“IN LYON, WE’RE SPEEDING UP INNOVATION IN ALL ITS FORMS.”

NEW IDEAS TO CHALLENGE DAILY MOBILITY

SUMMER 2019

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PULSE IS INTENDED FOR ALL STAKEHOLDERS, DECISION MAKERS AND OPINION LEADERS FOLLOWING EVERYDAY MOBILITY. A KEOLIS-LED INITIATIVE, THIS BIANNUAL MAGAZINE AIMS TO FUEL DEBATE AND GENERATE DISCUSSION ABOUT THE TRENDS AND CHALLENGES THAT ARE SHAPING OUR INDUSTRY.

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For some time now, the mobility sector has been profoundly impacted by a new concept: Mobility as a Service, or MaaS for short. It is often touted as revolutionary, although a little humility may be needed when MaaS is put in perspective. There won’t be any Big Bang on the horizon, as long as technology isn’t yet matched by the political will or the right system of governance to steer people away from single occupancy car use. Regardless of how innovative it is, one new application won’t change the landscape until two fundamental needs are met: a diverse multimodal mobility offer, tailored to specific local requirements, and a fully satisfactory door-to-door passenger experience on the ground.

Any MaaS project needs to be backed by a proactive, pragmatic and progressive governance that brings together all mobility players in the region. This is where the real revolution lies.

In this issue of Pulse, we reflect on the concept of MaaS. We also bring you a host of articles looking at various initiatives and different viewpoints and perspectives. Because it’s only by embracing a strategy of openness and working together that we’ll be able to drive mobility forward.

KARA LIVINGSTON
Keolis Group Marketing Director
Jeremy Yap is responsible for public transport at the LTA, part of Singapore’s Ministry of Transport. He also chairs the mobility transport authorities committee at the International Association of Public Transport (UITP) in Brussels. In Singapore and Paris, micromobility is a rapidly growing trend, especially the use of electric scooters. Together with Christophe Najdovski, Jeremy shares with Piia his vision about these new forms of transport, which are convenient but need regulating.

A professional lawyer, Fouziya Bouzerda was elected as a city councillor in 2008. She served as Deputy Mayor of Lyon in charge of business, trade and economic development since 2014 and second Vice President of the City of Lyon. In 2017, she was also appointed President of SYTRAL, the public transport authority that oversees France’s second-largest transport network. She talks to Palo about the host of projects underway to facilitate mobility in Greater Lyon and the Rhone department.

After graduating in social sciences, Piia Karjalainen has spent her career in the transport sector. She worked for Finland’s Ministry of Transport, then became a political adviser to the European Parliament. Since 2017, she has led the MaaS Alliance, an international public-private partnership, which promotes the development of MaaS (Mobility as a Service). Piia talks about the exciting partnership, which promotes international public-private cooperation.

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A look at the dazzling Kenyan Boda Boda bikers, new real-life action figures thanks to a collaboration with artists Bobbin Case and Jan Hook.

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A MAAS REVOLUTION?

by Lesley Brown
Illustration: Raman Djafari
Mobility as a Service is a customer-centric approach to mobility based on the aggregation of transport services within a single interface, most of the time a mobile app. By offering a combination of different real-time on-demand modes on a designated trip, it represents a promising solution for reducing single-occupancy car usage. But can it really revolutionise the way we design, think and use transport?

To find out, Aivar Savut discussed with PIJA KARJALAINEN, Senior Manager, MaaS Alliance.

Does MaaS really have the potential to ‘revolutionise’ mobility?

— I’m happy with the term ‘revolutionise’ because MaaS is both about changing the way transport is consumed and the way it is provided and managed. It creates opportunities to design not only more user-centric transport systems, but also far more efficient ones.

— Harnessing a more integrated use of public transport, with shared on-demand modes and even privately-owned vehicles used together in more integrated ways, MaaS aims to optimise resource allocation in relation to demand. Consequently, public transport authorities can really optimise the management of different transport modes in their specific environment.

— One major misunderstanding over MaaS that I often come across is the idea that it would require a completely deregulated environment. On the contrary, it calls for new regulatory thinking, with authorities playing a vital role in setting the framework and policy objectives, while still allowing room for innovation. So yes, I think ‘revolutionise’ is quite apt when talking about MaaS!

What benefits can MaaS bring?

— Even in developed countries, the public sector is facing tighter budgetary restrictions. At the same time, inadequate public transport and congestion are often proving an issue. Hence the optimisation MaaS promises is important because we are seeing a growing need to make more efficient use of public resources.

— And transport in general is a major contributor to carbon emissions. Although many different measures have been taken to try and cut them and make the sector more sustainable, nothing has really worked, as shown by the year-on-year growth in transport emissions since 1990. By making public transport more attractive and encouraging ridership, MaaS is obviously good news for the environment.

What needs to get involved for MaaS to take off?

— Many different types of stakeholders, starting with cities and regional authorities responsible for managing and setting the objectives for their transport systems. MaaS also needs private sector partners willing to bring innovations and capital to create the MaaS platforms. These are vital for offering mobility services via dedicated apps. As mobility providers, public transport operators clearly play a key role because they offer major mass transit options. In addition, there’s a need for new mobility providers, like ride-hailing, car sharing, or electric scooter companies, to complete the existing public transport offer, along with others that enable data sharing and technical integration, like IT firms and payment integrators. A change of mindset to see and unlock the potential of collaboration must be carried out by all those actors.

— However, my work with the MaaS Alliance has shown me that MaaS is no longer just about these core players. We are seeing growing interest coming from consulting and insurance companies — an indicator of a growing market. They are keen to become part of the ecosystem, seeing it as a new business opportunity for them. Consultancies are eager to demonstrate their expertise in helping both public and private organisations start with MaaS. Insurance firms can help boost the reliability and flexibility of MaaS in two ways: by creating a multimodal passenger protection framework and by offering new travel cancellation options.

— For MaaS to work we also need to adopt new business and collaboration models allowing profits and risk to be shared on an equal basis. It’s vital that every stakeholder is happy with the model used because you cannot expect anyone to come on board if the platform doesn’t offer them any added value. So public authorities need to see MaaS as a means to improve delivery of their transport policy goals, whilst operators need to see MaaS as a means to drive revenue.

What role do you think public transport authorities should play?

— I fully understand that MaaS may be challenging for PTAs since it opens up a completely new operational environment. Cities and regions have traditionally played a strong role in transport policy decision-making and regulation, with responsibilities often including funding of infrastructure, services and procurement.

— Today the whole mobility market is evolving much faster and in a less controllable way than before. The example of this change alongside others. Electric scooter services, for instance, can pop up in the streets overnight without authorities necessarily being informed. Obviously, this fast-changing mobility landscape is challenging to navigate. I think mobility decision-makers should focus on defining goals and conditions for MaaS in their region. Public authorities have a key role in defining the collaboration culture between the different MaaS stakeholders and monitoring the market dynamics to anticipate problems and avoid buckleys. •

— On the technical side, there are two basic enablers. Firstly, availability and sharing of high quality data is a major precondition for the success of MaaS. This means data sets that are precise and mostly in real time. And secondly, service integration enabling mobility services from various parties to be brought together. Here, improving interoperability will be key.

— In terms of market rules and regulation, the most important elements are privacy and data sharing. One way to encourage MaaS is to make sure the data is shared on an equal basis. But further innovation is needed to facilitate data sharing.

What other factors will determine the success of MaaS?

— Following a pilot programme in Gothenburg in 2013/14, the Swedish MaaS start-up VUXCO was relaunched in Stockholm in 2018 with platform provider Fluidtime and regional public transport operator Storstockholms Lokaltrafik (SL).

Three European projects are exploring different aspects of MaaS: • MyCarRental • MaaS4EU • MVO
Almost all of this Spanish town, home to a population of 83,000, has been made a car-free zone. Pedestrians have reclaimed the streets and quality of life is improving by the day. What lies behind the scheme’s success?

Explanations by **MIGUEL ANXO FERNÁNDEZ LORES**, mayor of Pontevedra, A PEDESTRIAN’S PARADISE!

The Galician town of Pontevedra in northwest Spain is known for its picturesque medieval centre with a maze of narrow streets lined with café terraces — but it’s not always been that way. In the late 1990s, the town was in decline, overshadowed by its nearby rival, Vigo. Hemmed in by a coastal valley, Pontevedra was choking from air pollution, mainly from cars, and quality of life for local residents, known as 'pontevedréses', was being eroded.

Photos: Ben Roberts
Illustration: Lila Briand

by Julien Thèves
Cars had literally taken over the streets. Up to 53,000 cars passed through the town in a day — almost as many as the people living there! While some just drove through, many others would go around in circles trying to find a parking spot — taking an average of 18 minutes to do so. The result was endless traffic jams, double parking and pedestrians forced to weave their way through dense and chaotic traffic.

Inevitably, traffic accidents were commonplace. 30 fatal accidents between 1996 and 2006. But this was all set to change. In 1999 Miguel Anxo Fernandez Lores, a town councillor, was elected mayor and quickly resolved to tackle the problem. “The town council had spent ten years thinking about how to transform Pontevedra. We consulted a lot of publications by urban development experts. My aim was to give residents a better place to live. I’m not against cars; I love travelling by car, especially on holidays. But for the wellbeing of people from using their cars,” explains the mayor. “We could have opted for partial pedestrianisation, but we wanted to go further and really discourage people from using their cars.”

Within a month of Lores’s election in 1999, cars had been banned from the historic district and 300,000 m² of the Old Town had been pedestrianised, with others soon to follow. Pavements were removed to level the streets and street parking, and surface car parks were replaced by underground facilities with 4,000 spaces for residents or visitors who had no choice but to drive into town, for example when moving home or attending a medical appointment.

“We could have opted for partial pedestrianisation, but we wanted to go further and really discourage people from using their cars,” explains the mayor. “There was some opposition, of course. Retailers were worried about losing customers and local residents were exasperated by disruption from the roadworks, but today no one would dream of going back to the old system. Smaller stores have even seen an increase in customers. Children can play safely outside, senior citizens or people with reduced mobility now enjoy an environment that’s much better suited to their needs, and our streets are perfect for a stroll!” Within no time, the rundown town centre had been renovated and restored to its former glory, boasting clean, well-lit streets. Delivery vehicles, which are authorised to enter the car-free zone four hours a day in the morning get around easily. The speed limit is 30km/h across the town — down to 20km/h in some parts, “where we’d like to lower it to 10km/h,” adds the mayor. “Cars never get above 30km/h on average in cities, if you include stops at traffic lights. In Pontevedra, we’ve replaced traffic lights with roundabouts, which improve the flow of remaining traffic. Today, the almost three-quarters of the town is car free. Only 9% of vehicles from across the urban area come into the centre, compared with 83% in 1999. However, there isn’t a complete ban on traffic in the pedestrian area, which now covers 1.3 million m², but surface parking is limited to 15 minutes. Drivers caught exceeding the limit face a hefty fine of up to €200! Free parking is available on the outskirts (2,500 spaces) and the centre is within easy walking distance. And that’s the really great part, because besides reducing pollution and creating a more people-friendly town, encouraging people to walk more is Pontevedra’s most distinguishing feature. Pedestrian power

For people with reduced mobility, pedestrianisation is very positive. It’s always better what we can reclaim space from cars. However, the infrastructure now needs to be improved for the blind and visually impaired. Pavements have gone from the town centre, so we need to adapt the road surface to guide people who use a white cane by integrating different types of paving stones to differentiate areas.”

Paulo Fontas, chairman of an association for people with reduced mobility

**Quality of life for everyone** says Lores, who’s been re-elected mayor ever since.

Transformation of a town

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Before, there were too many cars parked at the school — I couldn’t see my pharmacy! Pedestrianisation hasn’t harmed my business — quite the opposite. In fact, it’s also improved my health, as now I can walk easily to work. I welcome traffic restrictions in the area — the air in the town is cleaner. Outside the pedestrian area, however, there are traffic complaints. I can walk easily to work. Thanks to traffic restrictions, pedestrians have got the space they need, and walking couldn’t be easier! Nowadays, complaints are occasionally heard from drivers about traffic jams in the few streets where vehicles are allowed.

Numerous benefits

The car-free policy has provided plenty more positive benefits. The town hasn’t reported a single fatal road accident since 2011. Overall quality of life has also improved: fewer cars means less noise and cleaner air (CO2 emissions are 67% lower than they were 20 years ago). The town centre is full of life again by day and by night. “Pontevedra has been revitalised and became more accessible to families, it’s one of the few towns in Galicia to experience population growth,” says the mayor proudly. “What’s more, everyone’s talking about it! A steady flow of journalists come to admire our successful pedestrianisation scheme.” As well as an enthusiastic response from the media, the town has won several international awards, including a European Intermodes prize, a UN Habitat Award and a New York Center for Active Design Excellence award. Miguel Anxo Fernández Lorca is proud of what he’s achieved: “Every day, people step me in the street to talk about how good our town looks and what a great place it is to live. Plus, we’ve managed to transform Pontevedra without bleeding the town’s budget dry, it’s a matter of political will.”
MICRO-MOBILITY: ABIDING BY THE RULES?

The growing popularity of micromobility or personal mobility devices (PMDs) — monowheels, hoverboards, free-floating electric mopeds and scooters — in many cities worldwide, is highlighting the need for specific rules and regulations. Pulse met with transport directors from two major cities, Paris and Singapore, to find out more about their experiences and convictions.

by Lesley Brown
Illustration: Anil Rinat
Photos: Julien Benhamou and Juliana Tan
**MICROMOBILITY: BREAKING THE RULES?**

Paris is open to innovation in public transport, and to personal mobility devices (PMDs) in particular because they provide services that meet new mobility needs, in addition to those already on offer. Nevertheless, we are facing major challenges. These mainly concern parking of PMDs, the occupation of the public space and proper integration into the city. A year ago, the unclear and incomplete legal framework meant electric scooter services could proliferate any which way. Since then, operators have had no scripts about rolling out their fleets in districts that are already extremely crowded. This compromises safety for all and the accessibility of pavements for pedestrians. At the start of 2019, we decided to issue fines for riding and parking free-floating electric scooters on the pavement. Over the following six months, 1,200 devices were impounded.

“We have adopted an open-minded but firm approach with operators. We can’t let just anyone do just anything in the public space.”

Christophe Najdovski, Deputy Mayor of Paris, with responsibility for transport, roads, public spaces, culture and non-commercial sports activities.

**SHARED ELECTRIC SCOOTERS**

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<th>Number of operators</th>
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<td>12 (as of June 2019)</td>
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**SINGAPORE**

“We need micromobility to expand mobility options. We are working to establish the right balance between keeping the pavements safe and facilitating micromobility.”

Jeremy Yap, Deputy Chief Executive of Public Transport, Planning, Land Transport Authority (LTA), Singapore.

**SHARED ELECTRIC SCOOTERS AND BIKES**

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**PARIS**

Shake-up in the micromobility market. Today, micromobility companies (such as free-floating bike share providers) in the city state must obtain a licence to operate in public space. We run a two-tiered system comprising a full licence and a sandbox scheme. All new companies start off in the sandbox, with a controlled fleet size, to allow the LTA to assess their ability to run a device-sharing service in a responsible manner before granting any full licence.

**Evolution criteria for these licences include applicants’ plans to manage indiscriminate parking, compliance with motorised PMD fire safety requirements, their ability to maintain a healthy fleet utilisation rate, and track records.**

**NEW IDEAS TO CHALLENGE DAILY MOBILITY**

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**FEATURING**

Christophe Najdovski has been the Paris Mayor’s Deputy since 2014, with responsibility for transport, roads, public spaces, culture and non-commercial sports activities. He is also president of the European Cyclists Federation, which brings together all national cycling associations of the European Union.

Jeremy Yap holds the position of Deputy Chief Executive, Public Transport, Planning, Land Transport Authority (LTA), Singapore. He has also served as Deputy Director for the Land Transport in the Ministry of Transport, Singapore. He is currently the Committee Chair of the Transport authorities for the Association of Public Transport.

**Read the full testimonies on: pulse-mag.com**
Worldwide, the private car is the main form of transport for 64% of working people (1), and one in five commuters spends over 90 minutes a day at the wheel (2) — with all the familiar consequences: congestion, pollution, accidents and stress. As the main decision-makers on how work is organised, companies have a major role to play in changing behaviours and developing shared mobility.

One of the first to implement a mobility plan was London Stansted Airport (3), which initially had poor public transport links. In 2002, Stansted embarked on a mobility plan, which effectively increased the number of employees using public transport from 7% to 17% in five years by harnessing information acquired using a staff travel survey, exploring characteristics including their job types, travel habits and the range of public transport services and fares available.

Siemens was another early pioneer in Belgium (4). After encouraging staff to use public transport and bicycles by paying some of the costs, it now offers incentives for company car drivers, if they choose a more modest vehicle, or one with a smaller engine, they receive an additional subsidy for alternative mobility solutions.

Meanwhile, for the last 15 years, private shuttle buses have been carrying thousands of people a day from San Francisco's corporate campuses of the Silicon Valley tech giants, about 30 miles away.

Today, these kinds of initiatives are moving to a new level, with stricter regulations in some countries. In Italy (5) for example, companies with more than 100 employees must appoint a mobility manager. In January 2019 in France (6), the law on energy transition for greater growth made it mandatory for all firms with over 100 people on the same site to implement a mobility plan. Forthcoming legislation goes even further by requiring all companies with more than 50 employees to discuss travel-related issues at mandatory negotiations with employee representative bodies.

All these efforts to foster shared mobility are taking place amid a growing consensus about how companies can adopt more flexible organisational models. The more forward-thinking are looking at workspace location, remote working and flexible hours to reduce the number of home-to-work journeys.

As well as the obvious environmental benefits, mobility plans can be highly advantageous for companies in terms of attractiveness, quality of life in the workplace, absenteeism and cost outlays. Consultancy firm BeMobi (7) estimates that such a plan can reduce a company’s travel-related expenses by 5% to 20%, with savings in season tickets and mileage allowances, the cost of buying and managing a company vehicle fleet, parking facilities and more.

Despite the many benefits of a mobility plan, figures and feedback show there’s still a lot of resistance to change. In France, for example, only 9% of firms required to implement a mobility plan had complied with the regulation by January 2019 (8).

One key to success is to think beyond simply the physical forms of transport. The exercise begins by asking what task or activity goes into the journey in the first place. Then, and only then, you start searching for mobility solutions," says Jean-Luc Hampegn, who co-heads the Mobility Augmenter platform, which helps organisations in the mobility transformation (9).

French construction firm Cardinal Edifice is pioneering this approach. "It’s typically managing over 40 sites at the same time. So, to reduce the amount of time lost by travelling between them, it developed a software program that helps organise sites more efficiently and assigns the right people on to the journey in the first place. Then, and only then, you start searching for mobility solutions," says Jean-Luc Hampegn, who co-heads the Mobility Augmenter platform, which helps organisations in the mobility transformation (9).

Beyond the physical forms of transport

The rise of mobility planning

Multiple benefits for companies

by Caroline Mouy

Illustration: Lionel Serre

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AS the authority in charge of France’s second-largest public transport network, SYTRAL has a particularly complex brief. It spans the whole Rhône department, which includes the dynamic city of Lyon, of course, as well as vast suburban areas, which also pose significant mobility challenges.

This diversity is an asset, but it’s also a challenge, because it’s our job to create an efficient network capable of meeting continuously evolving needs. When developing mobility solutions, we look at the region as a whole and then cross-check that vision with our understanding of local needs. We wouldn’t dream of making changes to the transport network without placing citizens, in all their diversity, at the centre of our development process. In fact, our goal is to turn their expectations into real-world solutions that effectively meet their needs.

In Lyon, we currently face the particularly tough challenge of adapting our network...
work to a sharp increase in ridership. Network use rose by more than 5% in 2019 and again in first-quarter 2020, versus an average of 2% growth in previous years. We must now rise to the challenge created by our own success.

Mobilily, and of Lyon’s day-to-day life

The increase in network ridership reflects the area’s popularity. Lyon has forged a reputation, both in France and abroad, as an extremely attractive city. Thanks to the considerable resources allocated to boosting its development, Lyon is regularly recognised as one of the best cities to live and invest in. As a result, the city saw the arrival of more than 100 new businesses in 2018, half of them from outside France, and the creation of 3,000 new jobs. Since 2011, our population has increased by around 19% per year, thanks in part to the many young professionals who decide to make Lyon their home. These new arrivals come with high expectations about the environment and quality of life in Lyon and a determination to rely less on cars.

Lyon’s network (TCL) at a glance

4G in tunnels and stations.

We're innovating in transport, particularly female passengers. And we've automated the process for changing fare categories, so that passholders are automatically switched to the right category for their age.

We’re starting with the network layout, which we need to rethink so it better reflects our vision of what mobility should be. Public transport can no longer be based on a silo approach. Multimodality and intermodality must now be taken into account right from the design phase. It’s important, for example, that users can access a public transport network, such as the metro, by bicycle or car. And that means providing secure parking and cycle paths. The idea isn’t to pit one form of transport against another. Instead, we want to help residents combine the various modes available to find the best way to get from A to B. But network development can’t be approached lightly. Numerous factors must be considered, including the accessibility and safety of each site and how it will interact with other types of transport. To more effectively connect outgoing neighbourhoods, we’re starting building a new tram line that will skirt the city’s edge, a first for Lyon. Phase 1 will be operational in November 2019. A study is already underway on a second phase, which would extend network coverage to several of the city’s residential and business clusters.

A safe, accessible network

Accessibility isn’t just about the number of transport options available. We also need to devise solutions that enable everyone to make the most of the public transport network. That’s why, all except one of our 49 metro and tram stations, are the first to adopt new practices, and engineering schools. These young people are also pushing us to speed up innovation.

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The SYTRAL network covers the entire Rhône department:

278 tram stops.

2,700 weekly passengers on average.

1.8 square kilometres.

500 M broadband area.

We’ve also looked at how to help people who don’t feel safe on public transport, particularly female passengers. Women are the main users of our network, accounting for 60% of the

32

4

70

100

120

3

10

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Avenir Métro

To upgrade the metro network and increase its capacity, a bank of €430 million will be invested overall, notably to acquire 20 new-generation trains, and line B will be fully automated by 2023.

CapaTram

(2015–20)

which is designed to meet growing demand on the tram network. Close to €40 million has been invested to increase capacity by 20% on lines 71 and 72 by 15% and line 14 by 20%.

Asset management

Station upgrades, new metro and tram lines and dedicated bus lanes are just some of the initiatives being carried out as part of a major renovation effort launched by SYTRAL. The project is structured around three main programmes:

...
total. We’ve launched an app called Mon Chaperon, which helps users find someone to travel with. We’ve also introduced on-demand stops after 10 pm on our bus lines, so passengers can sit as close as possible to their destination if their bus isn’t crowded. And over four years ago, we were the first to launch “exploratory walks” on our bus lines (see Plate N.2). This initiative involves female passengers carrying out their usual journey accompanied by mobility and safety experts, so they can identify the places or factors that make them feel unsafe.

SYTRAL also shares users’ growing concerns about quality of life, which is why the energy transition is central to our initiatives. Every day, 1.8 million journeys are made on the TCL network. 75% of them thanks to electric power. Between our metro and tram lines, our fully electric trolleybuses and our cable cars, three-quarters of our network already runs on electricity. And we have even more ambitious objectives for the future. France’s energy transition act calls for 100% clean public transport by 2025. We plan to achieve that target five years earlier.

Starting in September 2019, one of our bus lines will be operated solely by biogas-powered buses. And in 2020, more than 30 new natural gas-powered vehicles, electric buses and next-generation (NG) trolleybuses will be added to the SYTRAL fleet. We’re also carrying out various trials that offer significant promise, including eco-driving assistance for bus drivers, load weight calculators on buses and, soon, hydrogen technology. In addition, our city is leading the way in autonomous vehicles. Since 2016, we’ve been testing two autonomous shuttle buses in the Confluence eco-district. A world first, the shuttles have already carried a total of 40,000 passengers. We’ve since acquired two new shuttles, which will be fully integrated into the TCL network and rolled out in the coming weeks to meet growing daily demand around the Océane Stadium.

It takes a long time to build an efficient network, so it’s easy to lose momentum. That’s why it’s vitally important that everyone involved is fully committed to meeting the mobility challenge. Operators are clearly key partners. With Keolis, whose teams have demonstrated their commitment on all fronts, we’ve forged a relationship based on high standards and transparency.

Our collaborative approach extends beyond this partnership to include residents, businesses and other stakeholders in the local economy. We maintain constant dialogue with all of them so we can work together to shape our future. At SYTRAL, we focus in particular on sharing information and fostering dialogue with residents. We talk to people in the street, organise workshops on specific topics and hold conferences for the public and meetings with local committees.

We also go to great lengths to gauge public opinion, which we’re currently doing for the future metro line E. For example, this time, even the route and the number of stations have been submitted for public consultation. Various formats are used to capture people’s views, including paper and online surveys, as well as face-to-face interviews. Above and beyond all the new technologies and solutions, the real innovation in our eyes is that we’re co-constructing with citizens.

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apted by machines, sent by our phones and shared in real time, data is everywhere and the sheer amount is growing all the time. In 2020, every person on planet Earth will be generating 1.7 megabytes of data per second — that’s the size of an MP3 music file1). Big data has become a fact of life. But what’s now emerging is the idea of smart data. So, what exactly makes data “smart”? Well, rather than just passively collecting huge amounts of it, what if we could cherry pick the information we actually need, analyse it on the fly and feed it into our systems and operations to make them better? This kind of smart approach is paving the way for Industry 4.0, connected healthcare and smarter cities — in which shared mobility will play a crucial role.

MANY SOURCES

So, where does all this smart data come from? The answer is in lots of places. Ticketing systems obviously tell us about passenger flows — how many people validate a ticket at a given place and time, or how many reduced fare tickets are bought in a specific district. Fleet management systems also collect and analyse data on things like the positions of buses or metros. Similarly, CCTV cameras give us a picture of passenger numbers on transport networks. But data can also come from outside the network. For several years now, some operators have been analysing the “digital exhaust” from mobile phones to better understand passengers’ behaviour patterns. Provided by telecom companies, these data trails tell us about the movements of anyone carrying a device, derived from the relay antennae they use, with a range of 50 metres (160 ft) in cities and 2 kilometres (1.25 mi) in rural areas. It’s not very accurate, but it can be supplemented by information from other sources like GPS. This can be captured directly from smartphones, as long as the location function is enabled and it’s accurate to 5 metres (16 ft). Other devices also provide information about our movements. On the Dijon network in France, for example, you can pay for your bus or tram ride contactlessly on the onboard validator. Like post-payment solutions2), this type of open payment technology gives insights into the habits of occasional network users, who don’t have travel passes.

SMARter SOLUTIONS GOING FORWARD

Public transport authorities, rolling stock manufacturers and mobility operators are increasingly using the value of smart data and how it can help improve services for passengers, such as real-time information and Maas (Mobility as a Service) solutions, as well as predictive maintenance. All around the world, cities and businesses are leveraging this wealth of information to improve the way we travel. In Singapore — with its ubiquitous cameras and sensors of every kind — buses and metro trains are hugely popular and new forms of mobility are being readily developed. The city stat’s public transport service is up there with the world’s best, and only 20% of people own a private car. In Bordeaux, France’s latest-generation on-demand transport service, made all the better by algorithms. The Ke’Op service from Keolis lets you book a journey, even at the last minute, with the assurance you’ll be taken right to your destination. The predictive model developed by France-based startup Quest makes it easier to use self-service bicycles by anticipating user demand and availability at stations. The Predict.io solution devised in Berlin helps you park your car by predicting vacant spots in real time. And traveller apps are fast being rolled out, though in some cases there’s real room for improvement. “Multimodal data is still quite limited,” says Dr Niels van Oort, co-founder of the Smart Public Transport Lab at TU Delft in the Netherlands. “So, if you want to do the first part of your trip by bicycle, then ride the metro, there aren’t many apps that can give you that kind of joined-up information. As far as offline apps go, they’re mostly unimodal and don’t cover the entire door-to-door traveller experience.”

OPEN, FREELY AVAILABLE DATA

With all this data sharing, what about privacy? In Europe, the General Data Protection Regulation, adopted in 2016 and enforced in 2018, provides a set of safeguards around how data can be collected and used. In France, the GDPR comes amid a raft of provisions already planned by CNIL, the country’s data protection agency. Other parts of the world have similar regulations and agencies to enforce them, such as the Privacy Shield framework in the United States and the Office of the Privacy Commissioner in Canada. Beyond the obligation to anonymise data, operators are increasingly required to make it freely available. This is the concept of open data. In Rennes, France, for example, data from the transport network is now being widely disseminated. The STAR network, operated by Keolis, shares information with businesses, cities and other stakeholders to help improve mobility services and better serve the public interest. “Startups developing transport apps should commit to discouraging solo driving, for example,” says Vincent Cadoret, chief data officer for Keolis. “Route calculators for motorists like Waze can create congestion, noise and pollution on streets that were previously quiet, just because the algorithm sends them that way.”

SMARTER URBANISATION FOR TOMORROW’S CONNECTED CITIZEN

So, what other shifts does all this smart data herald? As well as new mobility services, it should provide the basis for casting a new vision of what cities will look like in the future. “Smart cities are often judged by how much better things work, like real-time information on vacant parking spots, streetlights that come on at the right time and free flowing traffic,” says Arnaud Julien, innovation director for Keolis. “But we can go so much further by putting people at the heart of it, then interconnecting all those systems around them. From education to sport, culture, transport and more — making data freely available can improve quality of life by focusing on sustainability, inclusiveness and resilience as the drivers of how well a city functions.”

With the power of 5G, the rise of connected devices and innovations like biometric identification, the data on us will be even more detailed and precise, so it can be put to ever smarter uses. This absence of inventiveness is a huge opportunity, not least for public transport authorities. And the authorities making a firm commitment to the reasonable and fair management of smart data will ensure it’s not only giants like the GAFAM companies — Google, Amazon, Facebook, Apple, Microsoft — that will be cleverly exploiting their data for commercial purposes.

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1) International Data Corporation
2) Open Payment at the end of the month, based on actual use.
The transport and mobility sector is increasingly turning to subtler methods to drive affordable, sustainable and transformative behavioural change.

Nudging and...
These stickers encourage the passengers to speak up and challenge a driver when he is driving recklessly. And they work: they have resulted in 140 fewer road accidents per year and the annual death toll has dropped by 55%.

Nudges are now saving lives worldwide, their origins go back to the 70s when psychologist Daniel Kahneman — winner of the 2002 Nobel Prize for Economics — created the premise for behavioural economics by challenging the traditional view that human beings are rational and all decision making is based on rationality.

Indeed, he pointed out that our everyday actions were regurgitated by cognitive biases, biases that were both systematic and predictable.

Decades later, economist Richard H. Thaler won the 2017 Nobel Prize for Economics by harnessing Daniel Kahneman’s and other behavioural economists’ research to develop his ‘nudge’ theory which proposes that cognitive biases can be activated and disarmed in order to get individuals to behave responsibly and lessen negative impacts on society at large.

2018 study in France illustrates how nudging the decision-making environment via nudges subtly encourages passengers to adopt good behaviours, without overt coercion.

Despite awareness-raising to adopt good behaviours, at large.

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‘The unlikely masters of nudge theory our transit

Kahneman — winner

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making environment

illustrates how

2018 study in France

Clean up your act: France

Fake policeman: Singapore

In 2017, authorities had to

cut down in their efforts to

chastise traffic violators, after

there was a steep rise in

near 500 individuals in a

eye with near-kidnapping

of the victim and a police

officer involved in a

hit-and-run case on the

road. Police sources were so

surprised that the driver was motoring

of China, the US and the UK.

WHAT MAKES A NUDGE ETHICAL?

In his book on the topic, Sunstein both says that one principle — transparency — is a must: “can I explain my nudge transparently to the people I am applying it to?”

Indeed, the humble nudge is set to play a major role in the upcoming Paris Olympics, with the city adopting eight nudges inspired as part of its 2024 Nudge Challenge, organised by NudgeFrance(9).

Among them: having coloured footprints on the floor of metro stations guiding people towards the stairs rather than cramming into lifts.

THE NUDGE-Ledge ORA WITH ETIENNE BRESSAUD,
Managing Director of the BVA Nudge Unit

WHAT'S MORE, the nudge effect is sustainable, as was confirmed by the testers (7) — in the week preceding it a far better result than all the traditional safety measures used by policymakers until then.

The really cool nudge was developed at Islandbridge station, on the Horizon Public, and was the brainchild of Bressaud, as is the nudge transparently to the people I am applying it to? — you’re going to get your destinations with help. But if you don’t want to follow the GPS instructions, you don’t have to.

TELL US ABOUT THE ‘SLUDGE’ PHENOMENON. A nudge is a kind of friction, high or low, that people face when they have to. Yes, that is entirely possible!

DO YOU THINK AI CAN EMULATE THE NUDGE EFFECT?

What is the nudge cost virtually nothing?

The New York Times famously publishing a 2017 exposition of how Uber used ‘videogame payoffs.’

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DO YOU THINK AI CAN EMULATE THE NUDGE EFFECT?
Open in 1863, London Underground (LU) is the oldest metro system in the world. Alongside Beijing and Shanghai, it is also one of the largest networks, with 11 lines covering 402 km. And alongside Paris and Moscow, it is also notable for being one of the busiest networks, getting around five million passengers from A to B every day.

With its station platforms sometimes located more than 50 m below street level, maintaining and upgrading the escalators and lifts is crucial for keeping people safe and on the move. The figures speak for themselves: today, the London Underground has a total of 217 lifts (compared to 167 in 2017) for its 270 stations, 144 of which are now operational 24 hours a day on Fridays and Saturdays as part of Night Tube. As for escalators, 448 are in use up to 20 hours a day, seven days a week, 364 days a year. Together, they support the movement of 1.3 billion people per year!

Yet with only three escalators in some stations, having just one out of action can disrupt passenger flow and create bottlenecks. In order to mitigate the risks, Transport for London (TfL) has a continual programme of maintenance and renewal in place for its lifts and escalators. Escalators are refurbished every 20 years and replaced every 40 years to meet high performance levels. By way of comparison, lifts are replaced every 20 to 30 years depending on the model; they receive a routine maintenance check every two weeks, full safety and operational testing every six months, and a partial refurbishment every ten or fifteen years.

Given the sheer depth of many stations, the works are often carried out in a challenging physical environment. "We're working within concrete or steel cast tunnel rings that we can't move," Dan Marsh, senior project manager at TfL, told Pulse. "It's not like building an extension on your house; you are physically constrained. You can't get more space. This puts a lot more emphasis on the planning side of the sequence of activities."

Furthermore, each station has its own unique characteristics when it comes to layout and access routes. This means that TfL has to dismantle the escalators into smaller, modular sections in order to transfer them through the station to the work site. The trains stop at a focal point below, and the lifts and escalators are removed from service by crane alongside a station. Within 15 minutes, a bank of tunnel doors is opened and the escalator is lowered into the tunnel, with a cable reel close above. The escalator then moves back over the banks of doors as the doors are lowered one by one up the slope. A series of platform doors is then opened and the escalator is lowered into place. The escalators are then reversed over and the doors closed up again. The escalator is then lifted up, secured to a horizontal position, and moved through the station. Finally, the new escalator is wheeled up to the new site and installed before being swung into place and secured with a series of cables.
**NEW IDEAS TO CHALLENGE DAILY MOBILITY**

**FAIRE AVANCER LA MOBILITÉ**

The maintenance teams at Wood Green, while the station is closed for works, have been able to roll out changes and improvements to make sure passengers can still access the station. This may look a bit different from the usual as we’re not able to work throughout the station, but it’s great for the passengers it allows for retention of special staff knowledge, development of new skills and offers opportunities to improve our work and performance benchmark.

Traditional escalators are completely removed, the escalators are completely removed, and new ones are installed. The escalators are completely removed, and new ones are installed. The escalators are completely removed, and new ones are installed. The escalators are completely removed, and new ones are installed.

**ACCOMPRI**
Biomimicry has long accompanied the development of complex technologies. From Leonardo da Vinci to industrial designers who have seized the opportunity to use nature’s mechanisms to create both eye-pleasing and practical prototypes designed for urban use. “Life has been evolving for 3.8 billion years, and in that time, it has found what works and what does not,” said Megan Schuknecht, Director of Design Challenges at the Biomimicry Institute in Montana in the United States. “By looking to all that nature has accomplished, we can learn from its blueprints and apply the way that it does things to the way that humans create things, move things and live their lives.” Biomimicry could prove particularly useful as changes like population growth, urbanization and the transition to greener energies present both challenges and opportunities in sectors like mobility.

N. A. S. ecosystems are superlatively efficient and nature-inspired solutions have already proven fruitful. One of the most emblematic examples is Japanese Shinkansen Bullet Train (1) and its distinctive long nose. Engineer Eiji Nakatsu, a keen birdwatcher, employed observations of the splash-free water entry of kingfishers to develop the train’s distinctive aerodynamic front (1), creating decreased noise pollution and increased speed and energy efficiency. In the automotive sector Michelin has imagined an airless tyre, using a 3D printing system which smartly mimics a bee’s honeycomb structure (2). What’s more, this tyre optimises efficiency by adapting to new environments as soon as the driver informs the vehicle’s system of his or her next destination.

Beyond mobility, biomimicry is helping reinvent energy production and consumption. Scientists at Australia’s RMIT University have begun work which harnesses the photosynthesis system of a certain kind of fern to develop a new type of solar energy technology by up to 3,000%. Mobility solutions which harness biomimicry-led energy innovations can’t be far behind. “I think biomimicry really gives young people a sense of hope,” concludes Megan Schuknecht. “Nature has already presented us with this great model and the blueprint is there.”

By Hannah Metzger
One in four people said they had stopped walking to public transport. This is true in almost all cities, except where the car is the only option (3%), and Amsterdam (6%). From Barcelona to Tokyo, UK and Canada, the figures are similar (43%). However, only in four cities people said they’re satisfied with the infrastructure in place for pedestrians. This means designing centres that also make walking pay is the key to planning and layout of pavements and providing information for pedestrians.

Almost two in three people change means of transport from one day to the next in a given week, at least occasionally, especially in Mumbai (89%), Delhi (82%), Los Angeles (76%) and London (74%). When we travel, we do have a choice. In such a world of options, transport solutions need to offer a variety of services, where different modes of transport need to be combined.

From Montreal to Brisbane, from Osaka to Delhi, London to Beijing and all around the globe, people are using public transport, though differently in different places.

Private cars are a feature of the landscape, to a greater or lesser extent, as are new forms of mobility like ride sharing, electric bicycles and self-service scooters.

Lifestyles, working habits and smartphone ownership also vary from one country to the next. By analysing all these statistics, Keoscopie International, a global statistical producer, provides insights into mobility worldwide with some surprising findings.

59% of respondents have a smartphone. The figure is 89% in Oslo, just 70% in Mumbai and Rotterdam.

60% of respondents want the option of human assistance when making public transport decisions. It is only the case for 56% of public transport users.

70% of smartphone owners use a travel or map app at least once a month. Features used on a weekly basis include maps (86%), journey planners (33%) and route departure times (46%). With so many functions they have an advantage but they’re really useful for planning whether or not you have to rise your hand but

1/4 of respondents said they sometimes work late (51% and 54%) or have to make work at night, especially in Beijing and Hyderabad (69%). 26% work from home at least once a week, especially in Mumbai (43%), Delhi (42%) and Beirut (17%). In busy cities, habits change, so do peak travel times. As land use and night, transport services need to take account of these flexible working hours.

One in four people said the days of the week they work changes, or occasionally. In the United States, 54% of people said their work schedule is changeable.

Changing work patterns means changing lifestyles; so public transport needs to adapt accordingly.

One in five people like Boston and Los Angeles and more than half of respondents say they can share, in the back of the vehicle, 50% of respondents say they can share in the private hire vehicle at least once a week. Scooter and bike share schemes are gaining ground: over 20% of respondents in the cities surveyed said they use these solutions. Yet bikes and motorbikes are a way of life for almost 60% of respondents in locations where they operate.

Digital adoption is qualitatively still very varied.

27% of respondents are ‘digital natives’: smartphone owners who are hyperconnected, fully at ease with digital technologies and who know about them in general.

82% of respondents are ‘digital nomads’: smartphone owners who who are at ease with digital technologies and challenge preconceived ideas and assumptions. First in France, then internationally. From 2017, Keoscopie has conducted and commissioned a huge number of quantitative and qualitative surveys to gain insights into lifestyles and the mobility transformations taking place today.

In 2018, the observatory launched Keoscopie International, a global study focusing on 37 cities across 15 countries.

The travel patterns of 5,000 public transport users and non-users were analysed, along with how new mobility solutions are impacting them, based on a 19-minute online questionnaire compiled with the Ipsos Institute. Keoscopie uses these insights to expand and tailor its range of mobility solutions for transport authorities and passengers.
Boda Boda Style

“The first driver I met was Ghost Rider,” says Jan Hoek. He was already well known in Kibera, the largest slum in Nairobi. He’s the fastest driver in town and he’s completely fearless. You can hear him from far away because he has modified his bike so that its noise is amplified. Today he’s achieved celebrity status. Local documentaries have been made about him and he has also starred in a video by Kenyan artist Osborne Macharia.”

Meet Mad Max Driver, Madkota, Vigilant, Ghost Rider, Red Devil, Lion and ‘The Rasta Rider’—they’ll spark your imagination!

Boda Boda motorcycle taxis are a common feature of urban transport in East Africa, weaving their passengers through congested city streets. There are so many of them that some drivers build fantastically-themed motorcycles to attract the attention of those seeking a ride.

Ugandan-Kenyan fashion designer Bobbin Case and Dutch artist Jan Hoek were so fascinated by the creativity of some Boda Boda drivers in Nairobi, that they decided to collaborate on a project, ‘Boda Boda Madness,’ which saw them design dazzling new outfits to match customized bikes in the Kenyan capital.

They selected seven Boda Boda drivers with the most awesome bikes and sat down with each of them to create unique biker outfits. Jan then photographed these real life action figures in front of Nairobi scenes. He introduced them to Pulse by Robert Jack.

Photos: Jan Hoek
Who are the Boda Bodas?

In a class of their own, Boda Bodas are motorcycle taxi riders in East Africa. Some say their name comes from the expression 'border to border', due to their ability to transport people across a border without all the paperwork needed with a car. Cheaper than car taxis and faster than bicycle taxis, which make slow progress through the congested cities, there are believed to be around 500,000 Boda Bodas in Kenya alone, earning the country €3.5 million a day!

(1) Source: Standard Media.

Like his fellow drivers, The Rasta Rider, Lion Rider and Vibze Kartel Rider, Red Devil is from a Northern town near the border with Tanzania. He is a Red Devil, not to mention a real football fan. He wears a football-themed outfit, but now that it is warm enough to ride, he has had a new helmet made. Quinn made it to make sure that it won’t cause trouble.

The Lion Rider

"To photograph this Ngong-based rider against such an empty background we had to begin shooting at 5.30am, when the streets are relatively quiet. The Lion Rider really likes his new outfit, but in everyday life he thinks that the pants and top are a bit too much together, so he normally only wears one or the other."
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The editorial team would like to thank all contributors to this fourth edition of Pulse, and in particular:

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