerator

2016: Winner Final Go App! (Google)

2017: FrontierCities2 (100K grant FEDER)

2018: European Data Incubator (100K grant FEDER)

THE TEAM

Gregorio M. Toral, CEO

Andoni Recabarren, COO

José M. Rodríguez, CMO

Francisco José Melgar, CTO

Álvaro Otero, App Developer

Flávio H. Ferreira,
Sales Manager

www.ciclogreen.com



CIGO! FLEET → Spain

THE SOLUTION

Cigo!Fleet is a smart mobility management platform offering a unique interaction between the back-end and the mobile app. It offers the best tailored optimization algorithms to reduce operational costs. Dispatch the daily roadmap to delivery drivers with the touch of a click. Drivers can update the status of each delivery with their smartphones, enabling customers to know the estimated time of arrival. Cigo!Fleet creates a cloud ecosystem where every user benefits of real time information. Cigo!Fleet brings value by:

- Reducing costs;
- Automatizing tasks;
- Providing reports;
- Creating a communication network between all the users: clients, drivers and the back office.



THE COMPANY

Cigo is a Spin-Off from the Data Management research group created in 1999 at the Technical University of Catalonia (UPC). It is a Smart Mobility consultancy firm which creates and adapts many different cloud applications for clients ranging from a wide variety of sectors using our own proprietary platform technology. Our core value comes from the knowledge acquired during many years of creating Big Data solutions and smart mobility algorithms.

THE TEAM

Josep Lluís Larriba, CEO

Javier Torralbo,
Backend & Algorithm

Dàmaris Col, Marketing Lead

Carlos Balufo,
Development Lead

Marc Puig, Front end

Eric Cabañas, Business
development

Alejandro Muñoz,
Android Development

Pol Casasayas, Algorithm

www.smart-cigo.com



FLIWARE → Italy



THE SOLUTION

FLIWARE is a mobile app addressed to smart passengers who seek to improve, enrich and simplify their “go-to/from/through-the-airport” experience, by making their journey smoother. FLIWARE takes the stress out of travelling by offering a suite of advanced solutions and services. By using FLIWARE, travellers will enhance their: i) management of transfers to/from the airport, through integrated information about the best mobility options; ii) management of leisure time at the airport, by having access to different information; iii) management of check in/boarding time, thanks to real-time information about queue lengths and waiting times for security checks. Beacons deployed in strategic points of the airport building will communicate via

Bluetooth with users’ smartphones alerting of special deals or discounts. Location Assistant functionality will be also help users.

THE COMPANY

ENCO is an innovation & research-consulting firm based in Naples, active since 1987. Manly specialized in business consulting, it has expanded its range of activities, partaking in national and international R&D&I projects as a facilitator for business, product, technology and process innovation in different industrial areas, as logistics & transport, environmental management, agro-food and energy sector. ENCO manages the architecture design & development of software. The company is also specialised in design and implementation of mobile APPs.

THE TEAM

Simona Mincione,
Marketing Manager

Marco de la Feld,
Business Strategist

Francesco Martella,
IT developer

www.fliware.eu



NOWLOG → Ireland



THE SOLUTION

nowlog provide businesses with a solution to record the temperatures of their products in real time. Battery powered wireless temperature sensors are connected to the internet to track and trace products at any point in a supply chain. Any temperature outage such as refrigeration failure is communicated to the business owner immediately allowing corrective actions to avoid product spoilage and subsequent loss. A simple to install hardware kit that works straight out of the box is provided and the system is up and running in minutes. This novel approach makes the solution very cost effective. For cities, nowlog produce a Food Safety Data Kit used by Environmental Health Officers for site inspections. In all EU countries food premises must be checked every

1 -5 years. The Kit makes inspections quicker and reporting more accurate.

THE COMPANY

nowlog has commenced trading after a four year product development phase. Founder Dr. David Gray has 15 years of experience in the IOT for Food Safety business. The products are market disruptive on both price and functionality. The go to market strategy is B2B and targets market leaders in the food safety and healthcare compliance sectors who wish to increase their profitability. Products are initially supplied directly. For higher volumes OEMs can buy manufacturing licenses or royalty agreements to secure their supply lines.

THE TEAM

Dr. David Gray C.E.O.

William Morrow C.T.O.

Gvidas Karkbauskas Embedded
Software Engineering

Angelo Pinulan Apps
Development

Maria Olan C.F.O

www.nowlog.co



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 Aarhus
- o Lille and La Rochelle
- o Smart City Labs
- o Leuven



The journey to MaaS



Through a pilot project of a real solution for Mobility as a Service, municipalities in Business Region Aarhus, Denmark, want to investigate the possibility for creating a more efficient mobility system by integrating public and private mobility services, writes **Gustav Friis**

A pilot project in Denmark's second city, Aarhus, is demonstrating a new way of organising the mobility system in and around a city. The innovative demonstration project will combine public transport solutions with private peer-to-peer ridesharing in an integrated solution in a real-life environment. The mobility solution will be based on the principles of

Mobility as a Service (MaaS).

The transport demand in Aarhus is increasing as the city is growing. During the last 10 years, the number of inhabitants has increased by 11 per cent while the number of cars has increased by 27 per cent¹.

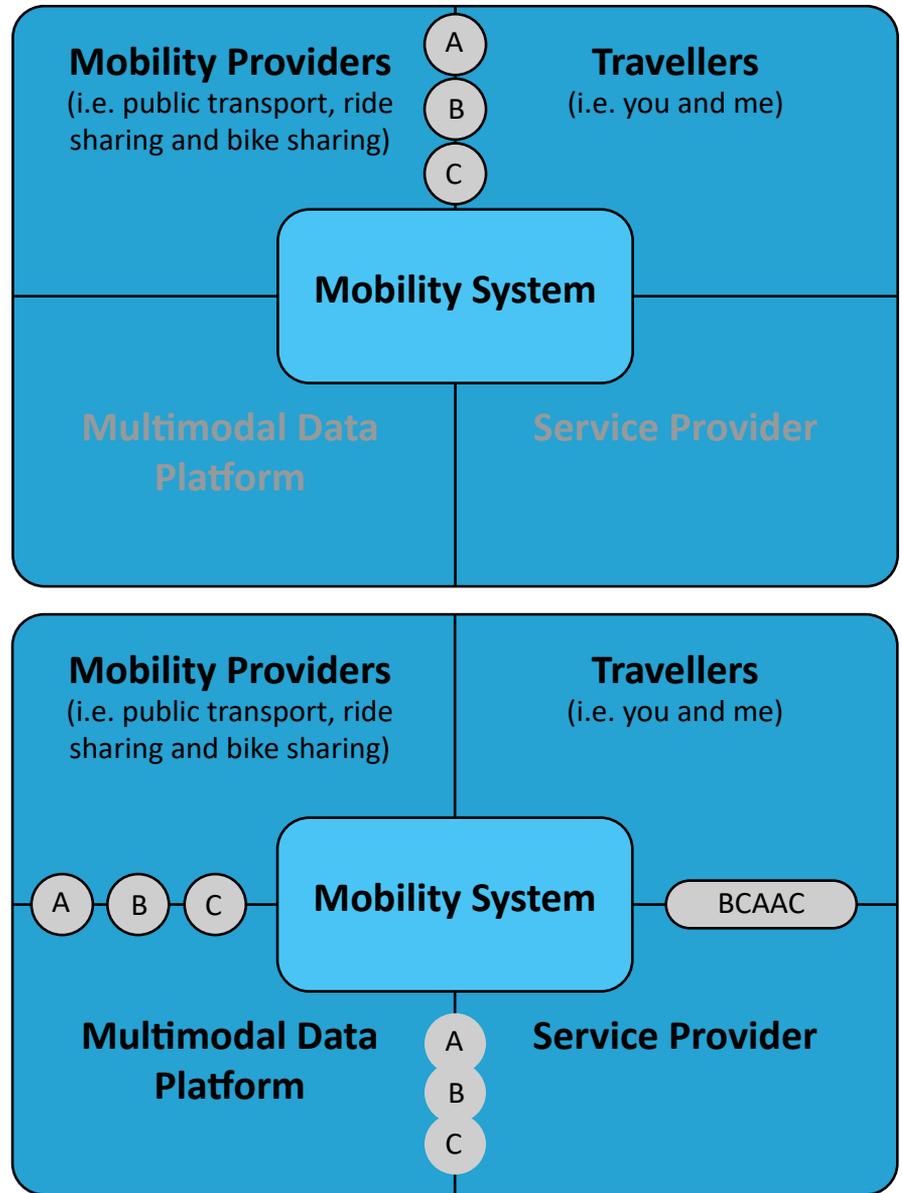
At the same time the average number of people in those cars has been decreasing since the first count by the Danish Road

Directorate in 1981. At that time, the average number was well above 1.8, whereas the number in recent times is around 1.4 in average. Transport related to commuting constitute the lowest average number of people in the cars with only 1.05². So, for each 100 passenger cars on the roads during peak hours, only five people besides the driver of the car will be transported.



Similar challenges are faced in the realm of public transport. Public transport planning and management seeks to limit the number of free seats on the buses, i.e. through a big restructuring of the public transport network in Aarhus in 2011 and with the implementation of the light rail system in 2017. Avoiding free seats lowers the public payment

Below” MaaS at a glance today and (bottom) in the future



per passenger. However, an emerging challenge for the efficiency of public transport is congestion. The longer the buses must operate on the roads to provide the same (or even reduced) service for the user, the more expensive it becomes to

operate. Getting more people to use ridesharing in congested areas will therefore also make the public transport system more efficient. However, there might be a risk of also pushing towards a system that makes public transport less

All stakeholders are crucial in setting up a sustainable Mobility as a Service solution. If the solution is not solving any societal challenges, there will be no need for the public sector to engage in it



between this, hence the traveller has no opportunity to plan a multimodal journey combining public and private modes, nor can the traveller pay them together. However, it is worth mentioning that all public transport in Denmark already has a multimodal planning opportunity (Rejseplanen) and payment method (Rejsekortet).

competitive and therefore the number of free seats might increase. Therefore, continuous planning and adjustments should continue for the public transport system.

Better occupancy of each car will potentially have a great impact on the mobility system. Ridesharing, where you share a specific ride with a peer, will increase car occupancy and make the system more efficient. With peer-to-peer (P2P) ridesharing, you as a driver or a passenger share the ride – the specific journey – with your peer and will be in the vehicle along with your peer for the whole journey or a part of it.

Ridesharing is an important mode of transport within MaaS, as the car still will continue to be part of an efficient and flexible mobility system. It means that the climate challenges about congestion and CO₂ emissions still will apply. Ridesharing is also seen as one of the major challenges in a MaaS system because it is a mode of transport that requires a change in the users' mobility behaviour. Behavioural change and the willingness to buy-in on a service from the user perspective will be a very important component of the project, and incentives will be tested to get travellers on board.

TAKING MaaS TO THE NEXT LEVEL

The key objective is an efficient mobility system that supports both economic, social and environmental sustainability objectives. It contains both the demand side of mobility and the supply side. An efficient mobility system provides better mobility for the same price or less, for both society and the traveller. It makes it easier to use all modes of transport in a flexible and easy way - as an attractive alternative to single occupancy cars.

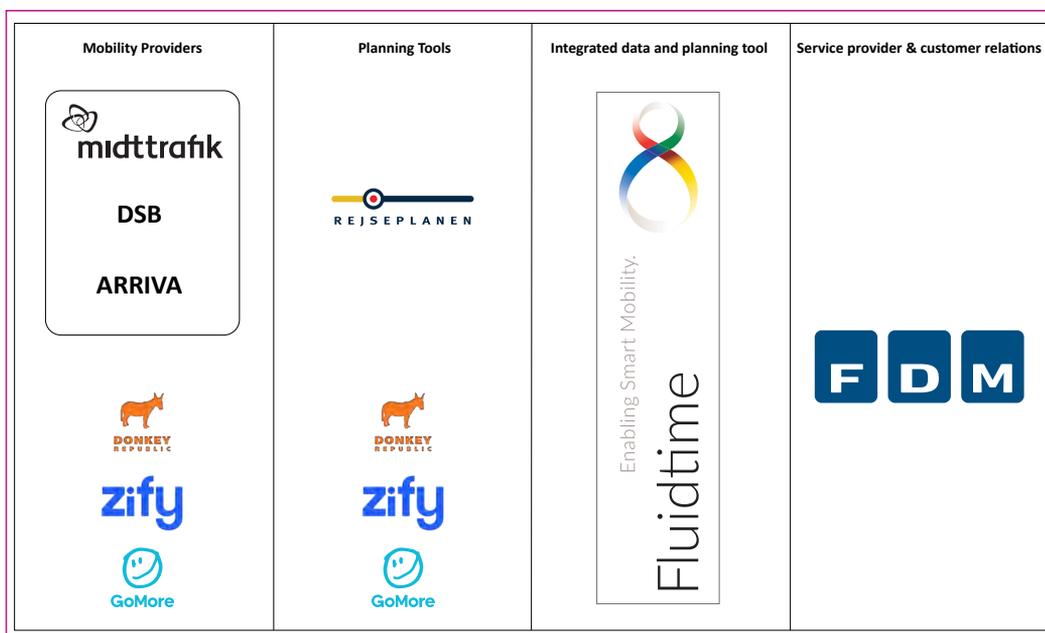
The efficient mobility system is complex. It works with many stakeholders, both private and public, and is set to replace a well-established and functioning set of mobility services. The MaaS project in Business Region Aarhus will in 2018 and 2019 take us closer to this, by thoroughly analysing each component in the realm of MaaS as a lever for both the supply and demand side of the mobility system.

The figures on the previous page show simplistically how the mobility system works today and what system that the demonstration project in Business Region Aarhus is demonstrating. Mobility providers are providing mobility (A, B, C) such as public transport or ride sharing directly to the traveller, but with no coordination

The demonstrated system is visualised in opposite. In other words, the project will demonstrate how mobility can be provided to the travellers as an integrated service – MaaS. How the demonstration will be carried out will be described in more detail in the section below, but the main idea of the demonstration is to bring the various stakeholders together, from the mobility providers in the system, through the data platform and service provider and all the way to the traveller.

As shown in the diagram opposite, there is a strong collaboration on the public transport side, since both Rejseplanen and Rejsekortet are owned by the national train operator (DSB) and the public transport authorities. There is a common understanding that the provided mobility is mainly public transport, the travel planner is Rejseplanen and the payment method (although amongst local solutions) is Rejsekortet. At the end of the day, the mission is to bring more people to public transport.

On the other hand, you will have a private mobility provider such as GoMore in Denmark and Zify in India and France, providing a system for peer-to-peer ride sharing. Both offers, and bookings are made via a dedicated app and they have separate payment



open their journeys to passengers. Further, how to get current car drivers to become passengers in other car drivers' cars.

How the value stream of the system will be, is still not clear and will be tested throughout the demonstration. Many working questions will be relevant to address to the demonstration of MaaS.

All stakeholders are crucial in setting up a sustainable Mobility as a Service solution. If the solution is not solving any societal challenges, there will be no need for the public sector to engage in it. If there are no economic benefits for the

private actors, then there is no need for them to engage in the solution.

Cities are important actors and good places to test advanced transport technologies like MaaS because they can work with political tools (incentives and frameworks) to change citizens' mobility behaviour.

As cities, we define the framework for incorporating MaaS solutions together with the development of the city. Aarhus and its surrounding municipalities have an interesting, mixed context of dense urban areas and rural areas. It is an obvious setting to make a pilot project that demonstrates elements of a MaaS system, focusing on ridesharing because it both contains the challenges of mobility found in cities and in the rural areas where the car still plays an important role in the mobility system. 

FYI

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systems. The perspectives from the companies are business-oriented.

A dedicated data sharing platform will gather all relevant mobility data from the mobility providers as described above. The platform will ensure that data is easy accessible for other services, that data can be processed in the same way and thereby be comparable.

To acquire the data-sharing platform, a Public-Private Innovation Partnership (PPI) is established. The PPI facilitates innovation between public and private actors, in this case between a data-sharing platform and the local authorities in Aarhus. The platform will be set up and operated by the Austrian company Fluidtime, whilst the public partner (The City of Aarhus) will define requirements.

In June 2018, an agreement between Business Region Aarhus and the Danish Federation of Motorists (FDM) was established.

FDM will in the demonstration project serve as the service provider of the system. This meaning that FDM will present the integrated data from the FluidHub (Fluidtime's data management platform). The Danish Federation of Motorists is in this particular case a very interesting partner, since they are already in close contact with the segment of people that would be interesting to influence; namely car drivers.

To be able to implement a successful MaaS system in Business Region Aarhus that both take into consideration, (1) the objectives of reducing congestion and thereby improving the mobility system in cities; (2) providing better and more efficient mobility in areas that are scarcely populated and where public transport therefore easily gets ineffective.

Car drivers are the key target group. The question to answer for a successful implementation will therefore be how to get drivers to

NOTES

[1] Numbers from Statistics Denmark: <https://www.dst.dk/en>

[2] https://www.modelcenter.transport.dtu.dk/-/media/Centre/Modelcenter/modeller-og-publikationer/Faktaark/2014-Faktaark_personer_per_koeretoerj.ashx?la=da&hash=BF3E918DABBEBE2EFD4D914C6B6294D093EFC45B

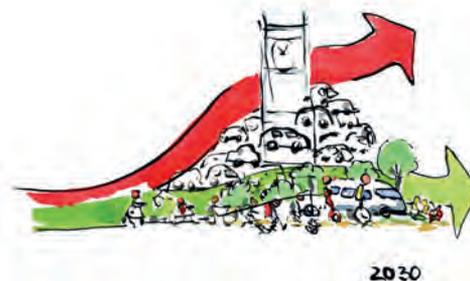


Everybody talks about MaaS: but what does it mean in Aarhus?

Every day many underused cars are driving in our streets. Numbers from 2014 indicates that cars used for commuting carry just 1.05 persons on average. That's a very inefficient use of vehicles. The MaaS system in Aarhus will be a strong combination of private car-pooling and public transport services. This system should not only provide better mobility for the citizens in Aarhus and the surrounding municipalities, but will also contribute to reducing congestion.

Thinking Cities (TC): How does it differ from what we already see with, for example, Whim in Finland?

Gustav Friis (GF): The approach is

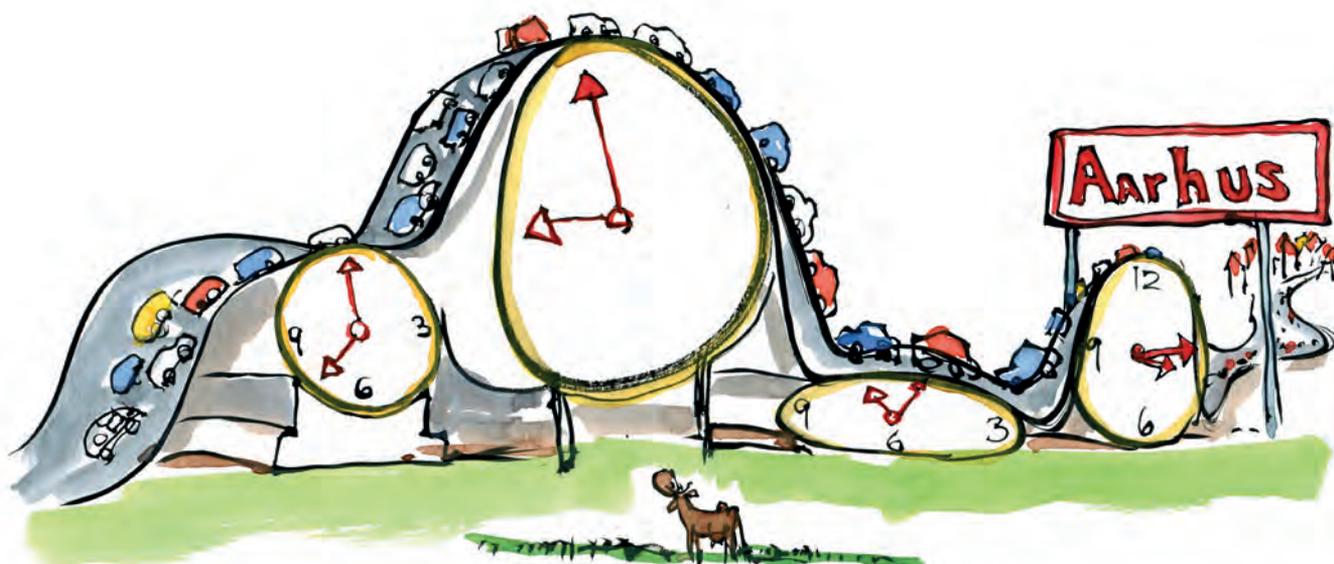


different. Whereas Whim, along with public transport, is concerned about the inefficient use of the car over the day, the system in Aarhus is concerned about the inefficient use of the car when it is driving. Although both concepts are about sharing, we believe that there is a much larger potential for reducing congestion with car-pooling compared to car-sharing.

TC: Why should people start using this MaaS system?

GF: That is a very good question. Although the 'sharing economy' is on everyone's lips it is hard to see a real breakthrough in mobility. Car-sharing has a very difficult time in Denmark and car-pooling is mostly used on longer-distance leisure trips.

When it comes to daily commuting it is very hard to see any incentives large enough to overcome the inconvenience of fitting car-pooling into a busy calendar. Aarhus has teamed up with The Federation of Danish Motorists (FDM) in a demonstration project where incentives will be tested.



TC: How can you be sure that the incentives are good enough?

GF: We will have to test it, and we will have to test different types of incentives depending on whether we are targeting the driver or the passenger, the young or the old. This is without doubt the most complex part of the project. Aarhus and FDM is working with the Department of Management at Aarhus University to identify the business model of the MaaS system. We want to investigate how the business model can be twisted to offer the most efficient incentives to the traveller while at the same time still have a valid business case for the private partners of the project and get the highest value for money for the public authorities.

TC: Does car-pooling work along the same lines as Uber?

GF: No. Often we use the term ride-sharing to avoid people thinking of a fixed pool of cars in a system that can be ordered. However, Uber is often referred to as ridehailing service – so it can get confusing. When we are talking about car-pooling, we are talking about ordinary people on their daily commute picking up passengers that are going in the same direction. Car-pooling can either be for the entire trip or for the first

or last mile. It requires, however, a critical mass of offered trips for the system to work. Therefore, the incentives for the drivers are very important.

TC: Why are you working with the Federation of Danish Motorists?

GF: It might seem odd to work with them on a matter such as car-pooling, but there is a very good reason for this. The Federation of Danish Motorists knows the car drivers very well and they know which incentives will be interesting for them. Since

we are working primarily to support the car drivers to change their behaviour, we need to have knowledge about them. FDM is providing this knowledge.

TC: How can you avoid this idea being seen as just another app?

GF: Let's be honest, it might be. However, the app as a technological solution is not the interesting issue here. The app is a framework for offering incentives for change. The MaaS solution will only be successful if we can come up with the right incentives for car users. The integration of both car-pooling and public transport is the first incentive for the user of the service and for the next year we will continue to develop incentives until we hopefully have the right mix.

TC: When will the app be ready to use?

GF: That is very hard to say. We will test it in closed environments in the beginning. We are testing both functionality of the service and the incentives and as we are getting more and more people on board the snowball will start rolling. When the snowball hits you, the service is ready for you to use. ☺



Creating the change

The new French parking law is celebrating its first anniversary. **Ivo Cré** asks Lille Metropole's **Olivier Asselin** to reflect

On 1 January 2018, France chose a drastic alternative way for managing parking. **Olivier Asselin**, coordinator for parking policy at Lille Metropole and the chair of the Polis parking working group, is well placed to explain the impact of this process.

Ivo Cré: Why was this change needed?

Olivier Asselin: The local authorities in France did not have the tools to implement effective parking policies: we could fine only up to €17 per day. Our neighbouring countries can go up to €40 (Belgium) or even €90 (Spain). In cities with higher parking prices, it is cheaper to pay the fine than to pay the fee. Another problem was that the French state was collecting the fines, and then redistributing this revenue to the local level without direct profit-sharing to the authority in charge of control. There were no clear statistics about local

parking infringements and the whole situation was not very transparent. It was estimated that in France only two out of every five drivers paid. Most on-street parking spaces only received payment for two hours per day!

IC: So, what was changed?

OA: Parking is brought under administrative law. The infringements on parking are no longer criminal offences. On-street paid parking is a simple public domain occupation. If you don't pay for parking, you are asked to pay afterwards for the services rendered. It is now possible to adapt the fine to local context and to involve the private sector in the control activities. The law also encouraged the use of new technologies to enforce and manage on-street parking. The price structure can be locally defined, to match local problems and can be linked to local policies. Just as



importantly, locally obtained revenues and fines can be used locally.

IC: How are cities working with the opportunities the legal change has offered?

OA: Some cities (around 10 per cent) stopped managing on-street paid parking, using the "European parking disc" system, but a large majority (500-600) kept it and implemented the reform. Cities have invested in better technology: pay machines, license plate registration, phone apps and so on. The law has offered a great opportunity to implement digital enforcement. Most authorities manage parking themselves. Only 15 per cent

Local opportunities for digital parking – a Polis Policy Paper

Smart parking management system is essential for a sustainable urban mobility system, which should manage supply and demand without detrimental effects, supporting air quality improvements and reducing carbon emissions whilst still providing access to the city and all its functions.

Polis members are gradually digitising their parking processes. But the digitalisation of parking develops rapidly. New apps, sensors and algorithms enable more precise assessment of occupancy, improved routing to empty parking spaces and payment. The rapid development brings risks: how long will applications survive, where to invest? The market which is undeniably growing, cannot be considered mature.

Polis members, local governments managing parking, see this digitalisation of parking in a wider

context. For them, it is about reaching wider mobility and transport policy goals – embedded in a global spatial, economic and social vision for the city. They understand parking is an emotional and sensitive topic for citizens and economic stakeholders.

In the recently published policy paper Local Opportunities for Digital Parking, current and upcoming use cases for digital parking are presented, together with recommendations on how to deal locally with digital parking.

Cities are invited to plan strategically, create an integrated digital parking ecosystem, and to develop tools that not only make parking management more efficient, but also can inform urban mobility and development policy.

- Find out more at www.polisnetwork.eu/parkingpaper

of cities delegated control to private companies. The overall management of street space has improved.

Even though there were some technical difficulties in the first months, the new system globally works and the reform fulfilled its objectives: local politicians can have local impacts and it is possible to see efficiency improvement through the increase of parking income, and through the better availability of on-street parking places. Moreover, beyond the aims of the reform, parking has become a major topic in discussions on urban mobility.

IC: What has changes in Lille thanks to the new legislation?

OA: In Lille Metropole there were four cities with on-street paid parking before the reform. Three of them entered the new system (Lille, Roubaix, Armentières), while one of them (Tourcoing) decided to use the “European parking disc”. Lille Metropole was associated in the preparation of the evolution of the city policies, with juridical and formation support to explain the reform and also by negotiating financial conventions with the three concerned cities.

The new legislation needed an adaptation of the parking rules in all four cities. In Lille and Armentières, the fee was kept to €17 with grids adaptations, while extended regulated areas are being prepared. In Tourcoing, the blue zone was extended around the train station, while the penalty fee was raised to €35. In Roubaix, the control was assigned to a private-public company, with a €25 fee, a modernisation of the pay machines and an objective of increased control intensity. Lille is conducting on-street enquiries to evaluate the efficiency of those changes. 🗣️

FYI

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La Rochelle: the change in practice

Karen Mounier is the parking manager in La Rochelle, a city of 80,000 inhabitants. She and her team of 15 parking controllers manage 3000 on-street parking spaces. The city also manages 2250 off-street parking spaces with a staff of 45, as **Ivo Cré** discovers

Ivo Cré: What do you want to achieve with parking in La Rochelle?

Karen Mounier: First of all we want to offer the possibility of parking for the very short-term visitors on the public road network. We want to incite the medium- to long-term visitors, in particular the tourists, to park off street. We also promote the use of our park and ride facilities by commuters and tourists. Yet, we want our residents to be able to park near their home.

IC: Is La Rochelle looking into the use of new technologies?

KM: La Rochelle has been using state-of-the-art technologies with good results. We have been working with electronic ticketing since 2014, issuing 52,000 fines that have seen us collect €1.8 million. Mobile payment has been very popular and effective and we have had this since October 2015. The average ticket revenue has increased and the rate of spontaneous payment is growing, so we have had to issue less fines. We have now moved to Automated Licence Plate Recognition, leading to speedy, comfortable registrations with less potential error.

IC: What are the technological outlooks for the future?

KM: We want to optimize street parking places in the public road network, developing an app to provide wayfinding and real time, available parking information. We also will introduce reduced parking fees for shared cars on parking meters. This application is really new: drivers, for example Blablacar users, will self-declare the number of people in their car by sending a picture via an app. This information will be linked to the license plate. In addition to a reduced parking fee, drivers will have incentives, for instance the possibility to use bus lanes. 🗣️

PARK4SUMP

PARK4SUMP is an exciting EU project that will develop and carry out a capacity-building programme: for external follower cities, as well as for national governments. It will also involve service providers and parking industry representatives. It will consist of trainings, shadowing programmes and webinars as well as of targeted policy transfers. The capacity building programmes will regularly be updated in order to incorporate new insights.

PARK4SUMP aims to change local parking practices and speed up the take up of high quality parking management and its integration into Sustainable Urban Mobility Plans (SUMPs). It will take the very best parking management examples, contexts and expertise in Europe and profit and learn from them in order to transfer these on a large scale and in the best way possible to new cities and new contexts: in PARK4SUMP leading cities, in PARK4SUMP follower cities and to project-external follower cities.



FIWARE: the open source component framework of choice for smart cities, by Smart City Lab's **Olaf-Gerd Gemein**

The global think tank

Cities have to cope with similar problems everyday (eg, ageing society and elderly people, inclusion, resilience, traffic congestion, air pollution, lack of parking slots, and so on), trying to find suitable solutions they can deliver to their citizens. In addition, cities aim at boosting innovation and growth of their local economies and wellbeing of their citizen alike.

The FIWARE community, born as a Public-Private Partnership in 2013 between the European Commission and hundreds of research, industrial and strategic partners across Europe, have reached awareness and recognition across the globe, not only facilitating the discussion about open standards, but also leading and enabling the implementation of the single digital market.

Today, the FIWARE Foundation is headquartered in Berlin and working in every continent. More than 40 countries have adopted the standards and framework on different levels. The standards are generic and the components are applicable in any ICT solution, the main focus is on Smart Cities, Smart Industry, Smart Agriculture and Smart Energy. In more than 100 cities FIWARE-based solutions have been

tested and successfully implemented, and renown international organisations have joined forces and recommend FIWARE incorporated standards and reference mechanisms, such as TM Forum, OASC, ETSI, NIST and many others.

WHAT DOES "SMART" MEAN IN THE CONTEXT OF ICT IN CITIES?

Making a city "smart" means performing a more efficient management of services and turning the city into an enabler for innovation, economic growth and well-being. Digitizing cities on a large scale is a very challenging endeavour and strategic decisions today have a huge impact on the long term.

By adopting common standard APIs and information models, cities can achieve this transformation with minimum effort but great impact, and join forces with other cities to build an ecosystem in which they can connect and collaborate. This enables the creation of interoperable and portable solutions that can be adapted and replicated according to the needs of each city. This way, cities can deliver better services, reduce costs and risks while triggering new business models supporting a Data Economy where data

can be used in an open, transparent, profitable and fair manner.

Ultimately such a "smart transition" should lead to a significant improvement in quality of life and economic prosperity.

CONTEXT DATA IN THE DIGITAL REALM

Data is at the centre of the new digital life: people and systems are constantly and permanently connected to the Internet and respond to data that surrounds them, even when they don't notice it. Pervasive and plentiful data is being generated every second, creating a digital continuum and a veritable tsunami of data that deserves to be utilized and transformed into knowledge, supporting meaningful fact-based decisions and comfortable assistance.

In Vienna, the FIWARE-based platform provided by *vero.city* provides data services. Brigitte Lutz, City of Vienna, said: "FIWARE-based platform *VeroCity* integrates multiple datastreams from IoT devices and Open Data on the same data lake in Vienna - *smartdata.wien*".

Vienna is one of the front-runners and most innovative cities in the world - and also co-facilitator of this year's

ICT Challenge in Vienna. Together with the Open & Agile Smart Cities initiative (a collaboration of more than 130 agile and Smart Cities in the world) and the European Commission the stakeholders in Austria have taken the lead, inviting the most innovative developers in Europe to showcase their talents in Vienna from 4-6 December.

Christiane Boschin-Heinz, CDO of the City of Paderborn, Germany, announced: “FIWARE in the City of Paderborn is the actual choice for our OpenData Portal, including IoT device management. We are looking forward to further develop our smart solution portfolio with the support of FIWARE-based technologies.”

The City of Aachen, Germany, has taken advantage of the FIWARE framework in the area of Mobility as a Service, improving the local mobility programme “Mobility Broker”, connecting them to nationwide and European transport providers, like FlixBus.

The City of Montevideo, Uruguay, has deployed a city-wide mobility management system based on FIWARE, controlling the city traffic and managing the flow of cars and busses through peak times as well.

Cities have deployed several vertical smart solutions dealing with specific challenges. Some of these smart solutions are very sophisticated, already relying on the deployment of modern sensor networks and the application of advanced big data processing techniques or even artificial intelligence algorithms.

However, very often these systems operate as information silos: each system lacks valuable information from the other and there is no shared data lake where relevant data from each system is gathered and accessible, bringing support to overall city-level governance systems or citizen demand. In addition, the adoption of open data policies is often limited to the publication of static historic data in so-called “data cemeteries”,

typically through direct files, often outdated. Actual data is not only relevant and valuable for big data analysis or visualization and even for the development of certain applications, “real smart” solutions require hybrid access (real-time and static data) to figure out what is happening in the city at any given moment.

FIWARE: A STANDARD WAY TO DEVELOP AND INTEGRATE SMART CITY SOLUTIONS

FIWARE is a curated framework of open source components which can be easily integrated and assembled together, combined and integrated with other third-party platforms or components to accelerate the development of Smart Solutions. FIWARE establish and facilitates the NGSI standards, a specification defining a simple way to send or request data and its context such as the meaning, related information, source or licensing of that data. Smart cities will be the first ones to benefit from this specification. ETSI Standardisation Group Specification CIM 004 defines a standard Application Programming Interface (API) for Context Information Management enabling close to real-time access to information coming from many different sources.

The FIWARE Orion Context Broker is a core component of FIWARE, represent the reference implementation of the NGSI standards: it gathers, manages and provides access to information coming from different sources that describe what is going on in the city, breaking the information silos.

Building around the FIWARE Context Broker, a rich suite of complementary FIWARE components are available in order to facilitate:

- interfacing with IoT sensors and other devices as well as vertical smart solutions and other information systems.
- processing of current and historic data using event rules or advanced Big Data and AI

algorithms to extract valuable insights supporting smart decisions or automated smart actions

- creation of dashboards for monitoring progress of processes within the city
- generation of valuable reports as well as the analysis and monitoring of KPIs (Key Performance Indicators)

The FIWARE Context Broker technology can easily integrate with blockchain technologies to provide a trustworthy and immutable tracing of certain updates on context linked to different activities managed by Public Administrations and private companies.

THE FIWARE SMART CITIES REFERENCE ARCHITECTURE

The FIWARE community has worked for some years on establishing the communication around a Smart Cities reference architecture, considering and harmonizing several references across the globe, from Asia to the Americas.

Currently many global organizations have adapted and joined the discussion – only this month (November 2018) the FIWARE Foundation, TM Forum and OASC jointly announced the establishment of the “Front Runner” programme, aiming for a joint collaboration programme to support the adoption of the reference architecture including compatible common data models that underpin a digital market of interoperable and replicable solutions for smart cities. The cities of Nice, Saint Quentin (France), Utrecht (Netherlands), Porto (Portugal), Santander, Valencia (Spain), La Plata (Argentina), Vienna (Austria) and Montevideo (Uruguay) are the first to join the programme, with an open invitation to other cities to join. The scope is:

1. The definition of a Smart City Platform Reference Architecture that both organizations will recommend. The reference architecture uses

the FIWARE NGSI (Next Generation Service Interface) API for context information management and other FIWARE components to support data monetization, based on TM Forum Business Open APIs.

2. The collaborative cross-industry generation, crowdsourcing and publication of data models for smart cities following a driven-by-implementation approach. Data model specifications will evolve from draft preliminary up to stable and final TM Forum recommendations as cities endorse the specifications based on experience with actual deployments.

THE SMART CITY AT THE DAWN OF THE DATA ECONOMY

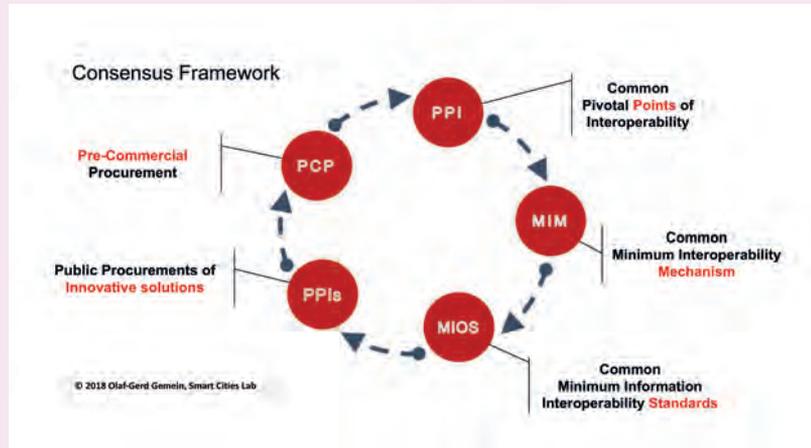
Businesses around the globe are transforming into platform models enabling the exchange of information, the exchange of goods or services, and the exchange of currency between consumers and producers.

To grow through levels of maturity, a smart city may consider establishing a platform model, leveraging an infrastructure to enable all city stakeholders to come together, find what they need, and transact with each other, should be considered at the core of a smart city strategy.

It's a new way of thinking that cities should be encouraged to follow. In the past, many city departments have seen their role in providing services to their citizens, visitors and the local economy. A platform model changes this world view and leads to "Smart City 5.0"!

Cities still have a role to play in providing services, but are doing so in partnership with a wider range of stakeholders. Cities are also forced to enable citizens, visitors and the local economy to create their own value by being able to combine the city services and assets they need themselves. For example, citizens are increasingly demanding information about the local transport services as well as real-time parking data, safe walking route

Global organisations endorsing FIWARE



GSMA has produced a Reference Architecture for IoT-enabled Big Data Ecosystem solutions where the FIWARE NGSI API is recommended. GSMA has collaborated with the FIWARE Foundation in producing Common Information Models compatible with the API.

ETSI launched an ISG (Industry Specifications Group) on cross-cutting Context Information Management (CIM) API standards which identified OMA NGSI and FIWARE NGSI as starting points for the API specs. The ETSI NGSI-LD API specification comes as a result of that work.

OASC (Open and Agile Smart Cities) is a non-profit, international smart city network that has the goal of creating and shaping the nascent global smart city data and services market. The initiative comprises actually more than 125 cities in 26 countries, is driven by implementation and focused on open platforms and citizen engagement. Within the OASC initiative, the FIWARE NGSI Standard is adopted as "MIM" and the API is adopted as a first open license standard API targeted to provide the basic artifact for portability and interoperability of smart city solutions.

The "Consensus Framework" pictured shows the circle in which innovation procurement is embedded. The framework is an outcome of the author's work with public authorities across the globe in multiple projects. It will be published in February 2019.

NIST (US) launched a global coalition aiming at defining a Things-Enabled Smart City Framework that identifies pivotal points of interoperability, where emerging alignment on standards can enable the landscape of diverse but interoperable smart city solutions. Within the framework, FIWARE NGSI was identified as one strong standard candidate enabling interoperability within a city and portability across cities.

information and ride-hire services. Whereas previously a city might see its responsibility as running the local bus service, now its responsibility is to make sure citizens are able to plan and map a multimodal transport journey in the way that they want: to get somewhere by a specific time, to reduce their reliance on cars, or to help them

increase their physical activity.

Citizens are demanding that cities make the context data available so that they can compose their own solutions or benefit from agile developers who can build innovative applications relying on available context data. The FIWARE core project "Smart MaaS", financed by the German Federal

Ministry of Economics and Energy (BMW), is addressing this and building a platform, marketplace and components to enable transport providers to exchange data and service based on standards and benefit from a truly open, innovative and interoperable framework with FIWARE technologies and standards at the core.

FIWARE IN CONTEXT

“The focus of the Smart MaaS project, however, is not only the handling of modern travel chains and their operational relations,” says Gernot Böge, FIWARE Solution Architect. “Since mobility as a cross-sectional function is closely interlinked with the other areas of modern life and society models, we will use examples and use cases to demonstrate the enormous potential resulting from the complementary and unifying networking of services of the different domains and into novel business processes and models can be transferred. One of the central elements is the implementation of the new ETSI NGSI-LD standard,” he continues.

“Only the machine-readable link and description makes isolated data information with overarching significance. We will implement structures of the semantic web and linked data concepts and develop freely available, cross-domain reference ontologies. Machine readable, semantic data descriptions will help developers to find unknown services, explore their provided data and functions, and merge them into their own applications. The FIWARE framework is ideally suited for such a highly integrated deployment scenario and we are looking forward to a successful project with all involved partners.”

Context data is made up of the combination of pieces of information coming from multiple sources. Only owners of each piece of information should drive the decisions of who shall have access to their data, when, where and what for. Freedom

of choice is a right digital citizens and businesses won't be forced to renounce. This means that they can exercise full sovereignty over their data. They also decide whether they want to monetize their data and who will have to pay for it. European regulators have recently influenced the practice by setting the GDPR directive, driven by the excessive breaches of global information players.

One crucial role of the city platform is to connect consumers and producers, enabling a federated publication of context data, allowing app builders to find and use data from city and third party sources while preserving data sovereignty. User rights acquisition processes and revenue-sharing APIs enable these “consumers and producers” to buy and sell context data, building the basis for the new local Data Economy.

THE FIWARE MARKETPLACE

The FIWARE Marketplace is a global one-stop shop that gives access to a wide range of Powered by FIWARE solutions and platforms, FIWARE-ready technologies, as well as related FIWARE services such as training, coaching, consultancy, integration and technical support.

The Marketplace offers everyone in the FIWARE ecosystem the platform to become more visible to their target customers, as well as potential investors and partners. Smart Solutions rely on FIWARE standards to manage context information on a large scale. They use FIWARE technologies to gather and process context information coming from different and highly distributed sources. FIWARE platform service providers offer FIWARE-compliant platforms as a Service

LINKS

<https://fiware.org>
<https://oascities.org>
<https://smartdata.wien>
<https://smart-maas.eu>
<https://smart-maas.eu>
<http://vero.city>

on private and public clouds. Also, Platform Service Providers can deploy FIWARE platform instances on premises for their customers.

HOW TO BECOME A MEMBER OF THE FIWARE FOUNDATION

FIWARE's mission is to develop an open sustainable ecosystem around public, royalty-free and implementation-driven software platform standards that will ease the creation of Smart Applications in multiple sectors.

The FIWARE Foundation is the legal independent body providing shared resources to help achieve the FIWARE Mission that is to build an open sustainable ecosystem around public, royalty-free and implementation-driven software platform standards that will ease the development of new Smart Applications in multiple sectors. It does so by Empowering, Promoting, Augmenting, Protecting, and Validating FIWARE technologies and supporting the Community around, including not only developers contributing code to the FIWARE component framework but also those who contribute to building the FIWARE ecosystem and making it sustainable over time. As such, individuals and organizations committing relevant resources in FIWARE Lab activities or activities of the FIWARE Accelerator, FIWARE Mundus or FIWARE iHubs programmes are also considered members of the FIWARE community.

The members of the FIWARE Foundation are pioneers in building the Smart Digital Future. To learn about the range of benefits and membership levels, visit fiware.org. 

FYI

Olaf-Gerd Gemein is Business Architect and Smart City Expert at the Smart Cities Lab

Follow Olaf-Gerd Gemein

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Family values

Like many other European cities, Leuven is making use of a number of different mobility-sharing schemes. Beyond the usual car- and bike-sharing systems, the Belgian city is promoting several projects that target children, teenagers and their parents, as **Thomas Mourey** reports

The city of Leuven – located around 25 kilometers east of the Belgian capital city, Brussels – is most famous for hosting universities and more than 50,000 students. Aside from the students, many families are joining the fastest-growing city in Belgium that now counts over 100,000 inhabitants. With the aim of solving the most pressing local mobility issues, including congestion, the municipality is welcoming the creation

of family-friendly mobility-sharing schemes in the urban area.

LEUVEN MAKES PARENTS' URBAN MOBILITY EASIER

For parents of babies and toddlers, mobility or simply going shopping in cities is not always easy: for car drivers, the buggy must be folded and put in the car and then unfolded every time it is needed; the buggies are often too large to be taken on public transport



and cyclists cannot carry buggies on their bikes.

To allow parents to freely visit the city centre with their children without having to park in front of every different destination, a buggy-sharing rental scheme has been installed in Leuven. The 'Buggy Booker' system allows parents to use sustainable mobility modes to reach the city centre or to leave their cars at the entrance of the centre for the time of their activities and then book a buggy for the last mile of their trip. The buggies adapt to all ages and have been designed for convenient use on public transport. The municipality of Leuven welcomes the arrival of such a scheme and the installation of rental points in several key cultural, touristic and mobility areas of the town.

Renting the Leuven buggies is free thanks to the scheme being funded via an advertisement on the side of each buggy. The only condition for parents to use the scheme is to book one online at a defined station prior to use.

To complement this buggy-sharing system, the city of Leuven is considering the introduction of a cargo bike-sharing system. Located in targeted areas, the cargo bikes would be made available to residents of specific neighbourhoods. This scheme would allow parents to travel more easily by bike in the city with their kids. This would also be an opportunity for them to test and get familiar with this vehicle before purchasing one and, perhaps, avoiding using a (second) car.

There's no more excuses for parents in Leuven to not use sustainable mobility modes!

BIKE-SHARING FOR ALL AGES

Once children have grown too big for a buggy, it's time for cycling. There should be no age limit for everyday cycling but finding the appropriate bicycles for children, maintaining and changing them according to the size of children and their often-unexpected



Children from toddlers to pre- and early-teens are provided with bicycles for only €60 per year as part of the VeloKadée initiative

growth spurts is often costly and not always simple. This can unfortunately prevent some children from using a bicycle to go to school or for leisure.

To tackle this issue, the municipality of Leuven, in cooperation with the national Lottery, is funding the initiative

VeloKadée. In this framework, children from toddlers to pre- and early-teens are provided with bicycles for only €60 per year. Apart from the attractive price, the system has many other benefits.

The main advantage of the scheme is its flexibility. As soon as a child is old enough for a bigger bicycle it can be exchanged for an appropriately sized one. The exchange is included in the annual fee so that it does not create a new cost for the family. The second advantage is the variety of the offer. All bicycles are designed for children and the offer ranges from push-along bikes to bikes with training wheels, to bicycles for 14-year-olds. All



bikes are neutral in their design and can suit both girls and boys. Additionally, maintenance is part of the subscription so all bicycles are regularly checked and maintained to ensure the safety and the comfort of young cyclists. This scheme aims at introducing children to cycling and the benefits of it, and hopefully convincing them to become teenage and adult cyclists.

Moreover, the initiative fulfils a social objective as it is designed to be accessible to all households. Parents with the most modest of incomes can get discount on the annual subscription, with fees down to €12 per year. Also the initiative relies on social employment for the maintenance of bicycles and the management of the system.

BICYCLES AT SCHOOL, BICYCLES FOR SCHOOLS!

The third mobility-sharing scheme is implemented directly within secondary schools as bicycles are not provided to individual children, but directly to their schools. The 'Velo Op School' initiative, supported by the Flanders Region, has been created especially for the trips made by pupils during their class hours: a visit to a museum or a library; a trip to the swimming pool or the sports hall; or even an excursion to a forest or a nature reserve.

Within the 'Velo Op School' initiative, secondary schools purchase fleets of bicycles. An investment of €495 per bicycle is requested. Robust, maintained and gender-neutral bicycles, adapted to the age of pupils are delivered to the schools and during the year bicycles are maintained by workers of Velo which, as a consequence, favours social employment.

Once delivered to the schools, the bicycles are to be used by pupils for the aforementioned type of trips. While these trips are usually made either on



foot (for the shortest distances) or by bus, the aim of 'Velo Op School' is to replace them with trips by bikes. The benefits are numerous: firstly, cycling is an excellent way for pupils to get some exercise outside of the sports sessions and therefore for maintaining their good health and for fighting against obesity.

By cycling in a group, under the supervision of a teacher, the pupils are also getting more confident with urban cycling and are improving their skills and knowledge about road safety and traffic regulations. Additionally, the teachers can see the difference: compared to walking or riding a bus, cycling is often the most rapid and efficient mode of transport in urban areas. Clawing back valuable chunks of time in the already full school agendas is greatly appreciated by all concerned

and the children's concentration is also improved thanks to cycling.

The municipality supports this initiative greatly as it directly sensitizes the school pupils and their families to the benefits of cycling. The direct effect of replacing bus trips with cycling is also tangible. In Leuven, the operation of two buses has been cancelled thanks to the school bike scheme, representing a major cost-reduction for the school budget and an improvement in local air quality.

As there is no age limit to starting mobility-sharing, there should equally be no age limit to stopping mobility-sharing either. The mobility-sharing offer for the children of Leuven and their families is only a part of the numerous schemes in place in Belgian towns and cities. It is now expected that young mobility-sharers will turn into great users and promoters of the 'traditional' mobility sharing

schemes of the city. 🚲

FYI

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For more information about the City of Leuven's family-friendly mobility sharing project, contact

Tim Asperges, Spatial Planner and Mobility Advisor

Tim.asperges@leuven.be

Buggybooker:

www.buggybooker.com

VeloKadée: www.velokadee.be

Velo Op School:

www.veloopschool.be

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

- Road Safety in Cities
- Truck Safety
- Smart City Hacking





Absolute zero

The benchmarking of road safety in cities has rarely been more timely says **Alexandre Santacreu**

Which cities have the best road safety performance? Which indicators are most relevant in assessing performance or setting targets? Are figures comparable across cities? Which road safety challenges are specific to cities? Answering these questions will determine the policy responses which can help cities deliver their Vision Zero ambitions.

As readers of this magazine are aware, local governments are working hard to develop sustainable

mobility solutions, seeking to shift people from their private vehicles to other modes. What is the impact of mode shift on road safety? If cycling is more dangerous than travelling by car, is there still a case to encourage a shift? When confronted with road network congestion, numbers of city dwellers choose to travel by powered two-wheelers (P2W). What is the impact on road safety? What can we learn about the relative safety of each mode, including the impact of one mode on the safety of others?

What can we learn about the relative safety of each mode of transport, including the impact of one mode on the safety of others?

With this in mind, the International Transport Forum (ITF) is collecting data and hosting expert meetings at both national- and city-levels, with the International Road Traffic Safety Data and Analysis Group (IRTAD) and the Safer City Streets network respectively.

Members of the Safer City Streets network met in Paris, Brussels and Rome, jointly with members of the Polis road safety working group. Building on these exchanges, the ITF has just published a working document: Safer City Streets Global Benchmarking for Urban Road Safety.

This article reports on some aspects of the ITF publication, and focuses on the impact of mode shift on traffic fatalities.

TRAFFIC FATALITIES IN CITIES

The most common road safety indicator is the number of road fatalities per unit population, also called road mortality. The ITF benchmark reveals a wide range of situations, with figures ranging from 0.9 to 24 fatalities per 100,000 population per year. Needless to say much progress can be made in most cities.

URBAN TRAFFIC CASUALTIES BY USER GROUPS

Vulnerable road users (VRUs) typically make up four in 10 fatalities in national-level statistics, according to the ITF IRTAD database. In cities, however, VRUs typically make up eight in 10 fatalities. This is a considerable difference which makes the protection of VRUs an absolute priority in cities.



FATALITY RISK BY TRANSPORT MODE

To measure the level of risk experienced by each road user group, the ITF measured the probability of being killed in a collision, for each unit of distance travelled. Here again, the benchmark reveals large variations in risk across cities. The risk experienced by pedestrians varies six-fold. The risk of being killed on a bicycle varies 10-fold. Such information is precious to help cities learn from their peers.

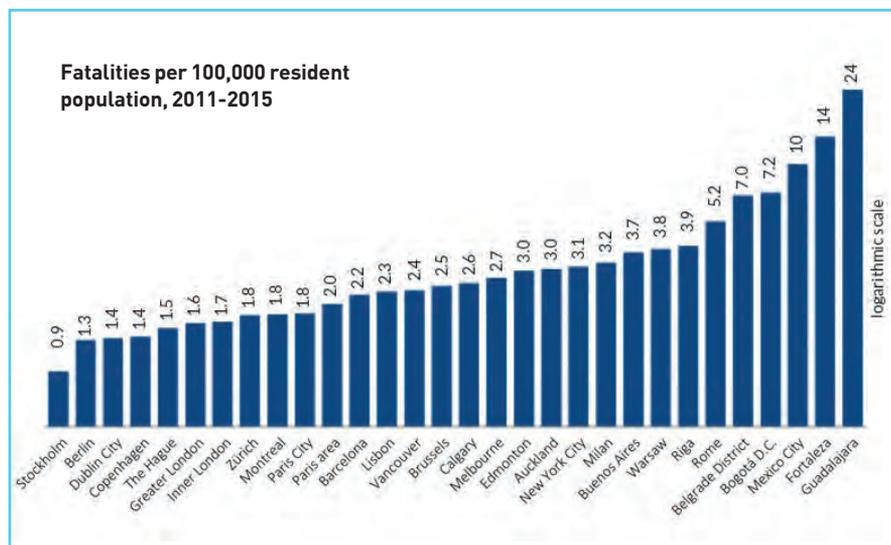
Differences observed across cities reflect, to some extent, the differences already observed across countries. Indeed, at national level, cycling risk figures between eight and 51

fatalities per billion kilometres cycled were reported in the ITF 2018 Cycling Safety Roundtable.

Results also highlight that cycling is not as dangerous as people often think it is. In the majority of cities, it seems to be safer to travel one kilometre on a bicycle than on foot. This may no longer be true if serious injuries were included in the performance indicator. The comparability of serious injuries across cities and countries is a significant challenge, as discussed further down.

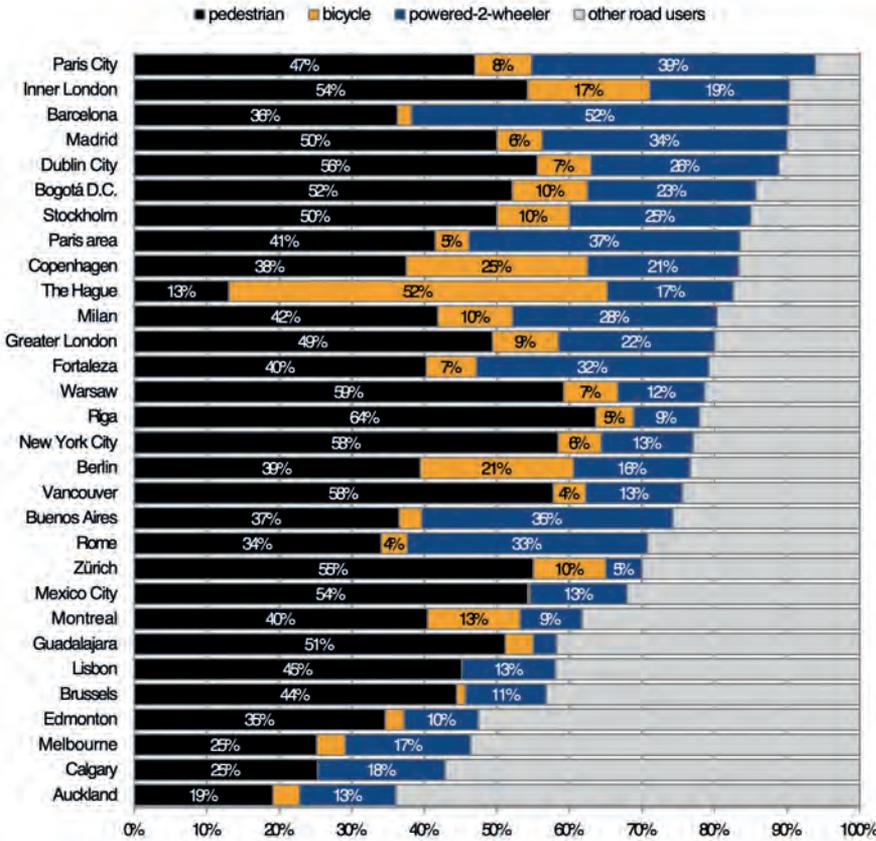
Can we compare the safety of different travel modes? To do so, the ITF assembled a comprehensive dataset covering five modes of transport in five cities:

- The risk of fatality is four times higher when riding a powered two-wheeler than when riding a pedal cycle over the same distance;
- The risk of fatality is 10 times higher on foot than in a passenger car travelling the same distance;
- Travelling on board a bus is an order of magnitude safer than all other modes of travel.



What interpretation could be made of such results by policy makers? Certainly that developing public transport is one of the keys to reducing road fatalities. Would there be

Modal shares of road fatalities, by city, 2013-2015



killed in traffic combined with the risk of causing fatalities among vulnerable road users. In these two components of risk, the latter has yet to be investigated in a greater number of cities and can only be seen as an order of magnitude – hence pictured as blurred.

Nevertheless, looking at the combined risk imposed onto oneself and onto others, it seems that bus travel has by far the lowest impact in terms of fatalities. At the other end of the spectrum, the use of a powered two-wheeler has by far the greatest impact, about 20-times greater than that of bus travel. If risk was presented by unit time, rather than distance, the risk associated with P2W would be 50 times higher than the risk associated with bus travel.

Risk by unit time couldn't yet be computed using the Safer City Streets database which only contains trips and distance information. To better estimate the road safety impacts of mode shift, the ITF will seek to collect passenger-hours data in the future.

SERIOUS TRAFFIC INJURIES

Due to inconsistent definitions and due to under-reporting, in the absence of hospital data, injury figures are not yet comparable across cities. This is why city-level road

a case to promote the use of private cars in cities, replacing some walkable or cyclable trips by car trips, on road safety grounds? This would be overlooking the risk imposed by motorised road users on other user groups, not to mention wider public health impacts.

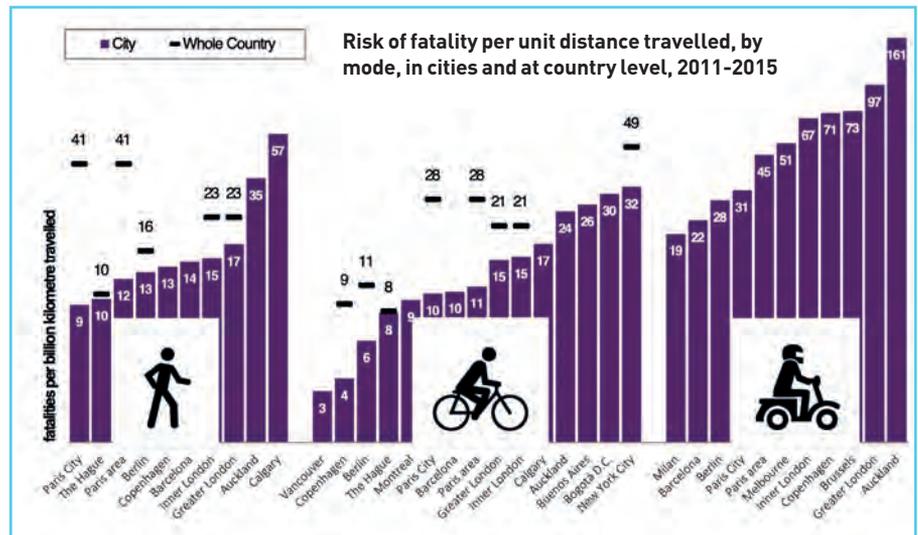
estimate the road safety impact of mode shift.

Using data from Bogota, Paris and Inner London, a first estimation can be made of the number of third party fatalities among VRUs. It is now possible to visualise the risk of being

FATALITY RISK IMPOSED ON THIRD-PARTIES

Occupants of private cars, vans, trucks and buses are remarkably well protected from the risk of being killed in traffic. On the other hand, they contribute to a significant risk for vulnerable road users (VRUs), such as pedestrians, to be killed in collisions with cars.

The goal is not to attribute responsibilities or blame a particular user group, but to give an indication of the road safety benefits in the event of mode shift. Without such calculations of "third party risk", one couldn't



safety performance analysis is limited to fatalities. This choice affects the quality of the analysis in two ways:

1) Much could be learned from injuries, as they don't necessarily follow the same pattern as fatalities;

2) Much statistical significance is lost due to the natural fluctuations of small numbers.

The ITF encourages local and national governments to further engage in the collection of robust and comparable injury data. Several methods exist, typically based on hospital admission data, many of which are documented by ITF, FERSI and SafetyCube. Where hospital data is not available, a survey of the population can produce an estimate of the true number of injuries, whether or not they are reported to the police. As it is the case in England, such a survey could be integrated to a permanent travel survey.

WHAT'S NEXT?

With the publication of this benchmarking report, the ITF seeks to raise the bar in urban road safety, specifically in outcome surveillance. In other words, the idea is to help cities collect relevant and comparable data, giving

About Safer City Streets

Safer City Streets is the global traffic safety network for liveable cities. In the network, cities improve their urban road safety performance by sharing data, experiences and knowledge – by learning from each other. Since the official launch of the initiative at the UN conference Habitat III in 2016, more than 40 cities have joined the network. Safer City Streets is funded through the FIA Road Safety Grant Programme and managed by the International Transport Forum (ITF), which collects, validates and analyses data on urban casualties, mobility, traffic and behaviours provided by cities. The ITF is an intergovernmental organisation with 59 member countries. It acts as a think tank for transport policy and organises the Annual Summit of transport ministers. The Safer City Streets network is open for more cities to join. To express your interest and learn more, please contact Alexandre Santacreu and visit the ITF website at www.itf-oecd.org.



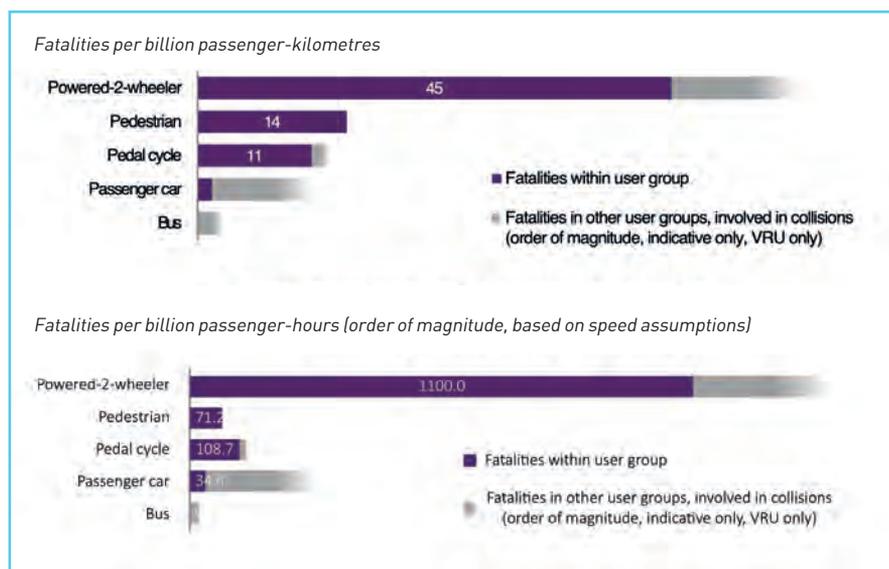
them a platform where to compare their performance with their peers. The idea is also to create a network of experts, helping make a robust interpretation of the data.

The analysis of road safety

performance in cities wouldn't be complete without a review of road safety strategies, action plans, budgets and governance arrangements. Nevertheless, much can be learned already from the analysis of road safety indicators focused on outcomes, i.e. casualties.

Further investigation will be needed to untangle the relationships between urban shape, density, speeds, mode share and road user risk. Gender and social aspects of road safety should also be examined. This will require not only good casualty data sources, but also good data on trips, most likely from household surveys.

Number of fatalities per unit passenger travel, 2011-2015, median value across Auckland, Barcelona, Berlin, Greater London and Paris Area



FYI
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In life you must have vision: Why the most vulnerable in our cities deserve to be seen

In an effort to reduce road fatalities, the EU is discussing a legal requirement for the amount of space truck drivers can see through their windows. By **Samuel Kenny**

In Europe, trucks represent 2 per cent of vehicles on the road but are involved in 15 per cent of road fatalities. Every year, truck collisions are responsible for the deaths of over 1,000 pedestrians, cyclists, or motorcyclists. The way that trucks are designed can be improved in order for such vehicles to be involved in less road fatalities. Trucks with better “direct vision”

enable drivers to see more of the space around their vehicles. There’s clear evidence that better direct vision would save 550 lives annually.

The European Commission published a proposal to review the General Safety Regulation in May 2018. This Regulation defines technologies and design features that must be standard features of new vehicles in order for them to be legally sold on the EU

market. The Commission proposed a “direct vision requirement” for trucks. Such a requirement will establish a minimum area that the driver must be able to see directly through the windows of new trucks sold in the EU. In other words, the requirement will reduce the number of truck blind spots.

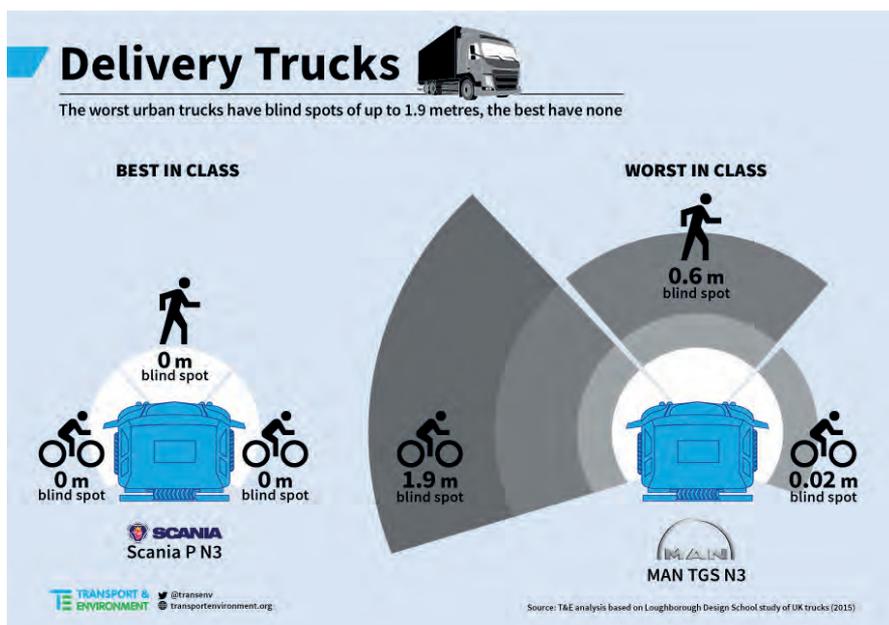
The truck blind spot problem is widespread:

Trucks with better “direct vision” enable drivers to see more of the space around their vehicles. There’s clear evidence that better direct vision would save 550 lives annually

configured has a major impact on what truck drivers are able to see from their cabin (direct vision). The Loughborough Design School in the UK analysed the direct vision and blind spots of top selling trucks in all vehicle categories (long-haul, construction, urban). The study shows that there are large differences between best and worst in class performance. This infographic (Figure 1 above) summarises the findings of the report for delivery trucks. The alarming difference in performance highlights the need for regulation to improve the worst in class.

So why improve direct vision when sensors or mirrors can detect such road users? A cognitive test performed for Transport for London found that drivers react 0.7 seconds faster when they see something with their own eyes through a window rather than indirectly (for example, through a mirror). Improving reaction speeds by 0.7 seconds may not seem like a lot but, in practice, it reduces stopping distance by 5m for a truck travelling at 25 km/h – that relatively short distance can be the difference between life and death.

Sensors that alert the driver every time a pedestrian or cyclist is in close proximity to their vehicle would sound constantly in cities. This overload of



- In Belgium, 43 per cent of cycling fatalities involve trucks, in the Netherlands 38 per cent, and in the UK 33 per cent. In some cities, like London, trucks cause more than 50 per cent of cyclist deaths.
- In Denmark, over the last decade, 50 cyclists have died in right-turn collisions with trucks.
- In the Netherlands on average nine cyclists die every year in blind spot/right-turn collisions (2005-2009 average).
- In Germany 23 cyclists lost their lives in right-turn collisions with a truck in 2012.

If cities aim to promote cycling and walking then those cities should actively support direct vision requirements in order for

“vulnerable road users” to be better protected.

WHY PRIORITISE DIRECT VISION?

The way trucks are designed and





Road users expressed a higher sense of safety when they could make eye contact with drivers

alerts could render the sensor ineffective as it is probable that the alert would eventually be ignored by drivers. Furthermore, the driver would need to be able to source the cause of the alert before being able to react to it. Requiring such action delays reaction speeds that in turn reduces the likelihood of avoiding collisions. Sensors may have a role to play on the parts of a truck where the driver cannot possibly see something directly (i.e. behind the trailer).

Transport for London commissioned surveys on truck safety with cyclists and pedestrians. These road users expressed a higher sense of safety when they could make eye contact with drivers. Eye contact allows for cyclists and pedestrians to determine whether they've been seen. Improving direct vision enables this interaction to take place in cities. Trials were also performed in London with truck drivers who expressed a lower stress level than usual in city environments when operating best-in-class trucks due to the fact that they could see more of the road around their vehicle.

Transport for London has developed a system to assess the direct vision performance of all trucks. This tool

will be used in the future to rate the direct vision performance of trucks that intend to operate within London. The purpose of the rating (a system that ranges from 0 to 5 stars) is to restrict the access of unsafe trucks from entering the city in the future. For more information on London's pioneering system, see <https://bit.ly/20vzvjp> or search for "London Direct Vision Standard" online.

WHAT CAN YOU DO?

Direct vision needs to come now as part of the reform of the General Safety Regulation, improving direct vision for all drivers of new trucks, particularly to the front and the sides of truck cabins. If supported by the European Parliament and EU national governments, the Commission's proposal to establish a "direct vision requirement" for trucks would improve the safety performance of new trucks sold in the EU. If we consider the Commission's proposal, the requirement will not be applicable to all trucks until 10 years from the date that the Regulation enters into force. This 10-year period will only begin once the discussions are finalised in Brussels. It is currently being discussed in the European Parliament and the Council. It is

imperative that such lead times are reduced so that safer trucks can be seen sooner on our roads.

CALL TO ACTION

Cities are an important voice in EU policymaking. We see an impact when European cities reach out to their national governments and MEPs in the European Parliament express support for this direct vision requirement. A coalition of 18 cities sent a joint letter to the Commission last year that called for truck safety to be a central element of the proposal and the cities voices have been more than noted in the community. Polis also supported this call for a direct vision requirement to be included in the Commission's proposal to review the General Safety Regulation.

One city alone cannot make all trucks safer. It requires a coordinated effort across the EU. As road safety is important for all cities, this rare opportunity to make trucks safer should not be ignored. 

FYI

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If you wish to join this city coalition or want some more information on what you can do, please contact samuel.kenny@transportenvironment.org

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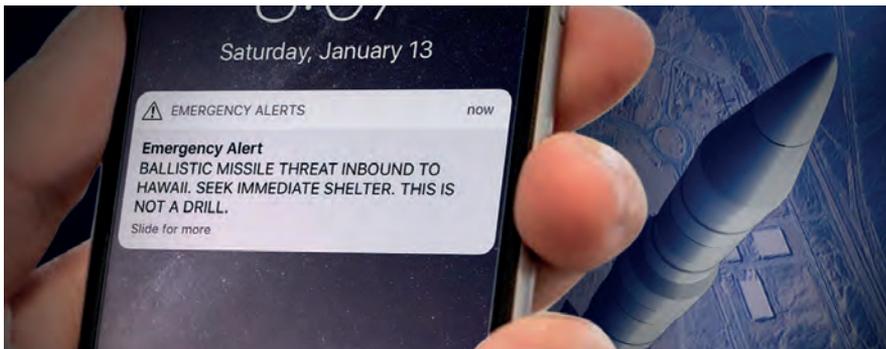
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How to outsmart the Smart City



Today's digital world has created new ways to keep us all informed and safe while automating our daily lives. Our phones send us alerts about weather hazards, traffic issues and lost children. We trust these systems since we have no reason not to — but that trust has been tested before, says **Daniel Crowley**



For a tense 38 minutes in January 2018, residents of Hawaii saw the following civil alert message on their mobile devices: **“BALLISTIC MISSILE THREAT INBOUND TO HAWAII. SEEK IMMEDIATE SHELTER. THIS IS NOT A DRILL.”**

It was not a drill but a false alarm that was eventually attributed to human error. However, what if

We found 17 zero-day vulnerabilities in four smart city systems — eight of which are critical in severity

someone intentionally caused panic using these types of systems?

SMART CITY VIEW

This incident in Hawaii was part of what motivated a team of researchers from Threatcare and IBM X-Force Red (led by the author) to join forces and test several smart city devices, with the specific goal of investigating “supervillain-level” attacks from afar.

We found 17 zero-day vulnerabilities in four smart city systems — eight of which are critical in severity. While we were prepared to dig deep to find vulnerabilities, our initial testing yielded some of the most common security issues, such as default passwords, authentication bypass and SQL injections, making us realize that smart cities are already exposed to old-school threats that should not be part of any smart environment.

So, what do smart city systems do? There are a number of different functions that smart city technology can perform — from detecting and attempting to mitigate traffic congestion to disaster detection and response to remote control of industry and public utilities.

The devices we tested fall into three categories: intelligent transportation systems, disaster management and the industrial Internet of Things (IIoT). They communicate via Wi-Fi, 4G cellular, ZigBee and other communication protocols and platforms. Data generated by these systems and their sensors is fed into interfaces that tell us things about the state of our cities — like that the water level at the dam is getting too high, the radiation levels near the nuclear power plant are safe

or the traffic on the highway is not too bad today.

SMART CITY VULNERABLE

Earlier this year, our team tested smart city systems from Libelium, Echelon and Battelle. Libelium is a manufacturer of hardware for wireless sensor networks. Echelon sells industrial IIoT, embedded and building applications and manufacturing devices like networked lighting controls. Battelle is a nonprofit that develops and commercializes technology.

When we found vulnerabilities in the products these vendors produce, our team disclosed them to the vendors. All the vendors were responsive and have since issued patches and software updates to address the flaws we’ll detail here.

After we found the vulnerabilities and developed exploits to test their viabilities in an attack scenario, our team found dozens (and, in some cases, hundreds) of each vendor’s devices exposed to remote access on the Internet. All we did was use common search engines like Shodan or Censys, which are accessible to anyone using a computer.

Once we located an exposed device using some standard Internet searches, we were able to determine in some instances by whom the devices were purchased and, most importantly, what they were using the devices for. We found a European country using vulnerable devices for radiation detection and a major US city using them for traffic monitoring. Upon discovering these vulnerabilities, our team promptly alerted the proper authorities and agencies of these risks.

SMART CITY SCARE

Now, here’s where “panic attacks” could become a real threat. According to our logical deductions, if someone, supervillain or not, were to abuse vulnerabilities like the ones we documented in smart city systems, the effects could range from inconvenient to catastrophic. While no evidence exists that such attacks have taken place, we have found vulnerable systems in major cities in the U.S., Europe and elsewhere.

Here are some examples we found disturbing:

- **Flood warnings (or lack thereof):** Attackers could manipulate water level sensor responses to report flooding in an area where there is none — creating panic, evacuations and destabilization. Conversely, attackers could silence flood sensors to prevent warning of an actual flood event, whether caused by natural means or in combination with the destruction of a dam or water reservoir.
- **Radiation alarms:** Similar to the flood scenario, attackers could trigger a radiation leak warning in the area surrounding a nuclear power plant without any actual imminent danger. The resulting panic among civilians would be heightened due to the relatively invisible nature of radiation and the difficulty in confirming danger.
- **General chaos (via traffic, gunshot reports, building alarms, emergency alarms, etc.):** Pick your favorite crime action movie from the last few years, and there’s a good chance that some hacker magically controls traffic signals and reroutes vehicles. While they’re usually shown hacking into “metro traffic control” or similar systems, things

in the real world can be even less complicated. If one could control a few square blocks worth of remote traffic sensors, they could create a similar gridlock effect as seen in the movies. Those gridlocks typically show up when criminals needed a few extra minutes to evade the cops or hope to send them on a wild goose chase. Controlling additional systems could enable an attacker to set off a string of building alarms or trigger gunshot sounds on audio sensors across town, further fueling panic.

In summary, the effects of vulnerable smart city devices are no laughing matter, and security around these sensors and controls must be a lot more stringent to prevent scenarios like the few we described.

THE VULNERABILITIES

IBM X-Force Red and Threatcare have so far discovered and disclosed 17 vulnerabilities in four smart city systems from three different vendors. The vulnerabilities are listed below in order of criticality for each vendor we tested:

Meshlium by Libelium (wireless sensor networks)

- (4) CRITICAL — pre-authentication shell injection flaw in Meshlium *(four distinct instances)*

i.LON 100/i.LON SmartServer and i.LON 600 by Echelon

- CRITICAL — i.LON 100 default configuration allows authentication bypass – CVE-2018-10627
- CRITICAL — i.LON 100 and



Recommendations to help secure smart city systems are out there

- i.LON 600 authentication bypass flaw – CVE-2018-8859
- HIGH — i.LON 100 and i.LON 600 default credentials
- MEDIUM — i.LON 100 and i.LON 600 unencrypted communications – CVE-2018-8855
- LOW — i.LON 100 and i.LON 600 plaintext passwords – CVE-2018-8851

V2I (vehicle-to-infrastructure) Hub v2.5.1 by Battelle

- CRITICAL — hard-coded administrative account – CVE-2018-1000625
- HIGH — sensitive functionality available without authentication – CVE-2018-1000624
- HIGH — SQL injection – CVE-2018-1000630
- HIGH — default API key – CVE-2018-1000626
- HIGH — API key file web accessible – CVE-2018-1000627
- HIGH — API auth bypass – CVE-2018-1000628
- MEDIUM — reflected XSS – CVE-2018-1000629

V2I Hub v3.0 by Battelle

- CRITICAL — SQL injection – CVE-2018-1000631

THE FIXES

Smart city technology spending is anticipated to hit US\$80 billion this

year and grow to US\$135 billion by 2021. As smart cities become more common, the industry needs to re-examine the frameworks for these systems to design and test them with security in mind from the start.

In light of our findings, here are some recommendations to help secure smart city systems:

- Implement IP address restrictions to connect

to the smart city systems;

- Leverage basic application scanning tools that can help identify simple flaws;
- Safer password and API key practices can go a long way in preventing an attack;
- Take advantage of security incident and event management (SIEM) tools to identify suspicious traffic; and
- Hire “hackers” to test systems for software and hardware vulnerabilities.

There are teams of security professionals — such as IBM X-Force Red — that are trained to “think like a hacker” and find the flaws in systems before the bad guys do.

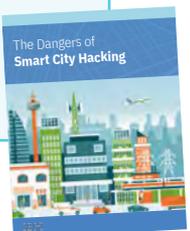
Additionally, security researchers can continue to drive research and awareness in this space, which is what IBM X-Force Red and Threatcare intended to do with this project. 🔄

FYI

Daniel Cowley is Research Director of IBM X-Force Red

To download ‘The Dangers of Smart City Hacking’ as a PDF, go to:

<https://ibm.com/2zzccz>



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

- Brno
- Tim Papandreu Interview
- India



Reality Czech

David Bárta reports from the Brno, the Czech Republic's second city and undoubted Smart Governance Leader. Things could well be about to change...



Brno's smart city story started in 2014 after the election, as two new political parties, together with existing progressive parties, established a new government. After several talks with the Mayor Petr Vokrál and his team on national smart city methodology where Brno was a pilot, the government decided to undertake the first steps towards smartness.

A new smart city committee was taken into force and its chairman Jaroslav Kacer formulated the first vision and the "mind change principles".

After becoming the Councillor for Smart City in 2016 (the first and only position in the Czech Republic) he focused on city administration and government, creation of a local partners ecosystem and civic engagements framing Brno's 2050 vision.

This article is a summary of results of that four-year period as the government lost this year's elections and "the old guys" have returned. We will look back fondly on what was a progressive period in Brno's history.

NATURAL PROGRESSION

Brno is, as the natural centre of the South Moravian Region (1.2 million inhabitants), a location with huge potential. Many universities and the presence of more than 65,000 students give the city its young spirit, creativity and dynamics. The universities have a long and strong tradition in many fields of expertise and specialise in progressive research, particularly in biological and medical science, information technologies, life sciences, electron microscopy, computer security and software development. A current ranking by the well-regarded Numbeo.com, states that Brno is a city with the highest quality of life in the Czech Republic.

There are four technological incubators here. For example, South Moravian Innovation Center (JIC) has already supported more than 200 technological start-ups. The region's high investments in research and development (CZK17 billion/€658m in science and science-research centres between 2011 and 2014) represents 20 per cent of the overall public research capacities of the Czech Republic. The presence of more than 400

technological companies with their own science and research facilities means 17,000 stable jobs with high added value.

JAROSLAV KACER

Deputy Mayor of Brno for Smart City, strategy and ICT (unique municipal position within the Czech Republic), Jaroslav Kacer was born in 1977, graduated from the Faculty of Mechanical Engineering of Brno University of Technology. He has worked at many management positions in both commercial and public sector, e.g. he founded an advertising agency and worked as a freelancer in advisory and project activities. Since 2010, he has been a member of General Assembly of the City of Brno and in 2010–2014, he was a member of Brno-Bystrc District Council. On 21 June 2016 he became the fifth Deputy Mayor of Brno for Smart City, city strategies, data processing and computerization of the Council area.

"The most common mistaken belief about the Smart City is that there is a universal solution that can be easily bought or acquired from a grant. You spend up to 80 per cent of your time

designing it and setting it right and only 20 per cent is left for tenders and the implementation”, says Kacer. “For me, smart city means smart people. Brno has made huge progress thanks to its people. Thanks to massive investments in high-quality scientists, managers and talents who, luckily, still keep coming here. I think that this would be a good time to transfer this positive effect into public administration. The whole story started in 2015, when the Smart City Board under Brno City Council was established. That is when this broad agenda started to be taken care of. As its chairman, I both lead and actively co-created the Brno Smart City Concept that the Council approved in October 2015, and this described what principles the city should follow and what it should stay away from.”

CHANGE MANAGEMENT

The main motto of the Brno Smart City Concept is “Change of the City’s Approach”. If we want to think about a smart city, we have to start with us, inside the Council itself, and change our approach to the world outside. A change is always seen as a threat and it is not easy and pleasant to manage it. You fight different forms of protests or disagreement almost every step of the way. From common “this can’t be done” to “we don’t have enough people for this”. Only time will tell if it was a change for the better and experience from abroad shows that those standing at the beginning of the change do not always get the glory.

In our experience, preparation of a smart solution takes up to 80 per cent of the time. It is not appropriate to skip this phase and reduce it to a mere contract award. Companies can’t compensate for a point of view of future users and their specific needs and they are also happy to work with a contracting authority that knows what it wants. That is why we, according to the national methodology, have devoted the first Smart City steps to

set the internal and external city processes, i.e. smart governance.

SMART GOVERNANCE

Paper documents that the Brno City Council approves every week were presented to the members, including all the copies for city departments and archiving. Piles of papers emerged with every point. Today, we have a computerized system that takes care of the signing and distribution and the change is visible. We also use video transmission that enables us to “invite” heads of units to City Council meetings. They can stay in their office and answer the questions through their laptops with webcams and we can also invite other experts from other cities. Therefore, they don’t have to spend the whole Council meeting waiting in the vestibule, just in case they were needed.

CITY IDENTITY: BRNO ID

With this concept from a detached perspective, we approached the electronic passenger handling as a future platform of city communication with citizens. When we introduced the service in 2017, we already experienced one experiment from the 1990s when most passengers bought a card with a printed photograph. However, the system didn’t work so they started sticking traditional coupons on the cards.

Our philosophy was different and arose from an unexpected direction. In the framework of the MUNISS student competition (muniss.cz), an idea of Brno citizen’s card emerged, with data not saved on a user data carrier but in a central database. So, a single standard for the following services was defined, costs were significantly reduced and every user can choose their data carrier, e.g. a bank card. After one year of operation, there are over 66,000 users (15 per cent of Brno’s inhabitants). Currently, the Brno iD portal can be used to pay the waste fee, the identity also serves as a tourist card and registered

inhabitants of the city can vote in Dáme na vás participatory budget. From one account, users can start and manage dependent accounts for their children or share their account with other adults. Currently, a new module is being launched – a library card for a network of over 30 Brno city libraries. Therefore, we created a city identity that will improve the life of inhabitants and users of the city.

DATA PLATFORM

In March 2018, a data portal was launched for the purpose of development and data-based management of the city and raised awareness of the public about the place where they live, work or study. Even though we tried to publish as many open datasets as possible, we followed the advice of our colleagues from Leeds, UK, a city that cares a lot about the quality and sustainability of datasets. On data.brno.cz, there are not only datasets (over 120) and their applications (76 applications altogether) but also interesting interpretations and statistics on the integrated dashboard. For example, thanks to the mobile data, the city found out that there are actually 425,000 people living in Brno, which is 50,000 more than according to the official statistics. Soon after its launch, the portal became one of the most visited parts of the Brno website.

CITY ECOSYSTEM

In order to involve the professional sector, the city has created a unique organization model; it extended the well-known “quadruple helix” with the non-profit sector and the trans-regional level. This created a special city department with six workers who take care of the ecosystem development in every one of the areas. Apart from the city workers, every area has its ambassador, i.e. a respected representer of the sector, and guarantors of the individual city values.

1. Science Brno – Brno Science Partners – BSP (Students,

universities, research and development centres and Czech Academy of Sciences)

2. Business Brno – Brno Business Alliance – BBA (Freelancers, SMEs, large corporations, investors and business chambers)

3. Non-Governmental Brno – Non-Governmental Organizations – BNO (Non-governmental and non-profit organizations, associations, foundations, endowment funds)

4. Active Brno – Brno Smart City Community – BSCC (Active citizens, experts and expats)

5. Brno Self-Government – Brno Managing Members – BMM (City municipality, city districts, political clubs, city companies and organizations)

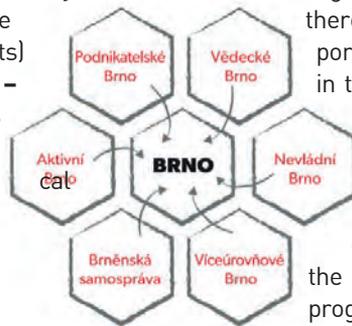
6. Multi-Level Brno – National and European Governmental Levels – NEGL (Brno metropolitan area, South Moravian Region, regional, state and European institutions and companies, government and ministries)

Since spring 2017, the city of Brno has been working on a new development strategy called #brno2050. It is based on VISION 2050 that contains 25 strategic values. Eleven special events have been held so far with between 80 and 150 participants at every one of them. The central topics are #brno2050 Vision, digital city and the involvement of citizens. The city now works on a communication web platform for more effective management of operation of the city's ecosystem.

SUPPORT OF SMALL BUSINESSES

Brno supports the ideas of companies with potential to change the market. It has allocated CZK26 million (€1m) for the SME Instrument Brno programme that has supported eight innovative companies with breakthrough

A strong point of the project is the emphasis on the neighbourly, community approach to project creation supported by a series of public meetings



technologies since 2016. These companies asked for support within the frame of the SME Instrument European funding programme and got a great ranking from European Commission but they didn't get the funding. The City of Brno has therefore decided to support these companies in the first phase, i.e. in concept validation and creation of the feasibility study, because it considers the ranking of the European funding programme to be a relevant quality recommendation.

For example, Optik Instruments (Nanovision) has been financially supported because it came up with a method of combining two previously incompatible types of microscope imaging. Furthermore, there is a project focused on the development of products for promoting the healing of chronic wounds or the development of a vertical axial wind turbine with folding blades that represents an alternative low-carbon energy solution for effective work in very bad and extreme weather conditions.

SUPPORT OF CREATIVE WORKERS

In 2010, a platform for networking and co-operation of companies and creative workers was created as a part of the Creative Brno project. The platform offers incentives such as Creative Vouchers that have been implemented through JIC since 2015. The Creative Centre Brno project, which is supposed to represent the main infrastructure support for the development of creative fields and

has become an official strategic city project provides specialist support of creative industries, was established in the municipality in 2016.

PARTICIPATIVE PROJECTS

In the Dáme na vás ('We Make Your Proposals Happen') project, the citizens of Brno make decisions about a part of the city's budget, namely the distribution of CZK30 million. The project is supposed to enable the citizens to design their own projects for city revitalization in a simple and comfortable way and decide directly about what ideas the city will implement. A strong point of the project is the emphasis on the neighbourly, community approach to project creation supported by a series of public meetings. In the beginning of 2017, the city launched the first year of the project with CZK20 million. Citizens submitted 216 projects and 162 of them were supported, with 83 projects advancing to the final voting. Based on the citizens' voting, 16 of them will be implemented. Every winning project is discussed with the submitter and the relevant city district so that all sides agree on the final form of the project. Most projects are now in the phase of contractor tendering.

In the second year, 133 projects were submitted and 109 of them received support. These projects include: building a playground, an outdoor exercise area, adjustments of sports grounds, classes for seniors, revitalization of gardens, etc. The money can be also provided to an event organization - for example a half-marathon or a concert, but the public needs to be interested in it and support it. This could be done either

online where a project needs to get at least 150 likes, or on a paper where at least 15 citizens' signatures are required have to show their support.

SMART CITY VOUCHERS

Currently, many new companies are focused on technological trends; however, to implement them, the city needs to create appropriate conditions. These are usually created by city companies focused on operation, not innovations. For such companies, it is relatively difficult to prepare a project in a Smart City area and define public tender demands in sufficient quality. That is why the city prepares the aforementioned Smart City Vouchers connecting innovations and city companies through cooperation of city institutions and the academic sector. The current cooperation is not yet very intense, so the programme is focused on the breakdown of the barrier. Currently, this project is piloted on the "Wireless Brno" project (inspired by Bordeaux), where trams are equipped with batteries enabling them to run over the broader centre without a power supply.

FLUXCOLLECTIVE

FluxCollective is a platform for the support of open innovations, minimizing barriers for potential users of the results. There is a complex system of support for established entities, however, searching and support of individuals in its early stages is fairly limited.

Founding members are community non-profit organizations that actively participate on the creation of alternative innovation and start-up environment in Brno on a long-term basis.

- **Base48:** community hacker-space focused on electronics, information technologies and safety, open-source, industrial automation and robotics;
- **Social Reactor:** non-profit formation dealing with re-activation of unused buildings and their implementation into

city-creating processes;

- **Koplac:** open, informal co-working space holding business support events specializing in the usage of satellite signals and cosmic technologies for industry and society; and
- **Vaizard:** operator of INDUSTRÁ, a creative and cultural centre in Brno with a mission to implement a city creative/innovation ecosystem, specializing in the inter-connection between fields and pivoting.

URBIS AND SMART CITY SUMMIT V4+

Brno is one of the leading lights of the smart city concept in post-communist Europe. One hundred years ago, it was the centre of the machine and textile industry with many groundbreaking patents and the 29th biggest exhibition area in the world. The city now plays host to the annual Smart City URBIS exhibition, with the ambition of becoming an important Central European event. In 2018, almost 1000 professional visitors and more than 50 cities from across Europe attended the event, while more than 60 speakers spoke on four separate stages.

The first year of the Smart City Summit V4+ was also a part of the event where representatives of ministries from five countries discussed the potential of sharing and closer cooperation between the cities and countries of Central Europe. "Our aim is to build the C2C European platform, that is City to City, to share experiences, both good and bad that we can learn from, and interconnect the academic and business sectors," said Kacer. Next year's event will take place on 5-6 June with the theme of digital planning and smart public services.



INTESMOG

Intesmog (Intelligent technologies for smog events) is a planned two-year demonstrator (2019-2020) of a smart service called Innovative Smog Event Service. It is a deployment of a traffic burden management system (TBMS) within a broader zone around the centre of the city. TBMS consists of a vast traffic flow detection based on IoT (up to 250 detection points), a series of standard ITS Air quality stations (CEN reference measurement methods) and a series of variable message signs (VMS). The aim is to offer the citizens and the city the information and open data on traffic burden and the quality of life per street and to start a public debate on the quality of life at the street level. Each street will have its own web profile to enable citizens as well as investors to compare. This is also the beginning of a more complex "Street DataBank" with much more information in the future. The data will also serve for specific city measures taken and decision making when alarming the approaching of a smog event.

The Intesmog demonstrator has been designed based on the work of Interreg project SOLEZ and the CityOne team's expertise and has been promoted as an Action within the Brno Air Quality Action Plan, thanks to the support of the Green Party. However, as the Green Party lost in the election well the next steps along the path are as yet unknown. The same can also be said for the future of Smart Brno. 🌐

FYI

David Bárta is the founder of the CITY:ONE platform on sharing innovations of CEE cities

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The race for space

Francesco Ripa talks to Tim Papandreou, founder of Emerging Transport Advisors



FR: The urban mobility landscape is evolving rapidly. What kind of effect does it have on the way urban space is used?

TP: It's relatively new for most cities, however we are starting to see more curb demand as this space has been traditionally been set aside for personal car parking. People are loading and unloading more from the curb as riders or to receive parcels and these have not been adequately accommodated by the existing street design. In addition, electro- and micro-mobility services are pointing to the lack of protected lanes, charging and street racks for these services.

FR: How can cities turn the hype for new mobility services into more space for sustainable transport modes?

TP: Cities have a responsibility to provide safe, affordable, efficient, accessible and inclusive transport choices. Some are starting to understand that their role is in managing the platform (that is, the public right of way).

What all these new services highlight is that cities have for too long been offering up and dedicating too much of the platform to private car use for free. That discount for drivers is very expensive for the rest of the city's residents, workers and visitors with all the associated impacts.

As cities learn to partner with these new services, setting performance measures for meeting these citywide goals will start to show their value to the city. It is important to note that cities will need to reallocate the space on the platform for these services if they show they meet the city goals. What this means is that the street would be flipped to optimize walking, scooters, bicycling, e-mopeds, and pooled rides with higher-capacity public transport instead of private cars.

FR: According to the mainstream media autonomous vehicles are already a reality and cities need to adapt to them. Do you think it should be the other way around?

TP: It depends on what you see as a reality. A lot of hype is out there. There are less than a handful of AV technology companies that are at the experimental stage of allowing people in their vehicles. Only two are at the stage where they've made public their plans for a city service. Cities don't need to do anything for the AV technology other than continue to maintain their streets. If companies are requiring special lanes, striping, lights etc, they may not be ready.

All the technology should be on board the vehicle. What cities should be focusing on is how to complete their contiguous protected bicycle network and dedicated transit lanes, creating more visible crosswalks and easing in new financial policies that charge per trip by mode, no new parking structures, removing parking requirements from future development and developing measures to manage and price their curbs. All the tools to make cities transport networks more efficient, effective and safer (using the

20 years of Vision Zero best practices) have been proven without the need for AV technology.

AV technologies promise to remove human error, the key cause of road fatalities and collisions, and to provide transport services in areas where the costs currently outweigh the benefits. A fleet of AVs can switch from single occupant to multiple occupants with a few lines of code. We would see a reduction in the private vehicle fleet as the AV network can optimize for use based on origin, destination and time of day.

But that's only part of it, it's in the combined synergies with active mobility, pooling and electrification where the transport system can be transformed. This is where cities have to really step up to the task of being platform managers. AV technology on its own can't transform streets and user behaviour. In fact, it is an optimizer of the space it's given.

That means cities that give all the available space to AVs will see a different outcome than those cities who allocate the space and curbs for multimodal trips and the smart land use for the AV technology to optimize. It's important to remember that this isn't about the car – it's about automation. AV technology is form factor agnostic, meaning it can be applied to all motorized vehicles regardless of their size and occupant capacity.

FR: Public support is essential to ensure a wider take-up of sustainable transport modes, but there are still many people that oppose relentless pedestrianization of city centres and the construction of bike lanes, saying that they have a negative effect on traffic and reduce parking space. How can cities better sell sustainable transport options?

TP: Cities have to re-learn how to engage with their customers using new customer-centric tools. The staff do not know everything and so it is important to learn the latest tools on



This isn't about the car – it's about automation. AV technology is form factor agnostic, meaning it can be applied to all motorized vehicles regardless of their size and occupant capacity

how to be better engagers and storytellers by utilizing new forms of data, creating stronger partnerships with the emerging mobility providers and businesses and understanding the psychology of their citizens. The combined skills of data scientists, urban psychologists, storytellers and strong partnerships who can speak in favour together will be essential for cities to make these necessary but politically challenging changes to the platform.

FR: Cooperation with private sector actors is fundamental to ensure that the introduction of new and shared mobility services benefits rather than disrupts mobility in cities. What are the key elements to make this cooperation work?

TP: Working with them earlier and setting key goals together has proven to be successful. Moving away from being prescriptive to being performance outcomes-based also helps as it gives the company a challenge to meet the goal with flexibility to iterate and try different things while aiming for the outcome. Cities have to be clear and consistent in what they're trying to achieve while being honest and open to change.

And most difficult, admitting areas where they are contradictory. For example, asking a new mobility provider to do something that the city itself doesn't do or unfairly pick winners and losers because there is familiarity.

Companies need consistency and a clear path to market to be able to work better with cities. And cities need to be able to trust these companies to make good on their claims of helping. That means both need to sit at the table to learn from each other and evolve together. We're still in experimental phases - so much of what it will eventually look like is very different from these initial, early steps. 🔄

FYI

Tim Papandreou is the founder of Emerging Transport Advisors. He previously worked at Waymo and as a Chief Innovation Officer at the San Francisco Municipal Transport Agency.

Francesco Ripa is Communication and Project Officer at Polis.

Female service provider

Kalpana Viswanath on using technology and data to build safer public spaces for women



Over 70 per cent of women interviewed had experienced some form of sexual violence in the past year

Fear and violence have become the defining experience of women in cities today. While women have won many freedoms in the past few centuries, violence and the fear of violence continue to be a part of their lives.

Women's mobility is seriously impacted by the lack of safety. There is data coming from studies around the world that is demonstrating women's lack of freedom while moving around cities, impacted by sexual harassment and sexual violence. Research

has shown that sexual harassment of women is a serious, global problem. A 2014 study by Hollaback! and Cornell University that interviewed over 16,000 women found that over 50 per cent of the European respondents and 75 per cent in the United States reported facing their first incident of harassment before the age of 17 (Hollaback, 2014). Over 80 per cent of women interviewed had experienced some form of sexual harassment. The multi-country Gender Inclusive Cities Project, conducted in 2009, found that

over 70 per cent of women interviewed in New Delhi (India), Dar es Salaam (Tanzania) and Rosario (Argentina) had experienced some form of sexual violence in the past year (Women in Cities International, 2010). In the United Kingdom, a YouGov survey found that 43 per cent of women aged between 18 and 34 had experienced sexual harassment in public spaces in the last year (You Gov UK, 2017).

Reliable data is especially useful in convincing city governments to deliver programs and respond to



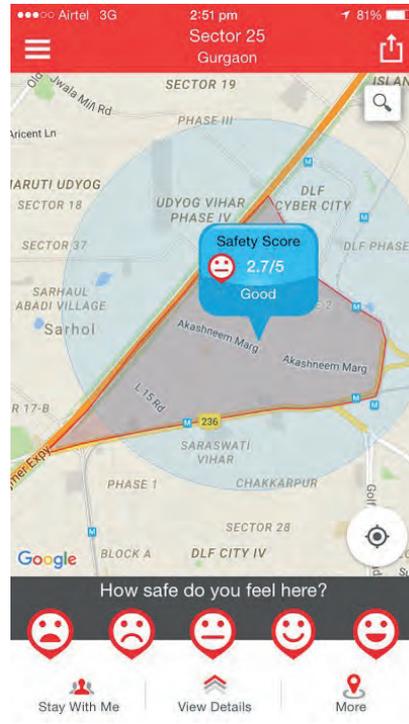
problems faced by citizens. Today data is generated and accessed in many ways including through technology. Safetipin is a technology platform that collects data through crowdsourcing as well through analysing photographs and other map-based data to understand the state of infrastructure and social usage of public spaces in cities. This technology is used to understand whether citizens (especially women) feel safe while accessing public spaces in the city. Our work in India and cities in other countries has shown that providing robust data is an important way to encourage city governments to make policies and programs that positively impact women's safety.

SAFETY AUDIT METHODOLOGY

One of the most innovative tools that has been used to diagnose the problem of safety in public spaces has been the Women's Safety Audit (WSA) that was first pioneered by METRAC in Canada in the late 1980s. The WSA was a gender specific response to increased violence against women in cities. It is a method of assessing the nature of public places in cities to define what makes women feel safe or unsafe. This tool has spread around the globe and has been used in more than 50 cities across the continents.

SAFETIPIN: A TECHNOLOGY PLATFORM

Safetipin has adapted the safety audit to a technology app platform and is being used in cities around the world to engage citizens on women's safety (Viswanath & Basu, 2015). Safetipin, an organisation based in India that works to collect large scale data about women's safety, was launched in November 2013, at a time of heightened awareness on sexual violence and harassment¹. The two key premises of Safetipin are that large-scale data collection can lead to change, and



that safety will ensue when more people become engaged in the issue. Safetipin is a map-based mobile and online platform and aims to address lack of safety in cities by building an extensive database about the perception of safety in cities around the world. It is designed keeping in mind key factors that enhance public space safety and inclusion, specifically focusing on the experience



of women and girls. There are two apps for data collection - My Safetipin for crowdsourced data and Safetipin Nite to collect night time pictures of the city. The app has data on more than 30 cities in India and globally.

At the core of the app is the Safety Audit, a participatory tool for collecting and assessing information about perceptions of urban safety in public spaces. The audit is based on eight parameters that include infrastructure such as Lighting, Openness, Visibility and Walkpath, as well as the social usage of the space and the availability of Public Transport.

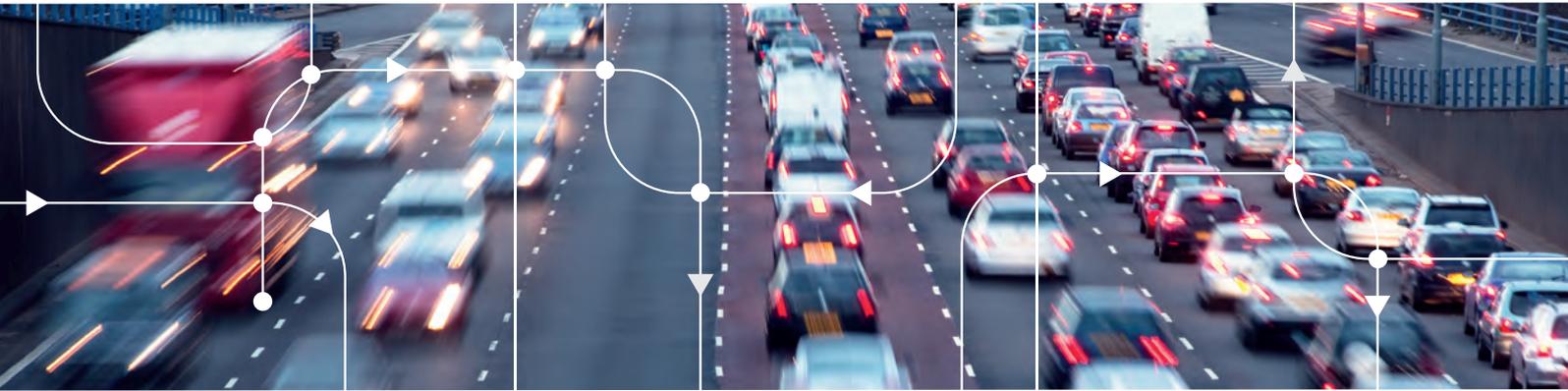
The app allows any user to enter data about these parameters, as well as share how they feel in any specific geo-tagged place in the city. This data is then immediately visible to all app users and thus becomes an interactive virtual space to converse about safety and perceptions. The data is further shared with city officials and other stakeholders to help improve safety in public spaces in cities.

Two methods are used for data collection in SafetiPin. The first uses crowdsourcing with the My Safetipin app. The second uses trained professionals to assess night-time photographs of public spaces (Safetipin Nite app). For the voluntary crowdsourcing process of Safetipin, the principle of the safety audit is that the user of a space is the expert and has the best understanding of why the space is unsafe or inaccessible. The My Safetipin app allows any user of the city to rate its infrastructure and social usage thereby generating bottom-up knowledge. People, and particularly women, are therefore given an opportunity to generate knowledge from their experience. This data that people feed in helps in making the total database dynamic and engaging. All data that is gathered is instantly available for others

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to see and use both at an individual level to make safer decisions. The app also has features of finding the safest route and providing notifications which help women to move with safety. Finally the app has a safety feature whereby the user can ask someone to track her if she is feeling unsafe.

In addition to this data from users, SafetiPin maps the city through capturing and assessing night time pictures of the city. This data is collected to map the entire road network of cities. This has resulted in large scale data being generated which allows city government to analyse and make decisions about how to improve safety conditions through infrastructure as well as design of public spaces.

SafetiPin then works with local stakeholders to change the unsafe

spaces by giving concrete recommendations. SafetiPin works with local government and non-government organisations to ensure that data collected is used for making spaces better and not limited to labelling places as safe or unsafe. SafetiPin has been working with city governments in India and globally including Delhi, Mumbai, Kerala and Bengaluru as well as Bogota (Colombia), Port Moresby (Papua New Guinea) and Hanoi (Vietnam). SafetiPin aims to provide useful data at regular intervals for city government for planning and designing inclusive and safe public spaces.

In Delhi the data has been used by the city government to fix dark spots around the city where women felt unsafe. In Bogota it was used by the city government to map the bike route of the city to make decisions

about where to place CCTV cameras and bike stands so that women would feel safe at night. It has been used to measure safety around transport hubs as well as to see assess the safety of the last mile. In Delhi, safety audits were conducted around 30 metro stations (covering a 500m radius) to assess safety and last mile connectivity. The data collected is thus made available to an individual using the app as well as shared with key urban stakeholders to ensure improved safety.

Safety is central to women's mobility and all efforts to improve urban transport should address safety. The lack of safe mobility hampers women's ability to access opportunities that the city can offer and thus limits their rights. 🌐

NOTES

[1] In December 2012 a gruesome case of gang rape took place which eventually led to the death of the young woman. This incident galvanised the city to weeks of protest and led to a slew of changes and initiatives in the city and country.

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