PULSE

METRO

ACCOMPLISH

"IN LYON, WE'RE SPEEDING UP INNOVATION IN ALL ITS FORMS."

INSPIRE
BODA BODA
STYLE

ENLIGHTEN
MICROMOBILITY
ABIDING BY THE RULES?

EXPLORE
NUDGING
AHEAD

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.

CHECK OUT OUR NEW WEBSITE: **pulse-mag.com** AND ADD THE WIDGET ON YOUR SMARTPHONE

IF YOU HAVE COMMENTS, OR WOULD LIKE TO SUGGEST ANY IDEAS OR CONTENT, PLEASE CONTACT US AT: PULSE@KEOLIS.COM

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

CONTRIBUTORS

◆

Piia Karjalainen

Senior Manager,
MaaS Alliance,
Finland

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 prospects ahead with MaaS and the best strategies for delivering them. ●

Jeremy Yap

Deputy Chief Executive of Public Transport, Policy and Planning, Land Transport Authority (LTA),
Singapore

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 *Pulse* his vision about these new forms of transport, which are convenient but need regulating. ●

Christophe Najdovski

Deputy Mayor of Paris (France), with responsibility for transport, roads, travel and public spaces

An economic and social sciences teacher, Christophe Najdovski was Deputy Mayor of Paris with responsibility for preschool services from 2008 to 2014. Since then, he's been in charge of transport and public spaces as part of the municipal team led by the Mayor of Paris. In a joint interview with Jeremy Yap, he discusses the issues around micromobility in cities: these new modes are popular, but the authorities need to support their development. ●
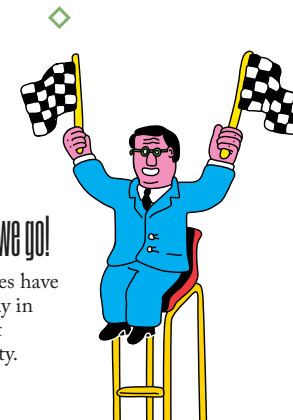
Fouziya Bouzerda

President of Greater Lyon's public transport authority SYTRAL and second Vice President of the City of Lyon (France)

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 with responsibility for the economy and integration since 2017. In 2017, she was also appointed President of SYTRAL, the public authority that oversees France's second-largest transport network. She talks to *Pulse* about the host of projects underway to facilitate mobility in Greater Lyon and the Rhône department. ●

CONTENTS

◆

Check out the online version:
pulse-mag.com

A ◇ MaaS REVOLU- TION?

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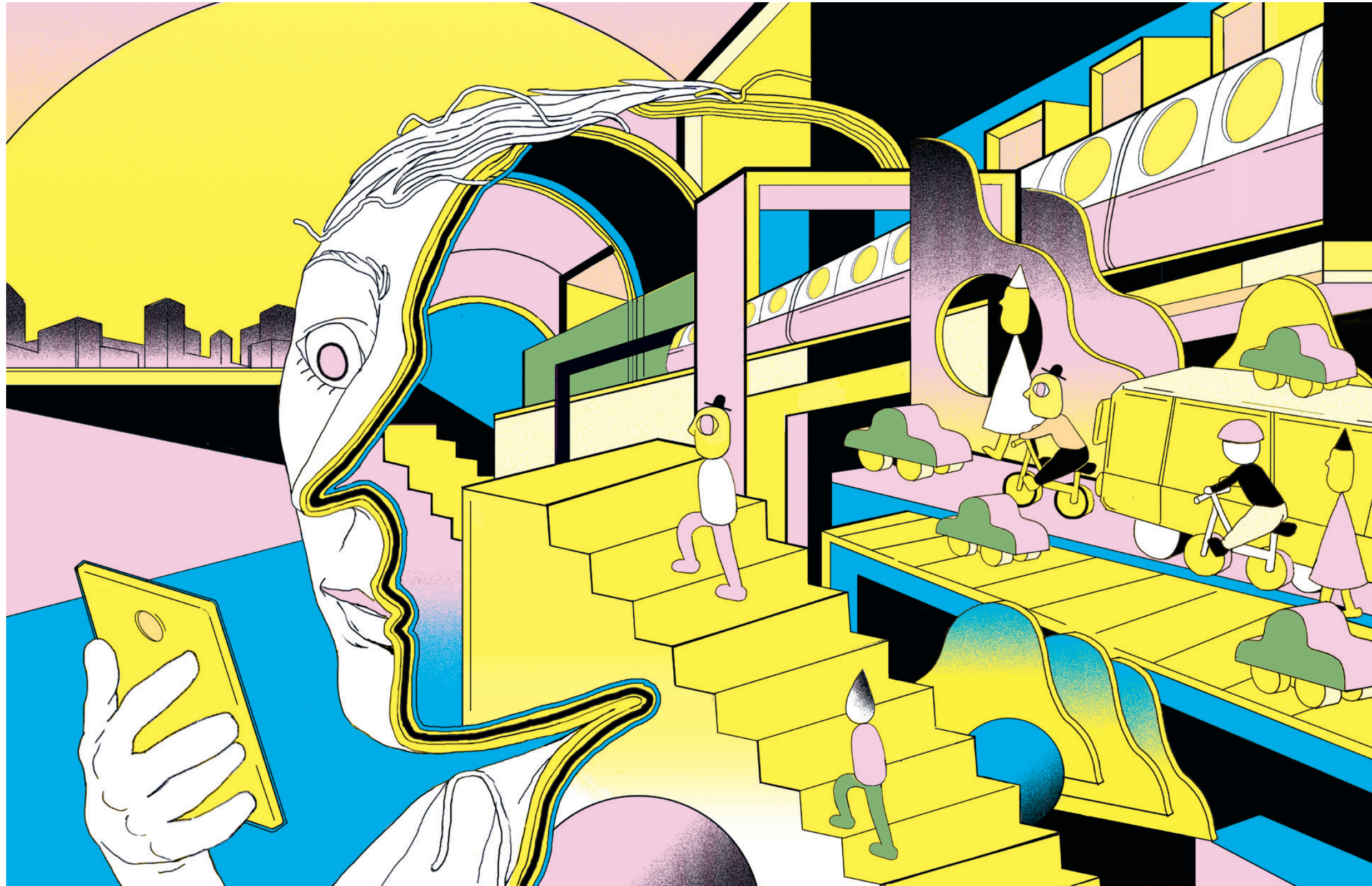
Mobility as a Service is a customer-centric approach to mobility based on the aggregation of transport services within a single interface, most of the time a mobile app. By offering a combination of different real-time on-demand modes on a designated trip, it represents a promising solution for reducing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

To find out, *Pulse* caught up with
PIIA KARJALAINEN,
Senior Manager, MaaS Alliance

INTERVIEW

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 'revolution' 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.

# Who 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

27%
🇪🇺 **Transport is Europe's biggest source of carbon emissions, contributing 27% to the EU's total CO$_2$ emissions,** with cars representing 45% of these. Transport is also the only sector in which emissions have grown since 1990, driving an increase in the EU's overall emissions in 2017.
Source: transportenvironment.org

🇪🇺 **Three European projects are exploring different aspects of MaaS:**
• MyCorridor
• MaaS4EU
• iMOVE.
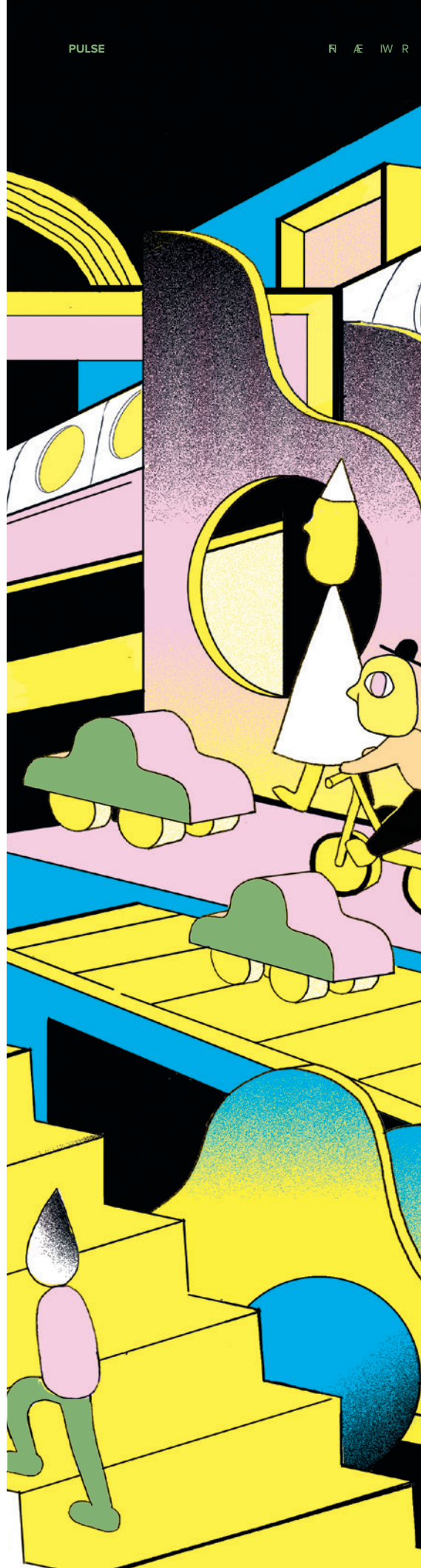
platforms. These are vital for offering mobility services, via dedicated apps. As mobility providers, public transport operators clearly play a key role because they offer major mass transit options. In addition, there's a need for new mobility players, like ride hailing, car sharing, or electric scooter 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.

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

What other factors will determine the success of MaaS?

— **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 regulations,** the most important elements are privacy and data sharing. One way to encourage MaaS is to make sure the data is shared in a secure environment. But further innovation is needed to facilitate data sharing.

— **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.** MaaS is just one 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 backlashes. ●

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!

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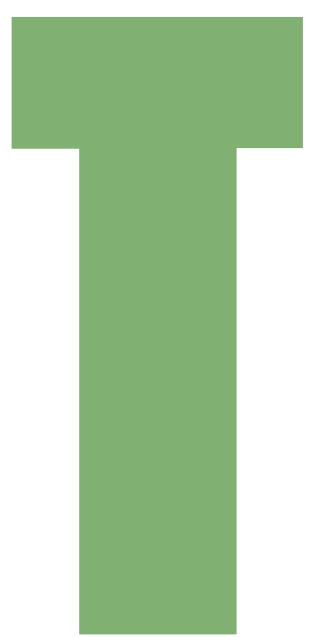
The Galician town of Pontevedra in northwest Spain is known for its picturesque mediaeval centre with a maze of narrow streets lined with café terraces — but it's not always been that way. In the late 1990s, the town was in decline, overshadowed by its nearby rival, Vigo. Hemmed in by a coastal valley,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

Cars had literally taken over the streets. Up to 52,000 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 Fernández 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 the motorway! But I wanted to create a more people-friendly town centre. For me, this was key. By taking back the public space for pedestrians, we'd be able to curb air pollution, revitalise the Lérez River, which had become a cesspool, and generally improve

quality of life for everyone," says Lores, who's been re-elected mayor ever since.

Transformation of a town

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,

ROAD TRAFFIC HAS BEEN REDUCED BY:

97% in the Old Town

77% in the urban centre

53% in the town as a whole

CO₂ emissions per capita have been **halved**

"What's incredible is the amount of respect drivers show to pedestrians. If you meet a car coming the opposite way in the Old Town, the driver either stops or moves aside to let you by! I must admit I wasn't in favour of the plans initially, but there's no doubt pedestrianisation has had a positive impact in several ways. And not just for tourists but for the wellbeing of everyone who lives here, too. The only regret I have is that in the few streets where stores are empty, it's a bit dead."
Miguel Lago, store owner

"For people with reduced mobility, pedestrianisation is very positive. It's always better when 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 Fontan, chairman of an association for people with reduced mobility

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

There is no public transport in the town centre. The last remaining circular bus service was withdrawn due to a lack of passengers. The only services

available run to neighbouring towns and outlying districts, such as the town hospital and Monteporreiro. So, people walk instead! What's more, the authorities have launched a mobile app to help people get around. MetroMinuto provides a metro-style map of Pontevedra showing typical walking times. **"The town covers an area measuring 2km by 3km, so it's relatively small. This means that if you walk at a speed of 5km/h, you reach your destination in no time."** The response has

"Before, there were so many cars parked on the street you 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. Thanks to traffic restrictions the air in the town is cleaner. Outside the pedestrian area, however, there are traffic jams at certain times of day, especially when people are leaving work or fetching their children from school."

Jose Luis Dominguez Gomez, pharmacist

"I deliver beer and soft drinks to the bars in Pontevedra. I'm only authorised to drive into the Old Town up to midday, but sometimes customers aren't available until late morning, which means I go slightly over the delivery hours... Fortunately, the authorities are pragmatic. It's a bit trickier outside the town centre. Drivers aren't allowed to park, so they apply the one-minute drop-off rule, which slows me down on my route."

Juan Daniel Garcia y Sorna, delivery driver

"Pedestrianisation is happening globally! Here in Pontevedra, it's changed our lives for the better. You can leave your car for as long as you like in one of the five large edge-of-town parking facilities (ed. note: known as 'dissuasive car parks'). Unfortunately, they quickly fill up. Local people need more parking spaces. Plus, the free car parks should be asphalted. For now, they're just rough ground, so when it rains you get muddy shoes!"

Santy Mosteiro, journalist

"Pontevedra is a great town for children! They can play outside without any worries, it's quite safe. The forecourt in front of the school was pedestrianised recently and the schoolkids even had their say on the project. Us adults also benefit from pedestrianisation, even though it means that my husband and I can no longer park where we live. So, instead we rent a parking space. We're ready to make a few small sacrifices if it means having a better quality of life."

Axa Tilve, writer and designer, and mother of two children, aged six and eight

pavements were too narrow and there wasn't enough room for two people holding umbrellas to get by. Now, pedestrians have got all the space they need, and walking couldn't be easier." Nevertheless, 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 (CO_2 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 us! 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 Lores is proud of what he's achieved: "Every day, people stop 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."

been tremendous. "At first, some people grumbled about not being able to park just outside their office. Now, they thank me for the short walk they get to enjoy every day," says Miguel Anxo Fernández Lores. That's no doubt thanks to the MetroMinuto app's 'calories burned' feature! Today, 72% of trips are done on foot or by bicycle. 90% of people walk to the centre to do their shopping (planning permission is withheld for grocery superstores across the town) and 80% of children walk to school. "It's a small town so not many people feel the need to cycle, but cycling is nevertheless high on our agenda. Motor vehicles, however, are the least of our priorities," says the mayor emphatically. And as a trained doctor, he knows exactly how important walking is to good health: people should aim for between 7,000 and 10,000 steps every day, according to WHO recommendations. Of course, when it rains it's not so pleasant, but the mayor is quick to brush that concern aside: "That's what umbrellas are for! Before, the

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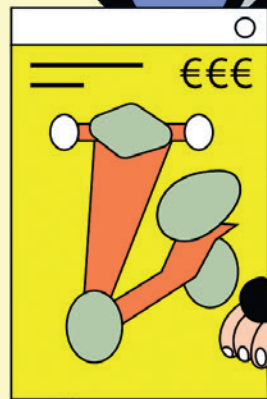
The growing popularity of micromobility or personal mobility devices (PMDs) — monowheels, hoverboards, free-floating electric mopeds and scooters — in many cities worldwide, is highlighting the need for specific rules and regulations. *Pulse* met with transport directors from two major cities, Paris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

◇

by Lesley Brown
Illustration: Anil Rinat
Photos: Julien Benhamou
and Juliana Tan

MICRO-MOBILITY: ABIDING BY THE RULES?

Paris

_____*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, their 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 scruples 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 also drawn up a code of conduct* which was signed by free-floating bike and moped operators in June 2018, and by electric scooter operators in May 2019. For the latter, the Conseil de Paris (Paris Council) has approved a fee to be paid in

exchange for occupying the public space. The revenue generated will be used to fund the creation of dedicated parking 'hubs' and introduction of services that are 'less floating'.

_____*In a further step, we have capped the number of electric scooters.* In Paris at the beginning of June 2019, we counted

12 scooter operators and over 20,000 shared scooters in service; one month later, several operators had suspended their operations and we counted just under 15,000 scooters on the city streets.

_____*Despite such moves, we still need to take further action,* in relation to employment standards, the life cycle of the scooters,

and so forth. When the new mobility orientation law *(loi d'orientation des mobilités, LOM)* is finally adopted, we will be able to issue a call for tenders in the fourth quarter 2019. Just two or three operators will be selected and they will be obliged to guarantee good working conditions for their teams and monitor the sustainability of their fleets. ●

Christophe Najdovski
has held the position of Deputy Mayor of Paris (France), with responsibility for transport, roads, travel and public spaces since 2014. He is also president of the European Cyclists Federation, which brings together all national cycling associations at the European level.

PARIS

🛴

SHARED ELECTRIC SCOOTERS

__Number of operators__

12
(as of June 2019)

__Number of devices in the public space__

15,000

> "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 (France), with responsibility for transport, roads, travel and public spaces

Jeremy Yap
held the position of Deputy Chief Executive, Public Transport, Policy and Planning at Singapore's Land Transport Authority (LTA) since 2015. He has also served as Deputy Director for the land transport at the Ministry of Transport, Singapore. He is currently the Committee Chair of Organising Authorities for the Brussels-based UITP (International Association of Public Transport).

SINGAPORE

🛴🚲

SHARED ELECTRIC SCOOTERS AND BIKES

__Number of operators of electric scooters__

LTA will award licences by 3Q2019

__Number of operators of electric bikes__

6 for 39,500 devices in total

> "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, Policy and Planning, Land Transport Authority (LTA), Singapore

Singapore

_____*Singapore's* 🇸🇬 *Active Mobility Act (AMA),* in force since 1 May 2018, is designed to ensure the PMD ecosystem develops in a safe and sustainable

manner. 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 licences.

_____*Evaluation 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.

_____*Working to establish the right balance* between keeping the pavements safe for all users and facilitating micromobility is key for the LTA. Riding PMDs on pavements is permitted, subject to certain conditions, like a cap on the motorised device speed and mandatory registration for both shared and even privately-owned electric scooters. This makes these devices easier to identify, which in turn helps in reporting and regulating them, as well as keeping everyone safe.

_____*Educating the public,* especially children and young people in order to teach good riding behaviour early on, is another priority. Our active mobility team at the LTA does a good job here by communicating on social media and via other channels.

_____*The LTA* believes building up a code of conduct over time to establish social norms will enable, encourage and facilitate micromobility. We need micromobility to expand the options because traditional scheduled mobility can be costly and PMDs grow options for first/last mile trips ●

Read the full testimonies on:
pulse-mag.com

OFF TO WORK WE GO

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.

◇

by Caroline Mouy
Illustration: Lionel Serre

E nvironmental imperatives and growing urban congestion have driven the emergence of mobility management tools, especially in **Europe** 🇪🇺 and the **United States** 🇺🇸, along with the development of company mobility plans. The goal is to reduce single occupancy car use by encouraging shared mobility like public transport and ride sharing as well as walking, cycling and other forms of soft mobility.

The rise of mobility planning

One of the first to implement a mobility plan was **London Stansted Airport** 🇬🇧, 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** 🇧🇪. 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 to the 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** 🇮🇹, for example, companies with more than 300 employees must appoint a mobility manager. In January 2018 in **France** 🇫🇷, the law on energy transition for greener 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.

Multiple benefits for companies

All these efforts to foster shared mobility are taking place amid a growing conversation 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[3] 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.

Furthermore, a study by the **Laboratoire de la Mobilité Inclusive**[4] revealed that 41% of employers in France have experienced difficulties in filling vacancies due to mobility issues and that 59% have had successful candidates turn down job offers for the same reason.

Beyond the physical forms of transport

Despite the many benefits of a mobility plan, figures and feedback shows there's still a lot of resistance to change. In France, for example, only 8% of firms required to implement a mobility plan had complied with the regulation by January 2019[5].

One key to success is to think beyond simply the physical forms of transport. "The exercise begins by asking what task or activity gives rise to the journey in the first place. Then, and only then, you start searching for mobility solutions," says Jean-Luc Hannequin, who jointly manages the **Booster de Mobilité Augmentée** platform, which helps organisations in the mobility transformation[6].

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 assign the right people on the basis of skills needs, qualifications and where they live." Showcasing the benefits of mobility plans is doubtless essential in convincing more companies to develop them. ●

"IN LYON, WE ARE SPEEDING UP INNOVATION IN ALL ITS FORMS."

◇

by Ingrid Labuzan
Photos: Didier Bizet
and Namla Gonzague

FOUZIYA BOUZERDA

President of Greater Lyon's public transport authority SYTRAL and second Vice President of the City of Lyon 🇫🇷

After postgraduate degrees in law and criminal science, Fouziya Bouzerda was admitted to the bar in Lyon in 1997 and set up her own law firm in 2002.
Actively involved in local politics, she was elected as a city councillor in 2008. Bouzerda has 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 with responsibility for the economy and integration since 2017.
In 2017, she was also appointed President of SYTRAL, the public authority that oversees France's second-largest transport network.

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 net-

≫→

work to a sharp increase in ridership. **Network use rose by more than 5% in 2018 and again in first-quarter 2019, versus an average of 2% growth in previous years.** We must now rise to the challenge created by our own success.

Mobility, one of Lyon's key assets

____ *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 1% 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.

____ *The Rhône department as a whole* is also seeing dynamic development. There's a large student population, with several universities and business and engineering schools. These young people are the first to adopt new practices, and they want flexibility, technology and connectivity. **We're innovating in all these areas, by extending the metro network's operating hours at weekends, and installing 4G in tunnels and stations.**

____ *Development* has been rapid in various parts of the Greater Lyon area. We now need to more effectively connect these neighbourhoods to our network to ensure overall cohesion.

____ *The many and varied challenges* we face are pushing us to speed up innovation in all its forms to ensure a seamless and inclusive mobility experience for everyone. **Our top priority for the network is accessibility in the broadest sense.**

____ *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 outlying neighbourhoods, we've started 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 funicular car stations are accessible to people with limited mobility.** We also aim to make the network more accessible in terms of pricing. A quarter of our travel pass holders now benefit from reduced fares for low-income earners. 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 also looking* 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 ➾➾➾ ▶

The SYTRAL network covers the entire Rhône department:

278 towns.

2,700 square kilometres (over 1,000 sq mi).

1.8 million people.

500 M journeys per year.

Over **45 M** kilometres (28 million mi) travelled each year by bus or trolleybus.

Lyon's network (TCL) at a glance

4 metro lines.

2 funicular lines.

6 tram lines.

Over **120** bus and trolleybus lines, with more than 3,000 stops.

3 autonomous shuttles.

75% of journeys on the network are made thanks to electric energy.

5% increase in ridership in 2018 and first-quarter 2019.

France's **2nd** biggest public transport network by number of journeys.

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:

CapaTram (2015-20)

which is designed to meet growing demand on the tram network. Close to €60 million has been invested to increase capacity on lines T1 and T2 by 15% and line T4 by 30%.

Avenir Métro (2017-23)

to upgrade the metro network and increase its capacity. A total of €430 million will be invested overall, notably to acquire 30 new-generation trains, and line B will be fully automated by 2020.

Atoubus (since 2011)

In the near term, in response to the significant increase in ridership already observed, SYTRAL is taking unprecedented measures to strengthen its network, with a budget allocation of more than €6 million.

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 alight 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 Pulse No. 3).* 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.

Sustainable mobility

____ 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 50 new natural gas-powered vehicles, electric buses and next-generation (IMC) 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 trialling 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 Groupama Stadium.

A close, transparent partnership

____ *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.** ●

Accessibility

30%
of the people who use the TCL network have accessibility needs (people with disabilities, the sick, elderly or injured, pregnant women, families with pushchairs, passengers with luggage, etc.).

All metro stations
are accessible except one, because of its layout. They're also equipped with talking lifts and tactile buttons with braille signage.

7 out of **10**
bus stops are accessible to people with limited mobility.

812
strategic bus stops will be made accessible by 2022.

The network's rolling stock is **100%** accessible (buses, metros, trams).

Lyon
won the European Commission's Access City Award in 2018.

Sustainable development

A total of
€1.2 billion
will be invested between 2015 and 2020 to expand the network and increase capacity.

More than
€200 million
spent on environmentally-friendly buses.

Lyon will have
the largest number of park-and-ride spaces
in France.

75%
of journeys are made on electric vehicles (fully electric trolleybus, metro or tram), and public transport as a whole generates less than **3%** of total air pollution.

The future solar power plant, will feature **10,000** square metres (2.5 acres) of solar panels.

Tick'Air
tickets is sold during periods of peak pollution to encourage residents to leave their cars at home and take public transport.

SMART DATA
ON THE MOVE!

◇

by Julien Thèves

Data, data, everywhere! Big data and the algorithms doing all the intensive data crunching are transforming whole areas of our daily lives — and transport is no exception. At a time when technologies are evolving faster than ever, we look at what could be achieved through cleverer use of information.

Captured 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 file[1]. 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: 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 passenger behaviour patterns. Provided by telecom companies, these data trails tell us about the movements of anyone carrying a device, derived from the relay antennas 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** solutions[2], 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 realising 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 state's public transport service is up there with the world's best, and only 20% of people own a private car. In **Bordeaux,** France, latest-generation on-demand transport is gaining real traction, 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 **Qucit** 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 vacating 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, codirector 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, citizens 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 CITIES 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 freer 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, efficiency 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 ferment 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. ●

_____
(1) Source: International Data Corporation
(2) Payment at the end of the month, based on actual use.

NUDGING AHEAD

The transport and mobility sector is increasingly turning to subtler methods to drive affordable, sustainable and transformative behavioural change.

by Marie-Noëlle Bauer

Floating zebra crossings: *London, UK* 🇬🇧

Pedestrian crossings resembling 3D optical illusions are designed to invite motorists to slow down and make pedestrians feel as if they are walking on air. They were introduced to India 🇮🇳 France 🇫🇷 China 🇨🇳 Iceland 🇮🇸 and the UK 🇬🇧

It is the commuter's classic pet peeve: you are in a rush to make it to that all important meeting on the other side of town, and you speed into the underground station only to find that the platform to your train is a picture of chaos — a crush of people everywhere.

Deflated, you reluctantly decide to wait it out and try to fight your way onto a train even though you know that this journey is shaping up to be a disaster, and there is little chance you are going to make your meeting on time. As you jostle for some space, you cannot help thinking: there must be a better way.

And there is. In Singapore 🇸🇬 they've been tackling this exact scenario by installing a traffic light system at their Mass Rapid Transit stations informing commuters of crowding levels on train platforms and recommending whether or not to wait for the next train or find

Flies on the urinal: *Amsterdam, The Netherlands* 🇳🇱

In what is considered one of the first and most emblematic nudges, the cleaning manager at Schiphol airport is said to have etched photorealistic images of flies on urinals to try and reduce spillage. He subsequently claimed an 80% reduction in mess and 8% reduction in cleaning costs. Flies have since become a staple in urinals internationally.

an alternative mode of transport. A traffic light system tells commuters that they can board the next train with a green light, that a probable wait of two trains will be necessary with an orange light, and that the platform is very crowded and a prolonged wait is expected with a red light. Disruption or delays to train services at the station are signalled with a flashing red light[1]. After a trial of these lights at Ang Mo Kio station, a survey found that 80% of commuters were aware of the system and thought it should be introduced in stations experiencing higher passenger volumes, which it duly was.

This ingenious traffic light system is just one example of how densely populated Singapore 🇸🇬 has thrived over the past 50 years in part thanks to its policymakers enthusiastically embracing nudge theory[2]. **The notion that you could nudge individuals into modifying their behaviour is of course highly appealing to public policymakers** at a time when our urban public spaces and transport systems are becoming increasingly saturated.

But what exactly is a nudge? In their ground-breaking 2008 book on the subject, Richard H. Thaler and co-author Cass Sunstein defined it as

'any aspect of the choice architecture that alters people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives'[3]. There is an ever-growing list of nudging techniques including 'setting default rules, framing, social proof, simplifying procedures, increasing the ease and convenience of desired behaviour, use of alerts, disclosures and reminders, inverting social norms, eliciting implementation intentions or soliciting pre-commitments'[4]. **Nudges are not orders: they subtly make it easier to do the right thing.** And these nuggets of information differ from signage in that they do not merely spell out what the right behaviour is, but instead spur you into action to take it.

Signs, however, can be successfully 'nudgified', as demonstrated in Nairobi, Kenya 🇰🇪. This African capital holds the record for the world's second worst traffic, with road accident fatalities often involving its *matatu* buses. To counter this, a charity called Zusha! ('Speak up!' in Swahili) has placed small informational stickers on the inside of 12,000 *matatus*.

≫ ▶

---

(1) 'Traffic lights at 10 more MRT stations', *The Straits Times*, by David Ee, 23 August 2014.

(2) 'The Nation that thrived by nudging its population', bbc.com, by Sarah Keating, 20 February 2018.

(3) 'Nudge: Improving decisions about health, wealth and happiness', by Richard H. Thaler and Cass Sunstein.

(4) 'Small is beautiful: using gentle nudges to change organizations', forbes.com, by Carsten Thams, 22 February 2018.

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[5].

Though 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.**

Instead, he posited that our everyday actions were regimented 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 disactivated in order to get individuals to behave responsibly and lessen negative impacts on society at large.

A 2018 study in France illustrates how modifying the decision-making environment via nudges subtly encourages passengers to adopt good behaviours, without overt coercion. Despite awareness-raising campaigns and it being a legal

(5) 'The unlikely masters of nudge theory our transit systems must watch', danji.se, 4 March 2019.

[2]

Clean up your act: *France* 🇫🇷
The 'Poubellator' rubbish bins disguised as monsters to engage children was just one of several nudges developed by Ouigo, the TGV's low-cost train line which contributed to a 14% decline in serious uncleanliness on trains.

POUBELLATOR
J'adore vos déchets
ouigo

Fasten your seat belts: *France* 🇫🇷
Despite awareness-raising campaigns and it being a legal requirement, getting teenagers to wear their seat belts is quite a challenge. Keolis trialled five nudges in its buses, boosting the seat-belt wearing rate by 2.4. It is now rolling out a fleet of over 20 'nudged buses'.

Don't ignore the tram: *Bordeaux, France* 🇫🇷
Tramways have become such an integrated part of our urban landscape that pedestrians, cyclists and drivers often forget that they're there, leading to collisions and casualties. To counteract this, Keolis is currently testing innovative, attention-grabbing nudges such as 'The Red Carpet' which projects an illuminated red danger zone in front of the tram.

Fake policemen: *Bangalore, India* 🇮🇳
In 2013, authorities had to get creative in their efforts to check traffic violations, after there was a shortage of at least 500 policemen in a city with over 4.2 million vehicles on its roads. The life-like cardboard police officers they placed at strategic spots on the road network were so successful that the idea was replicated in China, the US and the UK.

requirement since 2003, getting teenagers to wear their seat belts in the school bus is quite a challenge. Keolis trialled five nudges in its school buses in the Isère and Auvergne-Rhône-Alpes 🇫🇷 French regions to get more seat belts fastened. The nudges included the introduction of the 'Malassis' — which translates as the 'Sitting Awkwardly' — a foam sheath covering the seat belt which makes sitting on the seat uncomfortable unless the seat belt is attached. All five of the nudges were tested in combinations of two and three at a time and all of the trials proved successful in inciting teenagers to buckle up. **What's more, the nudge effect is sustainable, as was confirmed by the testers** who took the same bus a week prior to the introduction of the nudges and in the week that followed. On average, nudges boosted the seat belt wearing rate by 2.4[6]. Following this positive experiment — underscoring how efficient this innovative, yet easy to set up method can be — Keolis is preparing to roll out a fleet of over 20 'nudged' buses[7].

Nudges have also proven that they can be cost-effective while having serious pay-offs. In a memorable passage of *Nudge*, Thaler and Sunstein talk about one of the most notoriously dangerous curves in the United States 🇺🇸: the tight turn at Chicago's Lake Shore Drive and Oak Street. There was, however, a cheap

fix: in September 2006 the city painted a series of increasingly narrowing white lines perpendicular to travelling cars, giving drivers the illusion that they were speeding up and should put on the brakes. According to traffic engineers, there were 36% fewer crashes in the six months after the introduction of the lines than in the six months preceding it, a far better result than all the traditional safety measures used by policymakers until then. And this life-saving nudge cost virtually nothing[8].

The popularity of nudges inevitably means that we are also seeing the rise of dark nudges. And the transport sector has not been spared, with *The New York Times* famously publishing a 2017 exposé of how Uber used 'videogame techniques, graphics and non-cash rewards to prod drivers into working longer and harder', for the company's gain[9]. **Despite this, the art of gentle persuasion has a bright future ahead when it comes to public transport policies.** Indeed, the humble nudge is set to play a major role in the upcoming Paris Olympics, with the city adopting eight nudge-inspired initiatives as part of its 2024 Nudge Challenge organised by NudgeFrance[10]. Among them: having coloured footprints on the floor of metro stations guiding people towards the stairs rather than cramming into lifts. ●

(6) 'Déclencher le clic dans les cars scolaires, l'effet positif des nudges', fondation-maif.fr.

(7) 'Cas Keolis nudge prévention BVA Nudge Unit', by Étienne Bressoud et al., *Guide de L'économie comportementale 2018*.

(8) Nudge: improving decisions about health, wealth and happiness, by Richard H. Thaler and Cass Sunstein.

(9) 'How Uber uses psychological tricks to push its drivers buttons', nytimes.com, by Noam Scheiber, 2 April, 2017.

(10) *Horizon Public*, 2 November 2018.

THE NUDGE-LEDGE
Q&A WITH
ÉTIENNE BRESSOUD,
Managing Director of the BVA Nudge Unit

WHAT MAKES A NUDGE ETHICAL? Richard H. Thaler and Cass Sunstein both say that one principle — transparency — is a must: can I explain my nudge transparently to the people I am applying it to? A nudge is like using a GPS — you're going to get to your destination 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 sludge is a kind of friction, high or low, that people face when they want to take one direction, or the other. If it is often

associated with 'nudge for bad', it's actually not the same thing. You can 'sludge' for good, adding friction to help people achieve their goals. As Cass Sunstein, co-author of 'Nudge' wrote: "It should be clear that nudges can be for good or bad; also that sludges can be for good or bad". On the BVA Nudge Unit blog there is an article on nudges, dark nudges, and sludges that provides criteria for defining whether a nudge is for good or for bad. For example, it asks: 'is this in the interest of the person, against their interest, or solely in the interest of the brand producing the nudge?'.

LOOKING TO THE FUTURE, IS ARTIFICIAL INTELLIGENCE COMPATIBLE WITH NUDGES AND WILL IT EVENTUALLY BE USED TO BOLSTER THEM? That's a big question. AI can definitely complement nudging since both are decision oriented. But in my view, human intelligence will still have to complement AI since many tasks require human sensitivity.

WHAT UPCOMING NUDGE-RELATED PROJECTS ARE YOU MOST EXCITED ABOUT? The really interesting projects are focused on work and living environments. We are currently working on several 'nudge' buildings, for housing and offices, to encourage sustainable and sociable behaviour — both inside them and out.

SO DOWN THE LINE THERE MIGHT EVEN BE 'NUDGE CITIES'? Yes, that is entirely possible! Nudges are already in our cities. We can integrate them systematically instead of one by one.

GOING UNDERGROUND WITH TfL

LONDON

'This train is now ready to depart, please stand clear of the doors. Mind the closing doors.' This announcement is made countless times every day on London Underground (LU), commonly known as the Tube, and is familiar to the ears of millions of Londoners and visitors as they make their way across the British capital. But before accessing the trains, the passenger journey typically involves a trip underground by escalator, or lift. *Pulse* went underground with Public Transport Authority Transport for London (TfL) to find out how this vital equipment is kept safe and efficient.

by Lesley Brown
Photos: Linda Scuizzato

O pened 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 402km. 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 50m 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.

Open thinking, confined space

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 maintenance teams may have to work within a tight box but they have to think outside it, too. Access is complicated not only by the limited space available in the narrow 19th-century shafts but also by the drainage, electricity and fire sprinkler networks which crosscut the escalator and lift shafts.

Beyond access issues, the considerable size and weight of the escalators and lifts can present challenges, too. By way of example, a typical heavy-duty escalator weighs 40 tonnes and a

heavy-duty lift 5 tonnes. The deepest lift shaft — 58m — is at Hampstead, while the longest escalator at 60m, with a vertical rise of 27.5m, is housed within Angel station.

However, for passenger safety reasons, activities like cutting and welding, and larger equipment deliveries can only go on when the station is closed to minimise risks to the public.

To open or close: that is the question

As far as possible, during renovation and upgrading operations, station closures are avoided, and work goes on out of public sight behind hoardings, day and night. "Because we work behind hoardings, we're not really constrained by working access, says Dan Marsh.

Traditionally, when escalators are completely removed, the station in question would normally close, or service to a particular line would shut. However, this was not an option for the replacement of the three escalators at Wood Green station, on the Piccadilly line, as TfL looked to change its delivery model to improve passenger access. Instead, TfL broke with tradi-

tion and decided to keep the existing equipment running while installing the new machines one by one, and retaining the existing escalator frame — or truss as they are known.

This task involves a team of five skilled escalator installers to deliver the main works assisted by a support team of ten designers and construction supervisors. Interface contractors such as tilers, painters and builders are deployed during the day, whilst others — such as electricians, fire detection and suppression technicians and mechanical vent experts —

work the night shift.

Work at Wood Green began in October 2017 with a 12-month design and manufacture period. Installation of the first new escalator began in November 2018; the third and final escalator will be in place by March 2020.

Keeping the station up and running during a replacement project means the works can take longer, sometimes running from months into periods of over a year depending on the number of assets. Yet crucially these projects allow TfL to avoid interrupting services. There are other benefits too, including

requiring significantly less works and lower overall costs. Looking to the future, the newly installed escalators are modular and no longer bespoke, making them much easier to refurbish and replace deep underground in tight and difficult-to-access spaces.

Resources and planning – inside and out

To maintain and modernize TfL uses in-house maintenance and project

staff as well as external contractors. "If external staff underperform or if their company goes bust, we will always have in-house staff in case of a Doomsday scenario," explains Marsh.

"The mix of internal and external delivery allows for retention of specialist knowledge, development and utilisation of global best practices and the flexibility to change delivery to better meet business and customer needs. It also allows for good value and performance benchmarking to inform business strat-

egy," Marsh adds.

On a typical project, up to seven people usually work on the installation per shift, with two shifts a day overall, five or six days a week. "Planning of the works mean that we only do what is required, when it is required," says Marsh. "Coordination with the broader access and planning teams enable us to have visibility of other LU project works, closures or access opportunities."

He adds: "Working weekends and extended shifts as well as smart shift

patterns with good coordination of contractors' access are also essential for smooth project management."

Future forward

The escalators and lifts on the Tube are in increasing demand. TfL is continuing to modernise the Underground to provide faster and more reliable journeys. For example, state-of-the-art signaling on the Circle, District, Hammersmith & City and Metropolitan lines will sig-

nificantly increase capacity at peak times, and new trains will serve the Piccadilly line from 2024 as part of the Deep Tube Upgrade Programme. In addition, TfL is continuing to invest in improvements to make the Tube more accessible for Londoners and visitors to the city. There are currently 78 step-free Tube stations on the network and, as part of record investment, 34 per cent of Underground stations will become step-free by 2020. ●

A train inspired by a kingfisher's bill? An inter-vehicle communication system which can imitate shoals of fish? What if nature holds the secret to smarter cities using more efficient and sustainable mobility? Scientists, engineers and architects working in the field of biomimicry – literally 'imitation of the living' – believe nature can be emulated and harnessed to enhance man-made materials, structures and systems.

COULD NATURE HELP US BUILD MORE EFFICIENT TRANSPORTATION?

Biomimicry has long accompanied the development of complex technologies. From Leonardo da Vinci, whose study of birds directly influenced his sketches of 'flying machines', 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 lasts," said Megan Schuknecht, Director of Design Challenges at the Biomimicry Institute in Montana in the United States. "By looking to all that experience that nature has accumulated, 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, urbanisation and the transition to greener energies present both challenges and opportunities in sectors like mobility.

___Natural ecosystems are superlatively efficient and nature-inspired solutions have already proven fruitful. One of the most emblematic examples is Japan's Shinkansen Bullet Train 🇯🇵 and its distinctive long nose. Engineer Eiji Nakatsu, a keen birdwatcher, employed observations

(1)

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

(2)

printing system which smartly mimics a bees' 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.

Megan Schuknecht is Director of Design Challenges at the Biomimicry Institute in Montana in the United States. She began her career in the sustainability space as a Program Specialist for the National Center for Appropriate Technology before moving to the Biomimicry Institute, where she has now been working for 12 years. In her current role, Schuknecht focuses on getting biomimicry concepts into design pipelines, a job that combines her passions for nature, education and entrepreneurship. Schuknecht holds a Bachelor of Biology from Grinnell College and a Master of Environmental Studies from the University of Montana.

___Elsewhere students from California State University 🇺🇸, as part of the Biomimicry Student Design Challenge, worked on integrating biomimicry into sustainable solutions for transport. They came up with a creative idea which includes an imitation of cat's whiskers made with flexible fluorescent bands and

(3)

stripes to attach to bicycles to increase visibility and safety for both bike riders and car drivers. Just like cats use their whiskers to get about, analyse environment and sense potential dangers, the so-called VibraSee(3), which refers to the stiff vibration transmitting hair located on the

muzzle of most mammals is a mountable bike accessory allowing cyclists to define lane boundaries, signal turns, and discourage cars from overtaking too close.

___Biomimicry is a fast-growing discipline and holds real potential for future innovation too. Pioneers in this field are already experimenting with replicating the way shoals of fish communicate with one another to move through the water efficiently and avoid collision. Applied to
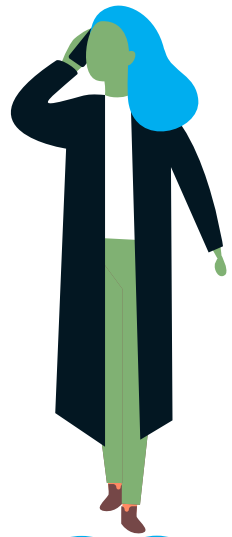
intelligent vehicles with onboard detection and communication systems, these principles could underpin tomorrow's synchronised driving behaviour via inter-vehicle communication, allowing for safer, cleaner and less congested travel. "There is a lot of potential there," says Megan Schuknecht. "If we can emulate this sort of fine-tuned signal and response that's happening in nature, generally it's going to mean more efficiency for our systems."

___Beyond mobility, biomimicry is helping reinvent energy production and conversation. Scientists at West Chester University in the US

have experimented with transposing the scalloped edge of the fin of a humpback whale, called a 'tubercle', onto wind turbine technology to increase efficiency and reduce drag. Similarly, 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 electrode that could boost the storage capacity 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 Meltzger

KEOSCOPIE INTERNATIONAL

GLOBAL MOBILITY INSIGHTS

From Montreal 🇨🇦 to Brisbane 🇦🇺, Paris 🇫🇷 to Doha 🇶🇦, London 🇬🇧 to Beijing 🇨🇳 — 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 study produced by the Keoscopie observatory, provides insights into mobility worldwide with some surprising findings.

1/4
One in four people have used voice guidance to find information. People in India 🇮🇳 talk to their phones the most (55% of respondents in Delhi). Voice assistance is most popular with public transport users, with 30% using it, compared to one in four people overall.

89%
of respondents have a smartphone. The figure is 98% in China 🇨🇳, but just 79% in Montreal 🇨🇦 and Rotterdam 🇳🇱

60%
of respondents want the option of human assistance when making transactions on the internet. It is only the case for 64% of public transport users.

So, the solutions we offer need to be 'phygital' — combining physical and digital.

70%
of smartphone owners use a travel or map app at least once a month. Features used on a weekly basis include maps (61%), journey planners (53%) and next departure times (46%).

Apps with these functions have an advantage since they're really useful for knowing whether or not you have to run for your bus!

59%
of respondents said they prefer walking to public transport. This is true in almost all cities, except Los Angeles 🇺🇸, where the car is the favourite (53%), and Amsterdam 🇳🇱, where bicycles are the preferred option (59%). However, only one in four people said they're satisfied with the infrastructure in place for pedestrians.

This means designing services that fit with walking, paying attention to the planning and layout of pavements and providing information for pedestrians.

37%
of public transport users almost always rely on another form of transport to reach the network. The numbers are even higher in Perth, Brisbane 🇦🇺, Manchester 🇬🇧 (55%) and Lyon 🇫🇷 (51%).

As they seek to meet people's requirements, transport networks need to offer a variety of services, where different modes can be readily combined.

42%
of respondents said they sometimes work Sundays, especially in New Orleans 🇺🇸 (56%) and Wuhan 🇨🇳 (54%). 36% often and/or occasionally work at night, especially in Delhi and Hyderabad 🇮🇳 (68%). 26% work from home at least once a week, especially in Mumbai (43%), Delhi 🇮🇳 (42%) and Boston 🇺🇸 (39%).

As working habits change, so do peak travel periods. On Sundays and at night, transport services need to take account of these flexible working hours.

44%
said they travel at least once a week to go shopping, especially in Australia 🇦🇺 (62%). 22% travel at least once a week **to visit family,** notably in Bergen, Norway 🇳🇴 (32%). 17% **travel to participate in a sport or cultural activity,** especially in Paris 🇫🇷 (40%). And 46% travel at least once a week **simply to go for a walk** in the city or a park, especially in Oslo 🇳🇴 (60%). Work-related journeys are only part of the picture.

Network routes and timetables need to take account of the many reasons for travel.

2/3
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 🇮🇳 (88%) and Los Angeles 🇺🇸 (78%). And almost two in three people use different means of transport on their outward and return trips in a given day, at least occasionally, especially in Chinese cities 🇨🇳 (80%) and Los Angeles 🇺🇸 (87%).

When we travel, we like to have a choice. As they seek to meet people's requirements, transport networks need to offer a variety of services, where different modes can be readily combined.

1/2
One in two people said the days of the week when they work or study change often or occasionally. In the United States 🇺🇸, 26% of people said their work schedules change.

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

38%
of respondents are already using new mobility solutions at least once a month. Uptake is even higher in the United States 🇺🇸 (47%), Argentina 🇦🇷 (57%) and China 🇨🇳 (77%). 65% said they're 'potential users' of new mobility solutions (90% in China). In US cities like Boston, Los Angeles and New Orleans 🇺🇸 over one-third of respondents regularly car share, while 50% said they use a private hire vehicle at least once a week. Electric bicycles, ride sharing, self-service scooters — these solutions conveniently complement public transport services, which are nonetheless used by 64% of respondents at least once a month.

All should be seen as options!

+90%
In Scandinavian cities like Stockholm 🇸🇪, Oslo 🇳🇴 and Copenhagen 🇩🇰, over 90% of people use buses. Trams and metros are also popular, with around 60% and 65% of people using them, respectively.

Conversely, new forms of mobility such as carsharing and private hire vehicles are much less widespread, with under a third of people making use of them.

1/3
In American 🇺🇸 cities like Boston, Los Angeles and New Orleans, over a third of respondents say they car share. In the land of the automobile, 50% of respondents say they car 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 buses and metros are also popular, used by almost 50% of respondents in locations where they operate.

3
types of improvements top the list as ways to facilitate mobility:
- More frequent public transport services, especially evenings and weekends (45% of respondents).
- Higher standards of comfort on public transport (seats, air conditioning, etc.) : 40%.
- Improved infrastructure for pedestrians (walkways, benches, lighting, signage, etc.) : 43%.

83%
of respondents said they think technologies make mobility simpler: Thanks to technologies people can select the right transport mode at the right time, mix transport modes, travel faster and more comfortably.

This is especially true for transport users — 87%.

DIGITAL ADOPTION IS QUALITATIVELY STILL VERY VARIED:

32%
of respondents are 'digimobiles': smartphone owners who are hyperconnected, fully at ease with digital technologies and enthusiastic about them in general.

27%
are 'followers': people who are at ease with many of the apps and functions on their devices and believe digital technologies positively contribute to their lives.

21%
are 'web-focused': these people have a smartphone, use it for entertainment only (social media, games, music, etc.) but also readily use other types of devices.

20%
are 'offline': people who own a mobile phone or smartphone but only use it to communicate (make phone calls, send texts) and potentially take pictures. Not really at ease with technology in general.

52%
of 'digimobiles' nonetheless have concerns about an all-digital world.

Set up in 2007, the Keoscopie observatory looks beyond the conventional statistics to uncover the deeper mobility trends 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 6,000 public transport users and non-users were analysed, along with how new technologies are impacting them, based on a 20-minute online questionnaire compiled with the Ipsos institute. Keolis uses these insights to expand and tailor its range of mobility solutions for transport authorities and passengers.

Learn more on:
keoscopie.keolis.com

BODA BODA STYLE

by Robert Jack
Photos: Jan Hoek

Meet Mad Max Driver, Machete, Vibz Kartel, 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.

GHOST RIDER

"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."

MACHETE

"This driver had a bike inspired by Machete, the action film from cult director Robert Rodriguez.
When we talked to him about his costume, we soon decided that a Machete-like weapon should be involved. The first 'gun helmet' was made by a prop maker from Nairobi, but it was too realistic — we feared that would get him arrested! So we asked metal artist Meshak Orio to make a new gun that looks more surreal."

RED DEVIL

"Like his fellow drivers The Rasta Rider, Lion Rider and Vibze Kartel Rider, Red Devil is from Ngong, a town located south west of Nairobi. His favourite football team is Manchester United, nicknamed 'the Red Devils' so Bobbin made a football-themed outfit, but one that is not too cold to ride in!"

VYBZ KARTEL RIDER

"This rider's favourite reggae artist is Vybz Kartel. Since his idol was imprisoned at the time of the photoshoot, Vybz Kartel Rider wanted an outfit inspired by jail — so small 'prison' bars have been added to his helmet."

MAD MAX RIDER

"This driver from Kiberia is a fan of Mad Max, and that was the inspiration for his bike. Now he has an outfit to match from Bobbin Case, so he can drive around as if he were a character from the post-apocalyptic action films."

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 paper-work 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]

(1) Source: Standard Media.

THE RASTA RIDER

"If you are The Rasta Rider, what's more tragic than having to conceal your beautiful dreadlocks underneath your motorcycle helmet? That's why we made a special helmet for him with two holes so that his dreads can wave in the wind as he gives his customers a real rasta ride experience."

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."

~ SPECIAL THANKS ~

The editorial team would like to thank all contributors to this fourth edition of *Pulse*, and in particular:

-A-

Romain Albera
Head of Customer Insight & Big Data, Keolis

-B-

Eva Blanco Fernández
Coordinator, Pontevedra City Hall

Fouziya Bourzerda
President of Greater Lyon's public transport authority SYTRAL and second Vice President of the City of Lyon

Étienne Bressoud
Managing Director of BVA Nudge Unit

-C-

Vincent Cadoret
Chief Data Officer, Keolis

Bobbin Case
Fashion Designer

Éric Chareyron
CEO of Keoscopie Observatory of Mobility trends

-F-

Miguel Anxo Fernández Lores
Mayor of Pontevedra

-G-

Thierry Guinard
Group Safety Director, Keolis

-H-

Jean-Luc Hannequin
Copilot of the BMA platform
(Boost Augmented Mobility)

Jan Hoek
Photographer

-J-

Arnaud Julien
Digital, Data and Innovation Director, Keolis

-K-

Piia Karjalainen
Senior Manager, MaaS Alliance

-L-

Kara Livingston
Group Marketing Director, Keolis

François Lodde
Studies Manager, Keolis

-M-

Dan Marsh
Senior Project Manager, Transport for London

Élodie Mijieux
Communication and Media relations, Keolis Lyon

-N-

Christophe Najdovski
Deputy Mayor of Paris, with responsibility for transport, roads, travel and public spaces

Sarah Norman
Head of press Desk, Transport for London

-P-

Antón Prieto
Communication and Protocole Officer, Pontevedra City Hall

-R-

Nancy Rider
Senior Press Officer at TfL

-S-

Emmanuel Samaniego
Chief of staff to Christophe Najdovski

Megan Schuknecht
Director of Design Challenges, Biomimicry Institute, Montana, USA

-V-

Marie-France Vayssières
Intermodality and Alternative mobility solutions Director, Keolis

-Y-

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

-PULSE-