

THINKING cities

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EUROPEAN CITIES AND
REGIONS NETWORKING
FOR INNOVATIVE
TRANSPORT SOLUTIONS

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May 2017

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Achieving change in the thinking city

Kevin Borras and **Karen Vancluyssen** on how living in a time of tumultuous change also affects how city authorities think about the word “smart”. Have the parameters changed?

Last week in the *Thinking Cities* offices we had occasion to do a bit of Spring cleaning. While moving boxes of back issues into storage we found an unopened box of the February/March 2007 issue of one of H3B Media's other publications, *Thinking Highways*, and after jointly deciding we weren't being financially rash and that opening the box wasn't in any way akin to opening a mint-condition copy of the initial pressing of *Canterbury Tales*, we sat down and leafed through the previously untouched pages.

This was largely for the benefit of a young colleague, who was 11 when that issue shot off the printing press and with whom we had been discussing how the intelligent transport systems sector had changed almost beyond recognition in a decade.

In truth it was more interesting watching the expression on his face change from total bemusement to amusement as came across articles extolling the virtues of what were then technological breakthroughs but have since been consigned to the archives.

When that issue was published the iPhone was a matter of weeks old and the only thing you could store in a cloud was water. One only has to look at the Advertisers Index at the back of that issue to see that the world is changing (the business world if nothing else) – exactly half of the companies happily promoting their wares and solutions in the early part of 2007 are no longer in business, have merged with other like-minded firms or have been swallowed up (and in some cases chewed up and spat out) by corporate behemoths. That has happened in 10 years.

We jointly launched *Thinking Cities* four years ago and yet it could be argued that the smart city sector has morphed into something equally unrecognisable but in only 40 per cent of the time. One theme that is evidently running through this issue is how cities are approaching the daunting task of changing people's mobility behaviour.

It's difficult enough changing one's own behavioural patterns, let alone several million strangers'. So how are we going about achieving change in the thinking city? It's a simple enough question but it doesn't have a particularly catchy, pithy answer. There's no “Well, we are doing this and it's working brilliantly” model to follow. The cities that feature in this issue are as different in every respect (age, geography, topology, socio-economic distribution, population, layout) as the people that live in them and call them home. If you have ever visited Paris and, say, Luxembourg then you will know that they have very little in common – other than the fact that both cities are taking very encouraging steps to subtly change the behaviour of their citizens and those that travel to those cities for work.

These are just a few ways in which cities and regions are addressing the notion of change:

Paradigm change: Europe and its cities and regions are making huge efforts to progress towards a more sustainable transport system. This requires changes in transport strategies, transport planning, transport investments and, crucially, each person's transport behaviour. The importance of giving those persons a choice of modes by which to travel to, from and within that city or region cannot be underestimated, and neither can the notion of “social inclusion”. On pages 34-36 of this issue we highlight one such measure that has been undertaken by Kaunas, Lithuania's second city, to address the needs of visually impaired users of the transport system.

Change in behaviour: Changing mobility choices of each individual person is one of the hardest things to achieve. Here's a thought: is there any technology, real-time information or self-driving vehicle that would persuade you to cycle to work today? Is there a cute image of a



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polar bear that would make you want to take the bus rather than drive to the office? Maybe if that message reaches us at the very moment our lifestyle is changing dramatically, when we move to a new city or our first child is born, it would tick that last remaining box. Behavioural choice is complex and long-lasting, long-term changes require a lot of thought and planning and can't be just be spur-of-the-moment decisions. Initiatives such as the European Mobility Week are key tools for cities to foster dialogue with people on mobility choices.

Changing role of local authorities: It is time to rethink the roles between the public and private sector while transport technologies are developed and rolled out. What is the societal gain if technologies are being developed without due to consideration of the city's needs?

We are moving into an age in which the voices of cities are heard in the industry and research spheres and one in which structural cooperation between the national and local governance levels is needed in the deployment of innovation in transport. Investments in the roll-out of new transport technologies and measures can only lead to true change and improvements if the specific needs of cities are properly taken into account.

As Polis wrote in its *Answers To The European Commission DG REGIO Consultation On A Future EU Urban Agenda*: "The transport sector would benefit from a more concerted approach between different

“
The transport sector would benefit from a more concerted approach between different levels of government: connecting local, regional, national and transnational transport networks is essential
”

levels of government: connecting local, regional, national and transnational transport networks is essential. An EU urban agenda would also benefit from increased coordination between policies linked to urban mobility at European level. We need a mechanism for governance at EU level. We need to include in the Transport Commissioner's mandate the role of guaranteeing coherence of policies related to urban and regional transport policies. This is a tool to overcome policy fragmentation when it comes to goals on urban sustainability. It is a step forward in recognizing the central role of urban mobility in any sustainable urban agenda and for the sustainable development of urban areas.”

Sustainable Urban Mobility Planning is a very efficient governance tool that helps more and more cities to tackle challenges linked to institutional cooperation, and this for horizontal (between city departments and across policy areas), vertical (between governance levels), and territorial (between neighbouring authorities within the same urban system) policy issues.

Transferability: Finally, in order to see through the changes that are being implemented, to ensure they aren't here-today, gone-tomorrow flashes of brilliance that are not founded on the needs of the city or its citizens, we must build on existing knowledge, develop transferability tools, share practices across borders to ensure that European cohesion at the local level becomes a reality. We need to embrace change, and not shy away from it. 🔄

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ERTRAC roadmap on Urban mobility

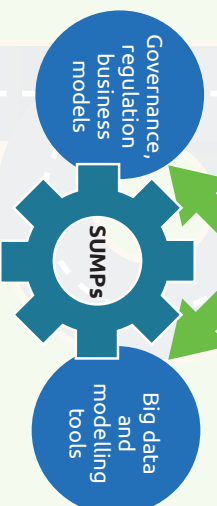


Which major challenges affect urban mobility?

- Air quality
- Carbon footprint (energy use)
- City dynamics
- Pressure on availability of space and congestion

Which major trends influence urban mobility?

- Demographic changes
- Sharing economy
- Digitalisation (including automation)



How to achieve sustainable urban mobility?

Urban mobility solutions and services to be prioritised for European research and innovation

MANAGEMENT



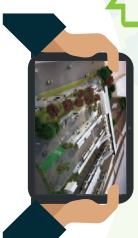
- **Management related solutions**
- Demand management
- Integrated urban mobility and network management
- Integrating urban mobility within overall European transport chains

SERVICES



- **Service related solutions**
- Integrated information
- Integrated payment
- Integrating urban freight and passenger mobility

INFRASTRUCTURE



- **Infrastructure**
- Land use and transport interactions
- Smart interchanges
- Optimised use of infrastructures

MODAL SOLUTIONS



- **Modal solutions**
- Clean fuels and vehicles
- Active and light travel modes

Urban mobility is vital to European society in providing access to services for passengers and goods and supporting economic growth. European cities face similar challenges and perceive similar trends. At the same time, transport demand continues to rise. To manage this increasing demand as well as tackle related societal challenges, a wide range of complementary mobility solutions and services adopting innovative user-centric, smart, multimodal and intermodal approaches, is required.

The new ETRAC Integrated Urban Mobility roadmap identifies research priorities related to urban mobility and freight delivery with the aim to achieve a more convenient, competitive, sustainable and resource-efficient mobility system.

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THINKING
Highways

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Want more about transport issues
concerning smart cities and regions?

All the previous issues
are available online at

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A large, dense school of fish, likely mackerels, swimming in a coordinated pattern against a deep blue background. The fish are arranged in a way that suggests movement and direction, with many pointing towards the right side of the frame.

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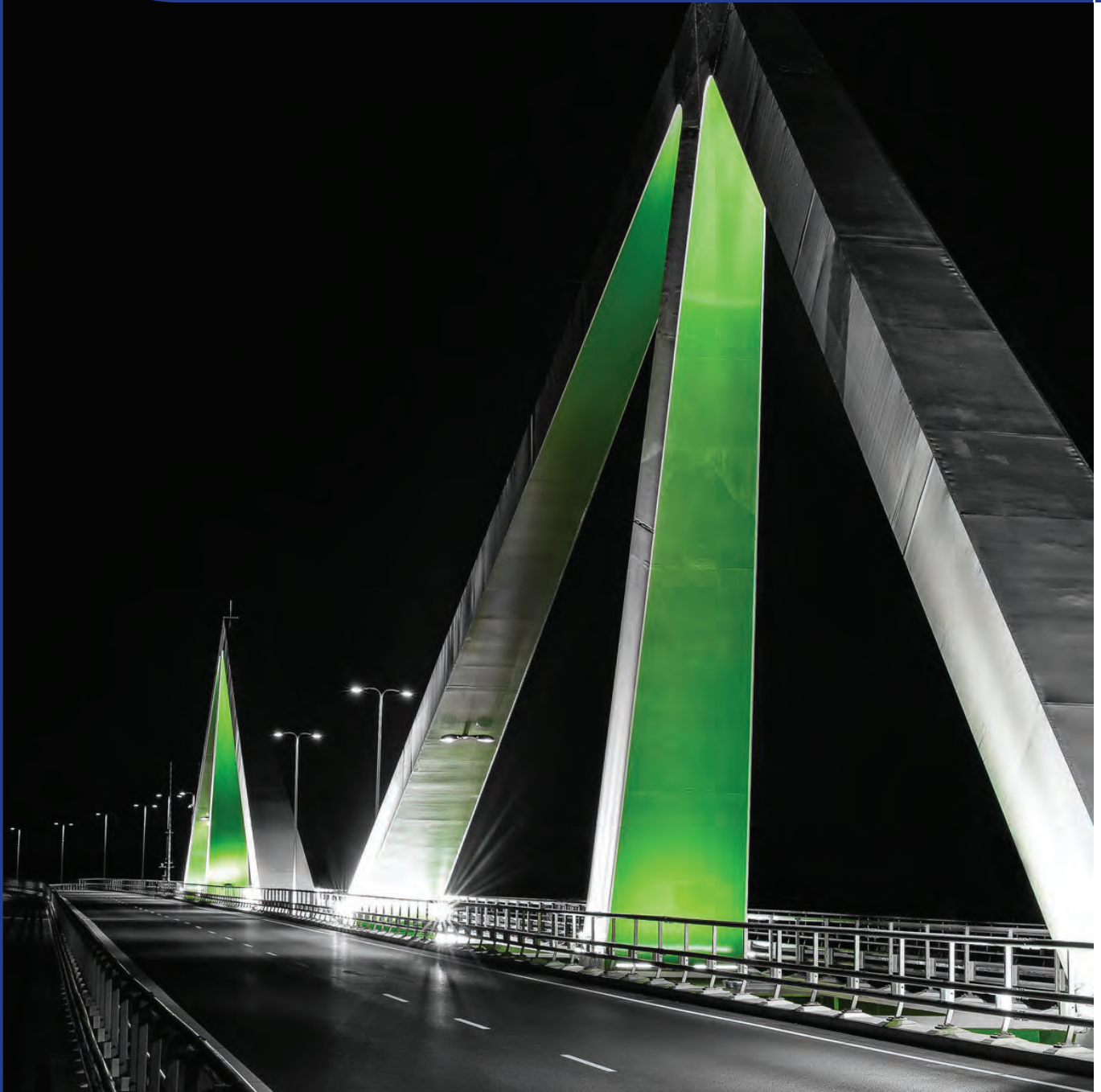
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Cityview

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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Odensification: how to grow your city organically



Thinking Cities' **Pasquale Cancellara** talks to **Steen Møller**, Deputy Mayor for Employment and Social Services Department for the City of Odense, Denmark

Odense is a well-known, middle-sized city in Denmark that has a very peculiar geographical position in relation with the Danish capital, Copenhagen. Could you give us a brief history of Odense?

Odense is an old Danish city, believed to be established before the year 1000, but new archaeological excavations have recently confirmed that

it is even older than that – Odense is at least 1,300 years old. From the Middle Ages to more modern times, Odense was an important city in Denmark. Then in the 19th century it started to become an industrial city with many factories being opened. Now Odense is going through some big and challenging transformations that will turn its industrial past into

a vibrant knowledge city. We have been struggling for the last 50 years and feel now that the changes are happening.

Odense lies in the middle of Denmark – for many people looking at Denmark from the outside it must be strange to see that Copenhagen is the capital as it's in a peripheral position. But this is due to the fact that

Sweden used to be part of Denmark in the old times so Copenhagen was in the centre of Denmark at that time. Odense is nowadays closer to Copenhagen. Twenty years ago the Great Belt Bridge that connected Odense to Copenhagen was finalised and now it takes only 1 hour and 15 minutes by train, so in a way Odense is also a suburb of Copenhagen, as well as being the 3rd largest city in Denmark. It's also the birthplace of Hans Christian Andersen who was born in the city in 1805.

We have experienced that after the big transformations in the city got under way that the population started to grow very quickly. We reached 200,000 inhabitants in August 2016.

Why is the population growing so fast in Odense?

What we can see is that the growth of the University and the higher education institution is part of the growth. It's not the only explanation as it's a combination of Odense's popularity as an educational city combined with the transformation that is taking off at the moment. From being a mere industrial city, Odense is now becoming a knowledge city.

About 30 years ago we decided that we had to focus on robotics, together with the university. We can see now that robotics is really a booming industry for the city, but the same can also be said for IT, drones and welfare technology, if we look at the business side.

The other side is that we have a very vibrant event culture. Now we have large music festivals with lots of events for students, a Hans Christian Andersen festival and a Harry Potter festival. The third reason is the physical transformation of the city. We had a vision in mind, we had the strategic aim densifying the city centre – we wanted to have more people living in the city centre. If you looked at Odense 10 years ago the



Main photo: Many new residential areas are popping up in Odense – including these just by the waterfront.

Left: Steen Møller in front of Odeon, the city's new music and theatre venue

Common to both types of trams is the simple, uncluttered Scandinavian design. Great effort has been put in to providing availability for wheelchair users and other passengers with disabilities

city centre was very flat, no density within the inner city, a very flat city if you like. The core was simply too small. This is due to the presence of industry at the very heart of the city centre. So our ambition was to make the city grow from the inside out. We didn't want to keep building single-family houses, so we took a series of strategic decisions, we made some financial decisions and we built infrastructures that attracted several private investors to build new houses in the centre.

All this is the result of a very integrated approach to urban development: infrastructure and transport, culture and city branding.

Over the last decade, Odense has been undergoing a series of urban transformations with the city centre being reshaped twice, in no small part due to enormous Thomas B. Thriges Street regeneration project. This has had a very positive effect on urban mobility, from bikes to cars, to active travel and now recently with the tramway. Could you briefly tell us what brought the city to implement this ambitious plan and what your overall vision was?

In the 1950s because of the industry that was situated a lot near the harbour, new roads were needed. So to ease congestion the city decided to build Thomas B Thriges Street, a fast-moving, four-lane road that cut the middle of the city into two halves with the purpose of bringing people from the south where they lived to the north where the factories were located.

Since it was opened people realised it was a big mistake. Since the 1980s there has been much discussion about how to make this road 'right' in the middle of the city centre. After the construction of Thomas B Thriges Street many projects around Denmark were scrapped. I was elected to the City Council in late 2005 and two years later, after many

Number crunching

- 53,000 square metres of retail, offices and housing.
- 1,100 parking spaces are being built underneath.
- Construction commenced in the summer of 2014.

The entire district is expected to be completed in 2020.

years of discussions, we decided that instead of just narrowing the street or allocating the space for buses we would make three strategic decision about the future of the street after it is closed:

- Get rid of the cars on the surface
- Build a tramline as the city's highest class transport solution to connect the most important parts of it
- Build a new big car park beneath the former Thomas B Thriges Street while transforming the surface which became free from cars.

All this happened in 2008. Now big hotels are being built together with a large number of new apartments. People are seeing this

important transformation and are feeling enthusiastic.

If before the general public was fearing congestion due to the Thomas B Thriges Street removal, now the attitude towards the project is very positive. There were also fears that nobody would have been attracted to this area and build houses in it.

How did you attract private investments? What was the business plan that you adopted for the urban regeneration of Thomas B Thriges Street?

The city used to own an energy company that was sold for DKr250m (33m). We invested that amount (a state rule in Denmark) and we got DKr250m more from the Danish foundation Realdania, and then the building rights were estimated to be another DKr250m.

So in total we had DKr750m to construct the parking basement in order to build the facilities on the surface like the squares, etc. All the rest is private investment like the apartments and the hotels. The total investments amount is about DKr1 billion, but only about a third was public money.



Steen Møller overlooking the transformation of Thomas B. Thriges Street from a 4-lane road to a new urban area

We have a particular approach when we design for bike users: every time that we build a new road, we create a bike lane. When we built the bridges crossing the canal we built a super cycle highway at the same time



The new bicycle bridge connecting the northern and southern side of the railroad tracks. Already a landmark for Odense it combines aesthetics and functionality

bikes to be able to do the same thing. When building the super cycling highway we are looking at the quality, we make sure that you can inflate your tyres all along the entire route and that there are enough lights. We are also looking at the cycling culture for the kids when they are still in the kindergarten. Our ambition is that every child from the first grade should use a bike or walk to school and we encourage that by letting the teachers plan bike excursions for the children. We lend bikes to kids if they don't have one. We want to make bike a natural means of transport in their everyday lives.

Currently, Odense is considered as “the city of cyclists” (26 per cent of all daily trips in the municipality are made by bike and there is a 540km bike network). Which was the primary pressing reason that brought Odense to invest in cycling?

Growing up in Odense and in the rest of Denmark, you don't think of bikes as a strategic means to get people not to use cars, it's just a natural means of transport.

So when you compare with other cities in Europe, you have to take into account that we have lots of rural areas where people use bikes less. In the inner city centre we have 50 per cent of the modal split of bikes. The first designed bike lane was built back in 1895. The reason why it was built is quite funny: the first bike lane in Odense was built in order to let the fine ladies that didn't want to use the same road as the horses were going (for “excremental purposes”) to reach the forest in the weekend.

But since then many bike lanes

have been built, with 550km of actual separated bike lanes in the city compared to 1000km of municipal roads in the city. We have a particular approach when we design for bike users: every time that we build a new road, we create a bike lane. When we built the bridges crossing the canal we built a super cycle highway at the same time. The bridge was opened two years ago and it is just for cycling and pedestrians crossing the railroad connecting the north and south.

For Odense all this comes naturally, it's something that people just expect. For the city council it is a strategic tool, because we know that if we can just get someone once a week to leave their car at home and take a bike we will have less congestion, less money to invest in roads maintenance and have a better quality of life. So we are investing in super cycle highways, a system identical to the one used for cars. Just as cars could go from the outside right to the city centre, now it's time for

At the moment the city is building a tramway line that is put forward as a solution to Odense's future transport requirements. Why is this tram so intrinsic to the success of the city?

The Initial decision was made back in 2008 when we decided to close the main road – the aforementioned Thomas B Thriges Street. We used the next few years to work on the core of the project and on how to finance it. The reason why the tram is so important is that we simply need a modern public infrastructure for our city that is growing rapidly.

The University is expanding with a new science park being built next to it, new student housing and so on. We estimated that by 2021 there will be in the region of 60,000 more people so we need to find a mobility solution as we cannot let these people attempt to move around by private cars or buses. We needed to have something more in order to accommodate the people using the area. This line will connect the core

Kengo Kuma designed the 2020 Olympic Stadium in Tokyo and is also the architect behind the coming Hans Christian Andersen Fairytale House



of the city, that is the University area to the city centre. The tram will connect also the city's main facilities and the big shopping areas and the big malls.

So we wanted to connect the most important parts of the city. We've been looking at what other cities experienced when building a new tramline and we have noticed that this generates lots of new private investments along the line, especially by the tram stops.

The overall city planning is now being linked to the tramway construction and to the city centre's densification. The tramway fits very well in the overall urban planning projects of the transformation of large parts of Odense. The tramways will cost DKr3 billion, of which 40 per cent comes from the government, 3 per cent from the region, and the rest is from the municipality. Also, we are looking at the option of having self-driving minibuses as a feeder system for the tramline.

How did you manage to get public involvement and acceptance of this very disruptive project?

When we launched the project in 2008, 85 per cent of people were in favour of the decision to build the

new tramline. Now it's slightly lower due to the fact that lots of people are annoyed because of the building sites and the construction works. But what we saw from other cities' experiences is that once the tramline is opened public support again becomes very high. At the moment we are facing a growing opposition and it is quite natural. We carried out a good communications campaign and we made a huge effort to make sure that the general public was well informed. The last result is that 55 per cent of citizens are still in favour.

Finally, what are Odense's plans for the future once this urban transformation project is completed?

One of the things we are really looking forward to and for which we got the finances a few months ago is the future Hans Christian Andersen Fairytale House. This house will be designed by the Japanese architect Kengo Kuma, who is perhaps best known for his Tokyo 2020 Olympic Stadium that is currently being built.

As far as it concerns the tramline, after the first line we want a second and in my opinion also a third and a fourth line because the planning is important so that everything

is interlinked. We know that in five years the old University hospital will be closed because the new one will be opened. So a new area will be made available and it can be transformed again. This area is near the city centre where the tramline 2 goes and we see this as a continuation of Odense's transformation.

We feel we have momentum - every day we read in the newspaper about the success of robotics companies and more investors are coming to our city. We have to help these investors to keep coming here, to look at Odense as a good place for investments. We could be on the verge of creating a new Hans Christian Andersen fairytale.

Aarhus Light Rail has ordered two different types of trains: on the route to Grenaa, the speed will reach 100 km/h. Hence, xll also boost the development of the existing parts of the city that it will run through. The outcome, when the modern, quiet and pollution free light rail replaces the more noisy and polluting buses, is a completely different and improved urban environment. 🌱

FYI

Steen Møller, Deputy Mayor of the City of Odense, is also the Chair of the CIVITAS Political Advisory Committee, a small group of leading and highly motivated politicians that acts as the steering group of the CIVITAS initiative and network of cities. CIVITAS welcomes all CIVITAS Forum members as well as European and global urban mobility stakeholders at the CIVITAS Forum Annual Conference in Torres Vedras, Portugal from 27-29 September 2017.

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Light relief



The first stage of the Aarhus Light Rail system will be inaugurated later in 2017, coinciding with the city's tenure as the European Capital of Culture. The Light Rail will improve both mobility and the environment, while also working as a driver for urban development, as **Jens Velling** reports

This has been a significant year for Aarhus, the second largest city in Denmark. In 2017 the city has been the European Capital of Culture, and at the same time, the first light rail system in Denmark is set to be inaugurated.

The first stage of Aarhus Light Rail consists of two parts. The existing railway from Grenaa to Odder via Aarhus will be upgraded and made

part of the light rail system. The second part will be a new city line reaching from the central station in Aarhus, to two new districts at Lisbjerg and Nye, located north of the city centre.

Aarhus Light Rail has ordered two different types of trains: on the route to Grenaa, the speed will reach 100 km/h. Hence, it will be operated by a tram-train offering high comfort for longer journeys. In the city of Aarhus,

passengers will be serviced by a slightly smaller tram.

Common to both types of trams is the simple, uncluttered Scandinavian design. Great effort has been put in to providing availability for wheelchair users and other passengers with disabilities. The selection of materials and colours are coordinated to give Aarhus Light Rail a distinct, yet elegant identity.



Much thought has been given to the interior design of the light rail system



Aarhus's new light rail system is set to go live later in 2017

AN ALTERNATIVE TO CAR QUEUES

One of the lines of Aarhus Light Rail will run on Randersvej, which today is one of the busiest roads in the city. In the northern part of Aarhus, the line will make a turn off Randersvej and continue towards the new University Hospital. On the way, the light rail will pass several companies, residential areas and educational institutions.

As such, the Aarhus Light Rail will become an alternative for thousands of current users of public transportation. Furthermore, it has the potential to attract many motorists, who will be able to move quickly and smoothly from the city centre to the north of Aarhus.

During rush hours, the light rail will have a frequency of eight departures per hour, making it unnecessary to look at timetables – passengers will simply arrive at the station and take the first available tram.

ENVIRONMENTAL ADVANTAGES

All 26 trams and tram-trains are electrically powered, which will benefit the environment in many ways.

An electric tram is very quiet compared to buses, diesel-powered trains

and cars. Furthermore, pollution from car exhaust and harmful particles will also be substantially reduced.

The electricity for the trams is made from renewable energy such as wind power and biomass. Thus, Aarhus Light Rail will make a substantial contribution to the fulfillment of Aarhus's ambition to become CO₂-neutral by 2030.

A TOOL FOR URBAN DEVELOPMENT

Aarhus Light Rail is not merely a transport system, but indeed a tool for urban development. Experience from other countries shows great interest in investing in real estate along the corridors of a light rail system. When the rails are first laid down, you will be guaranteed efficient public transportation for years to come. Such a long-term outlook attracts investors and developers alike, increasing investments in both businesses and real estate.

The municipality of Aarhus also focuses on urban development along the light rail system. Two new neighbourhoods are planned as clusters around the first stage of the light rail, respectively in Lisbjerg and Nye, north of central Aarhus. The total population of the two new areas is estimated to reach 40,000.

The Light Rail will also boost the development of the existing parts of the city that it will run through. The outcome, when the modern, quiet and pollution free light rail replaces the more noisy and polluting buses, is a completely different and improved urban environment. 🚲

FYI

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Sjors van Duren is Policy Advisor for the Province of Gelderland in the Netherlands and Programme Director of Velo-city 2017, the major cycling conference that takes place from 13-16th of June in the Arnhem and Nijmegen Region. He tells **Florinda Boschetti** more about his job as the lead Cycling Officer and Programme Director of the world's leading cycling event.

Cycle of change

In 2014, the then 29-year old Sjors van Duren was awarded as the Netherlands' 'Best Civil Servant of the Year'. This is some achievement for someone of such a tender age so, Thinking Cities wondered, who is the man behind this prestigious prize?

"At that time I was a traffic and transport consultant at the Arnhem-Nijmegen City Region and I was elected winner by the professional jury of Public Mission magazine, chaired by Jacques Wallage among 100 best civil servants of the Netherlands. I was, according to the jury, "a young, enterprising civil

Sjors van Duren



servant, who believes in an idea and knows how to realize that idea," and "an out-of-the-box thinker with an unstoppable amount of energy."

Today Van Duren is Policy Advisor at the Province of Gelderland where he coordinates cycling policy in the Arnhem-Nijmegen City Region and it's clear that his dynamic enthusiasm isn't even close to showing signs of wearing out.

"I work closely with local governments and the national government to get broad (political) support for the development of the provincial cycling plans. I also contribute to the work of the CROW/KpVV (a not-for-profit

There are more bicycles than there are people in the Netherlands



organization in the Netherlands, the technology platform for transport, infrastructure and public space) and the Dutch Cycling Embassy, to develop and spread knowledge on cycling; especially on the relation between spatial planning, land use and cycling,” he elucidates.

“I was a pioneer in the realization of fast cycling routes between the cities of Arnhem and Nijmegen: The RijnWaalpad. Together with four municipalities, a Province and the local representatives of the Dutch Cyclists union, 17m was invested in a 16km-long super cycle highway. The goal is to change the behaviour of commuters, from driving their cars to riding their bikes. The RijnWaalpad is a testing ground for cycling-innovations: an interactive app, new designs for tunnels and lighting. I also contributed to the realization of the cycling tunnel under the A15 highway which is part of the RijnWaalpad. There is an interactive light sculpture in this tunnel that is essentially a network of LED units that can light up in various colours. With the Bicycle Buddy smartphone app cyclists can choose their own favourite colour. By passing the tunnel more often you can collect more colours to choose from. In this way cycling on the RijnWaalpad is rewarding and fun.”

For a cyclist that sounds like nothing short of heaven on earth.

“Planning cycling infrastructure often encounters resistance in public opinion, even in the Netherlands which is considered to be a cycle-friendly country,” Van Duren responds with something of a ‘straight bat’.

“The Dutch really enjoy cycling. Most Dutch people (around 84 per cent) own one or more bicycles. Of the 17 million inhabitants in the Netherlands, 13.5 million are cyclists and they own 22.3 million bicycles in total. There is no other similarly affluent country in the world where bicycles are used so intensively! Good cooperation between Municipalities, Region and other Governmental bodies is key to success of cycling projects. We still can learn a lot from other countries, for instance on behavioural change and on framing the bicycle better - the Danes are world champions at that.

After Groningen played host in 1987 and Amsterdam held the event in 2000, the Velo-city conference is back in the Netherlands in 2017. So, with all due respect, how did Arnhem-Nijmegen win over the jury and beat the other candidate host cities?

“The Arnhem-Nijmegen region is one of the leading, most progressive

cycling regions in the Netherlands and has developed a cycling infrastructure in which cyclists and bicycles have come to receive top priority. Safety and speed are core values,” insists Van Duren, “and cyclists are respected and innovation runs free. Plus we had some excellent selling points! Firstly, we have the largest, most extensive and top-quality cycle superhighway network in the Netherlands: 60 kilometres of cycle path will be built by 2017, most of which will be non-stop routes. The special bicycle bridge over the River Waal is the perfect solution and a ‘must see’ in light of the global issue of bicycle access over bridges, rivers, canals and train routes. The same applies to the ‘Het Groentje’ bicycle bridge on the cycle superhighway between Nijmegen and Arnhem.”

Van Duren isn’t finished. “We have huge bicycle parking facilities with thousands of spaces in Nijmegen and Arnhem’s central train stations now. The ‘OV Chipkaart’ is a good example of coordination between public transport and bicycles, because the card can be used to rent an ‘OV-fiets’ bicycle, as well as for other public transport services. This leads to completely coordinated connections between both cities. We also have a visiting cycling professor and we host the yearly International Cargo Bike Festival. Last but not least, Nijmegen will be European Green Capital in 2018.”

It’s doubtful that any of the other candidate cities could compete with any of that but Van Duren is of the opinion that there’s more to their winning than what they have. Thinking locally, acting nationally might have been just as important.

“Actually, the whole country of the Netherlands will be the host of Velo-city in June. The conference itself will take place in Arnhem and Nijmegen but we have an extensive pre- and post-programme in the best Dutch cycling cities, organized by the Dutch

Cycling Embassy, and numerous excursions during the conference. On the Wednesday afternoon, 14 June, all conference attendees will visit Amsterdam to “be an Amsterdammer for a day”. A dedicated train will take all participants to Amsterdam to ride there and have a great evening in the Dutch capital!”

So what exactly is Van Duren’s role? What does being Programme Director of Velo-city 2017 entail and what will attendees have in store?

“Together with a team my role is to create a top-notch confer-

Strategy, under the supervision of the European Cyclists’ Federation (ECF), which will recommend objectives and define actions falling within EU competence,” he purrs.

“The keynote speakers will highlight the five conference themes: Governance, Infrastructure, People, Bikenomics and Urban Planning, in a different and innovative way. Personally, I am very proud to present names like philosopher and Dutch national thinker René ten Bos, the “cycling professor” Marco te Brömmelstroet and Julia Nebrija

enviously high levels of modal split?

“We will further integrate cycling policy into an intermodal transport system and the cooperation with architects and urban designers will be exploited to seek new solutions and combine attractiveness and effectiveness,” he notes. “We will continue to improve our infrastructure as we get more diverse bicycles like speed pedelecs and cargo-bikes. We will also continue to work on behavioural change, for instance with connectivity and with apps.

“The OV-fiets shows that there is a real synergy between high-quality public transport (rail or bus corridors) and cycling. Getting to the station by train and hopping on the bike for the last 5 kilometers; offering you the convenience of public transport on the long stretches and the freedom of cycling in the city near the station.

“The creation of fast cycling routes, sometimes called super cycle highways, makes it more and more convenient to travel by bike into the cities,” he concludes. “The removal of stops and the added comfort make cycling easier and more enjoyable and they prove to be an excellent system for the pedelec, reducing travel times and, very importantly, the efforts needed to bridge distances in the larger urban regions.” 🚲

MORE INFORMATION

- Velo-city 2017 conference: www.velo-city2017.com and preliminary programme www.velo-city2017.com/program/conference-programme
- Cycling in the Arnhem Nijmegen City Region: www.snelfietsroutesgelderland.nl/arnhemnijmegencycling

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Arnhem-Nijmegen could not be a more fitting host for Velo-City 2017



ence programme. The conference programme contains a number of inspiring keynote speakers, plenary sessions and more than 60 parallel sessions. There are over 260 speakers from more than 40 countries: great speakers from around the world will be presenting their latest insights, stories and research.

“Velo-city 2017 will welcome the EU Commissioner for Transport, Violeta Bulc, for the official handover of the blueprint EU Cycling Strategy. Stakeholders from diverse backgrounds, including Polis and some of other Members, have joined forces over the past few months to develop a blueprint for an EU Cycling

from Manila who will be addressing the impact of cycling on social inclusion and emancipation. In special outdoor sessions conference participants will see the effects of Dutch bicycle policy in practice (and also have a look at the not-so-good projects!) and they can bring their cycling project to special design workshops with the best Dutch experts from CROW.”

Finally, *Thinking Cities* wanted to know what the future has in store for Van Duren and for what is clearly his passion: cycling in the Arnhem-Nijmegen Region. What are his future projects for keeping up the good work and maintaining those

Environment and Health in Transport

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

- **Ile De France** - Paris has launched an ambitious electric van-sharing scheme
- **Zero emissions cities** - Who will win the race to be the world's first emissions-free city?
- **FIWARE** - greenApes, Magenta and TeamDev join forces to launch a FIWARE-enabled smart city network



Commercial in confidence

This Citroen Berlingo is among Ile de France's fleet of Light Commercial Electric Vehicles



Photo © Groupe PSA Direction de la communication

With the financial support of the Ile-de-France region and the national agency for environment and energy (ADEME), the City of Paris launched the VULe project in January 2017. The project implements an innovative electric van-sharing scheme for professionals in the French Capital. **Françoise Guaspere** and **Thomas Mourey** take up the story

In order to foster innovative mobility solutions in the Ile-de-France region, in 2015 the French regional authority launched an open call for innovative mobility projects. Through this open call, the region expected to select

projects able to develop new logistics systems, to create new partnerships and funding models and to change the users' behavior in the field of urban transport.

The objective was clearly to test and deploy innovative solutions

that are accessible to all and which contribute to the energy transition. The Ile-de-France region received a large number of applications and selected six projects to be funded, including VULe (Véhicules Utilitaires Légers Electriques, or Light Electric

Commercial Vehicles), an electric van-sharing scheme for local craftsmen and shopkeepers in Paris.

A RESPONSE TO A NEW LEGAL FRAMEWORK

The concept of the project responds to the results of a study carried out by the Paris Economic Chamber that shows that 47 per cent of companies in Paris use a vehicle to deliver goods in the city. This represents approximately 45,000 vehicles.

Due to the new French law on the Energy transition, 9 per cent of these freight vehicles (3,900) – those registered before 2001 – will not be allowed to circulate in the city of Paris after July 2017 as the municipality of Paris recently introduced new regulations limiting the traffic of polluting vehicles in the city with restriction levels increasing over time. In the study carried out by the Paris Economic Chamber, half of the companies' directors interviewed said that sustainable vehicles would be better

adapted to their delivering activities and admitted that the price of such vehicles is the main obstacle for the acquisition of an electric (or equivalent) vehicle.

Moreover, freight vehicles in urban areas are used for short distance journey and are responsible for 30 to 50 per cent of urban transport related pollutants (PM, NO_x, PM) emissions as well as for ambient noise. They are therefore good candidates for electrification.

In this context, the Ile-de-France region decided to financially support the City of Paris for the implementation of the e-van sharing scheme for local craftsmen and shopkeepers in the framework of the VULe project.

VULE IN ACTION

The electric van-sharing scheme – managed by Clem' – proposes a total of 10 zero-emission vehicles for sharing in five stations located in the very centre of Paris (2nd and 3rd arrondissements). Eight of the

vehicles are electric vans supplied by PSA-Citroën. The fleet is completed with a refrigerated electric Renault Kangoo van and a hydrogen vehicle provided by the company SymbioFCcell.

To use the scheme, professionals must register online, via a dedicated platform on which they can choose their type of subscription and book a vehicle any time they need to use one. The online pre-booking system gives users the certainty of finding a vehicle at a pre-defined station at a certain hour, therefore reducing the anxiety related to the fact of sharing a vehicle.

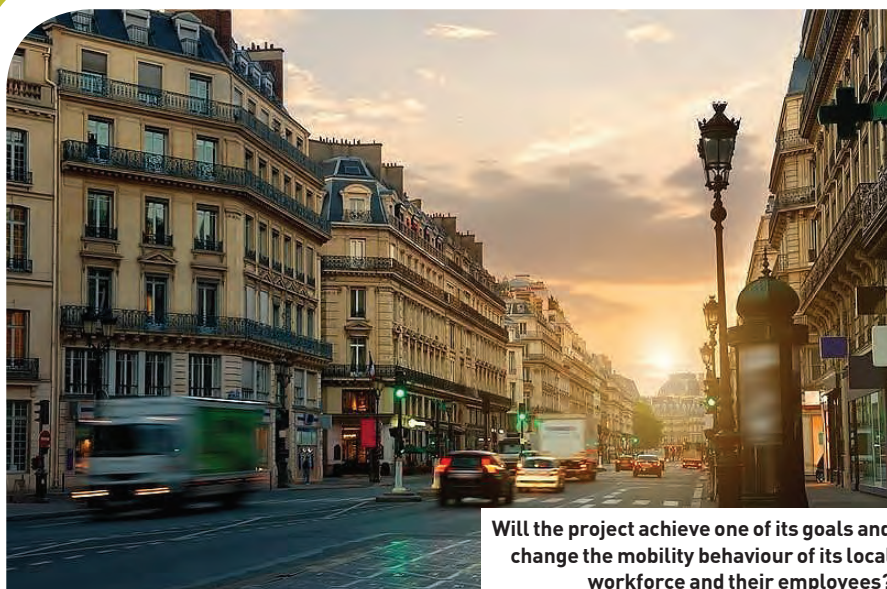
The payment is made via the same platform, on a pay-as-you-go basis at a rate ranging from 3 /hour to 11 /hour depending on the hour (peak hour or off-peak hour) and the type of subscription.

EXPECTED RESULTS AND NEXT STEPS

The test phase started in April 2017 and runs until the end of the year.



The City of Paris received financial support from the Ile de France region for the VULe project



Will the project achieve one of its goals and change the mobility behaviour of its local workforce and their employees?

During this period, the objective of the Ile-de-France region, the City of Paris and their partners will be to change the behaviour of the local craftsmen and shopkeepers by showing them the possible economic benefits of using the electric van-sharing system.

The idea of the City of Paris is to give to small companies the opportunity to respect the environmental norms without major investment. Christophe Najdovski, the Deputy Mayor in charge of transport explains that this scheme is a practical response both to the needs of the craftsmen and shopkeepers in Paris and to the repetition of pollution peaks.

The advantages for the professionals are numerous: using the zero-emission shared vans enables them to drive in Paris without any restriction related to the environmental performance of their vehicles.

The cost of the vehicle per hour is limited and the overall cost of using the sharing scheme is much lower than the purchase cost of a corresponding diesel (or clean) delivery van. Finally, thanks to the 12 parking places reserved for the vehicles of the sharing scheme, the costs and time usually related to parking are no longer supported

by the users. The same applies to time and money invested in maintenance. One of the users, the manager of a wine bar in the centre of Paris, estimates that using VULe vehicles will cost around 800 per month, compared to the approximately 2,000 of their current diesel vehicle costs.

During the test phase of the VULe project, the partners look into the business case and expansion possibilities. The partners estimate that to be economically profitable, the electric van-sharing scheme must propose one vehicle for at least 20 users. Prior to the launch of the project, the Paris Economic Chamber identified approximately 70 companies that were interested in testing the VULe concept and to take part in the pilot phase.


THREE STEP PROGRAMME

A group of 15 users has been selected to evaluate the concept and give feedback on the services and indicate their suggestions. This analysis work will be made following a three-step approach. The first phase has started with the identification of the users' needs regarding the delivering activities (frequency, duration and trips time slots) and

the reasons for using VULe prior to the test period.

The idea is to compare the information collected at the start of the pilot project with the effective use of the service. In a second phase, the VULe partners will interview different types of users in order to understand why they are using the service frequently or not. This task will also allow the identification of the companies that regularly use the service and the companies that use the service more randomly and see if there is a correlation between the type of use and the type of delivery activities of the company.

Finally, after the demonstration test, users will be asked whether they are ready to use permanently the new service or not and how much they would be willing to pay for it.

If the pilot project proves to be successful and if the results of the analysis are encouraging, the City of Paris will be considering making the electric van sharing scheme permanent and to expand it all over the city in order to increase the environmental impact of zero-electric deliveries in the city. 

FYI

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A large, three-dimensional green ring stands on the left. To its right is a green wreath made of many small leaves, which is shaped like a stylized letter 'e'.

How can we rise to these challenges while simultaneously reducing the environmental impact of all transport systems?

Holding out for a zero

The race is on for a zero emissions city of the future. **Graeme Davison** sets the pace

In 1950, less than one in three people lived in urban areas. Today over half of us call the city our home, and by 2050 that number is set to rise to every two in three of us. Over the course of 100 years, the pressure on the cities where we live, work and socialise will have doubled. Our planet already hosts 28 mega cities (with populations of over 10 million), with 13 more set to

join the ranks by 2030.

Though the modern city streets may not be paved with gold, these figures show that they do continue to thrive. However, the modern city also has its challenges. Challenges that will only become more acute as such cities continue to grow in both size and number. Among the most prominent of these challenges is transportation, and the

accompanying effects of carbon emissions.

Urban transportation systems need to evolve as their cities do, and that evolution in the way people navigate a modern city - what we term urban mobility - poses many questions. As more and more people look to travel, can journey times avoid increasing? Can quality of life be maintained, or improved, in a

city with more travel infrastructure? How must public and private transport flex to carry millions more in the coming years? Perhaps most importantly, how can we rise to these and other challenges while simultaneously reducing the environmental impact of all transport systems?

There is no single solution or an ideal city model that answers these questions. There

is, however, a common thread in the way cities are responding to the urban mobility challenge - technology.

Just as urban areas built around river barges or the horse shifted to a c c o m m o d a t e the emergence of the car, new technology is prompting a major rethink about the way we organise cities.

The Internet, smartphones and connected devices are having a profound impact on the shape of the cities in which we live. Maturing and emerging technologies such as electric vehicles (EV), connected public transport systems, 'smart' traffic sensors and even driverless cars offer a glimpse into what the mega city of the future might look like: a city in which people can travel efficiently, easily and sustainably.

As cities around the world use these new technologies to learn how to cope with increasing transport demands while reducing environmental impact and improving quality of life, the race has begun

to become the first zero emissions city of the future.

WHAT WILL A ZERO EMISSION CITY LOOK LIKE?

While we can't accurately predict what a zero emissions city of the future will look like, we can predict that it's highly likely they will share more than a few traits. Taxis, inner city rail and bus fleets will depend on clean, sustainable energy for power. Governments of zero emission cities will prioritise sustainable transportation networks both in terms of regulation and funding.

For those who choose private transport they will in all likelihood rely on electrically powered vehicles. Many journeys will also rely on car-sharing, and households will subscribe to schemes that will allow them access to a car when they need one. The preference for public transport and car-sharing will ultimately lead to a reduced number of vehicles on the road as well as the space needed for driving and parking cars. Congestion will ease, and new-found spaces could be converted into green leisure areas or used more efficiently for housing or commercial developments.

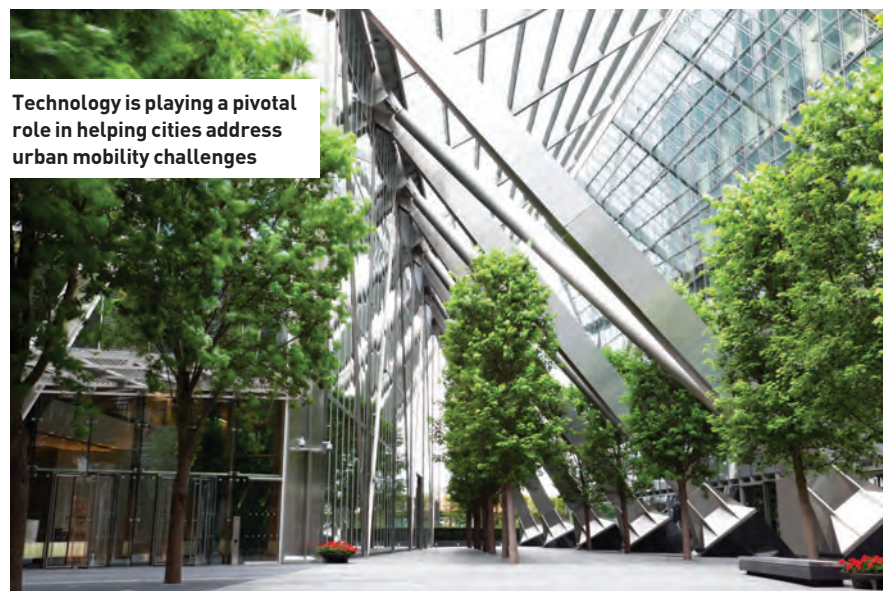
We also know that autonomous vehicles will play a significant role in making zero emissions transportation a reality. Driverless cars, taxis, buses and trains will minimise human error and make journeys much more efficient, reducing congestion and increasing travel speed. Paired with EVs, these two technologies will have the greatest impact on urban mobility.

Finally, for those who become zero emission city pioneers, these cities will pair technological advancements and sustainable infrastructure with substantial financial and non-financial incentives to encourage the use of sustainable transport. Such cities will have made the zero emissions agenda a priority via binding city-level plans and through international commitments at a country level.

WHO ARE THE FRONTRUNNERS?

While many may hold zero emission ambitions, some cities are much farther along this journey, and are likely contenders for the title of the first zero emissions city.

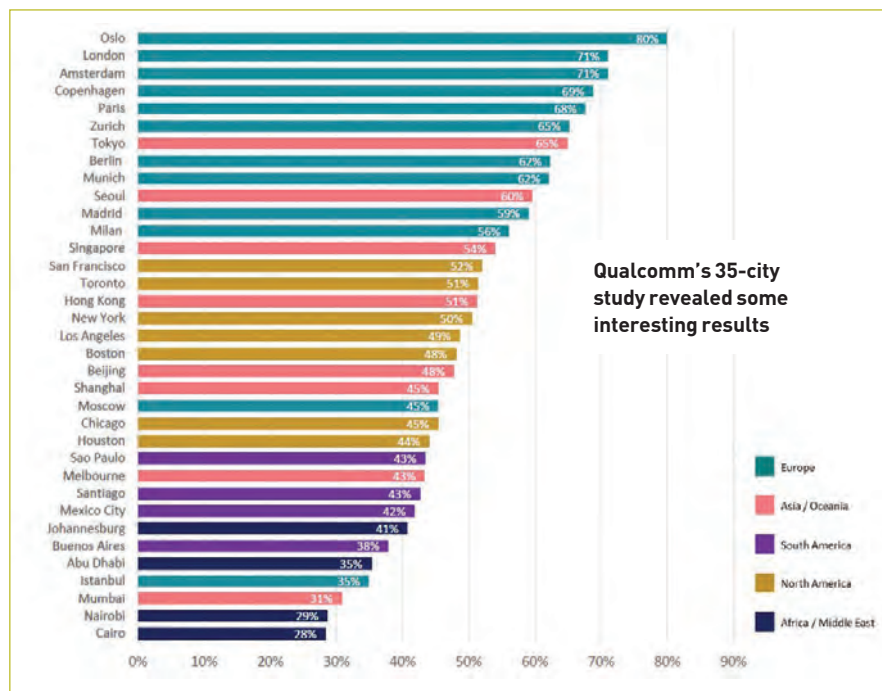
Qualcomm Technologies Inc. recently commissioned a report from the Centre for Economics and Business Research (Cebr) into the viability of zero emission cities



Technology is playing a pivotal role in helping cities address urban mobility challenges

around the world. The results begin to paint a picture of the global urban landscape of the future:

- Oslo is set to be the world's first city with a zero emissions transportation solution. The Norwegian capital tops the overall ranking, with London and Amsterdam occupying second and third spots respectively.
- European cities lead the way for sustainable transport. Eight of the top 10 scoring cities are based in Europe thanks to a mixture of innovative transportation schemes, intelligent use of technology and an advanced approach to incentivising citizens to change habits. Tokyo and Seoul round out the top 10.
- Asian cities are among the most ambitious and visionary in their approach to a zero emissions future, but are challenged by the scale of the current situation. Cities across Asia show a particularly strong performance in their preparedness for the future, with a desire to create smart, connected cities filled with driverless EVs and public transport, but grave air pollution concerns mean they face a long road ahead.
- Progress of North American cities is weakened by a reluctance to fully embrace change. A feature shared by many North American cities that damages their overall ranking is citizens' attachment to private, polluting vehicles. Low fuel costs and a tangled federal, state and city legislative framework



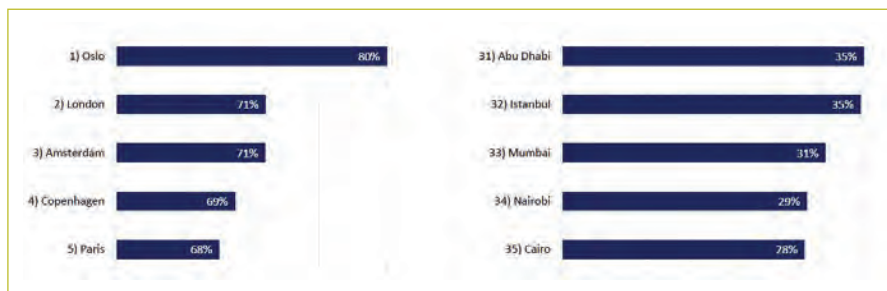
combine to leave North America in a position where citizens have a mixed level of incentives to change their habits.

- South American cities are still in early stages of battling emissions, but face fewer challenges. While there are some encouraging signs emerging from South America, cities are largely in the early stages of introducing low emission measures to transport systems and their pace of progress is slow. However, at present they face fewer challenges than in other parts of the world and could therefore achieve a sustainable transportation system more quickly, should they escalate efforts.
- With cheap oil and few zero emission incentives, Abu Dhabi

sits towards the bottom of the index. However, its huge ambitions and willingness to invest significant sums means it could quickly leap up the index. The Gulf city is in a somewhat unique position, as it scores poorly across both its current position and in its efforts to create change, but extremely highly when it comes to preparedness for the future. There is evidence the city is seeking to skip stages of the journey towards achieving zero emissions and should it stay on its current trajectory, the city could rush up the index in the coming years.

- For African cities, achieving zero emissions is still not a top priority, with little evidence of efforts on the behalf

As cities around the world use these new technologies to learn how to cope with increasing transport demands while reducing environmental impact and improving quality of life, the race has begun to become the first zero emissions city of the future



The top five and bottom five in Qualcomm's Zero Emissions Cities report

of government or private parties. Though cities such as Cairo, Johannesburg and Nairobi have a relatively low reliance on private, polluting vehicles, there is little evidence of a desire for change either at a governmental or citizen level and zero emissions isn't deemed a key priority.

WHAT WILL IT TAKE TO WIN?


With so many cities showing a firm commitment to eliminating emissions, and some already relatively advanced towards achieving this goal, the question is not whether a city with a zero emissions transportation solution will exist, but when.

Predicting which city's transportation system will reach the milestone of becoming emissions free and when is complex. What is clear is that an entirely emissions free system for urban mobility is still a few decades away at the earliest, as even Oslo, the top scorer in these rankings and the most mature city in its approach, has a target to be fossil fuel free by 2050. Given the city's track record of setting measured, achievable targets and its ability to meet them, this timeframe should be realistic.

Oslo, however, shouldn't relax yet. Rapid advances in technology and other cities' readiness to

embrace them could accelerate this timeline, and displace Oslo as the race leader. Other European cities with a strong starting position and innovative mind-set are contenders, and could leapfrog Oslo, while Asian and some Middle Eastern cities show signs of looking to jump straight to the finishing line by investing significant sums in technology and infrastructure.

Technology is a huge enabler for the zero emissions cities of the future, but it's far from the whole solution. Attitudes of governments and citizens is just as, if not more, important. We've seen that those cities that are willing to both pull the sustainable urban mobility agenda through incentives and push it via penalties have had the greatest success, in contrast to others that remain attached to traditional means of transportation.

Emissions are now firmly on the international agenda and cities have made incredible strides in a short period of time to tackle the issue. The conditions for change are, broadly, in place and the future is looking positive, with technology breakthroughs in transportation now firmly aimed at reducing emissions. Each city faces its own unique challenges and will find unique solutions for the people who live and work there, but with so many runners in the race all for the same goal there are commonalities and key learnings to be shared that will only accelerate advances towards cleaner, more connected and increasingly sustainable transportation systems. 



Traffic in Lagos, Nigeria. Many African cities are a long way from prioritising zero emissions goals

FYI

Graeme Davison is Vice President, Business Development & Marketing, Qualcomm Technologies, Inc.

The only way is ethics



Three FIWARE-based solutions for Smart Cities are joining forces to develop a modular and open platform, leveraging “complementary vertical experiences” in the fields of IoT, data management and citizen engagement. The all-Italian line-up is brought together by a common passion for ethical citizenship. **Walter Alexander** and **Kevin Borrás** introduce you to Magenta, greenApes and TeamDev

FIWARE, Future Internetware if you prefer the full description, is a middleware platform, driven by the European Union, for the development and global deployment of applications for Future Internet. The API specification of FIWARE is open and royalty-free, where the involvement of users and developers is critical for this platform to become a standard and reusable solution. The objective of FIWARE is to facilitate a



TrafficFlow/Magenta's devices can easily be installed with negligible costs compared to conventional bulky road infrastructure



cost-effective creation and delivery of Future Internet applications and services in a variety of areas, including smart cities, sustainable transport, logistics, renewable energy, and environmental sustainability. FIWARE provides an enhanced OpenStack-based cloud environment plus a rich set of open standard APIs that make it easier to connect to the Internet of Things, process and analyse big data and real-time media or incorporate advanced features for user interaction.

In September 2014 the European Commission launched the FIWARE Accelerator programme whereby SMEs, start-ups and web entrepreneurs can get a funding support of up to €150,000 for the development of innovative services and applications using FIWARE technology. It calls for SMEs and web entrepreneurs to develop highly innovative services and applications.

One of the ways in which applicants can do this is through the frontierCities2 - Another Level of Impact Accelerator (fC2) builds on the powerful basis of the first edition of the frontierCities Accelerator (2014-2016), which created an exceptional



geographical reach including 28 SMEs and start-ups developing and trialling 28 smart mobility solutions in 45+ city environments across Europe.

frontierCities disbursed €3.92 million in grant funding to address mobility issues in cities, through a streamlined two-step application process which attracted 594 Step 1 and 207 Step 2 applications respectively, and in addition provided technical and business support to the selected solutions.

frontierCities2 represents a quantum leap in the scope, ambition and service of the Acceleration & Incubation process of FIWARE SMEs and Start-ups. It provides €1.6 million in grant funding across two Open

Call strands (Market Acceleration Grants, Development & Acceleration Grants), further developing the range of available FIWARE-enabled smart mobility solutions, while broadening into other Smart Cities areas. One of the success stories of the original frontierCities project was greenApes, an Italian-based sustainable, digital social network.

One of the success stories of the original frontierCities project was carried out by greenApes, an Italian-based sustainable, digital social network. A FIWARE-powered solution, greenApes has been successfully piloted in Florence and Essen (European Green Capital 2017) and is moving on to new cities and regions.

greenApes is a digital platform that promotes sustainable living by combining social networking, gamification and real-life rewarding elements. An enjoyable and completely free environment for citizens, it delivers valuable services to municipalities and partnering brands. Since late 2015 and throughout 2016 greenApes successfully tested in the aforementioned two pilot cities with a thriving community of citizens that is constantly growing. Some 72% per cent of engaged users declared they adopted new sustainable behaviours while engaging with the app. After approximately 10,000 app installs, 100 commercial

The platform aims at developing a sustainability-oriented culture, reinforcing social norms around sustainable lifestyles and giving visibility to best practices

partners, advanced contacts with new cities and campaigns with national brands, the company is ready to expand its operations.

How does greenApes work? Citizens can create a profile and earn points for inspiring the community with ideas and stories around sustainability, and for certifying their green actions. These points, called BankoNuts, give them access to rewards offered by commercial partners. By being part of the greenApes platform, green companies gain visibility and access loyalty services to address a target audience of responsible consumers.

Certification of green behaviours is performed via the digital integration with third-party apps (e.g. public transport, car-sharing, energy providers) but also in connection with offline initiatives (recycling stations, NGOs). greenApes positions itself as a tool that strengthens synergies among existing and future initiatives of Smart Cities.

VIRTUE IS A VIRTUE

The platform brings together virtuous behaviours of citizens, who get to build a sustainable profile over time, being acknowledged and rewarded for their positive impact. Cities can thus benefit of an incentivizing scheme, engaging citizens and promoting local green economy, while displaying their commitment to sustainable development. The user experience can be readily customised city by city, allowing a complete alignment with local strategies and priorities.

Overall the platform aims at developing a sustainability-oriented culture, reinforcing social norms around sustainable lifestyles and giving visibility to best practices. This public-private scheme successfully introduced individual incentives for actions of collective interest.

The greenApes platform is composed by the frontend applications, which are available for mobile devices (iOS and Android) and web browsers, plus the backend services, which are a set of distributed software components deployed on different cloud services, to ensure scalability and redundancy.

An essential component of the backend services was developed with FIWARE solutions. Under the frontierCities acceleration programme greenApes developed the goApes functionalities that, among other things, allow the connection of third-party providers to the rewarding system of the platform and the automatic acquisition of sustainable mobility actions from trusted partners (e.g. car-sharing services, carpooling apps, public transport companies).

Gregory Eve, CEO and co-founder of greenApes, is very positive about the experience with the FIWARE technology and acceleration program: "Of course we were initially attracted to the programme, also for the funding opportunities attached, but as we deliver transparent solutions for citizen engagement, we felt that embracing FIWARE was the right thing to do, for the sake of openness and interoperability". He continues:

"I must say that the ICT team was a bit worried at first about this choice, there were rumours about the components being not fully reliable. But the enablers we picked gave us no problems and developers were absolutely satisfied with the experience. The mentorship and training delivered were also very good, just as the ones offered during the FIWARE INCENSE acceleration program that we were part of with our separate business line, which develops solutions for employee engagement in sustainability and CSR programs of large companies"

The next steps involve launch in new cities and countries, while the company is opening for a round of investment. But while evolving this citizen engagement app greenApes started looking into the opportunities offered by the Smart City platforms market.

"We never thought we should reinvent the wheel, but rather liked the idea of bringing our citizen engagement experience to join companies with complementary experiences," Eve argues. "I had worked with Walter Nunziati from Magenta in previous projects and from the start I appreciated their approach and IoT solutions. We were looking forward to concrete cooperation opportunities. When we started discussing about the development of Smart City Platforms he brought along the name of TeamDev and their experience with WiseTown. At that point the team felt right and we rolled up our sleeves"

IN THE PINK

Magenta's TrafficFlow initiative is another story that began in Florence, addressing a key problem of smart cities information systems, which is the acquisition of continuous traffic data.

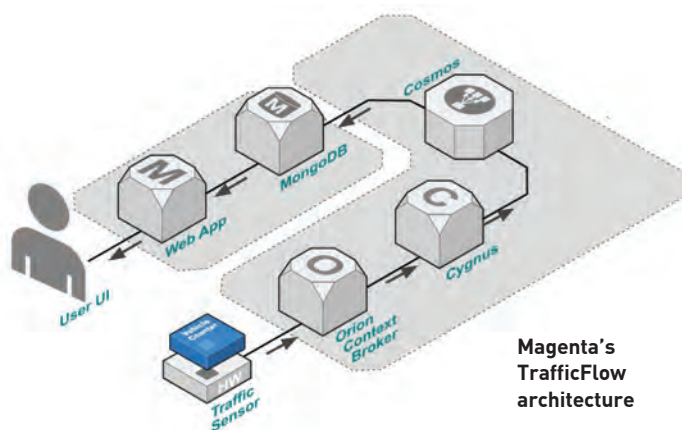
The recent push towards Intelligent Transport Systems (ITS) within modern day smart cities requires a large amount of high quality traffic flow data in real-time. In particular, data

collected from fixed or temporary on-road stations are important for a variety of planning, operation, and public information tasks and services, including:

- Solving traffic congestion problems (demand management, based on understanding of the behaviour of traffic under normal and extreme conditions, to encourage drivers to change mode of transport, alter the time of day or day of travel, or not to travel at all);
- Promoting economically and environmentally sustainable modes of transport (improved public transport, safe walking and cycling);
- Mapping in real-time available parking spots in order to communicate information to users.

Traffic data is, therefore, vital for efficient traffic management. Various reports demonstrate the dimension of the challenge. Traffic congestion “costs the US US\$121.2 billion per year.” The European Union estimates that traffic congestion costs “about 1 per cent of the total GDP every year and also causes heavy amounts of carbon and other unwelcome emissions”¹. The relation between air quality and traffic congestion has been also demonstrated.

However, there is a significant industrial and economic problem related to traffic monitoring. Despite the importance of traffic data, most cities have difficulty paying for infrastructure embedded with on-road traffic sensors, which support sufficient data collection. While traffic monitoring technologies (based on inductive loops, cameras, ultrasound, radio waves, to name but a few) have existed for some time, public and private organisations continue to rely largely on manual traffic counts. This is true for most



European countries: some merge manual and automated tools, but nowhere is there a fully automated system across the whole country.

This is where TrafficFlow steps in: it is an innovative, flexible and low-cost platform for road-traffic data collection and analysis. It is based on sensors equipped with video analysis software, capable of collecting meaningful statistics on the number of vehicles passing through the observed lanes, their estimated speed, and their type. The sensor's hardware is the Raspberry PI device equipped with the Raspicam camera. In typical installations, the sensor is attached to a window, or other existing vantage points, without requiring any dedicated infrastructure (see pictures below).

The entire platform has been extensively tested in the City of Florence in the context of projects CHEST², and FIWARE accelerator SOUL-FI³. Currently, the system is in usage in various pilots around EU and beyond, including London as part of the Organicity experiment.⁴

TrafficFlow is an example of a participatory approach to city monitoring, where citizens directly support the growth of agile and smart solutions using modern technologies. Magenta is currently experimenting the combination of traffic and air quality monitoring in an ongoing pilot in Florence.

“We built the web platform using components from the FIWARE

catalogue, and particularly we used the Orion⁵ context broker to acquire data from the sensors and the Cosmos Big Data⁶ enabler suite to store the data for efficient retrieval,” says Sanjeya Cooray, lead architect of the solution at Magenta.

Magenta seeks partnerships for the TrafficFlow product, and in particular would like to integrate

their solution with systems and platform for smart cities, “to leverage existing and upcoming initiatives centred on projects focusing on digital social innovation. With this goal in mind, greenApes is a perfect match to our proposal and we are currently working toward the design of an integrated solution for sustainable mobility which includes our IoT monitoring technology and their citizen engagement platform,” says Magenta's CEO Walter Nunziati.

WISE BEFORE THE EVENT



Some years ago the founders of TeamDev were working in several Public Administration IT projects and, after some experiences in middle size towns in Italy, the WiseTown concept was starting to play on their mind. Citizens and city management are mostly on two different sides of the “barricade” like in a perpetual undisclosed battle but this approach is not sustainable in the medium-long term.

So the idea was to create WiseTown as an ecosystem of applications and

tools to improve citizens' quality of life in a collaborative environment. Wise stands for Web Information Stream Enhancer and from this we can appreciate the main idea of the ecosystem: collecting information from different data sources to make them valuable to manage, organize and plan city development.

In the project we started building two different applications:

- **Issue Manager:** a tool, composed by web, app and API interface, capable of collecting information about city reports and managing them using an embedded set of workflows. WiseTown IssueManager can relay each reported issue to the right office or external suppliers and then follow the issue solution giving feedback to the citizens in real time. It uses open standards and Open311 as the main reference to store and manage citizens and not emergency reports;
- **Crowd Planner:** a tool that cities use to propose city improvements to the citizens. It's based on a geographical interface that the citizens can use to navigate the proposals and to evaluate their impact on the cities and on their own neighbourhood. It uses, as does the IssueManager, geographical Open Data to empower cartographic visualization of the city.

Now we are releasing a new module, WiseTown Situation Room, an environment that cities can use to manage local emergencies and other city-level events that involves not just the management team but



FIWARE at GCTC '16: Andrea Cruciani of TeamDev showcases WiseTown

volunteers and operators external to the city management team.

All these vertical applications are supported by specific modules like the OpenDataManager that enable WiseTown to consume and generate new real-time updated Open Data sets, a valuable asset for the cities and the IoT Monitor that connects our solution to third parties IoT solution, such as in the case of Magenta's TrafficFlow that provide key information about mobility in the ecosystem.

A key point of all the WiseTown civic technologies ecosystem is citizens' involvement, so we discovered the importance of collaborating with greenApes that can support WiseTown to be correctly implemented among the citizens and that can provide useful information to improve right usage of the applications and future development of new features requested by the citizens.

WiseTown's final goal is not only giving the right tools to the cities, but the heart of the whole project is the WiseTown Geo Analytics: a set of dashboards, maps and algorithms that can support city managers to analyse the actual situation, raising

awareness on hot spots and providing forecasts on city issues and future evolution about security, mobility, infrastructures and other topics. All this information can be enriched with the pre-existing legacy datasets of the city and are crucial to improve city planning. For this reason we say that WiseTown is a "city quality enhancer".

WiseTown applications are now in use in the city of Perugia and they have been presented, thanks to the FIWARE Mundus initiative, at several workshops in the US at the US Ignite GCTC (Global City Team Challenge) organized with the collaboration of NIST.

The initial kick-off of WiseTown has been accelerated by the FIWARE Finodex project, in which WiseTown has been awarded as one of the top-ranking projects, and thanks to that we have been showcased as one of the FIWARE Success Stories and one of the projects presented in several international events such as the Smart Cities World Expo 2016 in Barcelona, First FIWARE Summit in Malaga 2016 and now in the Second FIWARE Summit in Utrecht in May 2017.

Working in the Smart Cities civic technologies we are convinced that technology adoption is a focal point to improve the overall quality of life for the cities of tomorrow, we also think that: "We like Smart Cities but we prefer WiseTowns!" 🌐

FYI

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NOTES

- [1] European Commission (2014) The EU explained, Connecting Europe's citizens and businesses
- [2] <http://www.chest-project.eu/>
- [3] <http://soul-fi.ipn.pt/>
- [4] <http://organicity.eu/>
- [5] <https://catalogue.fiware.org/enablers/publishsubscribe-context-broker-orion-context-broker>
- [6] <https://catalogue.fiware.org/enablers/bigdata-analysis-cosmos>

Mobility, Multimodality and Traffic Efficiency

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 **Kaunas** - Lithuania's second city has something to say
- o **Luxembourg** - How to track and trace the mobility behaviour of a whole city's worth of workers
- o **Pisa** - A new electric passenger transport system is changing the mobility habits of an entire city
- o **Brussels, Budapest and Stockholm** - Thinking Cities reports from the 5th Sustainable Urban Mobility Awards
- o **CIMEC** - A co-operative ITS roadmap

Mobility, Multimodality and
Traffic Efficiency



The sound of progress

Visually impaired travellers in Kaunas are now finding it far easier to navigate their way around Lithuania's second city with the help of an innovative audible bus information app, as **Jim McGeever** explains

At the start of this year, the Kaunas city public transport bus company launched the 'KVT Voice' app (Kaunas Public Transport 'Voice') for blind and visually impaired persons. The development of the app, from conception stage through various design and development phases to full implementation, has taken less than a year.

This hardware and software solution allows blind and visually impaired users of public transport a more convenient and faster access to relevant information about services in real-time. It is the first such device in Lithuania, and the inventor believes it may also be the first such mobile application internationally to provide an innovative interactive audio solution in real time to inform on the arrival of public transport vehicles at bus stops.

Paulius Lengvenis - inventor, developer, and IT Manager at Kaunas Bus Company - says the inspiration for the idea came from a meeting he attended with Heads of Divisions and city council members in early 2016. At the meeting, the Vice Mayor explained that she was under pressure from leaders of the Blind and Visually Impaired Centre to substantially improve access to services. Paulius felt the suggestion of having loud

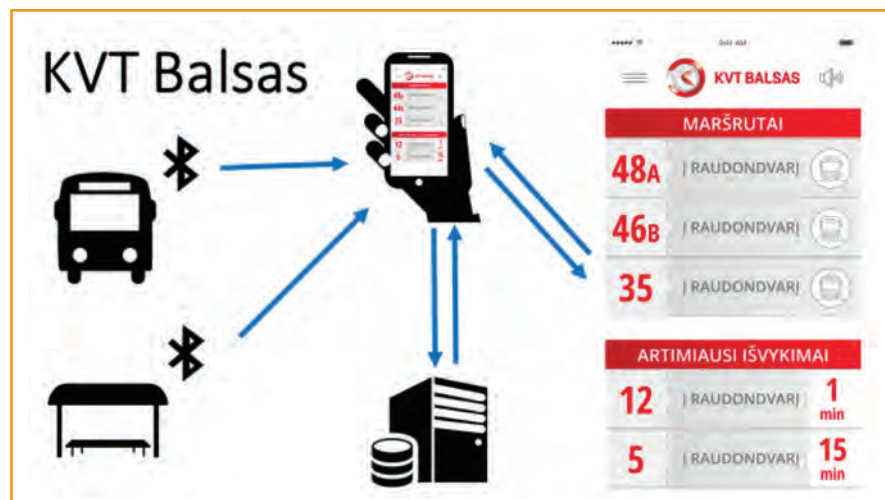
speakers fixed to the front of buses to announce the bus number and route direction was a primitive solution in an age where most passengers now had smartphones. "About this time, I was aware of the potential of beacon technology being used in retail, so I thought, 'Why not use the same technology to solve this problem'.

"With a visual impairment it's difficult to know when the vehicle arrives and which service it is. When looking for how to solve this problem, we discussed a number of options with blind and visually impaired users.

"Finally, we decided to develop software and hardware that enables real-time identification of the incoming bus and provides matching



Real-time route information connects seamlessly with all vehicles on Kaunas's public transport system





I was aware of the potential of beacon technology being used in retail, so I thought, 'Why not use the same technology to solve this problem'

information about it," he explains, before modestly adding: "This is the first of its kind, I think."

By downloading the free app "KVT Voice", available on the Google Play store, blind and visually impaired passengers waiting at any bus stop

will know what vehicle is arriving and which route it is taking. The app is also currently available with English as an optional second language for users, making public transport more accessible for foreign visitors and travellers to the city.

HOW DOES IT WORK?

The main principle behind the device is relatively simple, allowing the real-time information on routes (part of the city's PIKAS traffic management system - a system developed within the CIVITAS I programme) to connect with all Kaunas public transport vehicles - 245 diesel buses and 140 trolley buses. Each public transport vehicle is fitted with a small, cigarette-box sized beacon active tag, which in turn sends the information to the user's phone. Standing at the stop, the user's mobile phone will 'speak', telling of the next arriving bus and stating its number and its route destination. Once on board, all buses already have audio announcements of the next stop, so route management for blind and visually impaired is made easier with this added service.

Using Bluetooth 4 Low Energy (BLE) technology, widely used in mobile devices, installation was straightforward, and with relatively low costs. Installation for all public transport vehicles worked out to be approximately €40,000 with an additional amount of approximately €20,000 for development costs of the app. Low power consumption makes maintenance costs minimal too.

"We are pleased and proud that this innovation came from Kaunas city," says the Vice Mayor of Kaunas, Rasa Šnapštienė. "It supports our commitment to provide for the needs of all of our citizens, especially those with disabilities. However, this app has also shown us how we might now use the same technology to improve service provision of public transport for other groups of users too. We have the system established, we know it works, and we now hope to use this to further expand our knowledge."

Further uses of the app for public transport may include bus stop and journey experience monitoring, allowing passengers to provide instant feedback on the condition of bus stops and the interiors and exteriors

of vehicles, unruly behaviour of other passengers, and the driver's driving skills. The potential is there to have a fully active engagement with users of public transport services.

CITIZEN ENGAGEMENT IN DEVELOPMENT

The Kaunas Centre for Blind and Visually Impaired lists around 700 members. They have long been asking the city to provide improved public transport services that specifically cater for their needs. Members from the centre tested the app and provided user feedback to the technical team, with suggestions on how to improve it. Saulius Kavaliauskas, the Leader of the Centre's volunteers, himself visually impaired, says: "During the day, I can just about make out the numbers of buses coming to the stop. However, come twilight I am in need of assistance in defining what buses are arriving. Having this app to tell me which bus or trolley bus is coming and exactly when it will arrive is brilliant. Those who are totally blind have even more difficulties than I do, as they need to be ready at all times, and without assistance often can only guess by the sound of the vehicle which bus has arrived".

FUTURE DEVELOPMENTS AND USES

For development purposes, having an open protocol means the range of opportunities for future use is unlimited. The development team have started working on possible additional uses. Up to 100 bus stops will have beacon technology fitted before the end of 2017, with another 100 fitted with beacons by the end of 2018.

Bus stop beacons will allow the city transport team to work closely with other city departments to provide more focused information about the interchange opportunities for passengers breaking their journey.

However, there is by far a greater and wider potential for this technology


With the city already planning for its status of EU Capital of Culture in 2022, this technology has an enormous amount of potential to help the city grow and develop according to the needs and wishes of its citizens

Paulius Lengvenius, creator of the KVT Voice app, talks to the local media about his invention



to be used not only for public transport services, but also to promote the city's cultural and commercial attractions. In the UK already, two large retailers are testing beacon technology as a means of providing customers with a fuller shopping experience, with other large stores in Sweden likely to follow suit. The potential for Kaunas means that bus stops could provide information to customers within a 50-metre range to provide them with event, product and price information for attractions in close proximity to the bus stop. Museums, art galleries, theatres, cinemas, shops, cafés and public exhibitions to name but a few of the many city-based cultural and commercial opportunities to increase customer interest in what's going on in the city.

With the city already planning for its status of EU Capital of Culture in 2022, this technology has an enormous amount of potential to help the city grow and develop according to the needs and wishes of its citizens.

The city of Kaunas has been at the forefront of transport developments in Lithuania. In previous years, it was an active participant in high profile EU research and development projects including the very first CIVITAS programme (2002-2006) and winner of the prestigious CIVITAS Demonstration City Award. In recent years, the city has actively participated in a number of high profile, innovative EU projects developing mobility management measures in areas such as public transport, mobility planning, and road safety for schools. 

FYI

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Positive Drive is a gamified tracking and tracing campaign to uncover the mobility behaviour of employees in the Luxembourgish Cloche d'Or business area. **Dr Martin Kracheel** and **Patrick van Egmond** elucidate

Imagine a busy business area in Luxembourg city, lots of cross-border commuters and huge traffic problems. Every big company in the area tries to tackle this problem, yet only focus on their own employees, problems using its own resources. Now envision that all these companies decided to work together to solve their joint mobility issues at hand. This is what our Positive Drive campaign is about! But let's rewind for a second...

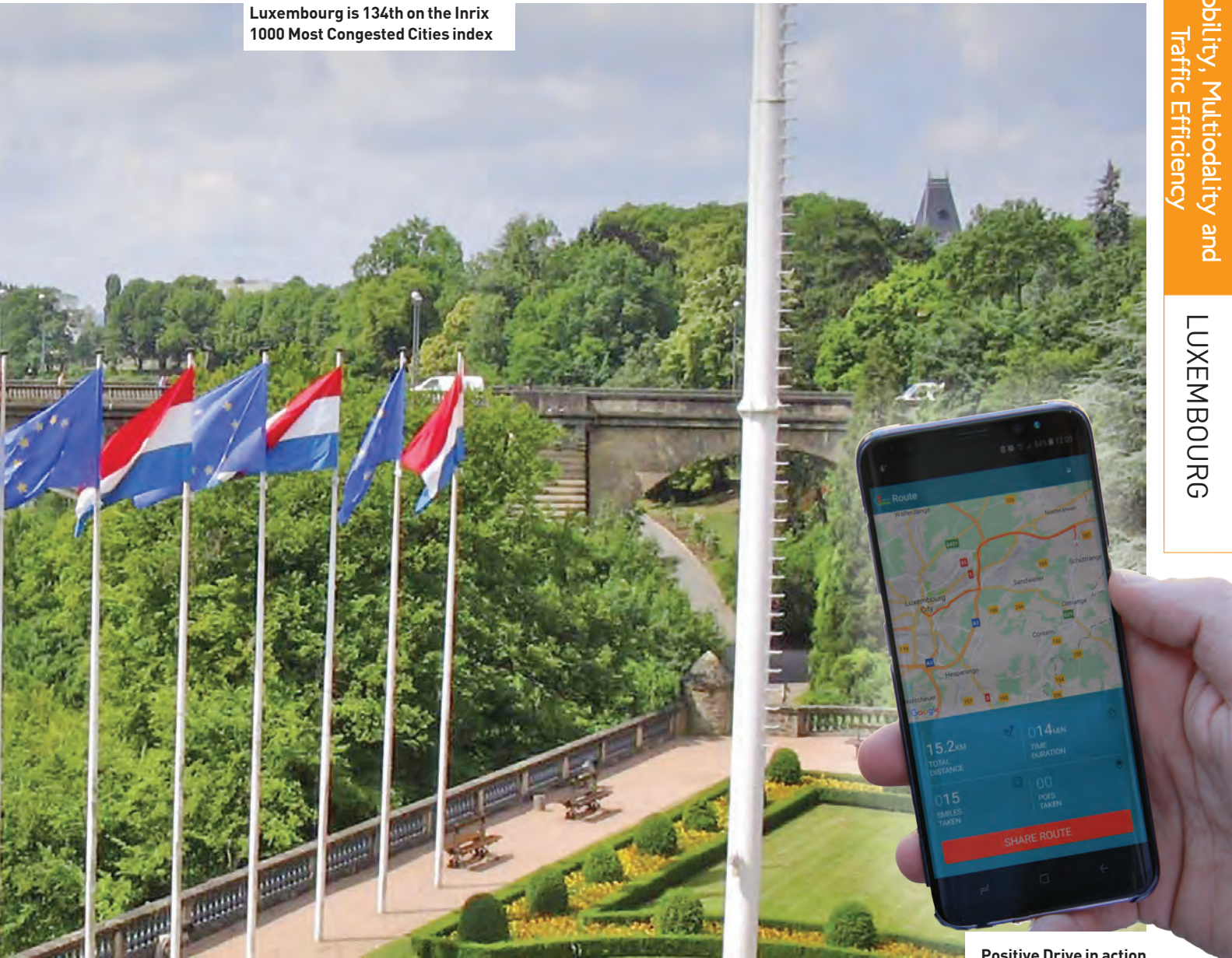
Almost 60 per cent of the country's

workforce commutes daily between Luxembourg and the neighboring regions in Belgium, France and Germany. This equates to around 181,000 cross-border commuters on average per day. Only 7 per cent of that daily cross-border commuting is done by public transport (i.e. bus and train) and as a result, large congestion is occurring on the main highways, especially during peak hours. Commuters spend on average 33.1 hours in congestion per year, putting Luxembourg 134th

in the list of the 1000 most congested cities in the world¹. Besides increased frustration among the cross-border commuters and deteriorating air quality, this leads to an estimated 1.5-3 per cent GDP loss annually, which in economic terms is in the region of US\$1.7 billion.

In order to solve these mobility changes the government put in place the ambitious infrastructure and mobility strategy called MODU2020. This strategy includes four strategic objectives:

Luxembourg is 134th on the Inrix
1000 Most Congested Cities index



Positive Drive in action

Companies are now recognizing that the Luxembourg government cannot solve the present deteriorating mobility situation on its own. It is clear that in order to avoid a near future mobility deadlock with heavily congested highways they have to also assume some of the responsibility

- Improve the coordination between territorial development and the mobility options on offer;
- Reduce the share of motorized

transport on short distance trips by promoting cycling and walking, including the improvement of related infrastructure;

- Improve the public transport infrastructure and services for the longer trips, of which many are cross-border;

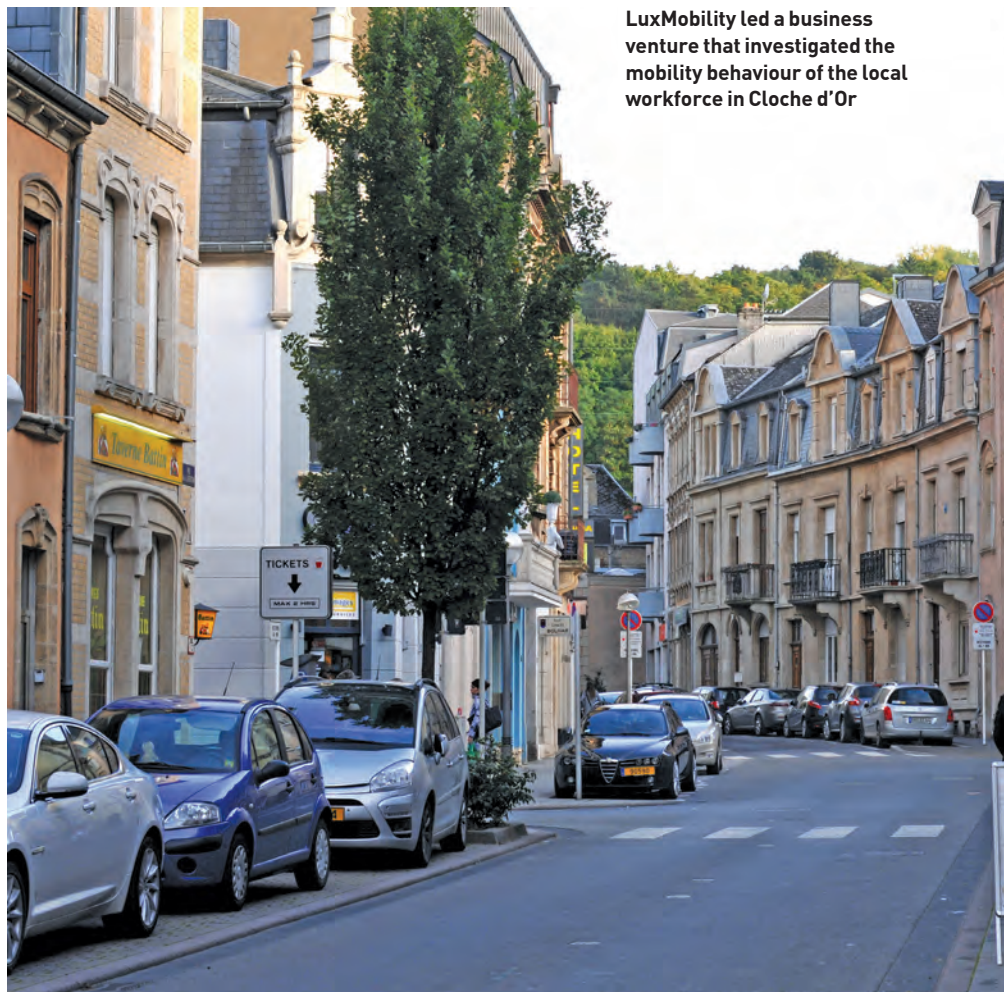
- Promote alternative usage of the car, such as carpooling and car sharing².

POSITIVE REINFORCEMENT

As a result the public transport infrastructure of Luxembourg City is currently being reorganized. The main change consists of the introduction of a tram, which in the first phase connects the central station with the Kirchberg, the busiest business district. In a second phase the central station will be connected with the Cloche d'Or area, a growing business district in the south of the capital. An important city bicycle network with, currently, 600km of bike paths has already been rolled out and will be further expanded to a total network length of about 900km, which is considerable for a country with an area of only 2,586.4 km².

The South of Luxembourg is considered as one of the most active regions in terms of economy and population. Most of Luxembourg's near 600,000 residents live in this part of the country and the biggest employers have their headquarters in the south. Luxembourg city and Esch-sur-Alzette are the two largest cities in this area and designated as the territories of economic attractiveness and demographic growth. The demographic outlook predicts that by 2050 Luxembourg will have 1 million residents an increase in economic activity, and consequently further increase in traffic and transport demand.

More and more companies recognize that the Luxembourg government cannot solve the present deteriorating mobility situation on its own. It is clear that in order to avoid a near future mobility deadlock with heavily congested highways they have to also assume some of the responsibility. It is with this in mind that a group of major companies in the Cloche d'Or business area in Luxembourg decided



LuxMobility led a business venture that investigated the mobility behaviour of the local workforce in Cloche d'Or

to join forces and work together to tackle local mobility problems.

It is therefore that LuxMobility, IMS (Inspiring More Sustainability) and seven large employers in the Cloche d'Or area joined forces to uncover synergies in the mobility behaviour of their 7800 employees in the district and to develop together improved mobility concepts for the area.

The companies understood that in order to be able to propose a new mobility solution they needed to get an insight on the actual mobility behaviour of their employees, taking a holistic approach. LuxMobility proposed that they go beyond the traditional stated mobility preference questionnaire and use for this purpose a gamified tracking and tracing campaign to uncover the true mobility

behaviour of their employees. The tracking and tracing application Positive Drive³, developed within the European Research project TRACE⁴ of which LuxMobility is one of the partners, was used for this purpose.

HUMAN FACTORS

Positive Drive can be used for different types of campaigns. Positive Drive is a smartphone app that rewards good mobility behaviour. No matter if you want to reward increased use of cycling walking, respecting of speed limits, avoidance of certain routes, the app together with a dedicated campaign steers the participants into the right direction. The Luxembourgish campaign is used to track actual behaviour with the aim to better plan



the future transport offers, including the construction of the new tramline and its surrounding mobility connectors.

During the month of May 2017 all trips of the participating employees will be automatically registered. No matter if the employee walks, cycles, uses public transport or travels by car, with the Positive Drive support we are able to register all routes, identify the mode of transport used and reward the users for their participation.

Next to the tracked and traced routes, the local institutional partners like the public transport authority, national train operator and the ministry of transport, are asked to provide more information on the present transport offer,

road works, traffic incidents, road works and relevant information on the urban context of the Cloche d'Or area. This will show external influences on our results. We will take compare further the traditionally executed traffic studies of the Cloche d'Or area with our data in order to understand the added value of real-time tracking. We share the results and explain how these translate in a better mobility plan for the area.

The Positive Drive app records GPS data that is enriched with a timestamp and unique user-ID. Algorithms are utilized to "Map-match" and to determine modality and give the user feedback about:

- Calculated distance
- Calculated statistical information (CO² reduction, calories burned, money saved, etc.)
- The rewards earned ((s)miles, money, levels, etc.). This is calculated per modality, per gamezone and for the overall statistics. Besides their personal statistics, users are able to compare themselves to other users.

This is specific for the modality and the gamezone. Users have access to their personal statistics and can compare themselves to other users who accepted their friend request.

Before we collect data the users are asked to express their consent. Rules, conditions of participation and other relevant information is accessible in the application and on the support website. Besides that, Positive Drive asks for authorization to use GPS and for the approval to send push notifications.

Positive Drive offers four methods of registration: Via email, Facebook, Twitter and Google+. All these methods are secured using https and require an API-Key to reach the login screen.

The application provides a gamification layer, which allows

us to provide incentives to users. Rewards in Positive Drive are based on a geographical location, called gamezone. Within the gamezone a campaign can be created. A campaign consists of multiple elements and involves local stakeholders and sponsors.

Using Positive Drive we collect dense mobility data of a local area that is heavily impacted by cross-border commutes and are able to better plan mobility on the true mobility behaviour of the employees.

Positive Drive uses game elements like levels, badges and points to provide users with feedback on their mobility behaviour. However, via the application and together with local sponsors, we also provide concrete incentives, like free lunches, biking accessories (lights etc.) and a main prize, which is an electric bicycle. In our Positive Drive campaign, we worked with the big local employers as multipliers for the recruitment of participants. This has the advantage that users have a more direct contact and relation to our campaign. However, for the purpose of collecting more dense and more comprehensive data, we aim to organize a Positive Drive campaign for the wider public in the near future. 🚲

NOTES

- 1 INRIX 2015
- 2 www.h2020-trace.eu
- 3 www.positivedriveapp.com/en/
- 4 <http://h2020-trace.eu>

FYI

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The City of Pisa has adopted a new, modern, European-level electric passenger transport system that, connects the international airport to the centre of the city. **Marilena Branchina** and **Raffaele Zortea** report



PisaMover will help to alleviate the city's intolerable road traffic levels

Pisa express

The PisaMover is an important step for the Tuscany of the future: a more modern, fast and efficient transport system with an intense focus on intermodality and eco-friendly mobility. It is one of the solutions that the City of Pisa has put in place to improve the high demand for mobility, driven in particular by tourism.

Among PisaMover's main features is its noiseless, high-frequency electric traction shuttle, linking Pisa Airport (5 million passengers per year) to the central railway station of Pisa (6 million passengers and 15 million people in transit every year). The frequency of passage is every 5-8 minutes, depending on timetables and seasons, and it's active from 6am to 12pm. The travel time is about 5 minutes. Each carriage has 100 seats

and there is an intermediate stop between the railway station and the airport, at the parking facility that has space for 1400 cars.

Its importance to the airport is that it offers an immediate connection to and from the central railway station, from which it is possible to reach the main Italian and Tuscan cities. The single ride ticket price is €2.70.

Thanks to the aforementioned new car park, an alternative is offered to the commuters who arrive each day in to work or to visit the city. Car parks are on the south and east routes for those arriving from Livorno through the Aurelian main road and for those arriving from the Fi-Pi-Li freeway (Cascina-Pontedera-Florence). It's possible to park the car all day from 6am to 12pm for only €2.50, including the PisaMover return ticket to the

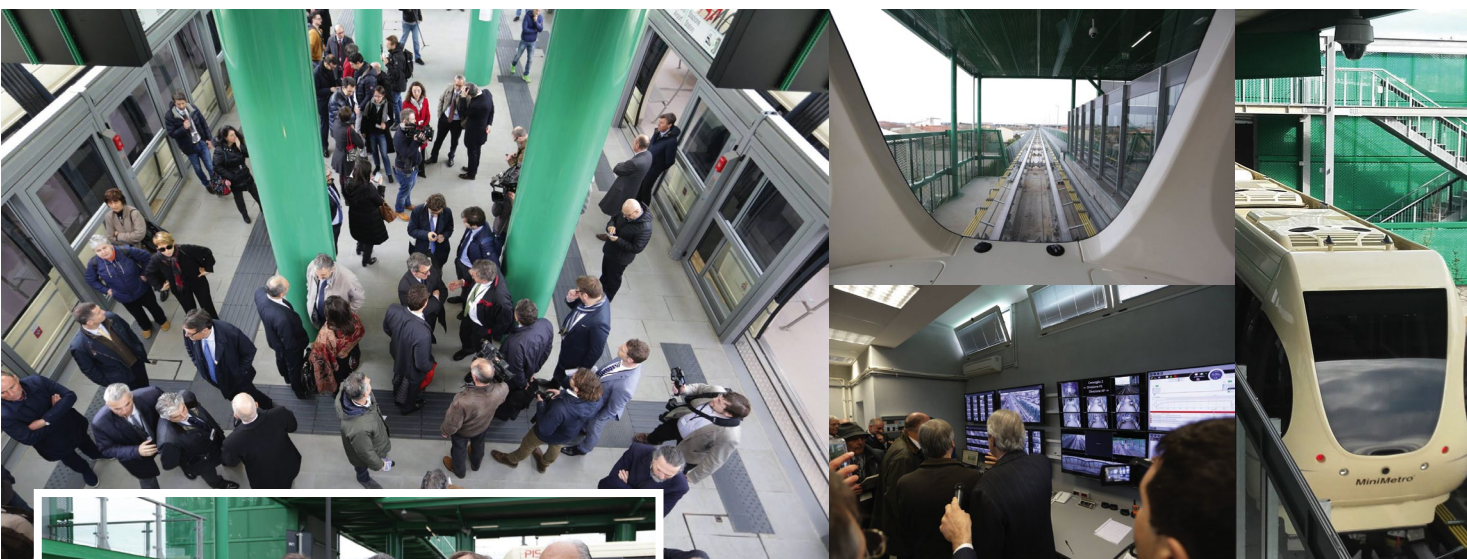
central railway station or to the airport. This was done to help break the on the "siege" of cars to Pisa, which on average is something in the region of 70,000 cars per day. Advantageous season tickets and discounted rates are available for those who share their car with other people.

The work saw the dismantling of the old track 14 that was previously used by a train that connected the airport and the railway station with a passing frequency of about one train per hour and that had largely inadequate carriages.

A VECTOR OF BUSINESS AND EMPLOYMENT

The work was carried out by a consortium that consisted of Leitner, Condotte and Inso. A total of 47 companies participated in the project,

Among PisaMover's main features is its noiseless, high-frequency electric traction shuttle, linking the airport to the city's central railway station that handles 6 million passengers every year



URBAN SUSTAINABLE MOBILITY


A sustainable urban mobility plan requires a significant innovative commitment in local policies, starting with the planning system. The

City of Pisa has trying to develop approaches and measures to become a smart city, a city that optimizes resources, enhances its capacities and uses technologies to minimize its ecological footprint and improve the quality of life of its citizens.

The awareness is that the sustainable development of a city as a whole is due to a balance between sustainability and environmental quality, where a fundamental part is represented by the same sustainability infrastructures, intended in terms of mobility, productive development, use of natural resources and cultural and urban regeneration.

The ideal is a systemic and complex approach that goes through the improvement of the transport system, whose major structural factor

is linked to changes in urban morphology and changes to the entire urban system, to its relationship between the city and its hinterland, a city "beyond" not defined by administrative or political boundaries and entirely dependent on mobility.

The People Mover is a prime example of new infrastructure that identifies a resilient urban system, adapted to new conditions, environmental, social and economic, but also a smart urban system based on efficiency, creativity, security, warmth, accessibility, thanks to technological innovations. 

FYI

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40 per cent of whom are based in Tuscany and 11 in the Province of Pisa.

About 286 people worked on site, with a daily average attendance of 60 workers.

The work cost €71 million, with €21 million of that coming from European funding and the remaining €50 million from private companies who will handle the infrastructure for the next 36 years. Costs also included improvements for the neighbouring residential areas.

As estimated by Tages, a company with 30 years of experience in the field of mobility and transportation systems planning and design, the implementation of PisaMover will see CO₂ emissions decrease by more than 2 million kilograms.



Budapest's Balász Mór SUMP seeks to increase competitiveness within the city's logistics market

United by freight

On 19 March 2017, at the 5th Sustainable Urban Mobility Planning (SUMP) award ceremony that took place in the heart of Brussels, the host city received the winner's trophy from Violeta Bulc, European Commissioner for Transport, and Daniel Calleja, Director-General for Environment, for its successful freight strategy. Budapest and Stockholm were also on the podium for much the same reason, as Polis's **Thomas Mourey** reports

After the preparation and implementation of the first (IRIS 1) and second (IRIS 2) regional SUMPs in 1997 and 2010 respectively, Brussels-Capital region began preparation of its third SUMP (Good Move) in 2016. From the

very beginning it had been decided that freight would be fully integrated in the Good Move plan. This is due to the successes achieved in freight transport under IRIS 2 and the conclusions of preparatory studies.

To build its freight strategy,

Brussels-Capital region will elaborate on a sound strategy called the "Strategic Plan for Goods Traffic in Brussels-Capital Region", adopted in July 2013 as a specification of the second SUMP of Brussels. This document is the result of a collaborative

The overall objective of the Brussels regional authority, in terms of freight transport, is to limit the negative environmental impacts of urban freight without compromising the positive economic effects of the sector on the local economy

Among Brussels' award-winning Good Move plan was a commitment to improve working conditions for delivery personnel



process for assessing the initial freight situation and defining a common vision for freight. The overall objective of the Brussels regional authority, in terms of freight transport, is to limit the negative environmental impacts of urban freight without compromising the positive economic effects of the sector on the local economy.

To achieve this, a total of 36 measures have been selected and incorporated in the SUMP approach, some of them already implemented under IRIS 2, the others being included in the Good Move plan. All measures are designed to achieve at least one of the following goals: 1) Reduce and optimise the movements of vehicles transporting goods within and to the city; 2) shift traffic from road to waterways

and rail and favour environmentally friendly vehicles for last-mile deliveries and 3) improve conditions for the delivery personnel. Among the measures' highlights are the implementation of a road charging scheme for lorries, based on the 'polluter pays' principle; the support to alternative logistics schemes, such as night deliveries and the use of urban consolidation centres; or a strong support to the use of alternative freight vehicles, the support to bike couriers and the encouragement to shift traffic towards the canal, especially for bulk and construction materials.

To implement the measures, Brussels-Capital region relies on partnerships with private innovative logistics companies and an involvement in EU-funded projects. The

example of the Urban Consolidation Centre (UCC) managed by CityDepot illustrates this. The UCC, located on the edge of Brussels, has been created in the framework of the Interreg IVB LaMiLo project, with the involvement of both Brussels-Capital region and CityDepot. Since the end of the trial, the UCC has been managed by CityDepot without any public subsidies. The region still supports the use of the UCC that proved to be beneficial for traffic reduction.

BUDAPEST (FINALIST)

Budapest SUMP, the Balázs Mór Plan, sets the mobility priorities for the years to come in the Hungarian capital. The mobility of people is at the core of the plan without minimising the importance of urban freight transport. The Balázs Mór Plan was officially adopted in summer 2014 and has now entered the implementation phase. Its main goal for urban freight is to improve the competitiveness of the city and its region and also to contribute to establishing a sustainable, liveable, attractive and healthy urban environment.

In harmony with the SUMP, two freight and urban logistics-related documents define the operative rules and strategies for urban freight transport in Budapest (the Freight Transport Strategy for Budapest and the City Logistics Concept).

To achieve this overall objective, Budapest's SUMP sets four

Shortlisted cities

In addition to the three finalists, the jury of the 5th SUMP Award decided to highlight the efforts for integrating urban freight in their sustainable urban mobility planning strategies. These shortlisted cities are: Rotterdam (Netherlands), Berlin (Germany), Pietra Neamt (Romania) and Naples (Italy).



European Transport Commissioner Violeta Bulc presents Pascal Smet, Minister of Mobility and Public Works of the Brussels Capital Region, with the SUMP Award

Photo: Kevin Borras

strategic goals for urban freight (1) more connections, (2) better services, (3) attractive vehicles and (4) efficient governance. The four strategic operational goals are to be reached via the implementation of specific measures.

The development of more connections is expected via the spreading of intelligent technologies (ITS) and the creation and promotion of urban consolidation centres. Under 'better services', the use of

IT technologies also allows the collection of data (via wi-fi, dynamic traffic information services) and the management of the freight traffic (via dynamic parking systems, dynamic traffic control).

This can, in turn, help tackle problems like congestion or pollutant emissions. To encourage the use of cleaner freight vehicles, the Freight Transport Strategy limits the access to certain roads to the least clean vehicles. The scheme

is based on the EURO classification and restricts over time the access to more and more roads for vehicles that exceed certain EURO levels. Finally, the efficient governance is expected to help shifting the freight traffic to chosen urban areas and roads at specific times of the day (off-peak deliveries).

The combination of the two types of measures are expected to help the freight sector develops and also to decrease its negative impacts, as identified for the development of the Balázs Mór Plan:

- Deteriorating living conditions in urban areas
- A lot of road accidents
- Air pollution, noise pollution, deteriorating environmental quality
- Congestion, congested roads
- Increasing pollutant emission

Although Budapest is starting the implementation of the measures contained within the Balázs Mór Plan, some results have already been observed by BKK, the organisation in charge of the SUMP development and implementation.

The different measures taken to decrease the adverse impacts of freight, including the implementation of the access restriction scheme has produced some effects. Several private sector delivery companies started to use cargo-bicycles for logistics transportation, especially for short distances in the Budapest inner city. A portion of road traffic has also been shifted to the waterways on the river Danube - this being the case for the transport of petrol. The public sector is also concerned as the redistribution of the bicycles of the public bike-sharing scheme is made by... bike.

STOCKHOLM (FINALIST)

The city of Stockholm has designed a strategy for freight that fits in the overall sustainable urban mobility

In Budapest, both the use of IT technologies and the implementation of strict and progressive urban access restriction scheme for freight vehicles are at the core of its strategy

Stockholm has adopted a series of six thematic sustainable urban mobility plans



Photo: Lennart Johansson

To achieve the objectives of both the UMS and the Freight Plan, Stockholm relies on a series of measures, projects and studies that include the establishment and use of an Urban Consolidation Centre (UCC) in the city centre to allow consolidation of freight activities

planning strategy of the Swedish capital. Good integration of urban freight is at the core of the transport strategy

To complement the “Urban Mobility Strategy” (UMS) that was adopted in 2012, the city has adopted a series of six thematic plans that together form the Stockholm Sustainable Urban Mobility Plan. Among the six thematic plans is the Stockholm Freight Plan (FP), published in 2014, that sets the priorities for urban freight over the period 2014-2017.

The main objectives are (1) to enable more reliable delivery times, (2) to facilitate a more effective use of commercial freight vehicles, (3) to

promote the use of clean vehicles, and (4) to advance the freight delivery partnership between the City and other stakeholders.

To achieve the objectives of both the UMS and the Freight Plan, Stockholm relies on a series of measures, projects and studies that include the establishment and use of an Urban Consolidation Centre (UCC) in the city centre to allow consolidation of freight activities by operators, estate property owners and carriers.

Another measure integrated in the Freight Plan is the conduction of an off-peak delivery project to increase the transport efficiency and time reliability without compromising the

quality of life of residents. Another measure focuses on the increase in the number of (un)loading zones for heavy vehicles. Stockholm also tested loading zone sensors to allow the better use of these (un)loading zones and thus of to enable more reliable delivery times. Additionally, aware of the importance of a supporting network of private and public stakeholders, the local authority cooperates with local businesses, the academic sector, agencies and the public sector and organise collaborative meetings with them.

Several measures of the Freight Plan have produced results. Consolidation is, for instance, developing in Stockholm, with the construction and the use of both an Urban Consolidation Centre (UCC) and a Construction Consolidation Centre (CCC) in the area of the Royal Seaport which is under reconstruction. The UCC is expected to be particularly successful as it will be economically viable, without public subsidies and it also combines retail and waste through an original reverse logistics scheme.

The business model includes concepts for property owners, retailers, offices, carriers and shippers. The use of clean vehicles is also progressing, especially thanks to the use of clean vehicles only for pilot activities and the modal shift from road traffic to waterways. As Stockholm is built on islands, the city encourages the transportation of construction materials, fuels, construction masses and waste on its waterways. 🚢

FYI

Thomas Mourey is a Project Officer at Polis. He is managing the SUMP Award secretariat in the framework of the EUROPEANMOBILITYWEEK.

Thank you for your cooperation:

Connected vehicles in urban areas



Mark Cartwright
presents the key points
of the CIMEC project
Roadmap for
Cooperative-Intelligent
Transport Systems

It's 2019, and you've just collected your new car. The online brochure has promised you lots of exciting new services to make your life as a driver easier, safer, and even cheaper.

So, as you approach a set of traffic lights, it will help you choose your speed of approach in order to ensure you get there on a green. By avoiding braking and accelerating, you save wear and tear, and reduce your fuel consumption. You are also less likely to have an accident with vehicles (or pedestrians) crossing your path.

That at least is the promise of an increasing range of carmakers, for



How much of your thinking will your brand new hot-off-the-production-line do for you?

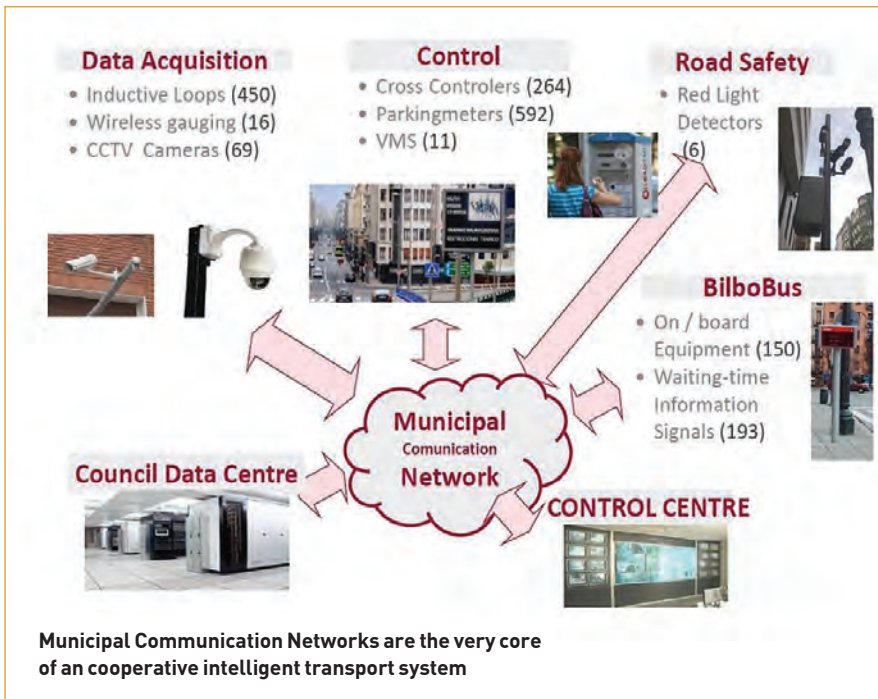
whom the concept of “connected vehicles” – when your car exchanges data directly with the road it is running on – has been developing rapidly in recent years. And it is a development that has gained a lot of interest from politicians across Europe, who see this as a way of using technology to improve the sustainability of their transport networks.

In the highway context, indeed, there has been a lot of collaborative effort. For instance, the European Commission's (EC) Second Framework Programme (1987-1991) had a subprogramme called DRIVE 1,

which included a number of connected vehicle projects. Remember, this was long before most of us had heard of the internet, and when mobile phones were still analogue bricks.

But there has been very little research on how vehicle connectivity will impact on cities. This is all the more surprising when you think that many of the services that connectivity makes possible will only (or primarily) be of interest in city traffic – including the example given above on “green light optimum speed advice” (GLOSA for short).

That has now changed. The



EC-funded CIMEC project, which launched in June 2015 and is now approaching its end, has looked specifically at cities, and more specifically at what “cooperative intelligent transport systems”, or C-ITS, might mean for city authorities.

There are certainly opportunities. In an extensive round of engagement, CIMEC identified 18 city-relevant “use cases”, relevant to one or more of city policy goals: traffic efficiency, traffic safety, the environment, or accessibility. Use cases include providing priority for public transport at traffic signals; helping freight vehicles manage their speed, fuel usage and emissions; supporting alternative and shared transport modes; and systems that could help forestall accidents with pedestrians and cyclists.

NETWORKING OPPORTUNITY

The focus on vehicles other than private cars should come as no surprise. While highways are essentially about maximising flow and minimising delays, the urban transport context is vastly more complex. City transport happens where people live and work:

it has to co-exist with leisure, retail, education, community activity, and a thousand other things. City networks are not highways.

Indeed, during the CIMEC project, the EC realised just how big a gap this was and created a new Urban Working Group in its high-level C-ITS Platform. Both the CIMEC research and the C-ITS Platform experts focused attention on a small number of these use cases as policy priorities for cities, with “traffic signal priority for public transport” receiving overall the strongest backing.

This interest is telling, for a number of reasons. The aims are clearly in line with city policies for modal shift. Experience of working with public transport operators is well established. Bus/tram priority schemes are familiar traffic management services, so there is a lot of evidence (practical and anecdotal) that cities can build on. There are many mature systems provided by suppliers, so the role of cities, the nature of projects, and the likely costs are clear. The different technology designs are well tried and can be compared: cameras, barcodes,

tag-and-beacon, number plate recognition, and so on.

By contrast, while cities are keen to encourage active modes (such walking and cycling), and would very much like to provide mechanisms to support this, they are far from clear what those mechanisms might be. It is true that some projects (notably VRUITS¹) have proposed some potential services linked to pedestrian or cyclist safety, but the evidence on their practicality is much less well developed.

And it has to be said that there are significant challenges in technical and commercial design of C-ITS. Technically, there are important choices on whether to communicate from the centre (over mobile channels) or from the roadside (using local systems), or both (“hybrid systems”). Commercially, it is far from clear which connectivity services actually require a city to be actively involved. Indeed, even for the services that have real value, there are many potential business options ranging from “leave it to the market” to “needs to be imposed by regulation”.

To gain an understanding of what is realistic and what is still “vapourware”, CIMEC conducted an industry survey, asking European suppliers – large and small – how ready they are to offer connectivity products and services to cities. The results were salutary. Most suppliers see the potential in cooperative systems, either to improve existing services, or to enable new services. However, few are investing heavily in their development, and the overall impression is of a market at an early stage of innovation and maturity.

Because of this, the benefits are currently hard to quantify reliably, and the costs and risks are not well understood. There are also new challenges. The connected model requires road users to be suitably equipped with matching technologies. Moreover, many connected services require information from the vehicle, which

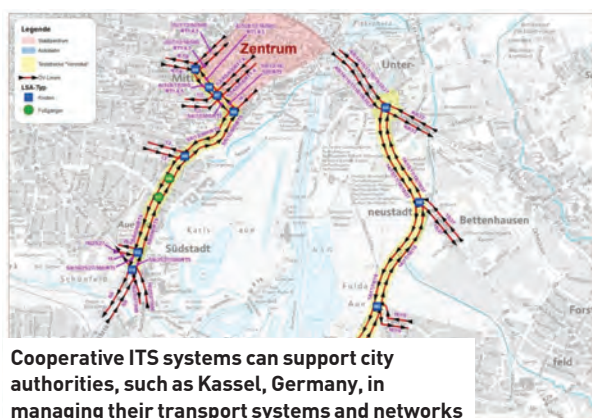
Key facts

CIMEC is a city-focused project which explores the role cooperative ITS systems (C-ITS) can play to support city authorities, both in managing their transport networks and the delivery of other transport-linked services.

It reaches out to key stakeholder groups (both public and private) to ensure a smooth and cost-effective deployment of C-ITS in cities around Europe.

The project commenced in June 2015 and will run until May 2017, and is funded by the European Commission in the framework of the Horizon 2020 research and innovation programme.

For more information, visit: www.cimec-project.eu



Cooperative ITS systems can support city authorities, such as Kassel, Germany, in managing their transport systems and networks

puts a significant burden on data protection.

CIMEC suggests that initial deployments are likely to focus on professional drivers in managed fleets. The example of public transport signal priority is one such service; another might be a variant of GLOSA specifically focussed on urban freight (where emissions are especially concerning for cities and fuel usage is commercially interesting to operators). One exception to this is the potential to capture information from vehicles: floating vehicle data has the potential

to enable much more responsive traffic management, and the more vehicles that provide it, the better informed the city will be.

A CO-OPERATIVE EFFORT


To complicate the picture yet further, there are several other developments underway which involve both transport and technology, and which are widely seen as being much more significant and fundamental. These include the rise of personal technology such as smartphones; the emergence of increasingly automated vehicles; the “Smart Cities” agenda, and the Internet of Things; and new transport modes, like ride-sharing and electromobility.

Like C-ITS, these are likely to affect traffic and transport operations; indeed, some of them might be delivered using one or more C-ITS services. Like C-ITS, they have potential

legal ramifications for what a city must do (for example to protect the safety of its citizens), for what a city can do (for example in managing freight routes), and for what a city cannot do (for example because of data protection requirements). Like C-ITS, they will require innovations in data management and publication, service contracting, and partnership agreements.

These are not trivial difficulties, and the pathway to harmonised Europe-wide C-ITS services is still very murky. However, we are now at least beginning to see the shape of the problem from a city perspective. As these become better understood, they are, in an increasing number of innovative city projects, being addressed in sound practical strategies: careful planning, phased implementation, realistic expectations and budgeting, and good project management.

Finally, though, it is important to note that cities and industry cannot build the future by themselves. The complexities of C-ITS are just too diverse, the policy interactions too deep, and the skillsets too undeveloped to make this an efficient approach. So national and European policymakers need to do their bit: clarifying the legal environment, collating a robust evidence base, guiding the private sector, establishing a suitable funding regime for cities, and facilitating technical support to cities as they begin their programmes.

We know that the future will be different from today. We just don't yet know how, or how we will get there. 

NOTES

1 Improving the safety and mobility of vulnerable road users through ITS applications, www.vruits.eu/

• The CIMEC “Roadmap for European cities” is available on the CIMEC website at <http://cimec-project.eu/wp-content/uploads/2017/04/CIMEC-D3.3-Final-Roadmap-v1.0.pdf>. Please note that this has not yet formally been accepted by the European Commission

• The CIMEC Use Cases for urban connectivity are on Page 13 at <http://www.polisnetwork.eu/publicdocuments/download/1986/document/cartwright-mark---from-stand-alone-its-to-connected-its.pdf>

FYI

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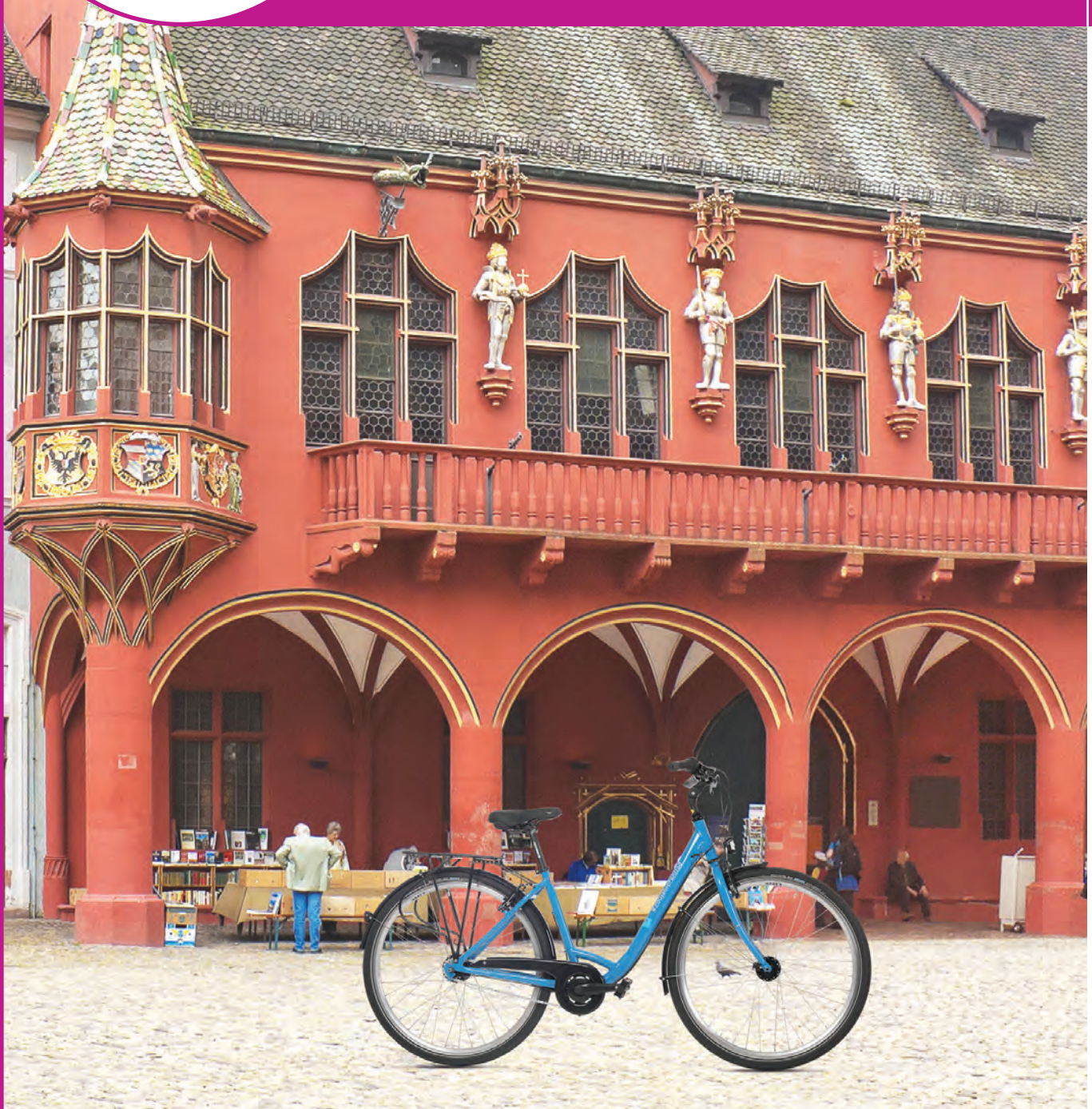
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Social and Economic Challenges of Transport

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

- **Bamberg, Karlsruhe, Potsdam and Stuttgart** - How a huge blue ball is making people think in several German cities
- **Urban Mobility** - For a paradigm shift in thinking a number of key economic drivers need to be in place
- **Urban Logistics** - An Internet of Things-enabled postbox could be about to revolutionise the parcel delivery sector





It rings a bell

Creative communication tools for successful municipal campaigning, by **Robert Sedlak** and **Gemma Tunmore**

It's the weekend. A group of people are strolling through the city centre. Suddenly, they are distracted by a blue arrow with the message "Klingelt's?" ("Ring any bells?"). Wondering what this strange inscription might mean, they decide to investigate. Soon, they find themselves facing a gigantic blue ball.

The "Klingelt's" ball is the talk of the town for a whole week until the Mayor finally reveals the explanation: the huge ball contains 113 cubic metres of carbon dioxide. That equals the amount you could save in just one

year if you decide to cycle to work instead of driving, based on a daily distance of three kilometres.

The German expression "Klingelt's?" is a play on words: on the one hand it is the sound of a bicycle bell and on the other it is a question you pose to see if someone has understood the obvious. The campaign of the same name was created by tippingpoints, the PR agency for sustainable communication, on behalf of the "Working Group of Bike-friendly Municipalities in Baden-Württemberg" (AGFK-BW).

"Climate change affects us all", says

tippingpoints' CEO, Michael Adler. "But that message hasn't caught on with everyone yet. That's why we need new means of communication."

Central to this are good stories. We humans love to pass on good stories and especially ones that we can relate to and fit into familiar frames. "Klingelt's?" uses the frame of our mobility behaviour. Thanks to the big blue ball, we can easily visualise the amount of greenhouse gas we produce in a playful way without any finger-wagging or moral lectures.

So, establishing familiar frames

Global warming is an established phrase. The problem is, we generally associate positive feelings with warmth. It equals summer, comfort and happiness - so why change our behaviour?

is crucial to make our messages meaningful for our target audience. Another powerful tool we can use is active “framing” to forge new cognitive connections. The linguist Elisabeth Wehling clarifies the term in her bestseller *Political Framing* (edition medienpraxis, 2016) using the example of climate change.

“Global warming” is an established phrase. The problem is, we generally associate positive feelings with “warmth”. It equals summer, comfort and happiness - so why change our behaviour? Things might be different if we introduced the expression “global heating”. “Heating” is often associated with feeling uncomfortable, which in turn signals a need for action. Applying this to the communication of sustainable mobility means we should carefully consider using terms like “slow traffic” or “shared space” as they create certain images in people’s minds.

CONCENTRIC CIRCLES OF COMMUNICATION

“We take a holistic approach in our municipal campaigns”, says Michael Adler, indicating a model comprising several concentric circles. The central circle includes the most important municipal stakeholders, such as local transport councillors, heads of public transport corporations and ideally even the mayor. All of them need to fully support and defend all activities in public as well as within their administration.

“This is an indispensable step”, says Rebecca Ilse, consultant at tippingpoints, recalling an unfortunate experience with a municipality. “We were certain that we had all the key players on board when we started

our public campaign activities. That was a big mistake.” The campaign was suddenly confronted with serious obstruction, traceable back to the city’s highest decision-makers.

Ilse had to halt the campaign and refer the discussion back to the central circle. After a lot of explaining and soliciting for support, unity was achieved and the next circles were approached in a positive and constructive working atmosphere. These circles comprised lower levels of the administration, associations, civil society, universities, schools, the media – and finally the general public.

Right from the start tippingpoints’ designs bespoke campaigns, but at the same time also overlapping tools

for each circle. Here is a selection of some recent activities which all played a part in forming overarching sustainable strategies. In Stuttgart, the company organised a workshop for local administrators on how to improve traffic diversions for cyclists and pedestrians. The citizens of Potsdam enjoyed the conversion of their city centre into a “green oasis” for a day complete with turf and sunbeds – highlighting the pleasures of car-free cities. As was the case with the “big blue ball”, all the measures for the general public were preceded by intense awareness-raising in the central communication circles.

STORIES, STORIES, STORIES...

The citizens of Potsdam enjoyed the conversion of their city centre into a green oasis for a day, complete with turf and sunbeds, highlighting the pleasures of car-free cities



Photo: Landeshauptstadt Potsdam

Switch your head on...
and your car off



Photo: fairkehr

As soon as a campaign becomes a talking point, the battle is already half-won. Just recently, tipping-points achieved great coverage with a PR stunt that highlighted the issue of parking offenders blocking bike lanes. The project, on behalf of the AGFK-BW, was called #woparkst-dudenn (#whereareyouparking).

We parked a car on a bike lane which a group of people then entirely covered with Post-its imprinted with the slogan “#whereareyouparking?” The whole stunt was filmed and subsequently won the German Bike Award 2017. Anna Hussinger, CEO of the AGFK-BW, is proud of this great communication success. She especially highlights “the win-win situation

of both public impact and the feasibility for municipal administrations.”

“This mixture of guerrilla marketing and street art grabs people’s attention and can trigger sustainable behavioural change”, says communication expert Adler.

Another example of stories worth sharing are the many claims used by the campaign “Kopf an: Motor aus” (“Switch your head on and your car off”) which was initiated by the German Federal Ministry for the Environment. For about 10 years, tippingpoint consultants, together with partner agencies Fairkehr and Tinkerbelle, have been producing material aimed at motivating people to avoid using the car for short

journeys. Several German cities have been confronted with tongue-in-cheek claims such as “Burn calories instead of petrol”, “Better if your own weight melts rather than the icebergs – cycle more!” or “Six-pack instead of six-cylinders”.

Of equal importance when it comes to encouraging long-term behavioural changes is to say ‘thank you’ to all those who tried sustainable options. “Kopf an: Motor aus” used billboards stating simply: “Thank you for being climate-friendly”.

Sustainability campaigns can also make use of another hotly debated leverage tool to initiate behavioural change: “Nudging”. Here, the target group receives small incentives to encourage them to act in a new way without them consciously realising it. Considered manipulation by certain critics, its supporters speak of “necessary measures without harmful side effects”. In the field of sustainable mobility, simple nudges can for example consist of smartphone-apps that automatically indicate public transport options.

DOES ALL THIS REALLY HELP?

Campaigns for behavioural change face constant pressure to justify their necessity – especially when public money is involved. Authorities, as well as the tax-payers, want to make sure that their money yields tangible results. The campaign “Kopf an: Motor aus” was evaluated as early as 2009 after the initial phase was completed in four German cities.

The surveys showed that half of the respondents who recalled the campaign felt motivated to rethink their mobility behaviour. Close to two thirds felt strengthened in their sustainable way of life and 16 per cent of all the adults surveyed indicated that they would shift their mobility behaviour towards walking and cycling. Evaluators projected that this translates to a total greenhouse gas reduction of about 13,000 tons.

Campaigns for behavioural change face constant pressure to justify their necessity – especially when public money is involved. Authorities and tax-payers want to make sure that their money yields tangible results



2017 represents the 200th anniversary of the invention of the bicycle; one such way of celebrating the event is with an interactive treasure hunt

Another positive effect: stakeholders responsible for the public funding of cycling and walking were encouraged to increase these activities as they felt the public support for their work.

The city of Bamberg experienced long-term effects from its successful 2009 campaign. Their modal split has changed dramatically. "Thanks to the campaign, in 2015 30 per cent of journeys were covered by bike compared to just 22 per cent in 2010", says Dagmar Spangenberg, from the city's planning department. Karlsruhe also praised the evaluation results regarding the effectiveness of the measures put in place for cyclists.

Johannes Schell, from the town's planning department, states: "Promoting cycling requires more than just building bike lanes. The communication must strike a chord too. Our campaigns played a key role in increasing the amount of cyclists from 16 to 25 per cent in just a few years." Indeed, their modal split in 2016 showed record numbers.

Another key factor for measurable success in the popularity of sustainable mobility lies in the interaction between communication and

Good communication in a nutshell

Storytelling: transmitting information and messages by creating stories that can be passed on and developed further by the target group.

Nudging: a method used by behavioural economists. People are encouraged by small "nudges" to act in a certain way, but without using orders, bans or consciously perceived incentives.

Framing: certain events, behaviours or topics are consciously linked together into a context, thus creating new (desired) connections and effects as well as activating new reaction patterns.

infrastructure development. "If car drivers are to be motivated to switch to cycling or walking, there has to be good infrastructure in place", explains Konrad Götz, a scientist at the Institute for Social-Ecological Research (ISOE). "If the structures in place meet this requirement, communication can build upon this without appearing implausible."

THE SEARCH CONTINUES...

This year sees the 200th anniversary of the invention of the bicycle, a perfect opportunity for governments to push sustainable mobility further. tippingpoints has developed a new campaign for the AGFK-BW involving

interactive treasure hunts for bicycles hidden in about 40 municipalities. The campaign involves the local media, social media work and videos. And, of course, we consider all the circles within the campaign model of concentric circles. In the end, it all comes down to a core philosophy: tell a story, build a frame, use nudges and make cities a better place.

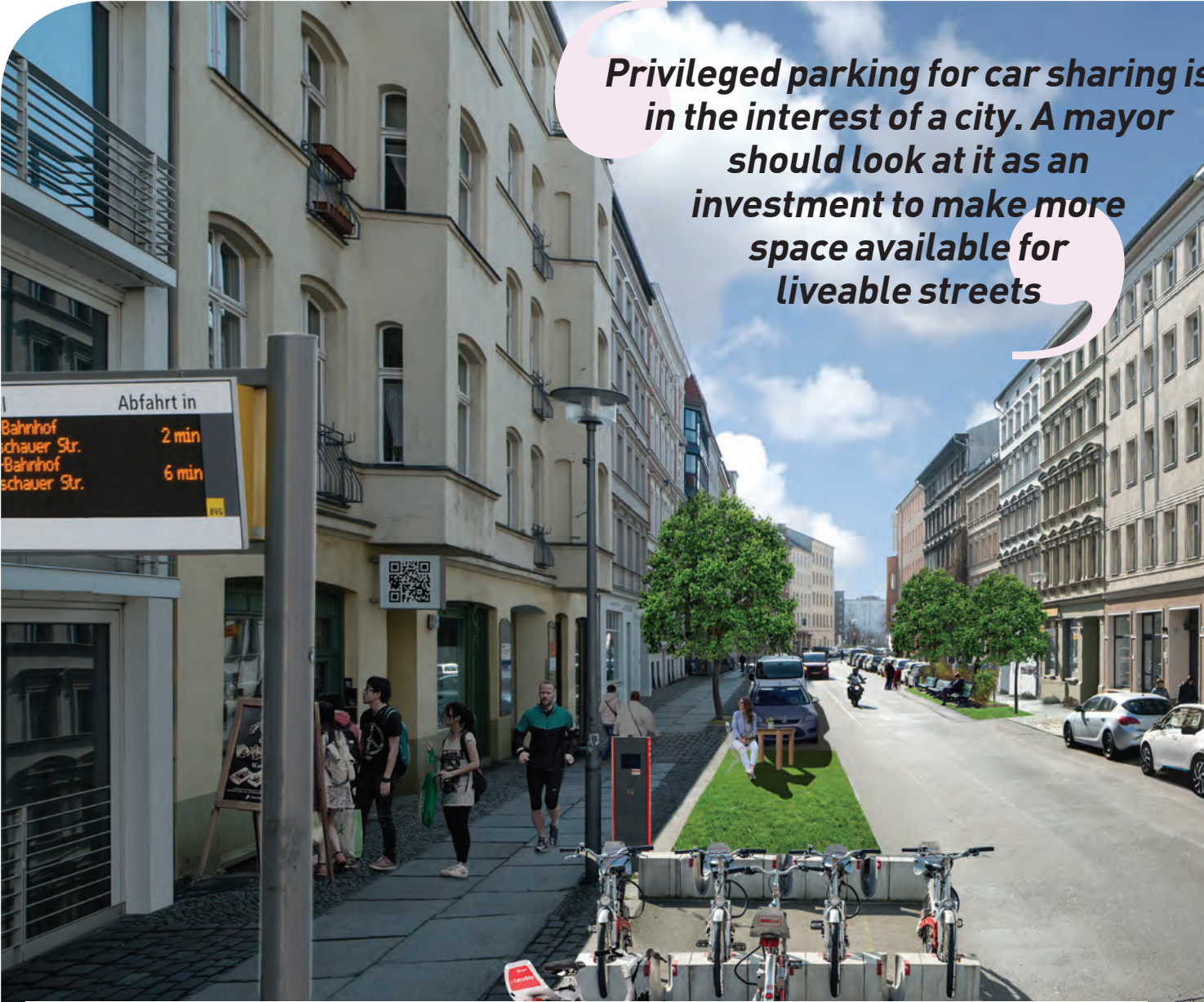
FYI

Robert Sedlak is a senior consultant at tippingpoints' Bonn office. He mainly focuses on stakeholder management and climate action issues.

Gemma Tunmore is a consultant at tippingpoints' Berlin office. She works on editorial projects and city campaigns.

LINKS

- Campaign "Kopf an: Motor aus", <http://www.kopf-an.de/>
- Campaign "Klingelt's? Die blaue Kugel" <http://www.klingelts-bw.de/>
- Elisabeth Wehling (Political Framing): <http://www.elisabethwehling.com/>
- tippingpoints – agentur für nachhaltige kommunikation: www.tippingpoints.de
- Do not smile (DNS) – network of sustainability agencies <http://www.donotsmile.com>



Privileged parking for car sharing is in the interest of a city. A mayor should look at it as an investment to make more space available for liveable streets

Welcome to Utopia: you have arrived at your destination



Improved urban mobility means improved quality of life, says **Dr Carl Friedrich Eckhardt**, but it is necessary to pave the way for those who would rather use a car instead of owning one



Mobility is essential for our quality of life. It enables us to organise our individual lives. It gives us more flexibility in choosing our jobs, more freedom to organise our social lives or we can see our distant family members more easily. Moreover, our wealth is based on division of labour and inter-regional business relations that are dependent on mobility.

However, for many years cities have been struggling with the negative impacts of road traffic: cars parked almost everywhere, we can often find half an hour of our valuable time eaten up by searching for a parking space and we spend more and more time in congestion. Lastly, and most importantly, almost every large city regularly fails to meet the air quality requirements of the EU. As the conflict becomes more intense, cities mostly react with restrictions such as number plate lotteries or car-bans.

At the same time, cities and their residents are aiming for a better quality of life: liveable public space, better traffic flow, better mobility and better air quality. What has been an intensifying conflict over recent decades can now be turned into harmony. The key words are customer orientation and innovation. Three developments are supporting this paradigm shift. First, customer preferences have already been changing and this will continue. Car-utilisation rather than car-ownership is becoming more and more popular. Second, the automotive industry is investing in all forms of sharing services (car sharing, ride sharing, ride pooling). Even the financial markets are investing massively in fast-growing start-ups. Last but by no means least, three technological developments support the previous two developments: electrification of drivetrains, digitalisation, and autonomous driving.

Against this background, from today's point of view, it appears bold but it is realistic to state that we are presented with an historic chance to

increase quality of life and urban mobility at the same time. Moreover, this can be achieved within the next 15 years. We don't need to wait. Everything we need is already in place. We need to implement and scale the solutions.

SPACE-MAKING FOR LIVEABLE STREETS: A WIN-WIN SOLUTION BY A RESIDENT-CENTRIC STEP-BY-STEP APPROACH

We are in a very promising situation in that we have all manner of technological solutions available. The challenge is a political and an economic one. The political challenge is to convince politicians, civil servants, residents, NGOs and the media that this paradigm shift can be achieved without renouncement and thus without fear of political pressure.

We need to pave the way for those residents having a car but who would prefer multi-modality without car-ownership: they don't need a car every day and they don't want to own one. They only have a car because they need one every now and then. If the availability of car sharing was sufficiently reliable, they would have a new option and might abolish their private car. This would also create benefits for all remaining car owners and the neighbourhood as a whole. First empirical indications from Berlin and Hamburg support this view. This target group counts for roughly a third of car-owners in urban residential areas. An additional 20 per cent could also be motivated because they don't need a car in their daily lives but they are emotionally attached to cars.

The economic challenge is to provide critical mass and to overcome path-dependencies. A small fleet does not provide sufficient availability for residents to use a car when they need one. This holds particularly true for residential areas with high parking pressure. Here, at first sight, it seems that car sharing would make things worse. But the contrary is true. Each and every shared car can substitute

Almost every large city regularly fails to meet the air quality requirements of the EU



Almost every large city regularly fails to meet the air quality requirements of the EU. As the conflict becomes more intense, cities are forced to invent regulations such as number plate lotteries or car-bans

roughly 10 private cars (usually substituting older, less efficient cars with new or electric ones) and in total the number of vehicle kilometers driven declines. Therefore, privileged parking for car sharing is in the interest of a city. A mayor should look at it as an investment to make more space available for liveable streets.

If it is easy to implement dedicated parking for car sharing and bike sharing, a city should go for it. But if it is politically difficult, here is a way to create a win-win situation. The starting point should be a participation process inviting residents to shape their neighbourhood according to their preferences. This could be supported by architecture or urban design students who could visualise various scenarios of how the neighbourhood could look. As these concepts are only suggestions, residents should be empowered to revise them. In parallel, it is wise to use an objective tool such as the Urban Travel Monitor (developed by BMW with the Karlsruhe Institute of Technology)

to understand mobility preferences, attitudes, and actual behaviour in that particular neighbourhood. Based on the objective and emotional dependency of car-owners the tool indicates the potential number who would be willing to opt for multi-modality without car-ownership. In order to transform that potential into real-life changes workshops are required to understand the preconditions under which these car-owners are willing to sell their cars. These early adopters will create a request for dedicated parking for car sharing and for improved cycling infrastructure. The latter includes bike racks, bike lanes, or bike sharing stations.

The win-win situation can be implemented in a step-by-step approach. All partners contribute: the city sets positive framework conditions and, partly together with private partners, takes care of the infrastructure. Mobility providers improve the availability of their services and residents get rid of their cars, first by temporarily parking them outside of the



neighbourhood and then by voluntarily disposing of them. In order to gain experience and to learn, the neighbourhood project could organise test events in selected locations of the neighbourhood. It could start with a weekend. The participation process should evaluate the success and feed back the lessons learned into a continuous improvement process. The next step could be a test week or two in order to gain experience in daily life. Finally, as a concrete result of the participation process, the infrastructures are implemented permanently and residents dispose of their cars.

The beauty of the concept is that such neighbourhood projects can make space available for liveable streets and improved mobility at the same time. After a series of iterations it may be that a significant numbers of cars can be substituted. This is quite something. It is important to understand that this process allows residents with preference for car-ownership to continue with their mobility behaviour. There is a strong invitation to change but it is not a must.

SCALING ELECTRIC MOBILITY: CHARGING STATIONS AND PRIVILEGED PARKING

Even though electric mobility helps cities towards compliance with EU air quality regulations, promoting this technology requires changed framework conditions such as taxation, preferential

parking etc. As the examples in Oslo, Amsterdam and Copenhagen show, it is possible to make a difference if the framework conditions are optimised. This requires a solution to the problem of critical mass and path-dependency (also referred to as the chicken-and-egg problem).

In order to lower NO₂ emissions, the scaling of electric mobility is necessary; therefore public charging is essential. According to a rule of thumb, roughly 75 per cent of all urban car-owners cannot charge their electric vehicle at home¹. Either they are on-street parkers or an installation of a wall-box is not possible due to expensive installation costs or a veto by the landlord or other proprietors. Therefore, a few public charging stations are not sufficient for EV-owners to charge their cars.

Scaling electric mobility requires a critical mass of public charging stations (several hundred or thousands) and additional incentives to use electric vehicles. At the local level parking privileges are very effective: cars are typically parked for 23 hours a day and are used for only one. Each and every trip starts and ends with a parking process. Again, to be effective, a critical mass of public parking spaces needs to be dedicated for electric vehicles only. If each year 10 per cent of public parking spaces were dedicated for electric vehicles, after five years every second parking space

would be available for emission-free drivetrains. This will have an impact.

However, provided a city could scale electric mobility, it would be politically difficult to justify this, the more the city suffers from parking pressure. Here again the step-by-step approach described above will also help. Firstly because the space being made available could be used not only for liveable streets and multi-modal offers, but also for electric vehicles. Secondly, electric car sharing fleets will provide base-load demand for public charging and privileged parking.

CONCLUSION

The paradigm shift towards a better quality of life and improved urban mobility is possible. One key is to establish a participation process in order to explore residents' and voters' needs and then pave the way for those who would rather use a car instead of own one. This provides the basis to create critical mass from the very beginning. Piecemeal policies are unlikely to succeed. To successfully manage the paradigm shift it is wise to establish a multi-stakeholder-process. 🔄

NOTE

¹ The EU Parliament and Council have the unique opportunity to improve the home charging situation for millions of citizens by agreeing to the Commission's proposed revisions regarding charging infrastructure in Article 8 of the Energy Performance in Buildings Directive

FYI

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Cache on delivery



Hans van Nikkelen Kuijper on an Internet of Things-enabled postbox that could revolutionise the city logistics industry

The way we buy goods is changing rapidly on a global scale. We are now less likely to go shopping in stores for our clothes, electronics, shoes and other goods: nowadays people are increasingly ordering online. Webshops are growing their business as a result and global online sales are estimated to double in the coming years. One side effect is that deliveries of online orders are growing at the same pace, which is a real challenge for carriers from a logistic perspective.

The challenge for those carriers is considerable. The last mile delivery of those online orders forces carriers to increase their efforts to be able to deliver an increasing number

of parcels. This increased logistic planning and operational infrastructure introduces higher costs, efficiency challenges and planning constraints. Secondly, the risk that the online buyer is not home when a parcel is delivered is realistic and forces the carrier to make a second or even third attempt to deliver.

Four Dutch entrepreneurs established the company Sesam Solutions with the aim to address this issue. They developed a technological solution where deliveries and returns of online orders would be made possible without somebody being at home when parcels were delivered or collected. As a result, in 2016 Parcer was launched, an Internet-connected smart parcelbox



The innovative Parcer solution comes in Large (84-litre) and Extra Large (134-litre) to enable customers to order sizeable items online and not have the worry about where they will be left



that allows consumers to receive and send parcels 24/7 without being at home for deliveries or pick-up.

Parcer is a typical Internet of Things solution and consists of a parcelbox that is wirelessly connected via the Internet to a Parcer user-account. Here one can manage parcel affairs, send and receive parcels or track and trace online orders. The system is delivered with an app that allows users to generate delivery and pick-up requests and receive real-time notifications of those deliveries and pick-ups.

SAFE, SECURE, SIMPLE

How it works is simple. Parcer is a Plug & Play solution and does not require any connection to the electricity grid. All webshops and carriers can make deliveries to the Parcer as the technology has been developed in a way that does not require any technical integration

The delivery driver opens the Parcer with the code that he reads on the label of the parcel. This encrypted code is safe and can open the Parcer only once

from webshops and/or carriers.

Parcer also caters for the growing trend that is seeing customers ordering far more sizeable packages than in the past - two versions are available, hosting either 84 or 134-litres of cubic capacity.

Parcer owners order their online goods as they would typically do in a webshop. During the checkout, a one-time code is automatically generated by the Parcer platform and printed on the traditional parcel label. This code is automatically sent to the Parcer that is installed in the customer's garden or mounted on the wall. The delivery driver opens the Parcer with the code that he reads on the label of the parcel. This encrypted code is safe and can open the Parcer only once. When the delivery (or pickup) is made, the customer receives a real-time conformation.


The same applies for returns. When a customer wants to return a parcel to the webshop they put the parcel in the Parcer-box. The carrier will be notified about the pickup request and the parcel will be collected from the box with a pick-up conformation to the customer.

Another good advantage of Parcer is the ability to collect fresh food. As the box is Internet-connected it measures real-time temperature and sends notifications as a warning to the user and/or supplier when the temperature threshold is exceeded.

Parcer facilitates online consumers and helps webshops to improve their services and increase

customer satisfaction. Also, carriers benefit from Parcer: the first delivery attempt is always successful and the return process is drastically simplified. This leads to significant cost reductions, less transport movements in cities, simplified planning and helps to reduce carbon emissions considerably.

Parcer has been tested during 2016 and launched in the Netherlands and Belgium in 2017 on a large scale. As the technology can be used in any country in the world, Parcer aims to launch in other countries in Europe during 2017 through a partner network.

Until now the inventors have concentrated on marketing Parcer as a high-end parcelbox but in the coming months, the range will be extended with additional types of boxes for generic markets. 



FYI

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Safety and Security in Transport

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

- o **Motorcycle Safety** - The European Association of Motorcycle Manufacturers' plea for improvements in rider safety
- o **ETSC** - Automation benefits vs risks
- o **Bristol, Florida, Copenhagen** - The Internet of Urban Things
- o **US Transit** - Dr Andreas Kossak weighs up the benefits





There are about 33 million motorcycles and mopeds in the European Union

Riding in plain sight

Dr. Veneta Vassileva from the European Association of Motorcycle Manufacturers (ACEM) on the vital importance of making motorcycling safer in European cities

Motorcycles, mopeds, scooters and quadricycles/quad-bikes are a very popular form of transport in many European cities. There are about 33 million motorcycles and mopeds in the EU – of which about 60 per cent are used for commuting. In recent years, registrations started increasing again as the European economy started to recover.

These vehicles have many intrinsic advantages. As a result of their reduced size, they are a very efficient

alternative to cars, have reduced running costs, save commuters valuable time and help Europe's cities to lower congestion levels, not to mention their fleet and logistics applications (e.g. police, paramedics, breakdown services, etc.). Further to this, motorcycles and mopeds are very fuel-efficient, and the most recent electric-, hydrogen- and hybrid-powered models emit little or no carbon monoxide and dioxide, hydrocarbons, nitrogen oxides or particulate matter.

At the same time, similar to pedestrians, the elderly and cyclists, motorcyclists remain vulnerable road users. This is why the motorcycle industry is working in several areas to increase motorcycling safety. This article will briefly examine some of the most important initiatives led by the industry.

IMPROVING MOTORCYCLE SAFETY IN EUROPE THROUGH TECHNOLOGY

In recent years a substantial improvement in motorcycle safety has been



ACEM and the German Road Safety Council (DVR) are promoting high-quality post-license training programmes through a European Training Quality Label

achieved. The latest data available from the IRTAD² shows that between 2000 and 2015 the number of fatal accidents involving powered two-wheeler users decreased from 7,612 to 4,338 – a reduction of 44 per cent. All this took place parallel to the substantial growth of powered two-wheelers across Europe, which grew from around 28.3 million vehicles in 2000 to 36.1 million in 2014, an increase of 27.6 per cent.

This encouraging trend is the result of a combination of several factors, but principally of continuous improvement in safety features, such as advanced motorcycle design, and new braking-, lighting- and suspension systems. Motorcycle manufacturers have also developed, either on their own or in co-operation with industry

partners, innovative passive safety systems such as airbags or airbag jackets.

Intelligent transport systems (ITS) applications solutions have also started to make their way into the motorcycle sector. Cooperative ITS (C-ITS) applications that make possible vehicle-to-vehicle and vehicle-to-infrastructure communication have a high potential to minimise the risk of accidents.

They will be of particular importance for cities, since many accidents in urban areas are the result of car drivers failing to see motorcyclists. This problem could be partly addressed by enabling non-motorcyclists to receive a 'motorcycle approaching indication' or, in case of an emergency, a 'collision warning' message.

UNDERSTANDING THE CAUSES OF MOTORCYCLE ACCIDENTS

There is no doubt that advanced vehicle design and technology makes a positive contribution to motorcycle safety. At the same time, in order to continue improving motorcycle safety, it is essential to have a solid understanding of why and how accidents happen.

Two types of studies are particularly relevant in this regard. The first type is what we can call 'in-depth accident studies'. Whilst general statistics provide only a first approximation to motorcycle accidents, in-depth studies provide a much more detailed analysis of accident mechanisms. This is precisely why the motorcycle industry is currently supporting the 'SaferWheels' project, an in-depth study led by Loughborough University in the UK on powered two-wheeler and bicycle accidents.

The second type of accident studies is what is usually known as 'naturalistic riding studies'. This type of project entails analysing the real behaviour of road users during ordinary every day trips with their own vehicle. To collect the necessary data the vehicle is equipped with unobtrusive sensors and cameras that record vehicle movements (eg speed, acceleration, braking, etc.) driver behaviour (eg eye, head and hand movements), and external conditions.

The findings of both in-depth and naturalistic studies are vital to develop efficient motorcycle safety policies. This area would greatly benefit from further European and national support. Also, further work at national level is needed to strengthen the collection of motorcycle safety data. Many EU Member States still lack vital information such as exposure data figures – it records casualty rates per distance travelled – helmet wearing rates, or detailed assessments of national and local infrastructure conditions.

Reducing commuting times in cities

A study by the French Environmental Agency (ADEME¹) concluded that 'pure' motorcycle travel time was halved when comparing motorcycle and car trips in the city of Paris. The survey was performed in "real life" conditions with the aim of comparing the two modes of transport on the same type of use. They were timed on a typical "homework" trip, between a suburb (Linas) and the Paris city centre (Musée d'Orsay), at peak time.

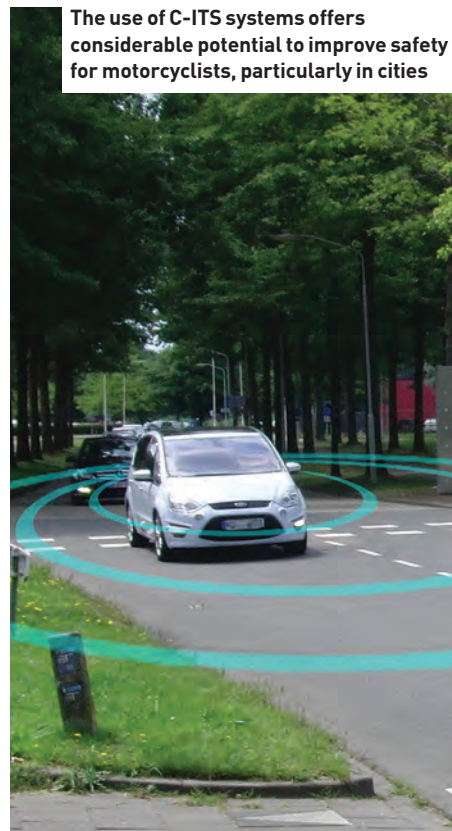
While car drivers needed, on average, 88 minutes to cover a 31 km journey, motorcyclists made it in 44 minutes, clearly benefiting from their lower exposure to congestion. The study also showed that car drivers needed on average an additional 16 minutes to find a parking place.

FURTHER IMPROVING MOTORCYCLE SAFETY IN EUROPEAN CITIES

Decisive action in other areas can also help to further increase motorcycling safety. Motorcycling training is one of the most relevant ones. Motorcyclists must have both the necessary technical skills for the vehicle they use and a responsible attitude on the road. For this reason, ACEM and the German Road Safety Council launched a European training quality label for post-licence training programmes³.

It is also critical that national and local authorities do enforce existing traffic rules. Higher compliance with legislation in speed, alcohol, licence and mobile phone use can bring substantial road safety benefits. In this regard, it is important to remember the importance of achieving high levels of helmet wearing. According to the OECD, the helmet-wearing rate in the EU is relatively high (95 per cent on average), but there is room for improvement in some countries. In Greece, for example, the helmet-wearing rate is 75 per cent for drivers and 46 per cent for passengers.

Furthermore, the establishment of mandatory safety checks for motorcycles in all EU Member States and the reinforcement of roadside inspections can help to improve



motorcycling safety since tampered or poorly maintained vehicles can lead to a higher safety risk.

National and local policy-makers need to ensure that infrastructure is well-maintained, receives the necessary investment and creates a safer environment for all types of road users, particularly

for motorcyclists and other vulnerable road users. Relevant aspects here include good motorcycle visibility, obstacle free zones and use of appropriate road surface materials. Also, allowing motorcycles in bus and taxi lanes, such as in London and Madrid, or using more advanced stop lanes in cities can

Working across borders to deploy cooperative intelligent transport systems

The motorcycle industry works closely with a wide range of stakeholders, particularly with the car industry, to develop common specifications and standards for ITS devices. This work takes in different projects and platforms such as the C-ITS platform created by the European Commission, or the CAR 2 CAR Communication Consortium. ACEM members also participate in the I_HeERO project that aims at preparing public-safety answering points in Member States for the deployment of eCall systems.

Further to this, in 2014, the motorcycle industry adopted a Memorandum of Understanding on ITS, which aimed at coordinating the deployment of safety relevant C-ITS on powered two-wheelers in Europe. By signing this Memorandum, ACEM members agreed to have at least one model equipped with a C-ITS device by 2020.

More recently, in 2015, a group of motorcycle companies launched the Connected Motorcycle Consortium. Its key objective is to promote use of C-ITS systems, to coordinate partners' research efforts in this area, to develop new hardware concepts and to improve existing safety applications for vehicles.



not only bring major safer benefits but also optimise the use of road infrastructure.

Lastly, safety campaigns encouraging riders to improve their skills and hazard perception, as well as campaigns encouraging car drivers to pay attention to motorcyclists on the road, have been instrumental in improving road safety. They will certainly continue to be in the future, particularly in those cities with larger numbers of motorcycles.

THE FUTURE OF MOTORCYCLING IN EUROPEAN CITIES

Motorcycling makes an extremely important contribution to our living standards. In cities such as Paris, London, Rome and many other places, hundreds of thousands of citizens use motorcycles, mopeds, tricycles and quadricycles every day to get their workplaces, to go back to their homes, and to move around the city.

The MAIDS study and the UDRIVE project

Between 1999 and 2004 ACEM, with the support of the European Commission and other partners, conducted the first extensive in-depth study of motorcycle and moped accidents: MAIDS. A total of 921 accidents were investigated in France, Germany, Netherlands, Spain and Italy. The study, which used a methodology developed by the OECD for on-scene in-depth motorcycle accident investigations, identified all human, environmental and vehicle factors which contributed to the outcome of the accident.

Between 2012 and 2016 ACEM members supported the UDRIVE project, a large-scale European naturalistic study into the traffic behaviour of motorcyclists, and passenger car- and truck drivers. A total of 240 passenger cars, 150 trucks and 40 motorcycles were continuously monitored with sensors and cameras for a year, yielding a wealth of data about everyday traffic behaviour as well as about near-crashes and crashes.

Also, allowing motorcycles in bus and taxi lanes, such as in London and Madrid, or using more advanced stop lanes in cities can not only bring major safer benefits but also optimise the use of road infrastructure

The number of these vehicles can be expected to continue growing in the coming years, probably at a faster rate as demand for mobility increases and the overall European economy recovers. It is, therefore, essential for national and city authorities to develop inclusive transport policies that take motorcycling into account and that make it possible to reap some of the benefits that motorcycling brings to society: quality of life through better access to jobs and services, affordable mobility and reduced traffic congestion levels in cities. 🌱

REFERENCE

1 Agence de l'Environnement et de la Maîtrise de l'Energie (ADEME). Deux roues motorisées Euro3: progrès environnementaux et comparaison à l'automobile.

2 The International Road Traffic Accident Database (IRTAD) is an OECD initiative. It collects international accident, victim and exposure data on a continuous basis. 29 OECD countries, including 17 EU Member States, are covered in the database.

3 For further information about this initiative please visit: <http://www.acem.eu/publications/item/340-acem-dvr-european-training-quality-label>

FYI

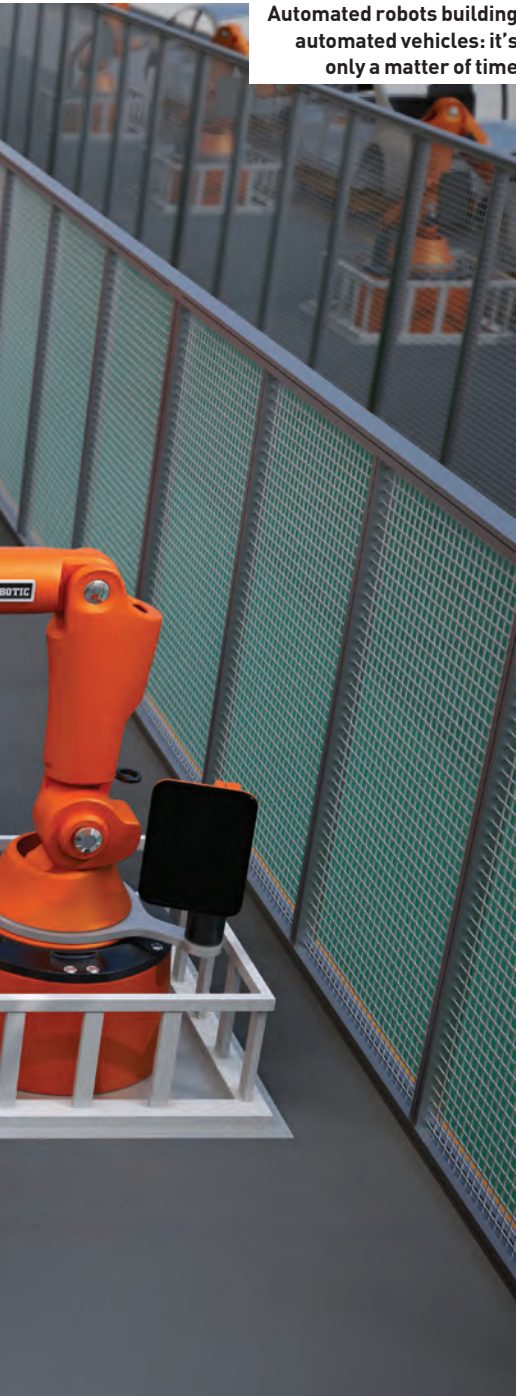
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Risk to exist

It's time to face up to the risks as well as the opportunities of automation, says the European Transport Safety Council's **Antonio Avenoso**



Automated robots building
automated vehicles: it's
only a matter of time

Regular users of computers running Microsoft Windows over the years will be familiar with something technically inclined people like to call the 'Blue Screen of Death'. This is the error message that renders your computer unusable until it is restarted or, in more serious cases, the operating system is reinstalled. In my experience it usually occurs on the day of a critical meeting or on the eve of an important project milestone.

We have become used to computers, mobile phones and other gadgets that can be unreliable in daily use. These situations are frustrating, but generally speaking, nobody dies as a result.

Technology companies and car-makers are now hoping that even more sophisticated combinations of hardware, software and mechanical systems will render human drivers obsolete, increase road safety and reduce congestion. They are racing to put computers in charge of cars, vans and lorries.

But for now much of the talk about autonomous vehicles is hype, with little scientific evidence to back up the claims. The available data often comes from the industry itself, with little in the way of independent verification.

Such hype has helped push the market value of Tesla, a 15-year old company that sold 76,000 vehicles last year, above that of Ford, which sold 6.65 million.

Tesla's website says that all new vehicles leaving its factory "have the hardware needed for full self-driving capability at a safety level substantially greater than that of a human

driver". Further down the same web page, the company says its "full self-driving capability" will have "what we believe will be a probability of safety at least twice as good as the average human driver".

Tesla provides no further information on its website to verify these claims. One snippet of publicly available data is a regulatory filing to the California department of motor vehicles for the year 2016. Tesla tested four vehicles on Californian public roads with engineers behind the wheel at all times. It lists the numbers of 'disengagements' i.e. times when the human driver had to take over control of the vehicle. In 550 logged miles of driving, there were 182 disengagements.

Many of these events took place on roads classified as 'suburban'. And indeed, the prospect of autonomous or semi-autonomous vehicles driving on streets where they will interact with pedestrians and cyclists raises many of the most pressing concerns surrounding automated driving.

HOW WILL PEDESTRIANS AND CYCLISTS REACT TO DRIVERLESS CARS?

A recent research paper by SWOV, the Dutch Institute for Road Safety Research¹, highlights a number of issues that have, so far, received little attention from the research community.

One fundamental challenge is how to ensure that automated vehicles can reliably predict the behavioural intentions of pedestrians and cyclists. Today, a whole range of complex factors impact on how

Technology companies and carmakers are now hoping that even more sophisticated combinations of hardware, software and mechanical systems will render human drivers obsolete, increase road safety and reduce congestion

people behave as pedestrians and cyclists, including formal rules and regulations, informal rules and non-verbal communication. Even if behaviour could be accurately predicted in current urban environments, it is not clear how vulnerable road users will change their behaviour when faced with driverless cars.

According to SWOV's research, the few studies that did examine the behaviour of pedestrians and cyclists in their interaction with automated vehicles generally found that they were fairly cautious and not necessarily confident of its 'skills'. Furthermore, pedestrians and cyclists were found to appreciate messages and/or signals from the car indicating whether the car has detected them and what it intends to do. However, which exact messages need to be brought about, and the method of communicating them, are not yet settled and this requires further study.

These types of questions, as well as others concerning related areas such as training, infrastructure and regulatory changes will need to be answered before automated vehicles are offered for sale, not as an afterthought.

WHO WRITES THE RULES?

At present, in the absence of regulatory clarity, car manufacturers are writing their own rules. In an interview for the US magazine and website *Car and Driver*, a Mercedes-Benz executive in charge of automated systems said a Mercedes automated vehicle's 'first priority' would be to save its occupants.

Whether one agrees or disagrees with this ethical choice, it simply shouldn't be up to carmakers to decide.

A fatal crash last summer in Florida is another case in point. A Tesla-owner, reportedly driving his vehicle in semi-automated 'Autopilot' mode, crashed into the underside of a large

The risk is of a kind of lawless Wild West for the early years of automated cars, not unlike the early years of motoring itself – before speed limits, traffic lights and driving tests started to set the rules of the road. This could be a disaster

truck that was crossing the highway in front of him.

Several facts of that case were disturbing. Firstly, the car was exceeding the speed limit at the time. Automated systems should not be able to break laws in place for safety reasons. Second, the car's automated system was activated despite the fact that the car was not driving on a suitable road. Tesla's system was apparently unable to cope with a large white truck crossing a highway on a sunny day in Florida, which must be a rather common occurrence. As with the theoretical 'occupant first' rule set by Mercedes, Tesla is currently deciding for itself what rules apply in every conceivable situation.

The risk is of a kind of lawless Wild West for the early years of automated cars, not unlike the early years of motoring itself – before speed limits, traffic lights and driving tests started to set the rules of the road. This could be a disaster. And not least for the nascent industry.

If independent regulation and step-by-step approval of automated systems is not in place soon, a number of high-profile deaths caused by automated vehicles could so horrify and appal the public, that the vehicles will be withdrawn from use. Rebuilding trust could be a huge challenge.

Regardless of the overall likelihood that deaths could eventually go down as computers gradually remove human error, and recklessness from driving, a small number of so-called 'false positives' where the

vehicle makes an error and causes a fatal collision, could be devastating for the industry.

The fears of automotive killing machines would be felt in a similar way to terrorism. To be stopped at any cost.

A STEP-BY-STEP APPROACH TO INCREASED AUTOMATION

What's needed is a step-by-step approach, starting with approvals for systems that have been proven to work in specific scenarios such as motorways without cross junctions or roadworks.

In Europe, it should be national governments, together with the European Union that set the rules, oversee testing, and independently investigate collisions. The current regulatory environment is not set up for any of these tasks in the vastly more complex world of automated cars. It's time Europe woke up to the risks as well as the opportunities of automation. 🕒

LINK

1 <http://tiny.cc/vqqa7ky>

FYI

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For the good of the people

The benefits of transit in the United States, assessed by
Dr Andreas Kossak

In July 2015 the Mineta Transportation Institute (MTI) at the San José State University in California published the final report of a research project entitled: *The Benefits of Transit in the United States: A Review and Analysis of Benefit-Cost Studies*¹. The sponsoring Agency was the US Department of Transportation (USDOT), Office of the Assistant Secretary for Research and Technology. The MTI was established by the US Congress in 1991 as part of the Intermodal Surface Transportation Equity Act (ISTEA) and reauthorized under the Transportation Equity Act for the 21st Century (TEA-21). From the very beginning it competed successfully with the leading Transportation Research Institutes in the



US - not at least in the field of public transit. The respective report is classified by the USDOT as a White Paper.

History and boundary conditions of public transit in the US are traditionally reasonably different compared to those in European countries. However, during the last few decades the role and the configuration of public transit in the US came to closely resemble European standards in many respects. In some areas even substantial impulses were adapted in Europe from the practise in the US. For example, in the 1970s the German Federal Ministry of Research and Technology closely cooperated with the US DOT Mass Transit Administration in the frame of its

Transit Research Program. Among the knowledge transfer complexes from the States to Germany have been in those days in particular the Paratransit services (including special services for disabled travellers) and the barrier-free layout of public transit facilities². Along with the worldwide mega-trend of urbanisation, (and as its result) the emptying of the rural areas, and the demographic changes, the importance of Paratransit services will further increase substantially in Europe in the future.

During the last few decades numerous metropolises in the US reached in a worldwide leading standard in the light rail sector. A very interesting element of this is the co-financing of the



Do the citizens of New York City use their public transit system in the same way...

infrastructure and/or the operation by beneficiaries. The latter is based on a project-specific valuation of the benefits and the beneficiaries of certain public transit services beyond the direct use.

In Germany, for example, it is mandatory for public transit-investments beyond €20-25 million (State) and €50 million (Federal) respectively to be assessed by use of methodically highly questionable standardised procedures based on the benefit-cost methodology; the assessment is oriented on one hand at the general worthiness of realizing a project (benefit-cost-indicator at least 1.0) and on the other hand at priori-tising it in the frame of public sponsoring programs according to the same criteria – more or less without taking into account if the projects are basically comparable. The MTI White Paper gives a good impression of the approach in the US in this regard.

EXECUTIVE SUMMARY

The white paper documents the findings from a review of available

research literature and the benefits and costs of transit systems in the United States. The primary goals of this research were the identification:

1. Of benefit-cost (b-c) ratio estimates for US transit systems.
2. Of the main categories of monetized benefits that derive from transit services in the US

The assembled data will help planners, advocates and policy-makers by:

1. Providing a resource of collected benefit-cost ratios and other quantifiable, monetized benefits of transit,
2. Identifying the key monetized benefits of transit that may be of interest to planners, advocates, and policy-makers, and
3. Providing a collection of monetized transit benefits that might be useful to researchers seeking ways to advance the methods for quantifying benefits and costs.

A review and analysis of the available b-c ratio estimates for transit systems in the US found wide variation among sources. Some of these differences are attributable to the population sizes and densities of the service areas – with rural and small urban areas generally yielding lower b-c values than urbanized areas.

However, substantial differences remained even after the context was accounted for, suggesting that analysts are using different methods of analysis and that appropriate transit investments in rural and small urban areas can yield benefits substantially greater than costs. The benefits of transit were measurable and strong in a variety of operating environments, not just in large cities. Key findings from this review and analysis were:

- *Substantial transit benefits in rural and small urban areas:* While two studies for rural area transit services found ratios either

...as the citizens of Berlin?



below or slightly above 1 for every dollar spent, other studies found values ranging from a respectable 1.67 to a high of 4.22. Further investigations revealed that these substantial differences among studies were due to measurement of the economic benefits to riders and transit-dependent populations. These findings suggest that appropriate transit investments in rural and small urban areas can yield benefits substantially higher than costs. Small urban b-c ratios were even better, ranging from 1.23 to a remarkable 9.70.

- *Transit pays for itself in congestion relief benefits for mid- to large-sized urban areas:* According to this report's analysis of a certain b-c study of transit systems in mid- to large-sized metropolitan areas, congestion relief benefits from transit investments begin to exceed transit costs for metro areas of 2.5 million people or larger.

- *Jobs and economic stimulus are among the largest benefit categories from transit investments:* Benefits to jobs (pictured) and the economy were found to be one of the most important categories in the b-c studies reviewed. While these benefits tended to be larger in urbanized areas compared with small urban and rural areas, smaller population areas stand to gain substantially from transit services, with between 40-46 per cent of total transit benefits attributable to jobs and the economy.

- *Transit improves health care access and outcomes while reducing costs:* Few of the published b-c studies surveyed for this white

paper measured the health care cost benefits of transit. However, some authors found that giving people low-cost and reliable transit access to medical services decreases the tendency of low-income people living in rural and small urban areas to forgo treatments, thereby improving public health and reducing the costs of health care to society.

- *Transit saves people money:* While the financial benefits of transit in rural areas are generally 10x compared with the total costs of transit, small urban areas receive somewhat larger benefits. In addition, transit services in urbanized areas added the most money to peoples' pocketbooks relative to costs. Overall, this is an important benefit category for transit services.

- *Low b-c ratios aside, transit saves lives:* The safety and security benefits of transit were low compared with the total costs of transit in the studies reviewed here. However, this paper finds evidence that b-c analysis methods are likely undervaluing the important role transit plays in reducing accidents and injuries and the costs to society from both. In brief, existing analytic methods struggle with properly valuing human life and health in monetary terms. Some argue that transit's benefits (safety and otherwise) are low because most people choose auto travel over transit. However, this paper presents a brief but compelling argument that this is largely due to a history of under-investment in transit services in

the US, coupled with the predominance of auto-oriented land use planning and development.

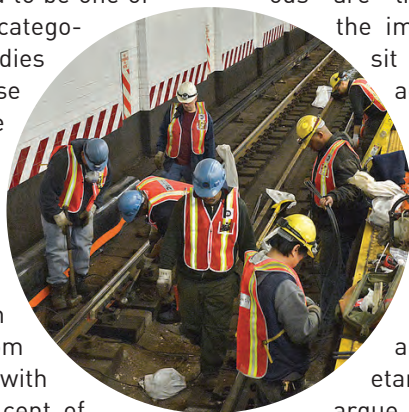
- *Greenhouse gas emissions, air quality, and other important but undervalued transit benefits categories should be considered:* This paper concludes that several benefit categories should be considered for research and possible incorporation into future b-c estimation practices. The benefits of transit for fighting climate change through reduced greenhouse gas emissions, reducing dependence on foreign oil, increasing property values, encouraging more compact/transit orient-ed development patterns, and improving emergency response services were all found to have received little attention from b-c studies. This is likely due, at least in part, to the lack of research investment in developing the rigorous analytic methods required for reliably and accurately measuring both the costs of these factors to society (climate change being a prominent example) and the benefits transit can yield in these areas. All merit further consideration and attention from policy-makers, academicians, and analyst practitioners.

THE KEY BENEFITS OF TRANSIT

The following key benefits of transit were the most-often cited and measured in the reviewed studies:

- Traffic Congestion
- Jobs and the Economy
- Health Care Costs
- Saving Money
- Safety and Security

These benefit-categories are discussed in greater detail in the white paper. An extract of the discussion is compiled below.



TRAFFIC CONGESTION

As expected, the benefits of transit in terms of reducing the traffic-congestion were identified as the main focus of cost benefit analyses to date. This has been far from the last the reason why the clear majority of the studies in this context were concentrated on the conditions of large cities and metropolitan areas respectively. The white paper documents quantitative details regarding the following results:

- The average delay per commuter increases parallel to the amount of population in the service area from 32 to 48 hours p.a. (year 2000). In Metropolitan areas with a population of more than 5.5 million inhabitants a slight decline to 46 hours p.a. has been observed; this is supposedly due to the comparably good public transit system in the respective regions.
- The benefit-cost-relations are increasing more or less steadily with the number of inhabitants; related alone to the benefit in terms of reducing congestion it exceeds the factor 1.0 only in service areas with 2.5 million inhabitants and more.
- The average annual congestion cost savings per capita from transit in US cities are indicated to be US\$41 in areas with bus-only transit-systems, US\$88 in systems with a moderate/small portion of rail, and US\$279 with a large portion of rail involved in the transit-system (Figures as of 2003 – see Figure 1 above right). In regions with a dominant share of rail transit the congestion (only) benefit-cost relation often exceeds the factor 3.0; that is seven times the factor being reached in average in areas with bus-only transit systems.

JOBS AND THE ECONOMY

The benefits of transit to jobs and the economy also feature prominently

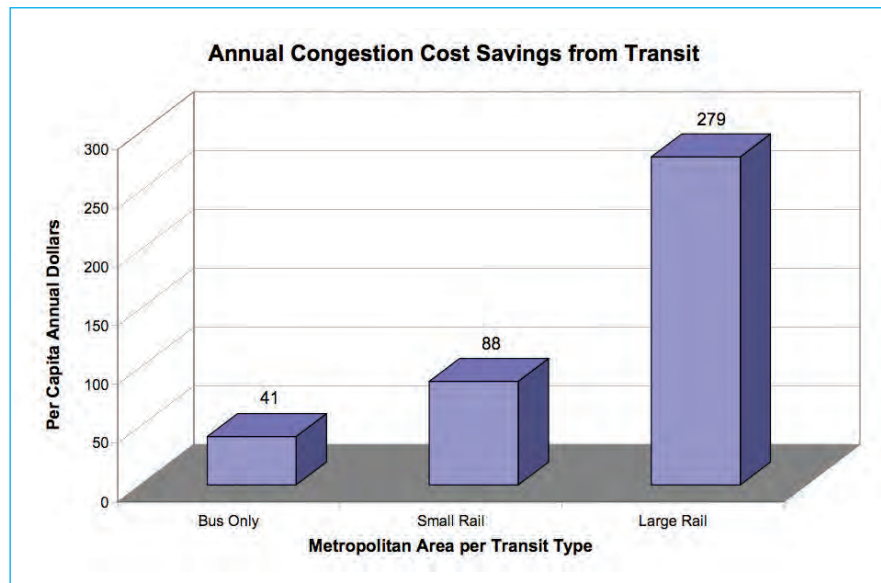


Figure 1: Annual Per Capita Cost Savings from Transit in US Cities by Type of Transit Available (2003 Dollars); diagram based on ¹(see sources notes)

in the reviewed studies. As a general result the differentiation related to the type of the service area in this category is similar to that of traffic congestion.

The lowest benefits have been found in rural areas – with a US-wide average benefit-cost factor of around 0.5 or even considerably lower. For small urban areas an average of nearly 1.0 is stated; related to German/European conditions the small urban areas include medium size cities (up to 50,000 inhabitants and more). For urbanized areas the factor is stated to reach on average almost 2.0, partly even significantly higher. Regarding the national level, a benefit-cost relation exceeding substantially 1.0 (only this category) is stated. As an example, for the conditions in a Federal State being primarily stamped by a low density of population, the following Figures for South Dakota: average 1.66, urban 1.95, rural 0.38.

In the discussion of the results of the studies reviewed regarding this aspect, the authors of the White Paper come to the following

conclusion:

- The various factors are handled differently in the studies. For example: in some studies the effects on the health sector (next category) in rural areas are attached to this aspect.
- The benefits of investments in public transit in this context are usually closely re-lated to other public or private financial activities. Because of that the public transit should not be seen and handled respectively in the sense of a sum of mul-tiple benefits addressing and satisfying numerous social requirements.

Remark: Over the last few decades numerous qualified investigations on the eco-nomic effects of building and operating light rail systems in the US (and worldwide) have been executed and published. The facts and Figures that have become available in this context are worth considering and used respectively for the further improvement and refinement of benefit-cost analyses.

Main reason for the respective activities/studies has been (and still

is) generally to support the arguments regarding a co-financing of the rail systems not only by the direct user and the common tax payer, but in particular by the indirect user/the beneficiary as well. The specific term for that is Value Capture. A compilation of results of various studies on that topic carried out in cities and metropolises worldwide (US, Europe, Australia) can be found in reference³.

HEALTH CARE COSTS

Regarding this benefit category is must be emphasized that it has not been taken into consideration adequately with transit in rural or small urban areas though it plays, in particular in those areas, in most cases a substantial role. In the respective regions the quality of transit can even be decisive regarding a reduction of the health care costs.

A direct context between the average state of health of the low-income population and the quality of the transit service was identified. According to an actual analysis, reduced health care costs make up between 40 per cent in small urban areas and 42 per cent in rural areas of the total benefits from transit services (see Figure 2, right). The authors of the respective study came to the conclusion that the health care benefits are an important factor regarding the outweighing of the relative high costs of providing good transit services in those areas; on the US level it compensates in rural areas on average for 51 per cent of the costs, in small urban areas even for 86 per cent.

SAVING MONEY

This category represents in rural and small urban areas around 15 per cent of the total benefits of public transit. As an example for the absolute benefit for a single person results of a study are cited in the White Paper, in which the average

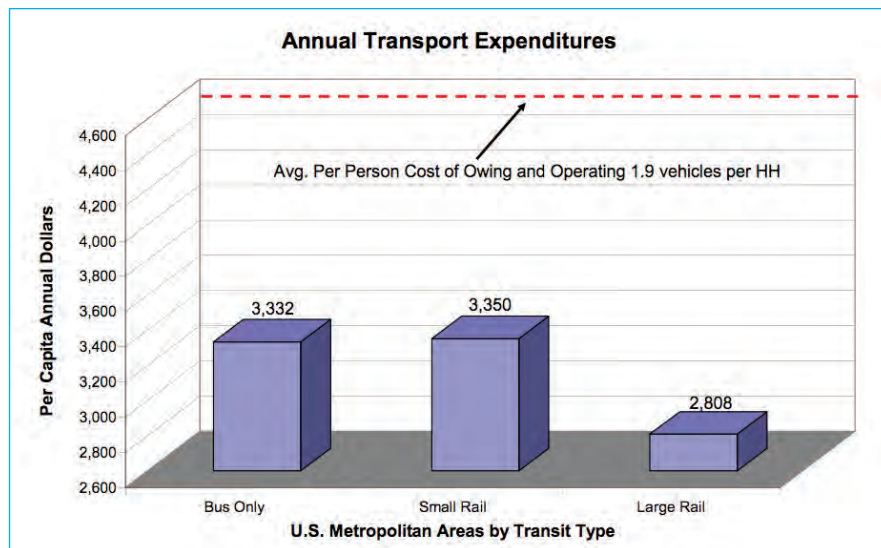


Figure 2: Share of Total Benefits for Each Benefit Category for Rural and Small Urban Areas in the US; diagram based on ¹(see sources notes)

annual transport expenditures per capita in urban areas in the US (as a whole) with different public transit systems have been investigated; according to the study (see Figure 3, above right):

- The average per person cost of owning and operating a car (1.9 cars per household) had been US\$4,528 in the year of the investigation (2003).
- In areas with bus only public transit service or with only a small share of rail the average expenditure had been US\$3,332 and US\$3,350 respectively; that means a saving of about US\$1,180 or 25 per cent per year.
- In areas with a large share of rail the Figure has been about US\$2,800; that means a saving of US\$1,730 or of about 38 per cent.

Results regarding the contribution of the cost-savings to the total benefit-cost-relation in different types of service-areas are also documented. Though the results differed from study to study, quite remarkably it shows generally as well a differentiation of the savings between rural (comparably low), small urban (mediate) and large urban are-as

(comparably high). In extreme cases it was found that the contribution of this benefit category alone was compensating for the total costs of public transit.

SAFETY AND SECURITY

This category is marked as a smaller but still important benefit category. It did not play a major role in any of the reviewed studies and this is explicitly addressed in the White Paper as not complying with the factual importance of the category for the society and for every single person.

Therefore it is recommended to pay much more attention to it in future benefit-cost studies. In this context results of a 2011 study published by the largest US Automobile Club (AAA - Triple A) are of relevance. According to this study the costs of traffic-accidents for the society are three times as high as the costs of traffic congestion. It is mentioned that this calculation does not even include all cost-factors of traffic accidents – irrespective of the fact that which costs and to what extent they are attachable to traffic accidents is the cause of some controversy.

While admitting that benefit-costs analysts and scientists made

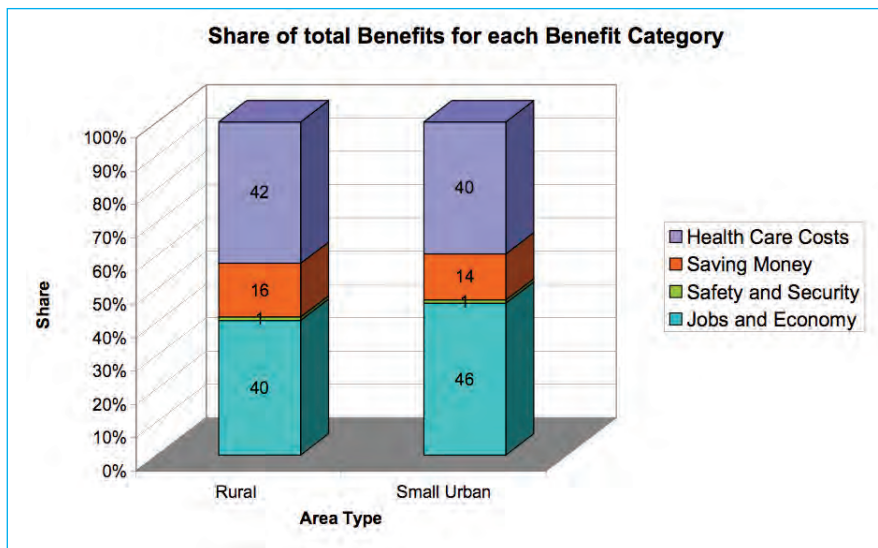


Figure 3: Annual Per Capita Transport expenditures in US Cities by type of transit available (2003 Dollars); diagram based on ¹(see sources notes)

substantial progress in this regard in the past, the authors of the White Paper are convinced that further improvements are possible and needed - in particular in order to be able to calculate appropriately the contribution of public transit to safety/health of the population. It is argued for example, that according to the statistics of the National Safety Council (NSC) it is 170 times safer taking a bus than riding in a car. This argument is underlined with a comparison of the rate of traffic fatalities in differently structured regions: the most "sprawled" counties in the US have substantially higher traffic fatalities than the least sprawled counties. The differences are significant and stable.

Finally it is expressed the expectation, that the safety factor will in future be substantially more recognized in favor of public transit in the frame of benefit-cost-analyses. If the public transit were more adequately considered in the methods of the analysts in this regard its benefits would be further acknowledged in the public perception.

What is particularly remarkable is the fact that the aspect of security connected to criminality (including

cyber crimes) and terrorism is neither addressed on the benefit-side nor on the cost-side in the White Paper, although it is explicitly part of the title of this category. It's even more astonishing if one takes into account that the Transportation Research Board (TRB) of the US National Academies of Sciences published a report in 2011 that addressed the importance of that exact issue for the transport politics and the transport infrastructure⁴.

CONCLUSIONS

The b-c analyses of public transit services and projects in the US are generally tailored to the specific characteristics of the subject and concentrate on its socio-economic value, its structural relevance and benefits for the effected individuals. This means it is targeted not only to the legitimacy of massive public funding but also on the acceptability of involving beneficiaries in certain cases. The assessment of the benefits is handled flexibly in accordance with the characteristics of each project.

In the White Paper there is not any examples any claims, any recommendations or even any remark

regarding standardized procedures. On the contrary, the

differentiation of project types according to structural conditions and the variety of accepted methodical procedures are to be interpreted as a clear vote that standardized methods are not appropriate in this context. That is a much more adequate approach than that being obligatory/practiced for example in Germany. The White Paper proves that exemplarily.

The findings and recommendations documented in the Paper should be taken as stimulation for improving the methods of b-c analyses for assessing public-transit and public transit projects respectively in Europe. Standardized procedures should at least be supplemented by components, taking into account the specific differences of project types in general and of characteristics and boundary conditions in particular. Not least it should be considered to connect the configuration of the studies and the definition of the results with the 'beneficiary pays principle'.

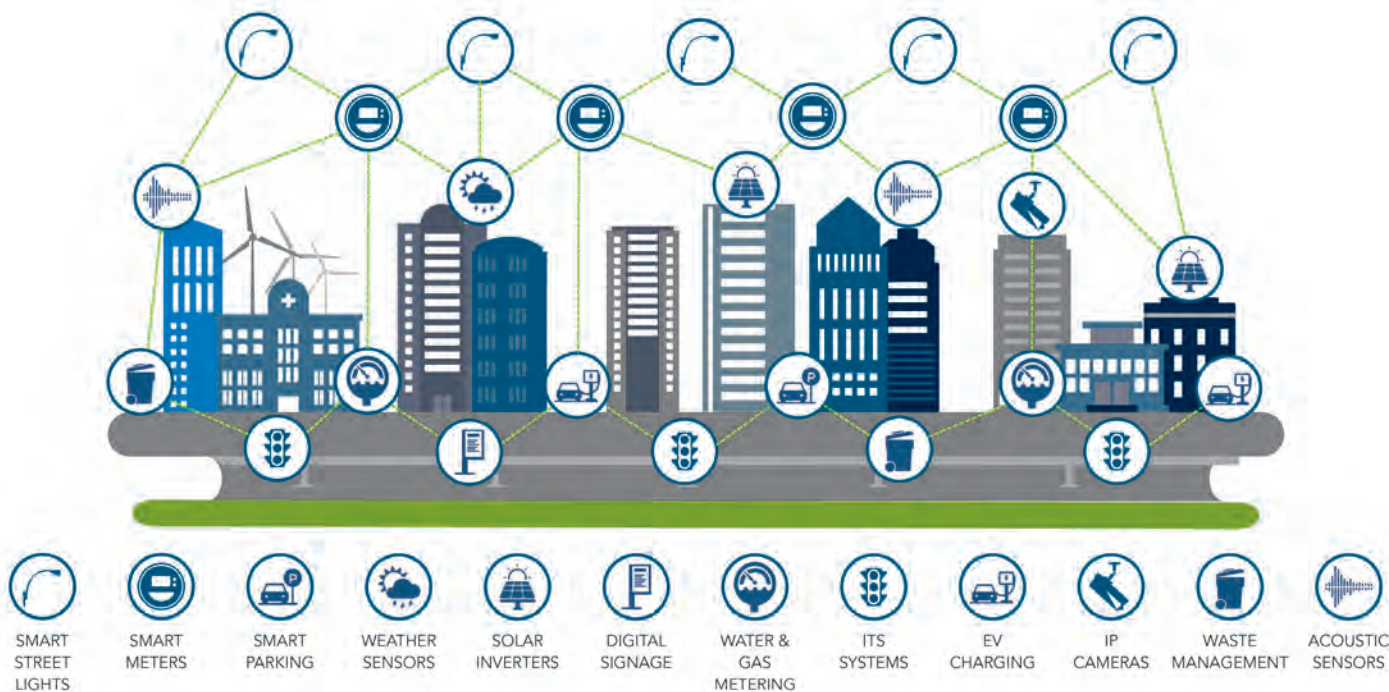
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FYI

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The internet of...



...very smart things indeed



Brian McGuigan on how a programme of global smart city technology adoption can mean survival in a competitive world

If there's a universal truth about cities, it's that they exist in a state of constant change. The built environment (buildings and roads) and natural environment (water and topology) are constantly evolving and being adapted to suit the needs of a city's most essential, but unpredictable element: its citizens.

The process of this change, when it works well, allows cities to grow, accommodate new residents, adapt to shifting industries and support artistic or academic endeavours.

When it goes poorly, cities become anemic, unsafe or stuck in time as the world moves on.

But cities are more than a collection of static, aging or 'dumb' parts, being exploited, adapted and worked around by their 'live' elements. Cities are complicated organisms, whose component parts interact, inform, protect and support each other. A truly 'smart' city is one where this interaction has been improved at every level, allowing the organism to adapt and thrive.

THE INTERNET OF 'URBAN' THINGS

The Internet of Things is generally understood through the lens of 'smart' devices, giving eyes, ears and a voice to previously insensible objects to allow for faster, smarter and more effective interactions. When taken to a city scale, the Internet of Things presents astounding opportunities for interactions between the living and structural parts of a city.

IoT technology creates nerve endings throughout a city, connecting

MESH NETWORKS

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No two cities are perfectly identical, and all cities, whether old or new, will continue to find ways to deploy and evolve using technology to serve, protect and support their citizens

responsive devices and sensors and building a network that can be articulated in nearly infinite ways. Responsive sensors or controllers unlock logistical efficiencies, but can also speed addressing problems or increasing the health and abilities of its users. Cities present both a broad and deep range of implementations, and will appeal to different groups in different ways - but when they are applied effectively can vastly improve potential for a city's growth and evolution.

A LIGHT TO LEAD THE WAY

Smart street lighting is one of the most familiar examples of IoT technology being implemented to improve the health of the city as a

whole. The advent of LED technology vastly improved the efficiency of urban lighting, but it also created incredible opportunities for responsive and intelligent lighting use. When distributed across the city, smart technology can respond almost instantly and provide exactly the right levels of power and illumination for discrete or specific needs.

Copenhagen, one of the world's most sustainable and smartest cities, worked with Silver Spring Networks and partners Citelum and SELC to deploy an enhanced city lighting system designed to improve energy efficiency, lower operational costs, enable remote lighting management and control. Radio modules allowed

for instant alerting on light failures, as well as an additional layer of energy savings by managing the light output throughout the night.

Furthermore Copenhagen are exploring how the system can be extended to improve the safety of cyclists across the city. This factor may not be important in every city, but in one where nearly half of all commuter trips are taken by bicycle, this is an invaluable and responsible system to Copenhagen.

This methodology may not be needed in every city, but in a city where nearly half of all commuter trips are taken by bicycle, this is an invaluable and responsible system to Copenhagen.

In Florida, Silver Spring Networks partnered with Florida Power and Light on the world's largest street light controls program. The lighting authority is adding over 505,000 connected lights to a footprint of over 5 million assets connected to Silver Spring's IPv6 network for smart metering and distribution automation. These were being used to reinforce the reliability of its grid,

Bristol deployed a city-wide smart city network designed to be used and leveraged not just by government, but by citizens, businesses and the local universities

often challenged by strong storms and hurricanes.

The program also solved a unique environmental challenge in aiding Florida's turtle hatchlings during nesting season. As viewers of David Attenborough's Planet Earth II television series learned this year, newly born turtles can be attracted to the bright roadway lights on land instead of the moon that would direct them into the ocean. With the lights now automated, lighting controls ensure dimming occurs during nesting season along south Florida.

SUITED TO THE HEART, BRAIN AND LUNGS

However, efficient and sensible, lighting, traffic and safety are only one organism of a city. Business, artistic and academic pursuits are also essential to the growth and operations of a city. A truly smart city would be one where all parts of the organic whole stand to benefit.

A modern example of this would be Bristol, UK, which deployed a city-wide smart city network designed to be used and leveraged not just by government, but by citizens, businesses and the local universities.

The 'Bristol is Open' smart city programme is a joint venture between Bristol City Council and the University of Bristol. The initiative employs a city-wide, standards-based IPv6 network to drive economic competitiveness for its citizens. Bristol, achieved this city-wide coverage by enabling smart city technology to just 3 per cent of lamp-posts in the city, and has become a true 'living lab' for innovation and for future growth in the region.



Beyond the development of better city assets such as smart street lights, Bristol is now exploring how to leverage the network to connect traffic light and congestion sensors, safety cameras, air quality sensors, weather sensors, public transportation sensors, remote personal healthcare monitors, acoustic detection and smart parking solutions which can augment city revenue.

TECHNOLOGY THAT CAN FEEL AND HEAL

IoT smart cities have the means to adapt, inform and improve the lives of their residents - but it's not a one-way street. The best cities reflect the nature of their residents, which is true of smart-city technology as well.

Silver Spring Networks has designed its solutions to operate as a distributed, self-healing mesh. Mesh networks take advantage of a large number of connected paths growing more resilient and stronger as more devices are added to the network.

They are designed specifically for flexibility and reliable connectivity.

Meshed devices adapt to local outages without completely shutting down by automatically seeking an alternative pathway by communicating with their neighboring devices. They also allow for individual elements of the network to be put offline or repaired without requiring a full shutdown. They also secure networks; if a rogue, unrecognised device attempts to connect, they are identified and blocked, similar to an immune system rushing antibodies to location of an invading virus.

GLOBAL SMART CITY TECHNOLOGY ADOPTION

Technology supporting the evolution of cities is not new, nor is it confined to the new world. Like any living thing, no two cities are perfectly identical, and all cities, whether old or new, will continue to find ways to deploy and evolve using technology to serve, protect and support their citizens.

If a city is an organism, a smart city is an organism best adapted to survive in a changing competitive world. Responsiveness, adaptability, flexibility, and the ability to employ a wide range of tools were all integral to the success of the human organism. Though IoT technology, smart cities are making a similar evolutionary leap into a bright future. ☺

FYI

Brian McGuigan is European Sales Director of Smart City Solutions at Silver Spring Networks

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